2 ALTERNATIVES

2.1 Introduction

This chapter describes the Shared Passenger Track Alternatives and the No Project Alternative that the California High-Speed Rail Authority (Authority) is considering in this Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS). The chapter addresses the following topics:

- The background and development of the California High-Speed Rail (HSR) System and the Los Angeles to Anaheim Project Section (project section)
- A general description of HSR system infrastructure
- Potential alternatives considered during the alternatives screening process and not carried forward for full evaluation in this Draft EIR/EIS
- The No Action (No Project) Alternative and the Los Angeles to Anaheim (project) alternatives
- Travel demand and ridership forecasts
- Operations and service plan
- Construction plan
- Permits and approvals required

More detailed information on characteristics of the project is provided in the following appendices:

- 1-A, Changes in Project Benefits and Impacts
- 2-A, Impact Avoidance and Minimization Features
- 2-B, Applicable Design Standards
- 2-C, Buena Park Metrolink Station Relocation and Commerce Metrolink Station Relocation Analysis
- 2-D, Station Access Methodology Report[1]
- 2-E, Operations and Service Plan

The project alternatives discussed in this chapter are consistent with and build from the train technology, alignment corridor, and station locations selected by the Authority and the Federal Railroad Administration (FRA) at the conclusion of the Tier 1 EIR/EIS processes for the HSR system (refer to Section 1.1.2, The Decision to Develop a Statewide High-Speed Rail System). The alternatives are the result of the Authority's consideration of an extensive array of potential alternatives and sub-alternatives, all with the benefit of extensive public, stakeholder, and agency input. The design drawings that support the descriptions of Shared Passenger Track Alternative A and Shared Passenger Track Alternative B are provided in Volumes 3.1 through 3.6, Alignments and Other Plans, of this Draft EIR/EIS. Figure 2-20 illustrates the alternatives considered in this Draft EIR/EIS. These alternatives are designed to a preliminary level of engineering sufficient to identify and analyze potential environmental impacts. Shared Passenger Track Alternative A is the California Environmental Quality Act (CEQA)-proposed project pursuant to State CEQA Guidelines Section 15124 and the Preferred Alternative under the National Environmental Policy Act (NEPA).

The Authority sought to identify reasonable and feasible project alternatives that would meet the purpose and need for the project (Chapter 1, Purpose, Need, and Objectives). Through the alternative development process, the Authority identified those alternatives where environmental

[1] This memorandum was produced on November 21, 2018, and presents references to older HSR guidelines and forecasts; however, the general methodology and stakeholder review process remains applicable.

constraints or engineering challenges would justify dropping alternatives from further analysis, while retaining those alternatives that would be expected to avoid or minimize impacts on environmental and community resources. The process also provided comparative information and data highlighting similarities and differences between alternatives by using applicable state and federal standards, environmental impact criteria, design criteria, and construction/operational factors.

The Authority worked with community and agency stakeholders to vet the conceptual alternatives and to gather information used in developing and comparing alternatives, as follows. The Authority and FRA initiated this project-level environmental review for the project section in 2007 by releasing the Notice of Preparation/Notice of Intent to inform the public of the beginning of the preparation of a Draft EIR/EIS for the project section.[2] They engaged in project scoping, completed a Preliminary Alternatives Analysis Report in 2009, and completed Supplemental Alternatives Analysis (SAA) Reports in 2010 and 2016. The 2016 SAA Report considered two alternatives: Alternative 1 (formerly called the Dedicated High-Speed Track Alternative) and Alternative 2 (formerly called the Consolidated Shared-Track Alternative). Because of higher capital costs and potentially greater adverse impacts on sensitive environmental resources, the Authority and FRA eliminated Alternative 1 from further consideration and advanced Alternative 2 (later refined as Alternative 2R in 2016 and then the HSR Project Alternative in 2018) for analysis in the project Draft EIR/EIS.

The Authority continued to refine the design and coordinate with stakeholders and determined that, to maintain existing passenger rail and freight operations, additional BNSF Railway (BNSF) and intermodal facilities would be needed in Lenwood and Colton. The Authority identified the 2018 HSR Project Alternative as the Preferred Alternative, which included new BNSF components in Lenwood and Colton, and rescoped the project in August 2020. Stakeholder feedback on the two BNSF project components following the 2020 revised scoping[3] raised substantial opposition to and concern for introducing a new intermodal facility far outside the project corridor. For these reasons, the Authority prepared another SAA (Authority 2023a) to remove these components, modify various project components, add design options, modify operations, and develop the Shared Passenger Track Alternatives to advance for further environmental analysis in the Draft EIR/EIS.

As of July 2019, the environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by the State of California pursuant to 23 U.S. Code 327 under a NEPA Assignment Memorandum of Understanding between FRA and the State of California. The FRA and the State of California renewed the 2019 Memorandum of Understanding on July 22, 2024.

2.2 Independent Utility

As discussed in Chapter 1, the Authority and FRA divided the HSR system they established with Tier 1 process into individual project sections for Tier 2 planning, environmental review, and decision making. The Authority, consistent with regulations issued by the Federal Highway Administration, considers three criteria when determining the scope of a project to be considered in an EIS: (1) whether it connects “logical termini” and has “sufficient length to address environmental matters on a broad scope”; (2) whether it has “independent utility or independent significance,” meaning that it will “be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made”; and (3) whether it will “restrict consideration of alternatives for other reasonably foreseeable transportation improvements” (23 Code of Federal Regulations Part 771.111(f)).[4] The Federal Highway Administration defines

[2] The Notice of Intent was issued in the *Federal Register* on March 15, 2007 (72 *Federal Register* 12,250).

[3] A Revised Notice of Intent was issued in the *Federal Register* on August 25, 2020 (85 *Federal Register* 52,406).

[4] While these regulations do not apply to this project because it was initiated prior to November 28, 2018 (the effective date of the regulations [23 Code of Federal Regulations Part 771.109(a)(4)]), these criteria were used to determine the scope of the project section.

logical termini as the rational starting and ending points for a transportation improvement project and for review of the environmental impacts of the project (FHWA 1993).[5] The project section connects logical termini at planned passenger stations where HSR service would be provided, at Los Angeles Union Station (LAUS) to the north and at Anaheim Regional Transportation Intermodal Center (ARTIC) to the south. If other sections of the HSR system are not completed, the infrastructure could be used by regional and intercity services to improve their capacity, reliability, and performance (Authority 2009).

2.3 Background

2.3.1 California High-Speed Rail System Background

The Authority, a state governing board formed in 1996, is responsible for planning, designing, building, and operating the California HSR System. Its statutory mandate 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. The California HSR System will provide intercity, high-speed service on more than 800 miles of tracks throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area, the southern Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. It will use state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, including contemporary safety, signaling, and automatic train control (ATC) systems, with trains capable of operating up to 220 miles per hour (mph).

The project section would be a critical link in the Phase 1 HSR system connecting San Francisco and the Bay Area to Los Angeles and Anaheim. The Authority and FRA relied on program EIR/EIS documents (refer to Section 1.1.2), specifically the *Final Program EIR/EIS for the Proposed California High-Speed Train System* (Statewide Program EIR/EIS) (Authority and FRA 2005), to select the Los Angeles – San Diego – San Luis Obispo Rail Corridor (LOSSAN Corridor) between Los Angeles and Anaheim for further study. Therefore, the development of alternatives for this project-level Draft EIR/EIS for the project section focused on alternative alignments along the LOSSAN Corridor.

Pursuant to the requirements of NEPA and CEQA, the Authority has conducted a public and agency involvement program as part of the environmental review process. The Authority has actively engaged local representatives, Native American tribes, public agencies, business interests, the public, and communities along the corridor in the development of the project section. This outreach began in 2007 with the Authority and FRA issuing a Notice of Intent and Notice of Preparation to begin a project-level environmental review of the project section.[6] Scoping meetings were held in 2007 to receive input on the scope of issues that should be analyzed in the Draft EIR/EIS. The Authority and FRA published a draft scoping report documenting the results of this process in September 2009. The Authority rescoped the project in 2020, with a revised Notice of Intent and Notice of Preparation released on August 25, 2020. The Authority and FRA held, and the Authority continues to hold, additional public meetings throughout the preparation of this Draft EIR/EIS in which public input was considered. Refer to Chapter 9, Public and Agency Involvement, for more information about those meetings. Specific

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[5] The Federal Highway Administration criteria for determining project scope, as established in 23 Code of Federal Regulations Part 771.111(f), do not specifically address the scope of individual projects considered in the second tier of a tiered NEPA process. With the tiered NEPA process, the same general principles apply, but they are applied in the context of the decisions made in Tier 1—in this case, the decision to build the HSR system as a whole. Therefore, in determining the scope of individual project sections for Tier 2 studies, the FRA and the Authority focused primarily on determining whether each project section could serve a useful transportation purpose on its own, and ensuring that a decision in one project section does not limit consideration of reasonable alternatives for completing the HSR system in an adjacent section for which the NEPA process has not yet been completed.

[6] The Notice of Intent was published in the *Federal Register* on March 15, 2007 (72 *Federal Register* 12,250). The Authority released the Notice of Preparation on March 12, 2007. Subsequently, the Authority released a revised Notice of Preparation/Notice of Intent on August 25, 2020, for a project definition that included the BNSF Lenwood and Colton Components, as discussed in Chapter 9.

efforts have also been made to engage minority and low-income populations throughout the Draft EIR/EIS process. Refer to Chapter 5, Community Analysis, for detailed information about those engagement efforts.

2.4 High-Speed Rail System Infrastructure

This section provides general information about the performance criteria, infrastructure components and systems, and function of the proposed statewide HSR system as a whole. Notable infrastructure differences between this project section and the proposed HSR system as a whole are described in this section as relevant. Detailed information on the Shared Passenger Track Alternatives, including alignment, station locations, and maintenance facility location, is provided in Section 2.6.2, High-Speed Rail Build Alternatives – Overview.

Blended System and Operations

The California High-Speed Rail Business Plans (https://hsr.ca.gov/about/business_plans/) suggest blending railroad systems and operations. These terms refer to integrating the planned high-speed rail system with existing intercity, commuter, regional, and freight rail systems through coordinated infrastructure (blended systems) and scheduling, ticketing, and other means (blended operations).

The Shared Passenger Track Alternatives are in a dense, urban environment primarily within an existing railroad corridor, and thus has certain infrastructure that differs from some other parts of the proposed HSR system. On most of the HSR system, HSR trains would operate on dedicated and fully grade-separated tracks. In this project section, HSR trains would share new and upgraded tracks with passenger and freight rail currently operating in the LOSSAN Corridor. This shared-track arrangement is known as a “blended system.” The Authority would build an additional mainline so that freight rail could operate on two of the passenger rail tracks. Two of the four mainline tracks would be electrified. Operational planning would support and optimize coordinated HSR, freight, and conventional passenger service. Currently, the Metrolink Orange County and 91/Perris Valley Lines, National Railroad Passenger Corporation (Amtrak) Pacific Surfliner and Southwest Chief, and BNSF and Union Pacific Railroad (UPRR) freight trains operate within the LOSSAN Corridor. Because the proposed Shared Passenger Track Alternatives are within the active LOSSAN passenger and freight rail corridor, existing operators may have to change their operational patterns.[7] New and realigned tracks would change the tracks on which the various users operate. Rail operators (HSR, Metrolink, Amtrak, BNSF, and UPRR) would coordinate train schedules and storage and maintenance needs to ensure efficiency and safety of the shared use of the corridor.

The Authority envisions the HSR system as a state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, which would employ the latest technology, safety, signaling, and ATC systems. However, in this project section, the Authority committed to meet the Positive Train Control (PTC) requirements and partner with current railroad operators and right-of-way owners to assess whether the system can be updated to include ATC or other traffic management solutions. The trains would be capable of operating at speeds of up to 220 mph, over fully grade-separated, dedicated track. In this project section, the HSR tracks would not be fully grade separated or solely dedicated to HSR trains, and the design would limit the maximum speed of HSR to 90 mph.

The infrastructure and systems of the HSR system are composed of trains (rolling stock), tracks, stations, train control, power systems, and maintenance facilities. The design of the HSR system includes a double-track rail system to accommodate planned project operational needs for high-capacity rail movement. Additionally, the HSR safety criteria require avoidance of at-grade intersections on dedicated HSR alignments; accordingly, the system must be grade separated from any other transportation system when operating at or above 125 mph.

[7] Although freight rail would generally not operate on shared-track alignment, changes to operational patterns may be required by freight operators because of new and realigned tracks in the LOSSAN Corridor.

HSR and other passenger trains will not exceed speeds of 90 mph in this project section. Therefore, grade separations are not required but would be built at six existing at-grade crossings under the Shared Passenger Track Alternatives, with five of them being full grade separations between the roadway and railroad corridor, and one being a partial grade separation with freight track remaining at grade. These grade separations have been designed to ensure the safety of pedestrians, vehicles, and HSR passengers. The Shared Passenger Track Alternatives would also maintain eight existing at-grade crossings.

2.4.1 System Design Performance, Safety, and Security

The Authority designed the proposed California HSR System for optimal performance, and to conform to industry standards and federal and state safety regulations, which are presented in Table 2-1. The HSR system would be a partially grade-separated and limited-access guideway. The capital cost estimates, presented in Chapter 6, Project Costs and Operations, of this Draft EIR/EIS, include allowances for appropriate intrusion protection (fences and walls), state-of-the-art communication, and access-control. Not only would the guideway be designed to keep persons, animals, and obstructions off the tracks, the ends of the HSR trainsets (train cars) would include a collision response management system to minimize the impacts of a collision. Aspects of the HSR system would conform to the latest federal requirements regarding transportation safety and security. The HSR trainsets would be pressure-sealed to maintain passenger comfort regardless of aerodynamic change, similar to the pressure-sealed condition of an airplane. Additional information regarding system safety and security is provided in Section 3.11, Safety and Security, of this Draft EIR/EIS.

Table 2-1 High-Speed Rail Performance Criteria for Blended System

Category	Criteria
System design criteria	▪ Electric propulsion system ▪ Partially grade-separated guideway ▪ Limited access guideway with intrusion monitoring or intrusion protection where required ▪ Track geometry to maintain passenger comfort criteria (smoothness of ride, lateral or vertical acceleration less than 0.05 g (i.e., acceleration from gravity))
System capabilities	▪ Capable of traveling from San Francisco to Los Angeles in approximately 2 hours and 40 minutes[1] ▪ All-weather/all-season operation ▪ Capable of sustained vertical gradient of 2.5 percent without considerable degradation in performance ▪ Capable of operating parcel and special freight service as a secondary use ▪ Capable of safe, comfortable, and efficient operation at speeds over 200 miles per hour ▪ Capable of maintaining operations at 3-minute headways ▪ Equipped with high-capacity and redundant communications systems capable of supporting fully automatic train control
System capacity	▪ Mixed track configuration; fully dual track mainline with offline station stopping tracks, or mixed track configuration for sections with blended systems/operations ▪ Capable of accommodating a wide range of passenger demand ▪ Capable of accommodating normal maintenance activities without disruption to daily operations
Level of service	▪ Capable of accommodating a wide range of service types (express, semi-express/limited stop, and local)

[1] Proposition 1A does not specify a travel time for service between Los Angeles and Anaheim.

HSR operation would follow safety and security plans developed by the Authority, including:

- A System Safety Program Plan, including a Safety and Security Certification Program, has been developed to address safety, security, and emergency response as it relates to the day-to-day operation of the system (Authority 2023c).
- A Threat and Vulnerability Assessment for security and a Preliminary Hazard Analysis and Vehicle Hazard Analysis for safety, which would be developed during the preliminary engineering phase to produce comprehensive design criteria for safety and security requirements mandated by local, state, or federal regulations and industry best practices.
- A Fire and Life Safety Program TM 500.4 (Authority 2018b) has been developed, and a System Security Plan is in development. Under federal and state guidelines and criteria, the Fire and Life Safety Plan would address the safety of passengers and employees as it relates to emergency response. The System Security Plan would address design features of the project intended to maintain security at the stations, within the trackwork right-of-way, and onboard trains.

Design criteria address FRA safety standards and requirements as well as a possible Petition for Rule of Particular Applicability that addresses specifications for key design elements for the system. The FRA is currently developing safety requirements for HSRs for use in the U.S. The FRA will require that the HSR safety regulations be met prior to revenue service operations. The following sections describe those system components pertinent to the project section.

2.4.2 High-Speed Rail Vehicles

Although the exact vehicle type has not yet been selected, this environmental analysis considered the impacts associated with the HSR vehicles produced in the world that meet the Authority's criteria. The world's HSR systems in operation today use electric propulsion with power supplied by an overhead system. These include, among many others, the Train à Grande Vitesse in France, the Shinkansen in Japan and Taiwan, and the InterCity Express in Germany. Refer to Figure 2-1 and Figure 2-2 for examples of typical HSR vehicles.

Source: Authority 2017

Figure 2-1 Examples of Japanese Shinkansen High-Speed Trains

Source: Authority 2017

Figure 2-2 Example of an At-Grade Profile Depicting the Overhead Contact System

The Authority is considering an electric multiple-unit concept, in which several train cars (including both end cars) would contain traction motors, rather than a locomotive-hauled train (i.e., one engine in the front and one in the rear). Each train car would have an active suspension, and each powered car would have an independent regenerative braking system (which returns power to the power system). The body would be made of strong but lightweight materials and would have an aerodynamic shape to minimize air resistance, much like a curved airplane body.

A typical train would be 9 to 11 feet wide consisting of two trainsets, each approximately 675 feet long and seat a minimum of 450 passengers. The train could be potentially extended to approximately 1,350 feet long and seat at least 900 passengers in double trainset formations. The power would be distributed to each train car via the overhead contact system (OCS)[8] (a series of wires strung above the tracks) and through a pair of pantographs that extend like antennae above the train (Figure 2-2). Pantographs are jointed frames that transfer a current to an electric vehicle from overhead wires. Each trainset would have a train control system that could be independently monitored with override control, while also communicating with the systemwide Operations Control Center. Phase 1 HSR service is expected to need up to 58 sets of trains in 2040, depending on the HSR fares charged and ridership levels.[9]

[8] The OCS provides electrical power to HSR trainsets and is necessary for their operation along the entirety of the HSR system. It is a two-wire system, a messenger wire and a contact wire, with overhead wires supported by cantilevers and attached to poles alongside the tracks. OCS standard wire height would be approximately 17.5 feet but can reach up to 24.5 feet. The OCS pole height can vary based on existing conditions.

[9] The Horizon Year 2040 operations and service plan envisions the need for 44 revenue trainsets. The total estimated trainsets include allowance for spare trainsets for maintenance and repair substitute and hot standby trainsets, and extra trainsets to accommodate higher demand on peak demand days, resulting in an overall fleet estimate of 58 total units. The 15 percent total spare ratio falls within the mid-range of spare ratios for other U.S. and international intercity and HSR fleets.

2.4.3 High-Speed Rail Stations

The design of the station areas would provide intermodal connectivity, passenger drop-off facilities, an entry plaza, a station building area for ticketing and support services, an indoor station room where passengers wait and access the HSR, and parking facilities. Station design has not progressed beyond the conceptual stage. Figure 2-3 depicts examples of station components from existing systems overseas. Figure 2-4 depicts a potential "functional" station and a plan view of various station components. The functional station is a basic design that could be more elaborate with cooperation from the local jurisdiction; the station has the potential to be an iconic building that would help define the downtown transit core.

Station Parking Facilities

Parking demand estimates are based on high-speed rail system ridership forecasts that assume initial parking availability is unconstrained (i.e., 100 percent of parking demand is met). These projections provide a "high" starting point to inform discussions with cities where stations are proposed. Based on a constraints analysis undertaken in consultation with station cities, this project environmental impact report/ environmental impact statement identifies locations for parking facilities needed to satisfy the maximum forecast constrained demand. Station access facilities are anticipated to be developed over time in phases while also prioritizing access to the HSR system through modes such as transit, which could lead to lower parking demand. Refer to the discussion on high-speed rail system ridership and station area parking in Section 2.7.3 for additional information.

Preliminary station planning and design are based on dimensional data and volumetric data from the Design Criteria Manual (Authority 2016). Stations would be designed in accordance with Americans with Disabilities Act accessibility guidelines. This project section would include HSR station facilities at ARTIC. This Draft EIR/EISS also evaluates an option for an HSR station to be located in either Norwalk/Santa Fe Springs or Fullerton. However, the Preferred Alternative for this project section only includes HSR station facilities at ARTIC. These station facilities would provide connections to several destinations, job centers, and transfer connections. Detailed information on the stations is included in Section 2.6.3.3, High-Speed Rail Station Facilities.

Source: Authority 2017

Figure 2-3 Examples of Existing Stations

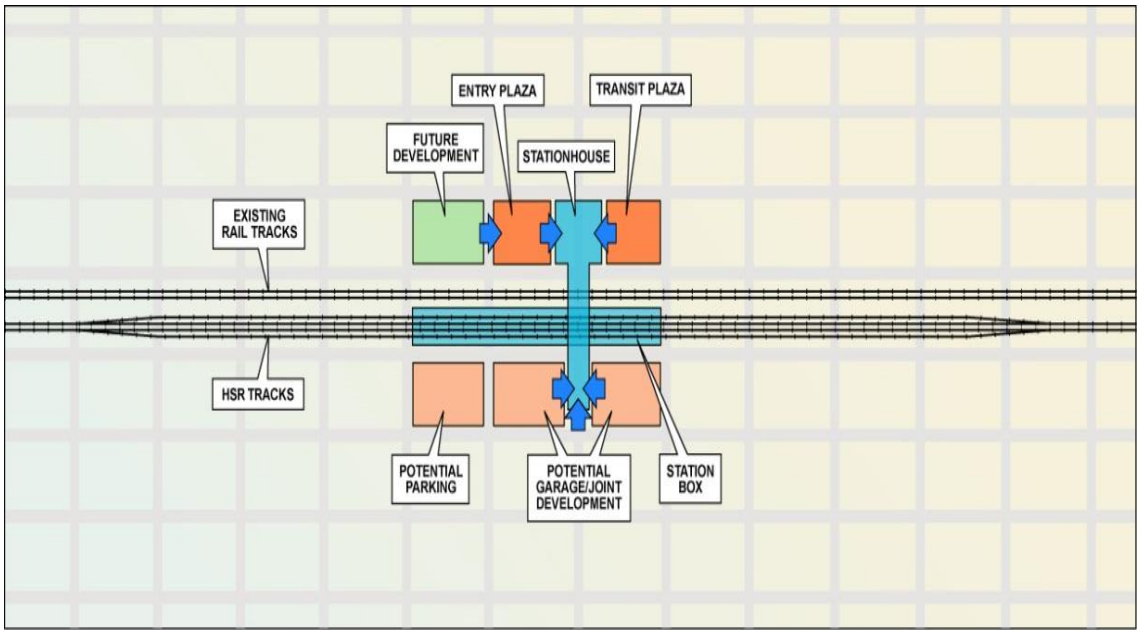


Figure 2-4 Simulated and Plan Views of a Functional Station and Its Various Components

2.4.3.1 Station Platforms and Trackway (Station Box)

A prototypical station would provide platforms with sheltered areas and accessible circulation elements (e.g., stairs, elevators, escalators) for passenger loading and unloading. Of the four tracks passing through the prototypical station, the two express (bypass) tracks (for trains that do not stop at the station) would be separated from those that stop at the station platforms. Typically, to allow enough distance for safe deceleration of trains, a platform track would diverge from each mainline track beginning 3,000 feet from the center of the 1,410-foot station platform. The acceleration track requires a reduced separation from platform to mainline. An additional stub-end refuge track would be provided to temporarily store HSR trains in the case of mechanical difficulty, for special scheduling purposes, and for daytime storage of maintenance-of-way work trains during periods when station or adjacent track maintenance is being performed. The combination of deceleration, acceleration, and refuge track extends the wider footprint of the four-track section up to a total distance of 6,000 feet. Although these HSR elements are typical throughout the HSR system, in the Los Angeles to Anaheim Project Section, these parameters may not apply or may vary because of the operational and right-of-way constraints of the existing railroad in the LOSSAN Corridor. The design of the stations in the project section is described and presented in Section 2.6.3.3.

> *Maintenance of Way*
>
> A train industry term that refers to repair and maintenance activity concerning the right-of-way and track, including track and roadway, buildings, signals, and communication and power facilities.

2.4.3.2 Station Arrival/Departure Facility (Station House)

A prototypical station building would be adjacent to the entrance plazas. The station building would be open to patrons and visitors. Services within the station building may include initial ticketing and check-in, traveler's aid and local information services, and concessions. Circulation linkages between the station building and the station platforms may include hallways, an access bridge or tunnel to cross over or under railroad tracks, stairs, escalators, and elevators.

2.4.3.3 Station Facilities Building

Station public areas include entry plazas and building entrances; ticketing; wayfinding/signage; publicly accessible restrooms; concessionaire-provided amenities such as food service, rental car counters, and retail; vertical circulation; concourse or mezzanine areas with passenger waiting areas; fare gates; controlled paid areas; and platforms. Pedestrian over-track bridges and under-track passageways enable public access across the rail right-of-way at stations. Station nonpublic areas include administrative, maintenance, operations, safety/security, loading, and back-of-house circulation areas. Station site improvements provide safe and efficient access for pedestrians, bicycles, transit, and vehicles to and from the station. Pick-up and drop-off zones offer direct and convenient access for taxis, ride-hailing/sharing services, shuttles, transit, and private and commercial vehicles. Parking supply estimates are based on projected parking demand and local conditions. Station site plans are configured to support transit-oriented development. Ancillary facilities are unoccupied back-of-house spaces required for station operations and maintenance, including normal, backup, and emergency power systems.

2.4.4 High-Speed Rail Infrastructure Components

The partially grade-separated infrastructure needed to operate HSR with blended systems has more-stringent alignment requirements than those needed for lower-speed trains. In the project section, the Shared Passenger Track Alternatives would comprise different track profile types, which vary according to elevation and relationship between the track and the surrounding ground surface: low, near-the-ground tracks are "at grade"; higher tracks are elevated on structures (bridges) or on retained fill (earth); and "below-grade" tracks are in a retained cut (trench) or tunnel. Types of bridges that might be built include full channel spans, large box culverts, or, for some wider river crossings, limited piers within the ordinary high-water channel. The various track profiles for the HSR system are described below.

2.4.4.1 At-Grade Profile

At-grade track profiles (Figure 2-5) are best suited in areas where the ground is relatively flat, and where interference with local roadways is infrequent. The at-grade track would be built on compacted soil and ballast material (a thick bed of angular rock) to prevent subsidence or changes in the track surface from soil movement. To avoid potential disruption of service from floodwater, the rail would generally be built above the 100-year floodplain. The height of the at-grade profile may vary to accommodate slight changes in topography and to provide clearance for stormwater culverts and structures to allow water flow and sometimes wildlife movement. Figure 2-6 also displays the various components of a typical OCS. The assembly and signal equipment installations of the OCS are explained in Section 2.10.5.4, Railroad Systems Construction.

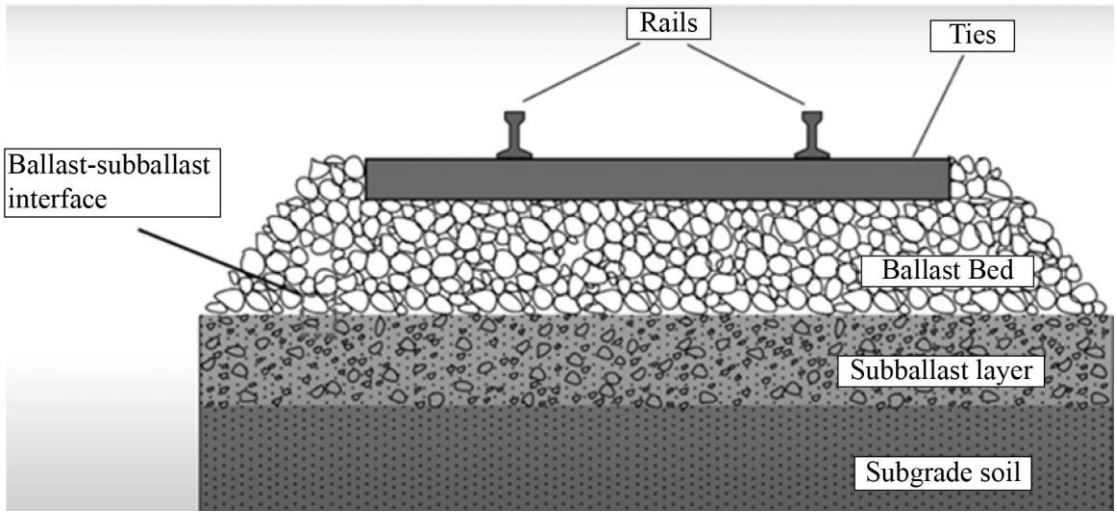
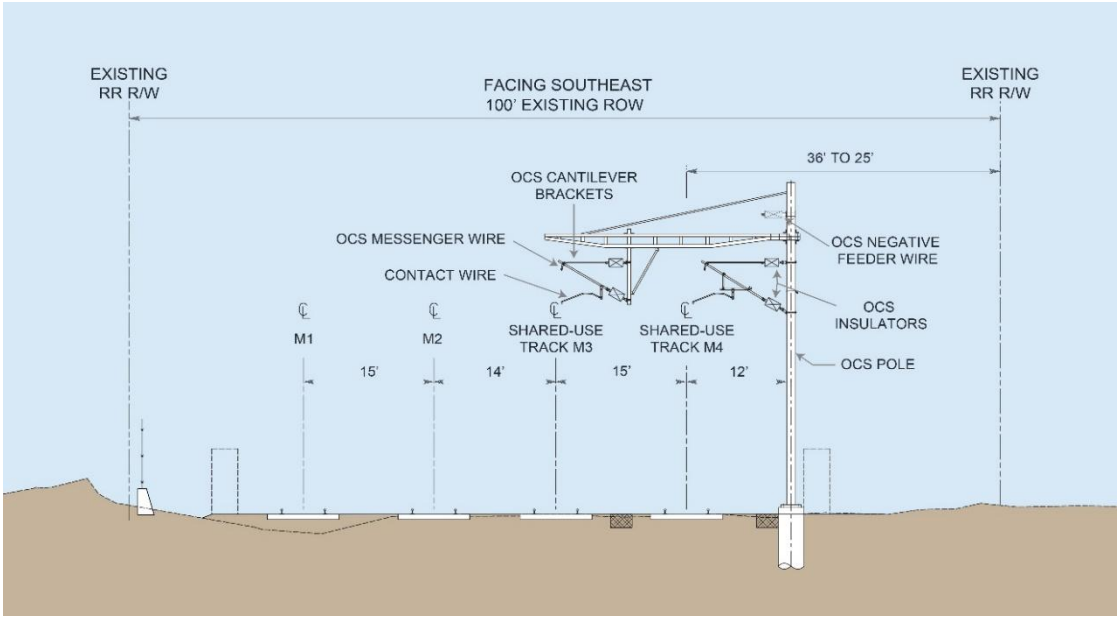


Figure 2-5 Typical Track Cross Section

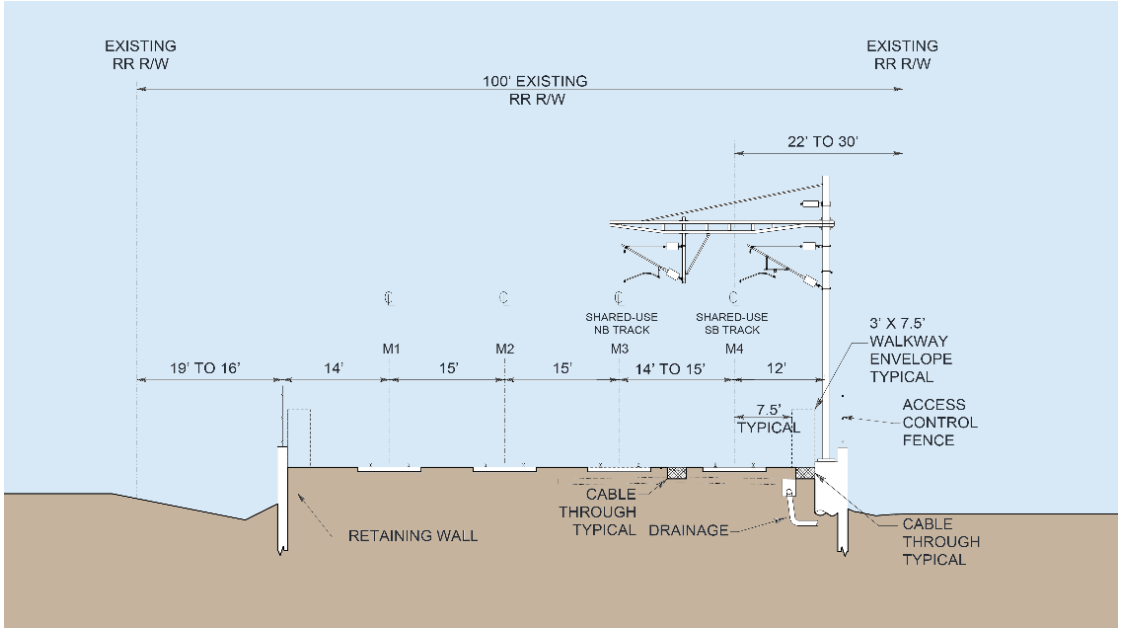


Source: Authority 2025
M = main track; OCS = overhead contact system; RR R/W = railroad right-of-way; CL= centerline

Figure 2-6 At-Grade Typical Cross Section

2.4.4.2 Retained-Fill Profile

Retained-fill profiles (Figure 2-7) are used when it is necessary to narrow the right-of-way within a constrained corridor to minimize property acquisition or to transition between at-grade and elevated profiles. The guideway would be raised off the existing ground on a retained fill platform made of reinforced walls, much like a freeway ramp. Short retaining walls would have a similar effect and would protect the adjacent properties from a slope extending beyond the rail guideway.

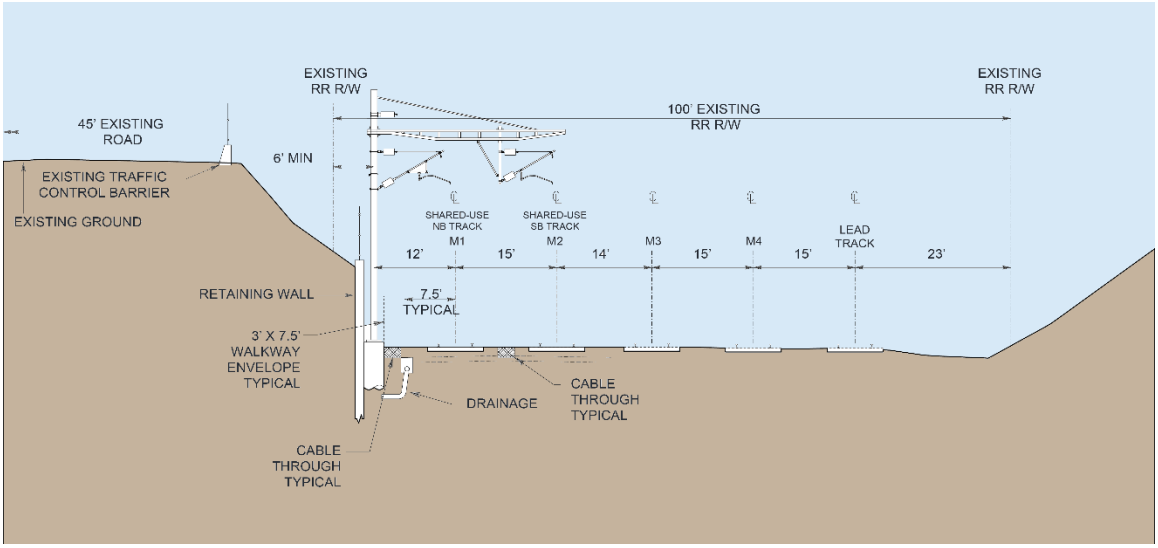


Source: Authority 2025
M = main track; RR R/W = railroad right-of-way; NB – northbound; SB = southbound; CL= centerline

Figure 2-7 Retained-Fill Typical Cross Section

2.4.4.3 Retained-Cut Profile

Retained-cut profiles (Figure 2-8) are used when the rail alignment crosses under existing rail tracks, roads, or highways that are at grade. This profile type applies to short distances in highly urbanized and constrained situations. In some cases, it is less disruptive to the existing traffic network to depress the rail profile under these crossing roadways. Retaining walls would typically be needed to protect the adjacent properties from a cut slope extending beyond the rail guideway. Retained-cut profiles apply also to roads or highways when it is desirable to depress the roadway underneath an at-grade HSR alignment.



Source: Authority 2025
M = main track; RR R/W = railroad right-of-way; NB = northbound; SB = southbound; MIN = minimum; CL = centerline

Figure 2-8 Retained-Cut Typical Cross Section

2.4.4.4 Trench Profile

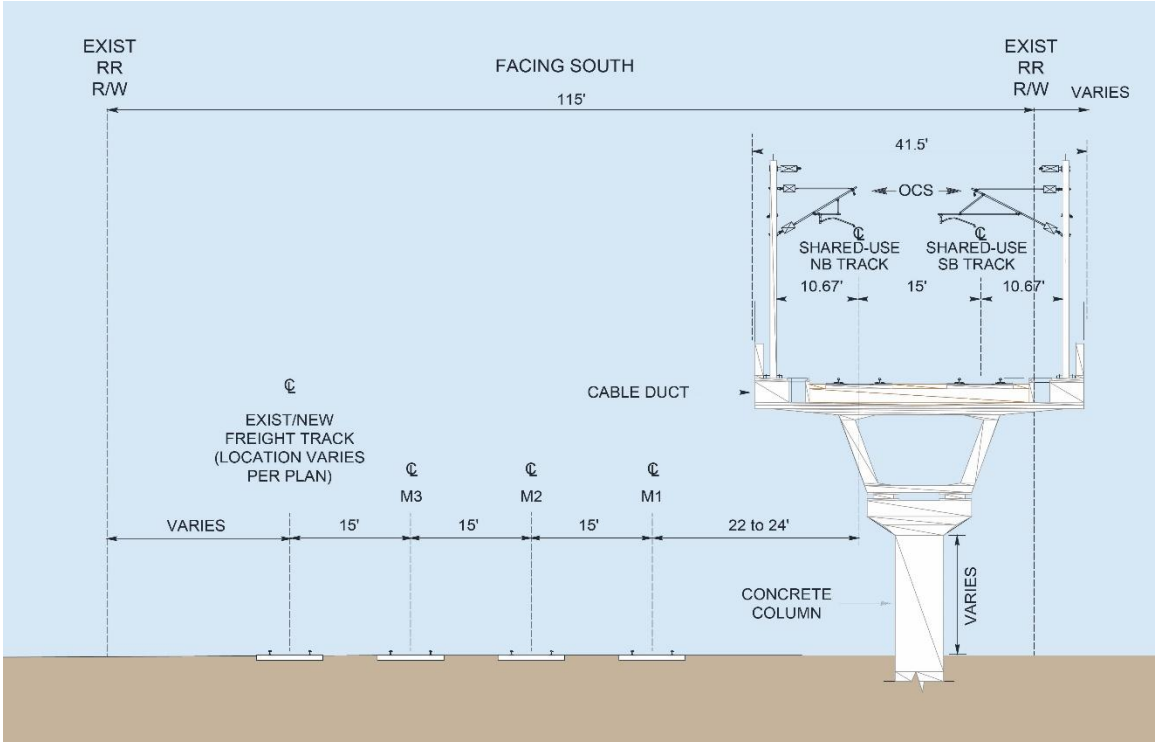
Trench profiles (refer to the August 2013 Appendix A of TM 1.1.21: Typical Cross Sections for 15% Design)[10] are used when the rail alignment traverses highly variable topography or highly constrained, densely developed urban situations. Trench profiles reduce track distance and curvature needed to maintain acceptable vertical and horizontal grades in mountainous terrain. Trenches may be used in dense urban settings to avoid land use or traffic disruptions.

Both Shared Passenger Track Alternative A and Shared Passenger Track Alternative B would have one braced trench near the Fullerton Airport. In addition, Shared Passenger Track Alternative B would have three trenches under Olympic Boulevard. Section 2.10.5.3, Trench Construction, includes details about these trenches.

2.4.4.5 Elevated Profile

Elevated profiles (Figure 2-9) can be used in urban areas where extensive road networks must be maintained. An elevated profile must have a minimum clearance of approximately 16.5 feet over roadways and approximately 24 feet over railroads. Pier supports are typically approximately 10 feet in diameter at the ground. The Authority could use such structures to cross waterbodies; even though the trackway might be at grade on either side, the width of the water channel could require a bridge at the same level, which would be built in the same way as the elevated profile.

[10] Refer to Authority website, www.hsr.ca.gov/docs/programs/eir_memos/Proj_Guidelines_TM1_1_21R00.pdf.

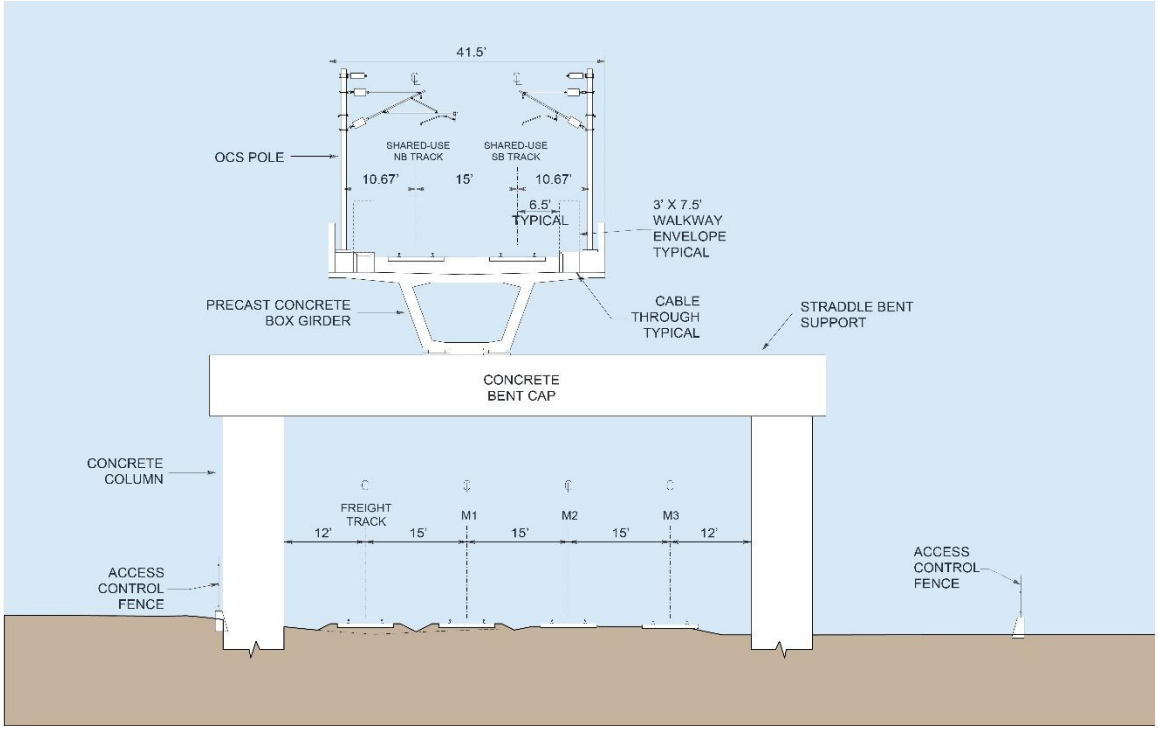


Source: Authority 2025
M = main track; OCS = overhead contact system; RR R/W = railroad right-of-way; NB = northbound; SB = southbound; CL = centerline

Figure 2-9 Elevated Structure Typical Cross Section

2.4.4.6 Straddle Bents

When the HSR elevated profile crosses over a roadway or railway on a very sharp skew (degree of difference from the perpendicular), a straddle bent ensures that the piers are outside of the functional/operational limit of the roadway or railway. As illustrated on Figure 2-10, a straddle bent is a pier structure that spans (or “straddles”) the functional/operational limit of a roadway, highway, or railway. Typical roadway and highway crossings that have a smaller skew angle (i.e., the crossing is nearly perpendicular) generally use intermediate piers in medians and span the functional right-of-way. However, for larger-skew-angle crossing conditions, median piers would result in excessively long spans that are not feasible. Straddle bents that clear the functional right-of-way would be spaced as needed (typically 110 feet apart) to provide feasible span lengths for bridge crossings at larger skew angles.



Source: Authority 2025
M = main track; OCS = overhead contact system; NB = northbound; SB = southbound; CL= centerline

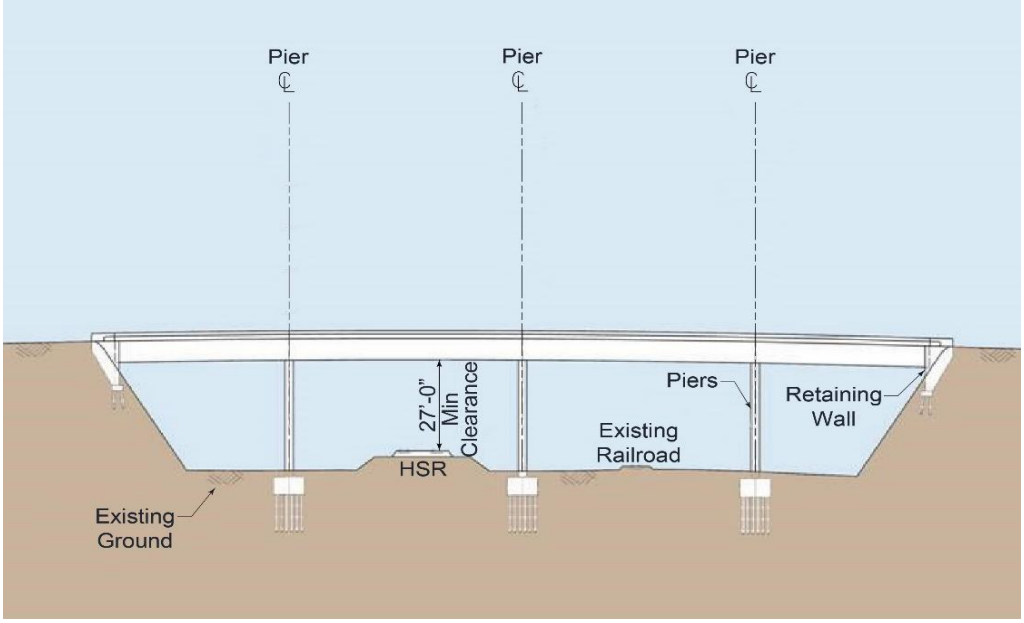
Figure 2-10 Straddle Bent Typical Cross Section

2.4.5 Grade Separations

The Shared Passenger Track Alternatives would remain mostly at grade, but 5 of 14 existing at-grade crossings would be rebuilt as fully grade separated, and one would be partially grade separated for HSR only, with HSR tracks on an elevated structure and freight train tracks remaining at grade. The following list describes possible scenarios for HSR grade separations for roadways, irrigation, and drainage facilities:

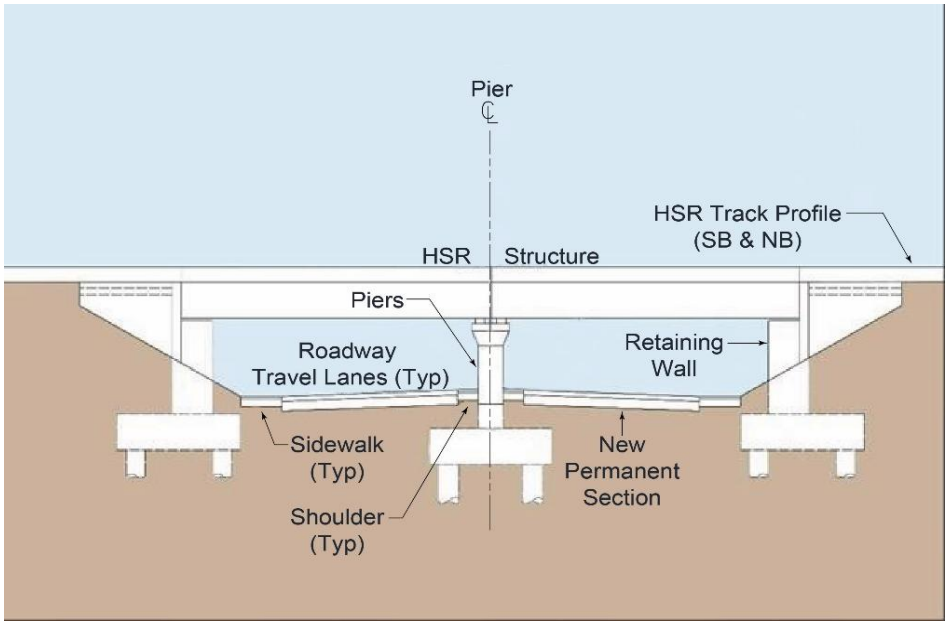
- Elevated HSR road crossings: In urban areas, it may be more feasible to raise the HSR as illustrated on Figure 2-11 and Figure 2-12. This is especially relevant in downtown urban areas where use of an elevated HSR guideway would minimize impacts on the existing roadway system.
- Roadway overcrossings: Along the project section, there are local roadways and state route facilities that currently cross at grade, over, or under the BNSF-, Los Angeles County Metropolitan Transportation Authority (Metro)-, and Orange County Transportation Authority (OCTA)-owned railroad right-of-way. Roadway modifications are identified on the project designs in Volume 3.3 of this Draft EIR/EIS, and described in Section 2.6.3.6, State Highway or Local Roadway Modifications. Figure 2-11 illustrates how a roadway would be grade separated over both the HSR and the railroad in these situations. Minimum clearance between the roadway bridge and HSR would be 24 feet over the HSR in some existing locations along the project section, but generally would be 27 feet over the HSR.
- Roadway undercrossing: The Shared Passenger Track Alternatives may require undercrossings for the HSR to travel over roadways. Figure 2-12 illustrates how the roadway would be grade separated below the HSR track.
- Irrigation and drainage facilities: The HSR alignment would affect some existing drainage and irrigation facilities. Depending on the extent of the impact, existing facilities would be

modified, improved, or replaced, as needed to maintain existing drainage and irrigation functions and support HSR drainage requirements.



Source: Authority 2025
Min = minimum, HSR = high-speed rail; CL = centerline

Figure 2-11 Overcrossings above High-Speed Rail Guideway and Existing Railroad Trackway



Source: Authority 2025
HSR = high-speed-rail, SB = southbound, NB = northbound, Typ = typical; CL= centerline

Figure 2-12 Typical Cross Section of Roadway Grade-Separated Beneath High-Speed Rail Guideway

2.4.6 Traction Power Distribution

California's electricity grid would power the proposed HSR system. The HSR system is expected to require less than 1 percent of the state's future electricity consumption. In 2008, a study performed by Navigant Consulting, Inc. found that although the HSR would be supplied with energy from the California grid, it is not feasible to physically control the flow of electricity from particular sources (Navigant Consulting, Inc. 2008). However, it would be feasible for the Authority to obtain the quantity of power required for the HSR from 100 percent clean, renewable energy sources through a variety of mechanisms, such as paying a clean-energy premium for the electricity consumed. In 2014, the Authority verified the feasibility of powering the HSR system with 100 percent renewable energy sources (Authority 2014).

The project would not include the construction of a separate power source, although it would include the extension of underground or overhead transmission lines to a series of substations positioned along the HSR corridor. Working in coordination with power supply companies and per design requirements, the Authority has identified frequency and right-of-way requirements for these facilities, as described below.

Trains would draw electric power from an OCS with the running rails acting as the other conductor. The OCS would consist of a series of mast poles approximately 23.5 to 28.5 feet higher than the top of the rail, with contact wires suspended from the mast poles between 17 to 23.5 feet from the top of the rail, depending on location along the project section. The train would have an arm, called a *pantograph*, to maintain contact with this wire to provide power to the train. The mast poles would be spaced approximately every 200 feet along straight portions of the track down to every 70 feet in tight-turn track areas. Statewide, the power supply would consist of a 2- by 25-kilovolt (kV) OCS for electrified portions of the statewide system.

2.4.6.1 Traction Power Substations

Based on the HSR system's estimated power needs, traction power substations (TPSS) would each need to be approximately 32,000 square feet (200 feet by 160 feet) and be located at approximately 30-mile intervals. Figure 2-13 is a typical TPSS. Figure 2-14 is a typical TPSS OCS feeder gantry.

Source: Authority 2017

Figure 2-13 Traction Power Substation

TPSSs would have to accommodate the power substations and would require a buffer area around them for safety purposes. In the Shared Passenger Track Alternatives, substations would be built at locations where required voltage is available from third-party utility substations. Potential TPSS locations have been identified in Los Angeles and Anaheim based on system requirements and existing conditions, including location of existing infrastructure and parcel size. The approximately 30-mile project section would require two TPSSs.

Source: Authority 2017

Figure 2-14 Traction Power Substation Overhead Contact System Gantry

Each TPSS site would require a 2-acre parcel and would have a 20-foot-wide access road (or easement) from the street access point to a protective fenced perimeter. Each substation would include an approximately 450-square-foot control room (each alternative design includes these facilities, as appropriate). Each TPSS would have two 115/50 kV, or 230/50 kV, single-phase transformers, both of which would be rated at 60 megavolt amperes. The autotransformer feed system would step down the transmission voltage to 50 kV (phase-to-phase), with 25 kV (phase-to-ground) to power the traction system. Screening of the TPSS could include a wall or fence. For additional information about potential TPSS sites, refer to Section 2.4.6.5, Network Upgrades.

Southern California Edison, the Los Angeles Department of Water and Power (LADWP), and Anaheim Public Utilities would provide electric service for the project section and have indicated that existing lines and facilities would need to be built, upgraded, or rebuilt to serve the Shared Passenger Track Alternatives. The work required in building, upgrading, or reconductoring high-voltage electrical lines or substations may include the installation of new equipment, support structures, and power poles/structures. When electrifying the HSR system, Southern California Edison would design and implement changes to its high-voltage electrical lines, including relocating existing power lines, adjusting height clearances of the existing electrical lines, and building or upgrading substations.

2.4.6.2 Traction Power Switching and Paralleling Stations

Switching and paralleling stations work together to balance the electrical load between tracks, and to switch power off or on to either track in the event of an emergency. Switching stations (Figure 2-15) would be required at approximately 15-mile intervals, midway between the TPSSs. These stations would need to be approximately 9,600 square feet (120 feet by 80 feet).

Source: Authority 2017

Figure 2-15 Switching Station

Paralleling stations (Figure 2-16 and Figure 2-17) would be required at approximately 5-mile intervals between the switching stations and the TPSSs. The paralleling stations would need to be approximately 8,000 square feet (100 feet by 80 feet). Each station would include an approximately 450-square-foot (18 feet by 25 feet) control room.

Source: Authority 2017

Figure 2-16 Paralleling Station

The switching and paralleling stations and associated feeder gantries could be screened from view with a perimeter wall or fence.

The Shared Passenger Track Alternatives' footprints include a switching station in Santa Fe Springs and paralleling stations in Montebello and Fullerton. Paralleling station locations were identified based on system requirements and existing site conditions. For additional information about the potential switching and paralleling station sites, refer to Section 2.6.3.2, Ancillary Facilities.

Source: Authority 2017

Figure 2-17 Paralleling Station Overhead Contact System Gantry

2.4.6.3 Backup and Emergency Power Supply Sources for Stations and Facilities

During normal system operations, power would be provided by the local utility service or from the TPSS. Should the flow of power be interrupted, the system would automatically switch to a backup power source through use of an emergency standby generator, an uninterruptable power supply, or a direct current battery system.

For the Shared Passenger Track Alternatives, permanent emergency standby generators are anticipated to be at passenger stations and terminal layup/storage and maintenance facilities. These standby generators are required to be tested (typically once a month for a short duration) in accordance with National Fire Protection Association Standard 110/111 to ensure their readiness for backup and emergency use. If needed, portable generators could also be transported to other trackside facilities to reduce the impact on system operations.

2.4.6.4 Electrical Interconnections

Southern California Edison, LADWP, and Anaheim Public Utilities would provide electric service for the project section and have indicated that existing lines and facilities would need to be built, upgraded, or rebuilt to serve the Shared Passenger Track Alternatives. As previously described, each TPSS would have two 115/50-kV or 230/50-kV single-phase transformers. These transformers would interconnect the TPSS to two breaker-and-a-half bays[11] built at a new utility switching station or within the fence line of an existing utility facility via a short section of 230-kV transmission or 115-kV power lines (tie-line). Per Authority requirements, the proposed interconnection points would need redundant transmission (i.e., double-circuit electrical lines) from the point of interconnection, with each interconnection connected only to two phases of the transmission source. A new utility switching station would encompass approximately 9,600 square feet (120 feet by 80 feet) and include an approximately 450-square-foot (18 feet by 25 feet) control building and, if required, a retention basin. The utility switching station could be screened from view with perimeter walls or fences. Communication facilities (i.e., redundant [two underground or one underground and one overhead on existing power structures] fiber optic lines) would also be required to support the electrical interconnections connecting TPSSs to new utility switching stations or to existing facilities, typically within tie-line/utility corridors.

2.4.6.5 Network Upgrades

The locations of electrical interconnections and network upgrades evaluated as part of the Shared Passenger Track Alternatives' footprints were determined through a preliminary engineering assessment. In the absence of formal agreements between the Authority and utility providers, assumptions about capacity and site access have been made. Detailed engineering of electrical interconnections and network upgrade components will be completed closer to the start of construction. Network upgrades could include modifications to existing infrastructure such as expansion of existing substations and reconductoring of existing electrical lines (i.e., replacement of power structures [poles and lattice steel towers] and electrical conductors with taller structures and more efficient electrical wires or new electrical lines). All network upgrades would be implemented pursuant to California Public Utilities Commission General Order 131-D.

Potential locations of TPSSs, switching, and paralleling stations for the Shared Passenger Track Alternatives have been identified using known parameters and system requirements, subject to future coordination with the utility provider. Section 2.6.3.2 lists the locations of the two proposed TPSSs, switching station, and paralleling stations. Volume 3 (Alignments and Other Plans) of the Draft EIR/EIS provides additional detail for locations for electrical interconnections.

2.4.7 Signaling and Train-Control Elements

PTC is a train safety system designed to automatically implement safety protocols and provide communication with other trains to reduce the risk of a potential collision. The Rail Safety Improvement Act of 2008 required the implementation of PTC technology across most railroad systems, which was completed by December 31, 2020.

The Authority is committed to safe operations and will ensure that any updated train control systems adopted meet the PTC requirements. Therefore, the Shared Passenger Track Alternatives would include communication towers and ancillary facilities to implement the FRA PTC requirements. PTC infrastructure consists of integrated command, control, communications, and information systems for controlling train movements. The intent is to improve railroad safety by substantially reducing the probability of collisions between trains, personal injuries, damage to equipment, and over-speed accidents. Unlike other HSR project sections, this project section would operate using conventional PTC signaling rather than a specialized HSR signaling system, because of the lower operating speeds of the trains in this project section. Integrating the Shared Passenger Track Alternatives with existing PTC would require further coordination with rail

[11] A breaker and a half is a common design of overlapping circuits and circuit breakers to provide system reliability.

operators within the corridor. Infrastructure sites such as communication towers already exist and could be utilized by HSR along with existing operators.

Conventional PTC signaling would use a radio-based communications network with a fiber optic backbone and communications towers approximately every 2 to 3 miles, depending on the terrain and selected radio frequency. The towers would be in the HSR corridor in a fenced area of approximately 20 feet by 15 feet, including a 10-foot by 8-foot communications shelter and a 6- to 8-foot-diameter, 100-foot-tall communications pole. These communications facilities could be collocated within the TPSSs. Where communications towers cannot be located with TPSSs or other HSR facilities, the communications facilities would be placed near the HSR corridor in a fenced area of approximately 20 feet by 15 feet. However, the Authority has delineated train control communication tower locations in the Preliminary Engineering for Project Definition.

Metrolink has implemented PTC throughout its entire network with the help of funding from the Authority. Within the Los Angeles to Anaheim Project Section, HSR trains would share right-of-way, tracks, or both with Metrolink.

2.4.8 Track Structure

The track structures in Shared Passenger Track Alternative A and Shared Passenger Track Alternative B would consist of either a direct fixation system (with track, rail fasteners, and slab) or ballasted track, depending on local conditions and decisions to be made in later design. Ballasted track requires more frequent maintenance than slab track, as described in Section 2.8.3, Maintenance Activities, but is less expensive to install.

For purposes of environmental review, slab or ballasted track is assumed for HSR structures and ballasted track is assumed for at-grade sections.

2.4.9 Maintenance Facilities

The California HSR System includes four types of maintenance facilities: maintenance of infrastructure facilities (MOIF), maintenance of infrastructure siding (MOIS), light maintenance facility (LMF), and heavy maintenance facility (HMF). The California HSR System requires one HMF, which would be within the Central Valley, outside of the project section. The project section is proposed to include only an LMF.

2.4.9.1 Maintenance of Infrastructure Facilities and Sidings

The HSR system infrastructure would be maintained from regional MOIFs at approximately 150-mile intervals. Each MOIF would be approximately 28 acres in size and would provide regional maintenance machinery servicing storage, materials storage, and maintenance and administration. An MOIF could be collocated with the HMF and sized to support the maintenance of infrastructure requirements for 75 miles in either direction, with additional support provided by a MOIS facility within each 75-mile segment. The nearest MOIF to the project section would be in the Palmdale to Burbank Project Section.

Maintenance of Infrastructure Facilities and Sidings

A train industry term that refers to repair and maintenance activity concerning the right-of-way and track, including track and roadway, buildings, signals, and communication and power facilities.

The MOIS facilities would be centrally located within the 75-mile maintenance sections on either side of each MOIF. Each MOIS facility would support MOIF activities by providing layover of maintenance of infrastructure equipment and temporary storage for materials. An MOIS facility would be about 4 acres in size. The nearest MOIS facility to the project section is proposed in Bakersfield, within the Bakersfield to Palmdale Project Section, outside of the limits of the project section being analyzed in this Draft EIR/EIS.

The design and spacing of maintenance facilities along the system would not require this project section to include an MOIF or MOIS. The track maintenance facilities in the Palmdale to Burbank and Bakersfield to Palmdale Project Sections, as well as opportunities for shared maintenance with other rail operators using the tracks in the corridor, would be sufficient for this project

section's maintenance needs. Maintenance activities and responsibilities would be detailed in memoranda of understanding or memoranda of agreement with the other rail operators.

2.4.9.2 Light Maintenance Facility

The Shared Passenger Track Alternatives would include an LMF, which includes space for activities associated with fleet storage, cleaning, repair, overnight layover accommodations, and servicing facilities. The LMF is likely to support the following functions:

- **Train Storage:** Some trains would be stored at the LMF prior to start of revenue service. The LMF would have two storage tracks that could accommodate nine 800-foot-long trains.
- **Examinations in Service:** Examinations would include inspections, tests, verifications, and quick replacement of certain train components on the train.
- **Inspection:** Periodic inspections would be part of the planned preventive maintenance program requiring specialized equipment and facilities.

The size of the LMF site would support the level of daily revenue service dispatched by the nearby terminal at the start of each revenue service day.

The Authority defines three levels of maintenance performed at an LMF:

- Level I: Daily inspections, predeparture cleaning and testing
- Level II: Monthly inspections
- Level III: Quarterly inspections, including wheel-truing

In 2023, the Authority released an update to its LMF standards in its Requirements for High-Speed Trainset Fleet and Infrastructure Maintenance Facilities Report (Authority 2023c).

Based on the Authority's maintenance requirements, HSR operations in Southern California would require a Level III LMF for fleet storage, cleaning, repair, overnight layover accommodations, and servicing facilities, including the necessary water cistern and power facilities.

Level III LMF requirements include:

- Yard tracks (capable of holding a minimum of 20 trainsets) and runaround/transfer tracks
- Dedicated train wash track
- Wheel defect detection equipment
- Inside shop tracks with interior access for inspections
- Material and equipment storage areas
- Employee offices, parking lot, and other related facilities

The proposed LMF sites for Shared Passenger Track Alternative A and Shared Passenger Track Alternative B are discussed further in Sections 2.6.3.4, Light Maintenance Facility, and 2.6.4.4, Light Maintenance Facility.

2.4.9.3 Heavy Maintenance Facility

Only one HMF would be required for the HSR system, and it would be within either the Merced to Fresno Project Section or Fresno to Bakersfield Project Section. This facility would require approximately 154 acres with space for activities associated with train fleet assembly, disassembly, and complete rehabilitation; onboard components of the trainsets; and overnight layover accommodations and servicing facilities. The site would include a maintenance shop, yard, Operations Control Center building, one TPSS, other support facilities, and a train interior cleaning platform. The property boundary for the HMF site would be larger than the acreage needed for the actual facility because of the unique site characteristics and constraints of each location.

Additional information on the HMF is provided in Chapter 2, Alternatives, of the Merced to Fresno Project Section EIR/EIS and the Fresno to Bakersfield Project Section Final EIR/EIS.[12,13]

2.5 Alternatives Considered During Alternatives Screening Process

The range of alternatives was developed using a tiered approach, which began with the 2005 Statewide Program EIR/EIS (Authority and FRA 2005). The following regulations and guidance support this approach:

- Procedures for Considering Environmental Impacts (FRA 1999)[14]
- State CEQA Guidelines Section 15126.6 (Consideration and Discussion of Alternatives to the Proposed Project) and Section 15152 (Tiering)
- California Public Resources Code Section 21068.5 (Tiering or Tier)
- FRA High-Speed Intercity Passenger Rail Program Guidance[15]

Following the Authority's and the FRA's Tier 1 decisions for the statewide HSR program (refer to Section 1.1.2), the Authority, in cooperation with the FRA, began the environmental review process for the Los Angeles to Anaheim Project Section. The environmental review process includes an outreach and public scoping process. Public and agency comments received during the project section EIR/EIS scoping period (2007), revised scoping (2020), and through interagency coordination meetings also informed the development of initial alternatives for the screening evaluation. After the Authority identified the initial group of potential alternatives, it developed alignment plans, preliminary profile concepts, and cross sections.

The following section provides additional information on the project section alternatives development and analysis process.

2.5.1 High-Speed Rail Project-Level Alternatives Development Process

2.5.1.1 Project Definition Framework and Alternatives Development

HSR project definition began with the corridor and station locations selected by the Authority and FRA in the Tier 1 programmatic decisions for the statewide HSR system. In 2001, the Authority, in cooperation with the FRA, started a tiered environmental review process for the statewide HSR system. The approved 2005 Tier 1 California HSR Program EIR/EIS studied conceptual corridors, alignments, and station locations for the statewide HSR system. The Authority and FRA selected the LOSSAN Corridor for the project alignment between Los Angeles and Irvine, with station locations at LAUS, Norwalk/Santa Fe Springs, Anaheim, and Irvine.

The development of project-level alternatives followed the process described in *Technical Memorandum for the Alternatives Analysis Methods for Project EIR/EIS* (Authority 2011a). The assessment of potential alternatives involved both qualitative and quantitative measures that address applicable policy and technical considerations. These included field inspections of corridors; project team input and review considering local issues that could affect alignments; qualitative assessment of constructability, accessibility, operations, maintenance, right-of-way, public infrastructure impacts, railway infrastructure impacts, and environmental impacts; engineering assessment of project length, travel time, and configuration of key features of the alignment, such as the presence of existing infrastructure; and geographic information system–

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[12] Refer to Authority website, https://hsr.ca.gov/high_speed_rail/project_sections/fresno_bakersfield.aspx, for Merced to Fresno Project Section documents.

[13] Refer to Authority website, www.hsr.ca.gov/Programs/Statewide_Rail_Modernization/Project_Sections/fresno_bakersfield.html, for Fresno to Bakersfield Project Section documents.

[14] While this Draft EIR/EIS was being prepared, the FRA adopted new NEPA compliance regulations (23 Code of Federal Regulations Part 771). Those regulations only apply to actions initiated after November 28, 2018. Refer to 23 Code of Federal Regulations Part 771.109(a)(4). Because this Draft EIR/EIS was initiated prior to that date, it remains subject to the FRA's Environmental Procedures rather than the Part 771 regulations.

[15] Refer to website, High Speed Intercity Passenger Rail (HSIPR) Program | FRA (dot.gov)

based analysis of impacts on farmland, water resources, wetlands, threatened and endangered species, cultural resources, current urban development, and infrastructure.

The Authority and FRA evaluated the potential alternatives against the HSR system performance criteria contained in the Authority's *Technical Memorandum for the Alternatives Analysis Methods for Project EIR/EIS*: travel time, route length, intermodal connections, capital costs, operating costs, and maintenance costs (Authority 2011a). Screening also included environmental criteria to measure the potential impacts of the proposed alternatives on the natural and human environment:

- The land use criteria measured the extent to which a station alternative supports transit use; is consistent with existing adopted local, regional, and state plans; and is supported by existing and future growth areas.
- Constructability measured the feasibility of construction and the extent to which right-of-way is obtainable or constrained.
- Community impacts measured the extent of disruption to neighborhoods and communities, such as potential to minimize (1) right-of-way acquisitions, (2) dividing an established community, and (3) conflicts with community resources.
- Environmental resources and quality measured the extent to which an alternative minimizes impacts on natural resources.

2.5.1.2 Summary of Project-Level Alternatives Development Process

Alternatives Analysis Reports

The Alternatives Analysis, including the preliminary and supplemental reports, is available to request online at:

https://hsr.ca.gov/about/public_records/

An EIR/EIS is required to analyze the potential impacts of a range of reasonable alternatives (Cal. Code Regs., tit. 14, Section 15126.6; 64 *Federal Register* 28546, Section 14). Under CEQA, the alternatives are to include a No Project Alternative and a range of potentially feasible alternatives that would (1) meet most of the project's basic objectives, and (2) avoid or substantially lessen one or more of the project's significant adverse impacts (Cal. Code Regs., tit. 14, Section 15126.6(c)). In determining the alternatives to be examined in the EIR, the lead agency must describe its reasons for excluding other potential alternatives. There is no ironclad rule governing the range of alternatives to be studied in an EIR other than the "rule of reason." Under the "rule of reason," an EIR is required to study a sufficient range of alternatives to permit a reasoned choice (Cal. Code Regs., tit. 14, Section 15126.6(f)). It is not required that all possible alternatives be studied.

Under NEPA, an EIS is required to analyze reasonable alternatives to the proposed action, including the no action alternative (64 *Federal Register* 28546, Section 14(l)). Pursuant to Section 14(l) of the FRA's Procedures for Considering Environmental Impacts, these include "all reasonable alternative courses of action that could satisfy the [project's] purpose and need" (64 *Federal Register* 28546). The range of alternatives should include those that are technically and economically practical and feasible.

Based on the Statewide Program EIR/EIS (Authority and FRA 2005), the Authority and FRA selected the LOSSAN Corridor in 2005 as the alignment to advance for further Tier 2 (project-level) study between Los Angeles and Anaheim. The LOSSAN Corridor was selected during the Tier 1 (statewide) process because the Statewide Program EIR/EIS determined that it would result in fewer infrastructure requirements, potentially decreased cost, and fewer environmental impacts. The Authority and FRA based the selection of the LOSSAN Corridor alignment on the assumption that the capacity and compatibility of uses associated with the shared operation of HSR and existing nonelectric service (Amtrak, Metrolink, and freight trains) in the LOSSAN Corridor would be resolved in subsequent project-level studies.

The Authority and FRA issued a Notice of Intent and Notice of Preparation (published in 2007) for this project section. The Authority performed public scoping in 2007. During the scoping process, several comments received by the public included suggestions for alternative alignments, including options (e.g., other alignments, tunnels) in consideration of at-grade street crossings,

and an alternative Santa Fe Springs station location. Alternatives were developed with consideration for travel time, train speed, cost, local access times, potential connections with other modes of transportation, ridership potential, the distribution of population and major destinations along the route, and local planning constraints and conditions. The Authority considered options suggested during public scoping, with some deemed not feasible based on the aforementioned factors (Authority and FRA 2009a).

The Authority and FRA then conducted further planning to develop and screen potential alignment alternatives between Los Angeles and Anaheim. The alternatives development process is documented in the Anaheim to Los Angeles Section Alternatives Analysis Report (2009 AA Report) (Authority and FRA 2009b), the July 2010 Los Angeles to Anaheim SAA Report (Authority and FRA 2010), and the 2016 Los Angeles to Anaheim Project Section SAA Report (Authority and FRA 2016). The 2016 SAA Report considered two alternatives: Alternative 1 (formerly called the Dedicated High-Speed Train Alternative) and Alternative 2 (formerly called the Consolidated Shared-Track Alternative). Because of higher capital costs, right-of-way impacts, and potential impacts on sensitive resources, the FRA and the Authority eliminated Alternative 1 from further consideration, and refined Alternative 2 to include up to six mainline tracks in the project corridor, which would allow for introduction of HSR service with blended systems and increased Amtrak, Metrolink, and BNSF trains.

The 2016 Refinement Report describes design refinements to 2016 SAA Report Alternative 2. These additional design refinements occurred following the 2016 SAA Report as a result of engagement with key stakeholders within the project corridor. The Authority engaged with various stakeholders, including legislative staff and elected officials, through group and individual briefings with Stakeholder Working Groups and key rail-related organizations such as Amtrak, the LOSSAN Rail Corridor Agency, Metrolink, BNSF, and Metro to address project design and operational issues. More details on stakeholder coordination can be found in Chapter 9.

As described in the 2016 Refinement Report, the Authority made design refinements to Alternative 2 between Redondo Junction and Fullerton Junction, which is the portion of the project section owned by BNSF. Generally, the design refinements to Alternative 2 reduced the total acres that would need to be acquired to introduce HSR service within this active passenger and freight rail corridor. On November 15, 2018, the Authority Board of Directors identified the refined version of Alternative 2, referred to as the 2018 HSR Project Alternative, as the Preferred Alternative for the Los Angeles to Anaheim Project Section.[16] Figure 2-18 and Figure 2-19 illustrate the evolution of the 2018 HSR Project Alternative throughout the alternatives analysis process.

In 2020, the Authority conducted revised scoping to garner additional public and agency input for the BNSF Components (Colton Component and Lenwood Component). Early interested party feedback on the BNSF Colton Intermodal Facility Component (Colton Component) raised substantial opposition and concern to introducing a new intermodal facility far outside the project corridor. In particular, interested parties in the Inland Empire expressed concerns about the Colton facility's impacts with the added concern that the benefits of HSR and its associated improvements would not reach them. Opposition to the Colton Component is documented in the Summer 2020 Agency and Public Scoping Meetings Series Summary Report (Authority 2023a).[17]

[16] Refer to the Authority website, https://hsr.ca.gov/docs/brdmeetings/2018/brdmtg_111518_Item6_Final_Resolution_HSRA18_21_Preferred_Alternative_for_LA-Anaheim.pdf, for final resolution.
[17] Refer to the Authority website, Los Angeles to Anaheim Project Section Supplemental Alternatives Analysis Report (ca.gov), for the report under Appendix A.

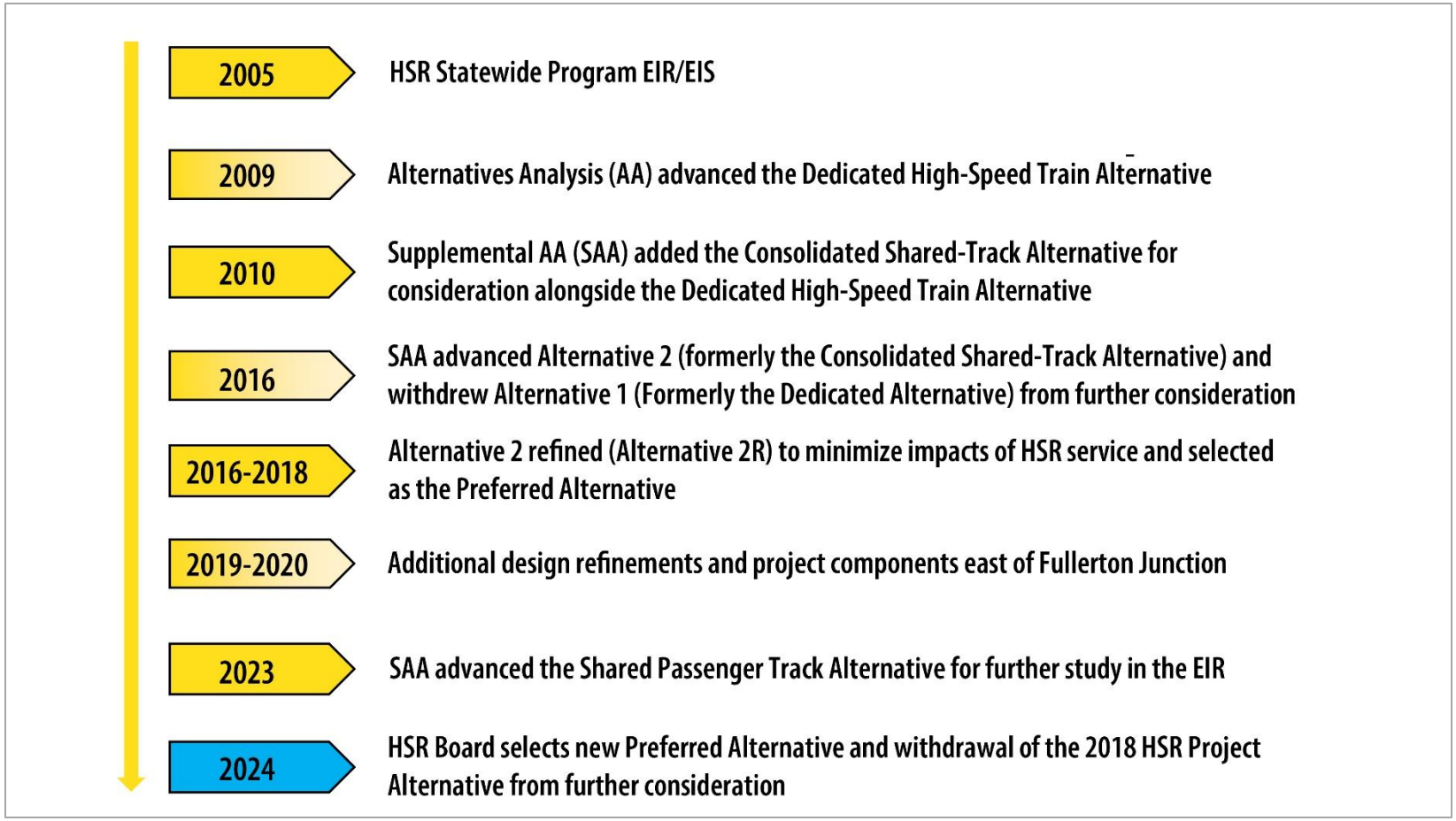
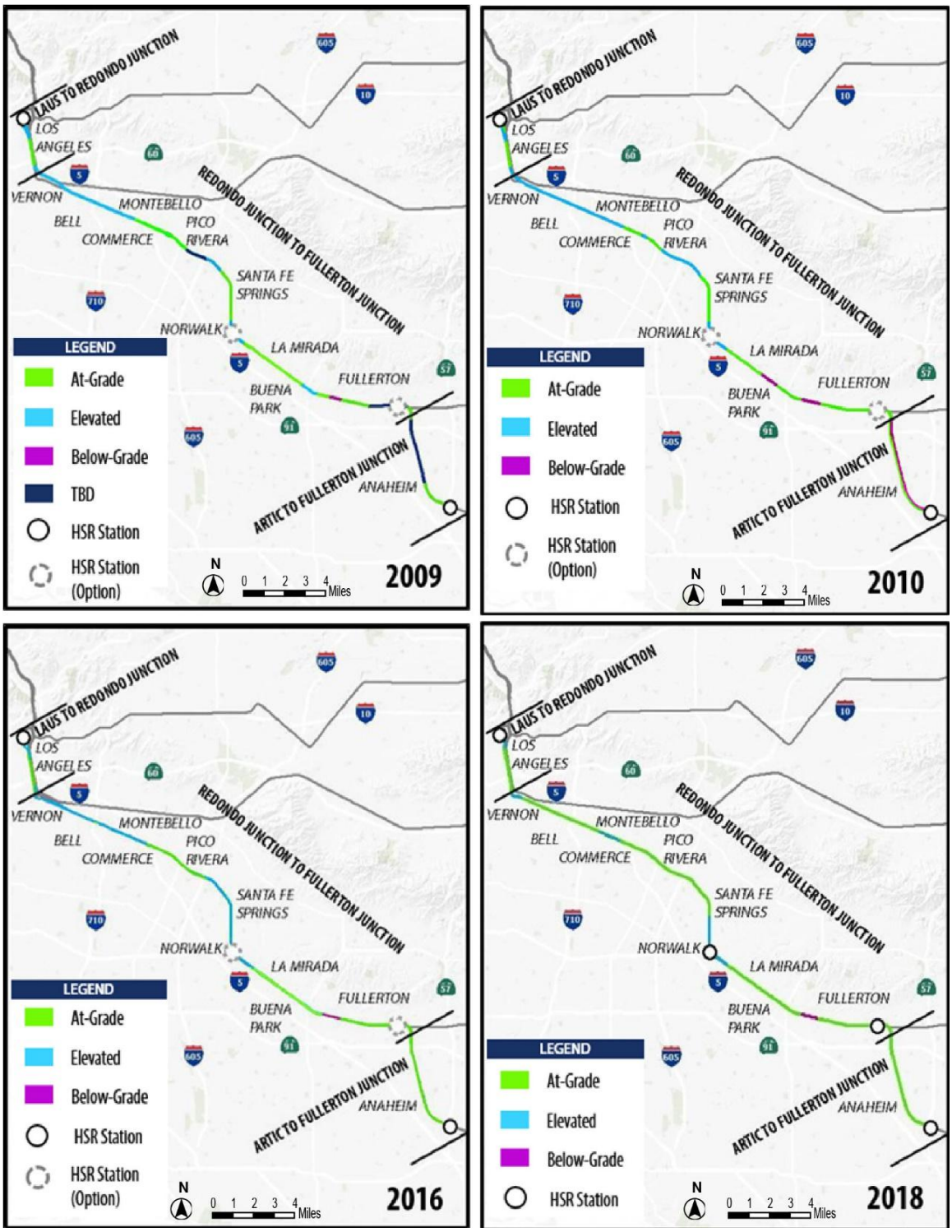


Figure 2-18 Evolution of Los Angeles to Anaheim Project Section Alternatives



Sources: Authority 2023a; ESRI 2020

Figure 2-19 Graphical Representation of Evolution of Los Angeles to Anaheim Project Section Alternatives

Responding to these concerns, the Authority considered additional potential alternatives, within the 2023 SAA Report, that would eliminate the need to redirect trains and trucks to a new BNSF intermodal facility in San Bernadino County (Authority 2023a). To maintain reliability and freight and passenger rail service, staging tracks were identified as mitigation for some alternatives during project construction. The 2023 SAA Report introduced three new alternatives to address the project's purpose and need and respond to concerns expressed on the 2018 HSR Project Alternative. These three new alternatives are the Shared Passenger Track Alternative, 3A – Freeway Tunnel Alternative, and 3B – UPRR Alignment Alternative. The 2018 HSR Project Alternative and the Shared Passenger Track Alternative were initially deemed the best candidates for further analysis. However, because of concerns related to the Colton Component, only the Shared Passenger Track Alternative was selected for continued evaluation. The Shared Passenger Track Alternative follows the same alignment as the 2018 HSR Project Alternative but excludes the Colton and Lenwood Components. Ultimately, it was decided that the Shared Passenger Track Alternative would be subject to further evaluation in this EIR/EIS. This alternative was subsequently analyzed in the 2024 Preliminary Impacts Assessment Report, which considered the inclusion of an LMF at either 15th Street or 26th Street, no intermediate stations or one intermediate station option in either Norwalk/Santa Fe Springs or Fullerton, and limited grade separations in Anaheim. As a result, the Shared Passenger Track Alternative was split into two project alternatives: Shared Passenger Alternative Track A with an LMF at 26th Street and Shared Passenger Alternative Track B with an LMF at 15th Street (Authority 2024a).

2.5.2 Range of Potential Alternatives Considered and Findings

Shared Passenger Track Alternative A and Shared Passenger Track Alternative B are approximately 30 miles long, crossing 12 cities including Los Angeles, Vernon, Bell, Commerce, Montebello, Pico Rivera, Santa Fe Springs, Norwalk, La Mirada, Buena Park, Fullerton, and Anaheim, as well as the unincorporated area of Los Angeles County known as West Whittier–Los Nietos. Figure 2-20 illustrates an overview of Shared Passenger Track Alternative A and Shared Passenger Track Alternative B.

Metro owns the right-of-way from LAUS to Redondo Junction. After Redondo Junction, railroad ownership of the corridor changes from Metro to BNSF.[18] After Fullerton Junction, the railroad ownership changes to OCTA.

The alternatives analysis provides the reader with an understanding of how alternatives were developed, taking into account alignment and station development considerations for the urban corridor between Los Angeles and Anaheim. The alternatives analysis process evaluated design options within individual alternatives to isolate concerns, screen, and refine the overall alternative to avoid key environmental issues or improve performance. The alternatives not carried forward had greater direct and indirect environmental impacts, were impracticable, or failed to meet the project purpose.

Since 2009, the Authority has developed numerous alternatives through several alternatives analysis reports and additional design refinement reports, which are discussed in more detail below. Additional information on alternatives preliminarily considered but not carried forward for full evaluation in this Draft EIR/EIS can be found in the AA Report (Authority and FRA 2009b), the 2010 SAA Report (Authority and FRA 2010), the 2016 SAA Report (Authority and FRA 2016), and the 2023 SAA Report (Authority 2023a).

2.5.2.1 2009 Alternatives Analysis Report

As part of the Tier 1 decisions in the Statewide Program EIR/EIS (Authority and FRA 2005), the Authority eliminated Interstate (I-) 5 and the Pacific Electric right-of-way from the Los Angeles to

[18] BNSF ownership specifically begins at Control Point Soto, a railway interlocking site approximately 1,500 feet east of Soto Street in the LOSSAN Corridor. For the purposes of project definition and environmental analysis, the Redondo Junction is immediately west of where the LOSSAN Corridor crosses the Los Angeles River.

Orange County segment options, and instead carried forward the LOSSAN Corridor; as an existing corridor, this option presented fewer costs because it would not require building a new railway system. In addition, this option presented benefits for commuter services running along the LOSSAN Corridor, which would support greater connectivity and accessibility for passengers. Identified station locations along this corridor included the existing Metrolink stations at LAUS, Norwalk, and Anaheim.

Eliminated in the Statewide Program EIR/EIS (Authority and FRA 2005), the Authority did not evaluate an Anaheim to Irvine subsection because of potential high costs and construction and right-of-way complexities. Therefore, the Authority did not consider it in the 2009 AA Report. The Authority added a station option in Fullerton after receiving scoping comments in favor of a station in this area.

The 2009 AA Report used preliminary planning, environmental, and engineering information to identify feasible and practicable alternatives to carry forward for environmental review and preliminary engineering drawings in the project-level Draft EIR/EIS. For each alternative, the 2009 AA Report evaluated detailed configuration options for three subsections (from south to north)—Anaheim to Fullerton, Fullerton to Hobart Yard, and Hobart Yard to LAUS—and stations. Alternatives analyzed in the 2009 AA Report were the Program Level Shared-Track Alternative, Expanded Shared-Track Alternative, and Dedicated High-Speed Train Alternative. The Program Level Shared-Track Alternative included modifications to the typical at-grade configuration in station areas where freight access would be needed on the southern side of the right-of-way. The Expanded Shared-Track Alternative included three tracks, instead of the two existing, for the subsection between the BNSF Los Angeles Intermodal Facility (referred to as Hobart Yard) and Fullerton. With the information available at the time, the Authority deemed the existing two tracks dedicated to BNSF traffic unable to accommodate future freight and passenger train traffic. The Dedicated High-Speed Train Alternative configuration would allow HSR trains to run on dedicated tracks and leave enough right-of-way for non-HSR traffic operation on up to four conventional tracks if needed in the future. The 2009 AA Report found the Dedicated High-Speed Train Alternative was the only alternative that would provide the capacity and performance to meet the Authority's Phase 1 Service Plan, which proposed five trains per hour (Authority and FRA 2009b). The Authority also determined that shifting existing tracks and using minimum design standards for horizontal features could lessen the right-of-way needed for the Dedicated High-Speed Train Alternative.

Source: Authority 2025

Figure 2-20 Los Angeles to Anaheim Project Section Alignment

Design options carried forward or eliminated from further consideration are captured for various facilities, stations, and yards in Table 2-2.

Table 2-2 Summary of High-Speed Rail Project Alternative Design Options—2009 Alternatives Analysis Report

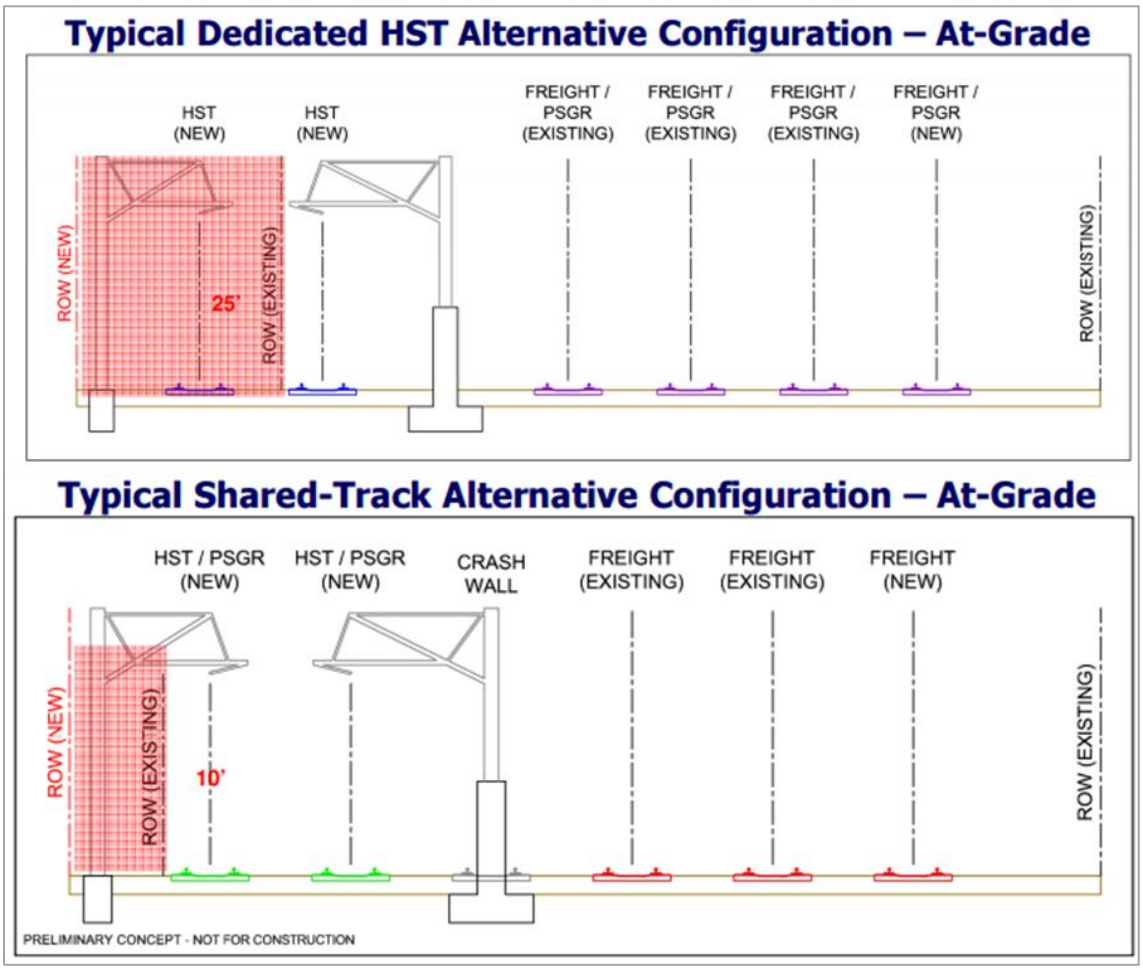
Los Angeles to Anaheim Project Section	Design Options Carried Forward	Design Options Eliminated from Further Consideration
Maintenance/Layover Facilities	▪ Anaheim Area Maintenance/Layover Facility ▪ Los Angeles Area Maintenance/Layover Facility	▪ Intermediate Maintenance/Layover Facilities
ARTIC	▪ 6-track, 2-platform at-grade station	▪ Existing Anaheim Station
Anaheim	▪ At grade ▪ Deep tunnel	▪ Aerial ▪ Braced trench tunnel
Fullerton Station	▪ At grade—no HSR station ▪ Aerial HSR station	▪ Deep tunnel HSR station
Fullerton Airport	▪ HSR tracks in trench	▪ HSR tracks at grade
Buena Park Metrolink Station	▪ HSR tracks south of existing station	▪ HSR tracks aerial
La Mirada rail yards	▪ HSR tracks north of existing tracks	▪ HSR tracks south of existing tracks
Norwalk/Santa Fe Springs Station	▪ No HSR station ▪ HSR station north of existing station	▪ HSR station east of existing station
DT Junction[1]	▪ La Habra Subdivision flyover/Patata Line trench ▪ Tall aerial structure	▪ At-grade rail crossings
Commerce/Vernon rail yards	▪ HSR tracks on aerial structure south of existing tracks	▪ HSR tracks at grade
Interstate 710	▪ Tall aerial structure	▪ At grade
Hobart Yard/Los Angeles River	▪ Washington Blvd/at grade	▪ Union Pacific/tall aerial
Los Angeles Station	▪ Aerial HSR station above existing LAUS	▪ Deep tunnel HSR station below existing LAUS ▪ Shallow trench HSR station on Los Angeles River west bank

Source: Authority and FRA 2009b
[1] DT Junction is the historical and industry name for this area; DT does not represent additional information.
ARTIC = Anaheim Regional Transportation Intermodal Center; HSR = high-speed rail; LAUS = Los Angeles Union Station

2.5.2.2 2010 Supplemental Alternatives Analysis Report

The 2010 SAA Report was released in response to modifications to the alternatives and design options that were made as coordination with local cities and agencies progressed and additional engineering detail became available throughout 2009 and 2010. The 2010 SAA Report accounted for refinements in design criteria and added the Consolidated Shared-Track Alternative to compare to the Dedicated High-Speed Train Alternative (illustrated on Figure 2-21). From the time of the 2009 AA Report, the Authority continued coordination with stakeholders including Metro, OCTA, Metrolink, and Amtrak. This coordination resulted in new proposed operational and

physical configurations that would allow for consideration of a revised shared-track alternative; this became the Consolidated Shared-Track Alternative. Both the Dedicated High-Speed Train Alternative and the Consolidated Shared-Track Alternative were able to provide the capacity and adequate operational performance to introduce HSR service in the LOSSAN Corridor. The Dedicated High-Speed Train Alternative's two tracks exclusively for HSR trains allowed for higher-speed operations than did shared-track alternatives, and would not have potential impacts associated with delayed Metrolink and Amtrak service. It also prevented mixing HSR trains with conventional trains, thus not requiring a waiver from the FRA. The Consolidated Shared-Track Alternative minimized the operating impacts of shared-track operation (such as congestion and delay) by consolidating passenger rail schedules in the corridor while providing separation between freight trains and HSR trains. The Authority and FRA advanced both alternatives for further consideration. As with the 2009 AA Report, the 2010 SAA Report refined various station, alignment, and maintenance facility design options as coordination with local cities and agencies progressed and additional engineering detail became available (Table 2-3 and Table 2-4). Consistent with the 2009 AA Report conclusions, the 2010 SAA Report eliminated the Expanded Shared-Track and Program Level Shared-Track Alternatives from further consideration because of the uncertainty, at the time, of the operational ability for HSR trains to share tracks with other trains (Authority and FRA 2010). The 2010 SAA Report resulted in two alternatives being carried forward for additional study: the Dedicated High-Speed Train Alternative and the Consolidated Shared-Track Alternative.



Source: Authority and FRA 2009b
HST = high-speed train; PSGR = passenger rail; ROW = right-of-way

Figure 2-21 Typical Cross Sections, Dedicated and Shared-Track Alternatives (2009–2010)

Table 2-3 Summary of Dedicated High-Speed Rail Project Alternative Design Options—2010 Supplemental Alternatives Analysis Report

Los Angeles to Anaheim Project Section	Design Options Carried Forward	Design Options Eliminated from Further Consideration
Los Angeles Station	▪ LAUS Aerial HSR station option ▪ LAUS at-grade HSR station option	▪ LAUS deep tunnel HSR station option ▪ Vignes aerial HSR station option ▪ West bank trench HSR station option
Los Angeles River	▪ At-grade option	▪ Tall aerial option
Vernon/Commerce rail yards	▪ Interstate 710 tall aerial option	▪ Interstate 710 at-grade option
Pico Rivera rail yard	▪ Shifted track alignment option	▪ Existing track alignment option
DT Junction area	▪ Tall aerial option ▪ Aerial south option	▪ At-grade option
Norwalk/Santa Fe Springs Station	▪ No HSR station option ▪ East HSR station option	▪ North HSR station option
La Mirada rail yards	▪ At-grade option	▪ Aerial option
Buena Park/Fullerton Airport	▪ Underpass option	▪ Flyover option
Fullerton Station	▪ No HSR station option ▪ At-grade HSR station option	Not applicable
Anaheim	▪ At-grade option ▪ Deep bore tunnel option	▪ Aerial option ▪ Braced trench tunnel option
ARTIC	▪ West at-grade HSR station option ▪ Underground HSR station option	▪ East at-grade station option
Vehicle Maintenance Facility	▪ Anaheim west option ▪ Los Angeles 8th St option[1]	▪ Los Angeles Golden Pig option ▪ Anaheim east option

Source: Authority and FRA 2010
[1] Although the Authority and FRA noted that additional evaluation would be needed for the Los Angeles 8th Street option, it was carried forward as an option.
ARTIC = Anaheim Regional Transportation Intermodal Center; Authority = California High-Speed Rail Authority; FRA = Federal Railroad Administration; HSR = high-speed rail; LAUS = Los Angeles Union Station

Table 2-4 Summary of Consolidated Shared-Track Alternative Design Options—2010 Supplemental Alternatives Analysis Report

Los Angeles to Anaheim Project Section	Design Options Carried Forward	Design Options Eliminated from Further Consideration
Los Angeles Station	▪ LAUS aerial HSR station option ▪ LAUS at-grade HSR station option	Not applicable
Los Angeles River Adjacent	▪ At-grade/cut and cover option	Not applicable
Los Angeles River Crossing	▪ Aerial Los Angeles River crossing	Not applicable

Los Angeles to Anaheim Project Section	Design Options Carried Forward	Design Options Eliminated from Further Consideration
Montebello/Pico Rivera	▪ At-grade option ▪ Aerial option	Not applicable
Norwalk/Santa Fe Springs Station	▪ No HSR station option ▪ East HSR station option	Not applicable
La Mirada rail yards	▪ At-grade option	Not applicable
Buena Park/Fullerton Airport	▪ Underpass option	Not applicable
Fullerton	▪ At-grade option	Not applicable
Fullerton Station	▪ No HSR station option ▪ At-grade HSR station option	Not applicable
Anaheim	▪ At-grade option	Not applicable
ARTIC	▪ East at-grade HSR station option	Not applicable
Vehicle Maintenance Facility	▪ Anaheim west option ▪ Los Angeles 8th St option[1]	▪ Los Angeles Golden Pig option ▪ Anaheim east option

Source: Authority and FRA 2010
[1] Although the Authority and FRA noted that additional evaluation would be needed for the Los Angeles 8th Street option, it was carried forward as an option.
ARTIC = Anaheim Regional Transportation Intermodal Center; Authority = California High-Speed Rail Authority; FRA = Federal Railroad Administration; HSR = high-speed rail; LAUS = Los Angeles Union Station

2.5.2.3 2016 Supplemental Alternatives Analysis Report

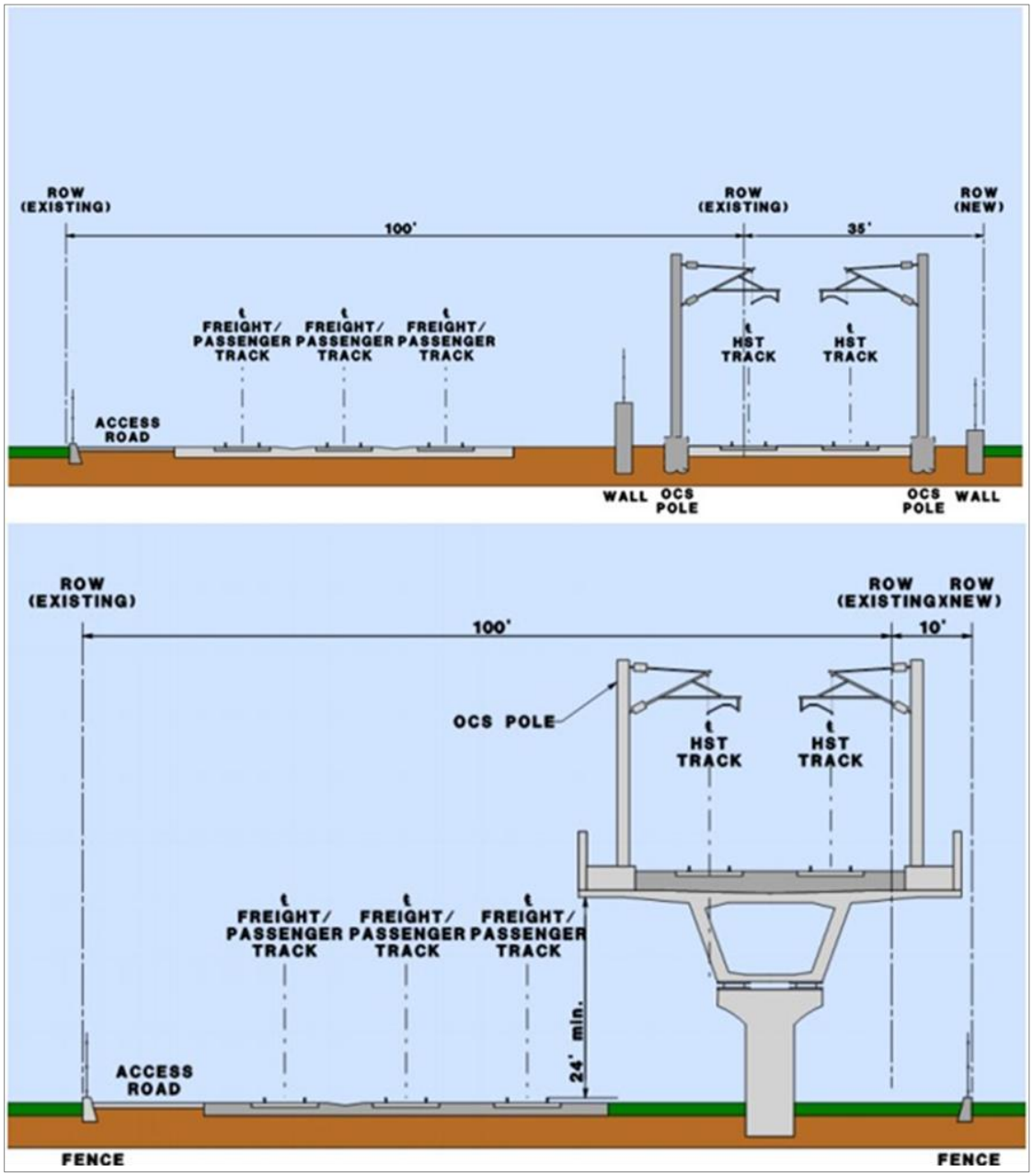
After the 2010 SAA Report, comments were received on prior versions of the SAA Report from stakeholders and the public. The 2016 SAA Report presented the changes that were made in response to those comments and new technical developments, including the emphasis in the Revised 2012 Business Plan, 2014 Business Plan, and Draft 2016 Business Plan on phased implementation of the HSR system as a whole, and implementation of a blended system on the bookends that meets the goal of providing a one-seat ride from San Francisco to Los Angeles and Anaheim. The purpose of the 2016 SAA Report was to describe the latest range of alternatives considered and to:

- Evaluate whether the alternatives meet the HSR project objectives and the purpose and need.
- Evaluate and disclose the potential impacts of the alternatives based on a screening level of information.
- Evaluate whether the alternatives are potentially feasible and reasonable.
- Either recommend alternatives for further study in the environmental review process or withdraw them from further evaluation.

The 2016 SAA Report concluded that Alternative 1 (previously the Dedicated High-Speed Train Alternative) would require the acquisition of additional right-of-way that, while generally included industrial uses, also included some residential areas in the southern section of the corridor. In contrast, Alternative 2 (previously, the Consolidated Shared-Track Alternative), while also requiring right-of-way acquisitions, would not require as many additional right-of-way acquisitions in residential areas south of Fullerton Junction. Alternative 2 was also refined to include certain components of previously considered project alternatives and reflect ongoing stakeholder engagement. The 2016 SAA Report summarized the following recommendations:

- Decrease width of project alternative footprints.
- Avoid potential right-of-way impacts on sensitive land uses, specifically residential areas.
- Increase operational efficiency and safety of existing passenger and freight service within the LOSSAN Corridor.
- Develop alternatives that also provide safety and efficiency benefits to local communities.

The 2016 SAA Report advanced Alternative 2 and eliminated Alternative 1 because of its greater impacts on right-of-way and community resources. Typical cross sections of Alternative 2 are provided on Figure 2-22.



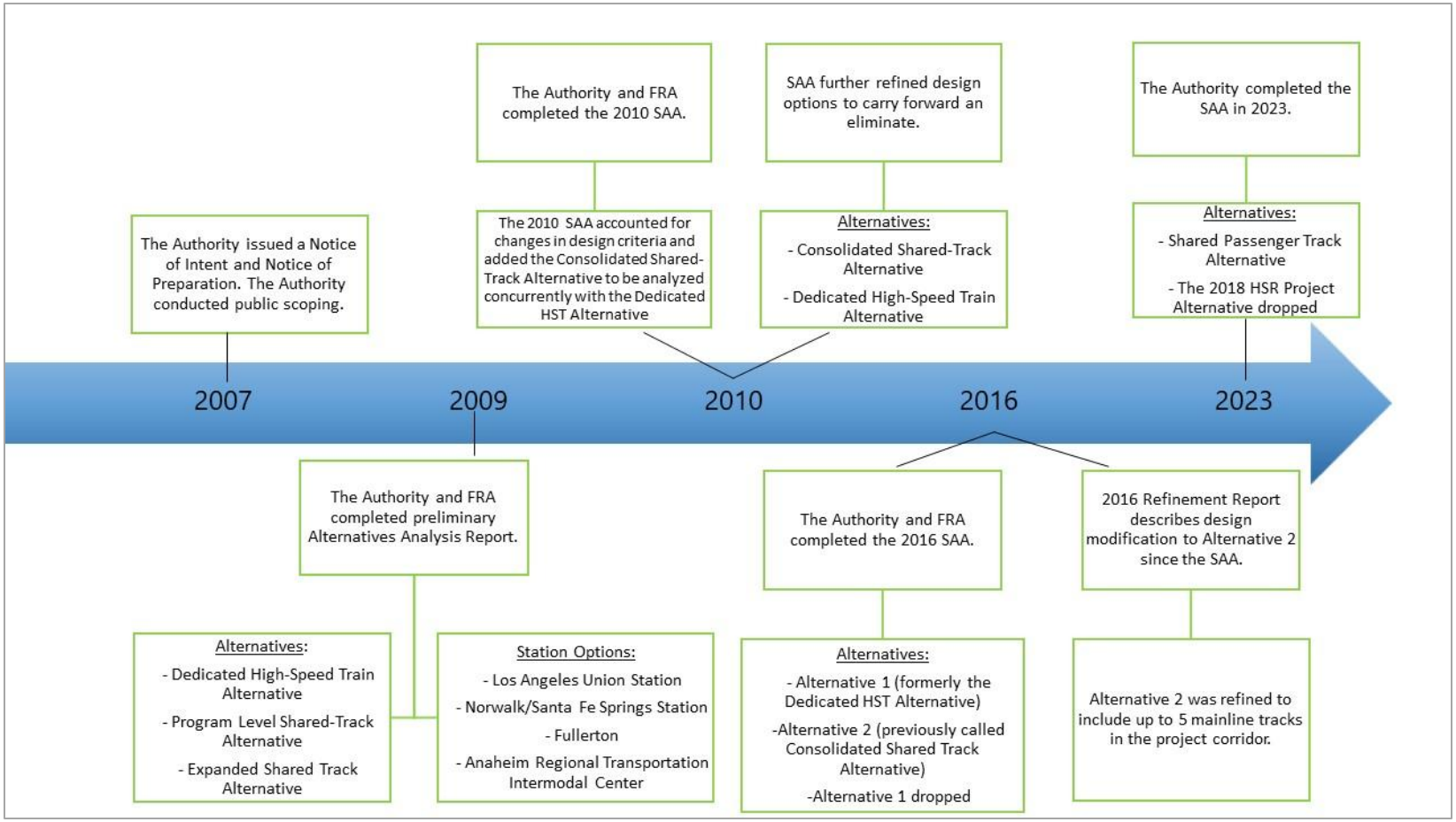
Source: Authority and FRA 2016
HST = high-speed train; OCS = overhead contact system; ROW = right-of-way

Figure 2-22 Typical Cross Sections, Consolidated Shared-Track Alternative (2016)

2.5.2.4 2016 Refinement Report

The 2016 Refinement Report evaluated refinements to Alternative 2 that the Authority advanced from the 2016 SAA Report. It recommended advancing the refined project alternative, named Alternative 2R, for further evaluation in the project Draft EIR/EIS. The refinements further capitalized on the blended system concept and reduced right-of-way impacts by consolidating passenger service on HSR tracks, removing passenger service from freight tracks, and allowing freight trains to use HSR tracks when necessary. These refinements provided two electrified tracks for HSR service while reducing the total number of mainline railroad tracks needed to introduce HSR service within the LOSSAN Corridor. Generally, these additional refinements resulted in avoidance or minimization of potential negative environmental impacts on historic resources, parks and recreational facilities, and water resources; reduced need for property acquisition; reduced construction cost; and were developed as a response to input from the public, stakeholders, and other operators within and adjacent to the railroad corridor.

Figure 2-23 illustrates the alternatives development process since 2007. Table 2-5 summarizes the alternatives and station options considered during the first three rounds of alternative analyses (2009, 2010, and 2016).



Authority = California High-Speed Rail Authority; FRA = Federal Railroad Administration; HST = high-speed train; SAA = Supplemental Alternatives Analysis

Figure 2-23 Potential Alternatives Considered During Alternatives Screening Process

Table 2-5 Los Angeles to Anaheim Project Section Alternatives and High-Speed Rail Station Options Considered (2009–2016)

Alternative	Alternatives Analysis Report Introduced	Eliminated or Carried Forward
Alignment Options		
Dedicated High-Speed Train Alternative	2009 Alternatives Analysis Report	Carried forward in the 2009 Alternatives Analysis Report and 2010 Supplemental Alternatives Analysis Report Renamed Alternative 1 in 2016 Supplemental Alternatives Analysis Report
Program Level Shared-Track Alternative	2009 Alternatives Analysis Report	Eliminated in the 2009 Alternatives Analysis Report
Expanded Shared-Track Alternative	2009 Alternatives Analysis Report	Eliminated in the 2009 Alternatives Analysis Report
Consolidated Shared-Track Alternative	2010 Supplemental Alternatives Analysis Report	Carried forward in the 2010 Supplemental Alternatives Analysis Report Renamed Alternative 2 in 2016 Supplemental Alternatives Analysis Report
Alternative 1	2009 Alternatives Analysis Report (previously called Dedicated High-Speed Train Alternative)	Eliminated in the 2016 Supplemental Alternatives Analysis Report
Alternative 2	2010 Supplemental Alternatives Analysis Report (previously called Consolidated Shared-Track Alternative) Modified in the 2016 Refinement Report	Carried forward in the 2016 Supplemental Alternatives Analysis Report
High-Speed Rail Station Options		
Los Angeles Union Station		
Aerial high-speed rail station above existing LAUS	2009 Alternatives Analysis Report	Carried forward in 2009 Alternatives Analysis Report and 2010 Supplemental Alternatives Analysis Report
Deep tunnel high-speed rail station below existing LAUS	2009 Alternatives Analysis Report Reintroduced in 2010 Supplemental Alternatives Analysis Report	Eliminated in 2009 Alternatives Analysis Report Eliminated in 2010 Supplemental Alternatives Analysis Report
Shallow trench high-speed rail station on Los Angeles River west bank	2009 Alternatives Analysis Report Reintroduced in 2010 Supplemental Alternatives Analysis Report	Eliminated in 2009 Alternatives Analysis Report Eliminated in 2010 Supplemental Alternatives Analysis Report
Vignes aerial high-speed rail station	2010 Supplemental Alternatives Analysis Report	Eliminated in 2010 Supplemental Alternatives Analysis Report

Alternative	Alternatives Analysis Report Introduced	Eliminated or Carried Forward
LAUS at-grade high-speed rail station	2010 Supplemental Alternatives Analysis Report	Carried forward in 2010 Supplemental Alternatives Analysis Report
Norwalk/Santa Fe Springs Station		
No high-speed rail station	2009 Alternatives Analysis Report	Carried forward in 2009 Alternatives Analysis Report and 2010 Supplemental Alternatives Analysis Report
High-speed rail station east of existing tracks	2009 Alternatives Analysis Report Reintroduced in 2010 Supplemental Alternatives Analysis Report	Eliminated in 2009 Alternatives Analysis Report Carried forward in 2010 Supplemental Alternatives Analysis Report
High-speed rail station north of existing tracks	2009 Alternatives Analysis Report	Eliminated in 2010 Supplemental Alternatives Analysis Report
Fullerton Station		
At grade – No high-speed rail station	2009 Alternatives Analysis Report	Carried forward in 2010 Supplemental Alternatives Analysis Report
Aerial high-speed rail station	2009 Alternatives Analysis Report	Carried forward in 2010 Supplemental Alternatives Analysis Report
Deep Tunnel high-speed rail station	2009 Alternatives Analysis Report	Eliminated in 2009 Alternatives Analysis Report
6-track, 2-platform at-grade station	2009 Alternatives Analysis Report	Carried forward in 2010 Supplemental Alternatives Analysis Report
Anaheim Regional Transportation Intermodal Center		
Existing Anaheim station	2009 Alternatives Analysis Report	Eliminated in 2009 Alternatives Analysis Report
Anaheim Regional Transportation Intermodal Center	2009 Alternatives Analysis Report	Carried forward in 2016 Supplemental Alternatives Analysis Report

Source: Authority and FRA 2016
High-speed rail stations carried forward in the 2010 Supplemental Alternatives Analysis Report were also carried forward in the 2016 Supplemental Alternatives Analysis Report.
LAUS = Los Angeles Union Station

2.5.2.5 2018 High-Speed Rail Project Alternative

As described above, Alternative 2R was advanced forward for further analysis. Operationally, the Authority estimated that the main HSR line through the Central Valley would have eight trains per hour in each direction during the peak periods and five trains per hour during the off-peak periods. Alternative 2R included this same operational estimate—that the Los Angeles to Anaheim corridor would have eight trains per hour in each direction during peak and five trains per hour during off-peak. This alternative would be within a shared freight and passenger corridor.

In 2017 and 2018, BNSF provided operational modeling, based on the Authority's plan to run eight HSR trains during the peak period and five HSR trains during off-peak times, indicating that, to maintain freight rail performance and reliability, there was a need for additional freight capacity during construction and operation of the HSR Los Angeles to Anaheim Project Section. Specifically, to maintain existing freight and passenger rail performance, the modeling results demonstrated a need for BNSF staging tracks in Lenwood and the Colton Component, a new freight rail intermodal facility in Colton in San Bernardino County because of the increased train

traffic resulting from the introduction of HSR trains into the corridor. Authority modelers then independently verified the modeling results that established the need for both the Colton Component and the staging tracks in the Lenwood Component. As a result, these BNSF facilities were identified as necessary project components of the project section (Authority 2024c). With the addition of the BNSF staging tracks in Lenwood and the Colton Component, the alternative became known as the 2018 HSR Project Alternative and additional scoping to obtain public and other interested party feedback and information for the environmental review process became necessary. On November 15, 2018, the Authority Board of Directors identified the 2018 HSR Project Alternative as the Preferred Alternative for the Los Angeles to Anaheim Project Section (Authority 2018a). The 2018 HSR Project Alternative included the option of an intermediate station in either Norwalk/Santa Fe Springs or Fullerton, or an intermediate station in both locations. In 2020, the Authority issued a revised Notice of Intent/Notice of Preparation to solicit public input on the Colton and Lenwood Components.

2.5.2.6 2023 Los Angeles to Anaheim Supplemental Alternative Analysis Report

Interested party feedback on the Colton Component received following the Authority's revised scoping in 2020 raised substantial opposition to and concern for introducing a new intermodal facility far outside the project corridor. In particular, interested parties in the Inland Empire expressed concerns about the Colton Component's air quality and community impacts with the added concern that the benefits of HSR and its associated improvements would not reach them. For these reasons, the Authority considered additional alternatives that could eliminate the need to redirect trains and trucks to a new intermodal facility in San Bernardino County.

The 2023 SAA Report introduced three new alternatives to address the project's purpose and need and respond to concerns regarding the 2018 HSR Project Alternative (formerly called Alternative 2R). The three new alternatives were the Shared Passenger Track Alternative, 3A – Freeway Tunnel Alternative, and 3B – UPRR Alignment Alternative.

The 2023 SAA Report determined that the 2018 HSR Project Alternative would no longer be evaluated within the environmental analysis and identified the Shared Passenger Track Alternative to be evaluated further in this Draft EIR/EIS. The Shared Passenger Track Alternative would follow the same alignment as the 2018 HSR Project Alternative but would not include the Colton or Lenwood Components and would operate fewer trains in the project corridor. Operationally, the Shared Passenger Track Alternative would reduce the peak service level for HSR trains to two trains per hour per direction, with up to two trains per hour during off-peak service. Additionally, up to 10 freight trains per day could operate on the passenger tracks, eliminating the need for the BNSF intermodal facility in Colton. However, the 2023 SAA Report indicated that staging tracks would still be needed to mitigate congestion within the corridor that would occur with the introduction of HSR service and shared operations; two potential sites for staging tracks were identified in Victorville and Hesperia. Unlike the 2018 HSR Project Alternative, these proposed staging tracks outside the project corridor were not considered a component of the Shared Passenger Track Alternative; rather, they would be provided as mitigation for freight rail performance impacts resulting from HSR construction and operations. In October 2023, the Authority selected one Shared Passenger Track Alternative for further analysis within the Tier 2, project-level EIR/EIS, which, as described below, was split into two alternatives in 2024.

2.5.2.7 2024 Preliminary Impacts Assessment Report, Selection of Preferred Alternative, and Subsequent Design Refinements

After the 2023 SAA, additional design refinements and outreach occurred, and in May 2024, the Preliminary Impacts Assessment Report was presented to the Authority Board. The Preliminary Impacts Assessment Report further defined elements of the Shared Passenger Track Alternative, such as:

- HSR station options: The build alternative would not have an intermediate station, but an option for an HSR station is considered, in either Norwalk/Santa Fe Springs or Fullerton. One

location could be selected and added to one of the build alternatives should the Authority Board so decide.

- LMF: Two sites would be considered for the LMF, at either 15th Street in Los Angeles or 26th Street in Vernon.
- Grade crossings in Anaheim: Unlike the 2018 HSR Alternative, which grade separated all crossings through Anaheim, the 2024 report recommended only grade separating two crossings and leaving eight crossings at grade to minimize environmental impacts and cost.

The Preliminary Impacts Assessment Report recommended the Shared Passenger Track Alternative be split into two build alternatives: Shared Passenger Track Alternative A and Shared Passenger Track Alternative B. The two build alternatives would be similar in all aspects, except for the LMF size and location. Shared Passenger Track Alternative A proposes an LMF at 26th Street, which would have storage capacity for 24 trainsets, and Shared Passenger Track Alternative B proposes an LMF at 15th Street, which would have storage capacity for 20 trainsets. In May 2024, the Board identified Shared Passenger Track Alternative A without an optional intermediate station as the Preferred Alternative.

In fall of 2024, the staging tracks mitigation sites in Hesperia and Victorville, San Bernardino County, were removed from the build alternatives. The staging tracks had previously been considered for mitigation of freight rail impacts in the 2023 SAA Report and 2024 Preliminary Impact Assessment Report. Because the California Department of Transportation would complete a separate project, the High Desert Operational Efficiency Project (HDOE), which fulfills the same function as the Authority's proposed staging tracks, prior to implementation of HSR, the HDOE will be considered as part of the No Project Alternative; refer to Section 2.6.1.5, Planned Freight Rail Improvements, for more details on the California Department of Transportation project.

2.6 Alignment, Station Site, and Maintenance Facility Site Alternatives Evaluated in this Project Environmental Impact Report/ Environmental Impact Statement

This section describes the alternatives evaluated in this Draft EIR/EIS, which include the No Project Alternative, Shared Passenger Track Alternative A, and Shared Passenger Track Alternative B. This section also evaluates two optional intermediate station locations at the existing Norwalk/Santa Fe Springs Metrolink Station and the existing Fullerton Metrolink/Amtrak Station. Neither Shared Passenger Track Alternative A nor Shared Passenger Track Alternative B includes HSR service at these two optional station locations. These optional intermediate station locations are analyzed should the Authority Board choose to add an HSR station in one of these two existing station locations.

2.6.1 No Project Alternative

NEPA requires the evaluation of a no action alternative in an EIS (64 *Federal Register* 28546, Section 14). Similarly, CEQA requires that an EIR include the evaluation of a no project alternative (State CEQA Guidelines Section 15126.6(e)). The No Project Alternative (synonymous with the No Action Alternative) represents the conditions that would occur if the proposed action is not implemented. Specifically, with respect to the Shared Passenger Track Alternatives, the No Project Alternative reflects the impacts of growth planned for the region as well as existing and planned improvements to the highway, bicycle and pedestrian, aviation, conventional passenger rail, local rail and bus transit, intercity bus, and freight rail systems in the project section area, through the year 2040 time horizon of the environmental analysis.

The following sections describe planned improvements proposed by various agencies that would be implemented regardless of construction and operation of the proposed build alternatives. Planned and other reasonably foreseeable projects under the No Project Alternative would also include commercial and industrial land developments; and utility construction projects. In addition, large residential housing developments consisting of single- and multifamily residential units, condominiums, and apartment projects are planned in the area. The No Project Alternative as it

relates to the Shared Passenger Track Alternatives is discussed in Sections 2.6.1.1, Planned Land Use, through 2.6.1.6, Planned Port Improvements. A full list of anticipated future projects is provided in Appendix 3.19-A, Cumulative Plans and Nontransportation Projects List, and Appendix 3.19-B, Cumulative Transportation Projects Lists.

2.6.1.1 Planned Land Use

As presented in Table 2-6, the California Department of Finance and Southern California Association of Governments (SCAG) forecast Los Angeles County populations to decline by 7 percent and Orange County populations to grow by about 3 percent by the year 2040, while employment is expected to grow by 7 and 17 percent for Los Angeles County and Orange County, respectively. General plan updates in each of the counties and incorporated cities in the region have occurred in preparation for this projected growth.

Table 2-6 Projected Population and Employment in the Resource Study Area

County	2021 Totals	2040 Projections	Percent Change
Population			
Los Angeles	10,019,635	9,306,759	-7
Orange	3,182,923	3,283,811	+3
Employment			
Los Angeles	4,885,032	5,225,800	+7
Orange	1,596,831	1,898,900	+17

Sources: California Department of Finance 2023a, 2023b; SCAG 2020b

Future development projects in Los Angeles and Orange Counties include the implementation of general and specific plans throughout the counties. Growth in the region and populations within the communities' resource study area would add residential and business developments and associated infrastructure to the landscape.

The residential and commercial growth expected in and around Los Angeles and Orange Counties is anticipated to alter land use patterns, convert existing land uses to transportation land uses, and result in incompatibility between adjacent land uses. Residential land uses are the most common sensitive receptors. Other sensitive receptors along the corridor include places of worship, schools, daycare facilities, medical facilities, and elder care establishments. An extensive list of planned developments is detailed in Appendix 3.19-A.

2.6.1.2 Planned Highway Improvements

Analysis of the No Project Alternative considers the funded and programmed improvements on the intercity highway network based on financially constrained regional transportation plans developed by regional transportation planning agencies. The 2020 Regional Transportation Plan (RTP)/Sustainable Communities Strategy (SCS) (SCAG 2020a), 2023 Federal Transportation Improvement Program (SCAG 2023b), and 2022 State Transportation Improvement Program include numerous projects. Table 2-7 identifies planned projects in the fiscally constrained SCAG 2020 RTP/SCS, 2023 Federal Transportation Improvement Program, and 2022 State Transportation Improvement Program that are in the resource study area for transportation. The table includes map identification numbers that coincide with the numbered projects illustrated on Figure 2-24.

Table 2-7 Planned Highways Project List

Location/ Map No.	Routes	Planned Improvements	Project Timeline
1	I-10	Conversion of HOV lanes to HOT lanes on I-10 from Alameda St/ Los Angeles Union Station to I-605 and on I-110 from 182 St/Artesia Transit Center to Adams Blvd	2015–2035
2	SR 710[1]	Bus infrastructure improvements, bikeway improvements including Class I, II, III, or IV bikeway projects, pedestrian safety and roadway improvements, sidewalk improvements	TBD
3	SR 19	Street improvement, Imperial Hwy, Los Angeles County to Harbor Blvd: restripe four to six lanes	2015–2035
4	SR 91: I-5 to SR 57	Freeway improvement: tie existing auxiliary lanes together to form a new fourth mixed-flow lane and modify on- and off-ramps	2025–2028
5	SR 91: I-5 to SR 57	Freeway improvement: one mixed-flow lane addition, SR 91 westbound I-5 to SR 57	2025–2028
6	I-5	I-5 Continuous Access HOV Lane Striping from SR 57 interchange to SR 91/Beach Blvd interchange	2015–2035
7	SR 57	Add one mixed-flow lane and interchange improvements at SR 91, SR 57 northbound: Lincoln Ave to Orangethorpe Ave	2015–2035
8	SR 57	SR 57 Orangewood to Katella-Add 1 mixed-flow lane northbound between Orangewood and Katella	2016–2028

Sources: Caltrans 2022, 2023; SCAG 2023b
Map identification numbers coincide with the numbered projects illustrated on Figure 2-24.
[1] This is a highway project in the 2020 Regional Transportation Plan/Sustainable Communities Strategy. It has since transitioned to a series of bicycle, pedestrian and roadway improvements under the Los Angeles County Metropolitan Transportation Authority's direction.
HOT = high-occupancy toll; HOV = high-occupancy vehicle; I = Interstate; No. = number; SR = State Route; TBD = to be determined

Bottleneck Relief Strategy

In 2013, SCAG studied key regional freight truck bottlenecks and associated projects and since then has incorporated a revised methodology to update the bottleneck analysis used for the 2020 RTP/SCS. Through this analysis, SCAG identified a process with project strategies including Corridor System Management Plans, which are strategies developed to improve the flow of highways and arterials, as well as Transportation System Management, which aims at expanding roadways and filling in gaps to the existing network. These concepts support the assessment of corridors and an analysis on traffic control, traveler data, and incident management (SCAG 2020a). SCAG identified high-priority bottlenecks/congested areas (representing the top 48 freight truck bottlenecks) on I-5 between Los Angeles and Pico Rivera, and between Santa Fe Springs and Buena Park (SCAG 2020a). The 2020 RTP/SCS identified funding toward freight truck bottleneck relief strategies such as ramp metering, extending merging lanes, improving ramps and interchanges, and adding auxiliary lanes (SCAG 2020a).

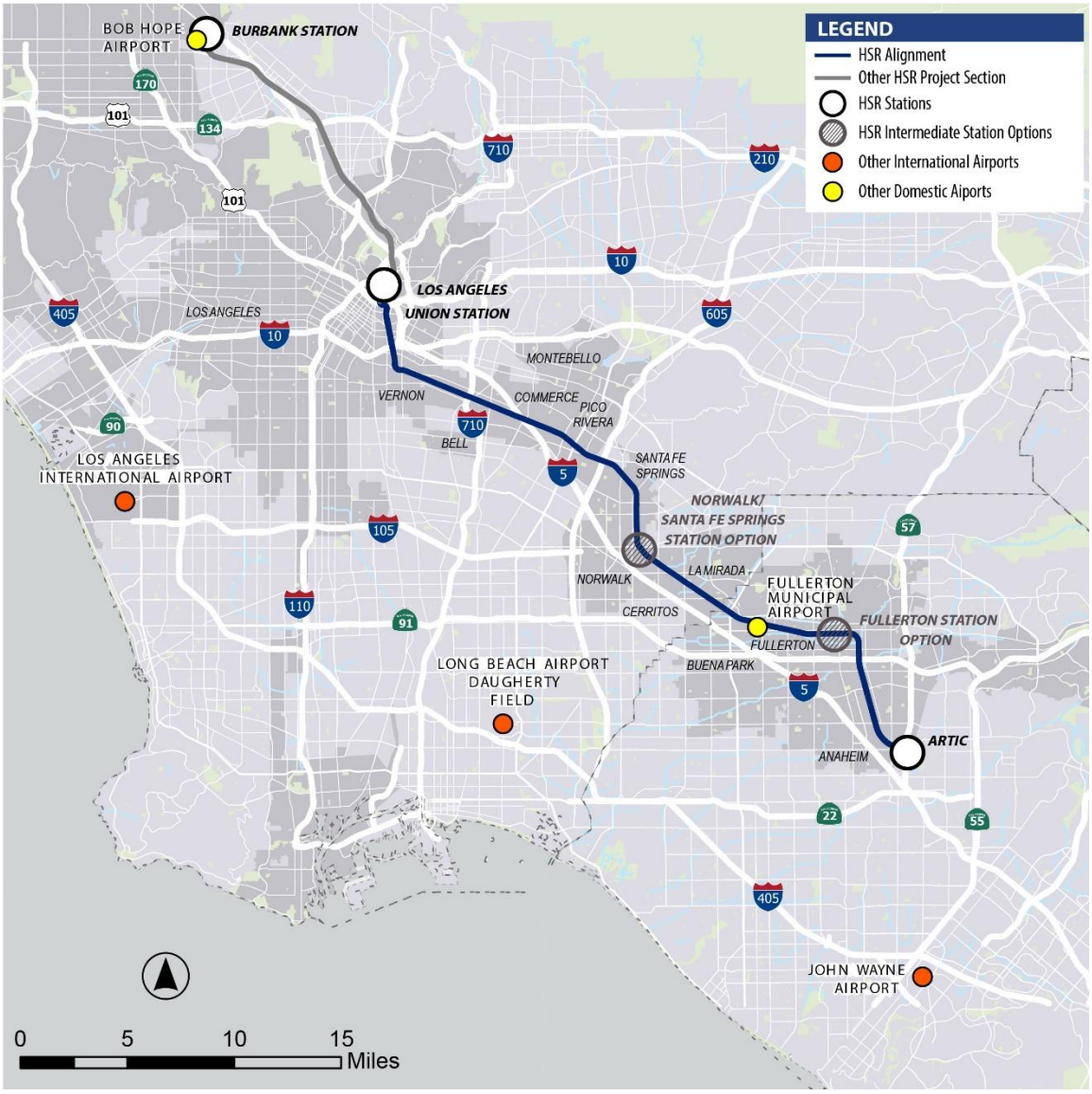
Source: ESRI 2020
Numbers coincide with planned highway projects listed in Table 2-7.

Figure 2-24 No Project Alternative Planned Highway Improvements in Los Angeles and Orange Counties

2.6.1.3 Planned Aviation Improvements

There are three international airports (Los Angeles International Airport, Long Beach Airport, and John Wayne Airport), one commercial service airport (Hollywood Burbank Airport), and one reliever airport (Fullerton Municipal Airport) providing service within the project section (FAA 2012). The Hollywood Burbank Airport (Bob Hope Airport) is analyzed as part of the Burbank to Los Angeles Project Section. For more information about Burbank Airport, please refer to the Burbank to Los Angeles Project Section Final EIR/EIS, available on the Authority's website. In addition, there are three other general aviation airports within a 15-mile vicinity of the project section. General aviation airports in the area provide civil aviation operations other than scheduled air services, with flights including nonscheduled air charters, commuting flights, and corporate business jet flights.

Figure 2-25 illustrates the locations of international and domestic airports in the project section area, a portion of which have planned improvements or projects, which are detailed further in the tables and text below.



Source: ESRI 2020

Figure 2-25 Airports within the Project Area

Los Angeles International Airport

Table 2-8 summarizes the active Los Angeles International Airport projects that are planned or under construction (Los Angeles World Airports 2024).

Table 2-8 Los Angeles International Airport Major Projects

Project Name	Description	Project Timeline
Airfield & Terminal Modernization Project	This project would add two new terminals, called Concourse 0 and Terminal 9, for a total of 23 new gates. The project would also include an infill station for the under-construction LAX Automated People Mover at the proposed Terminal 9. The project would include airfield and roadway improvements, with the goals of reducing tarmac wait times, enhancing passenger experience, and reducing congestion on roadways that access LAX terminals.	In planning phase
Landside Access Modernization Program (LAMP)	The program includes the LAX Automated People Mover, Intermodal Transportation Facilities, a Consolidated Rent-A-Car Center, improvements to the Central Terminal Area, and a connection to Metro Green (C) Line. These projects seek to accomplish the following: ▪ Relieve traffic congestion within the Central Terminal Area and the surrounding street network. ▪ Create new convenient locations for passenger pick-up, drop-off and parking outside of the Central Terminal Area. ▪ Give passengers a fast and reliable way to get to their flights. ▪ Reduce vehicle emissions and improve air quality.	Phase I Construction 2018–2023 Phase II Construction 2025–2035 Operational by 2035
Midfield Satellite Concourse – North/ Baggage Optimization Project	A new concourse addition to the Tom Bradley International Terminal will feature 12 aircraft gates as well as a Baggage Optimization Project that will expand capacity for the Tom Bradley International Terminal and the new facility.	Under construction
Northside Development	The Northside Development, also known as the bow tie, is an approximately 70-acre section of land north of Westchester Parkway in which LAWA will be developing commercial and open space in the coming years. The commercial area includes 901,000 square feet of allowable development for a variety of commercial applications. Nearly 13 acres of land designated for recreational areas will also be built as part of the community benefits of the project.	In planning phase
Receiving Station X	In cooperation with the Los Angeles Department of Water and Power, LAWA is building a new $157.8 million power receiving station, Receiving Station X, that will address persistent power reliability, redundancy, and capacity issues at LAX.	Operational by 2025
Terminals 4 and 5	Terminals 4 and 5, home to American Airlines, JetBlue and Spirit Airlines, are undergoing a $1.6 billion modernization slated to complete in 2027 that will create a centralized location for ticketing, screening, and baggage claim with enhanced amenities for guests, as well as provide direct connection to the Automated People Mover rail system.	Operational by 2027

Source: Los Angeles World Airports 2024
LAWA = Los Angeles World Airports; LAX = Los Angeles International Airport; Metro = Los Angeles County Metropolitan Transportation Authority

Long Beach Airport

As part of Long Beach Airport's Modernization Program, the airport launched the second phase of terminal improvements following the completion of Phase 1 in 2012, which included a new passenger concourse, parking structure, and other improvements. Phase 2 focuses on presecurity improvements to enhance the overall experience for visitors and passengers, which include renovating facilities and spaces and improving overall functional flow. Construction of

Phase 2 began in 2020, with most elements completed in 2024. Other elements designed as a part of Phase II were delayed as a result of budget constraints; the terminal roadway improvements project is anticipated to be completed by end of 2024, with other improvements continuing into early 2025 (LGB Road Improvements 2024).

John Wayne Airport

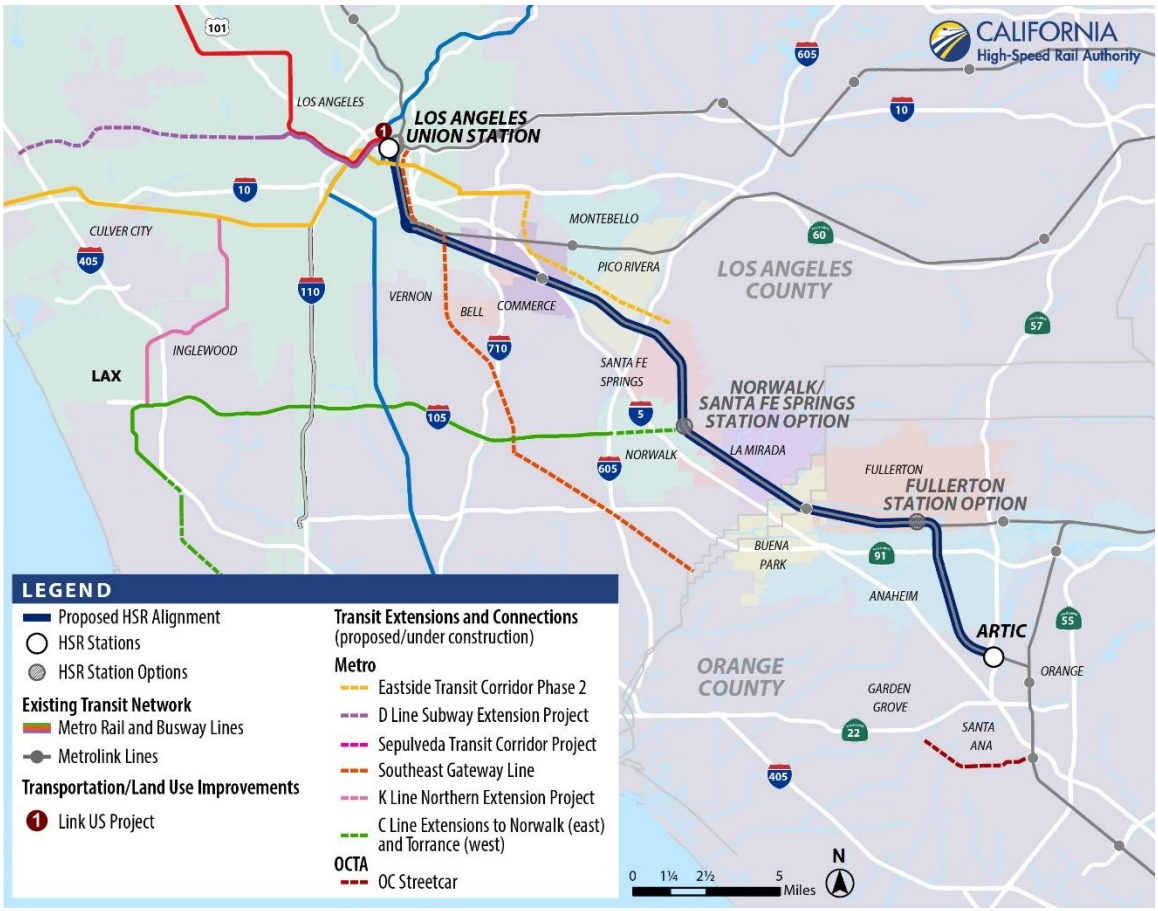
John Wayne Airport currently has no listed, active projects in the planning phase.

Fullerton Municipal Airport

Fullerton Municipal Airport currently has no listed, active projects in the planning phase.

2.6.1.4 Planned Local and Regional Fixed Guideway Transit Rail and Bus Improvements

The 2040 No Project Alternative transit service levels include planned bus and rail services to accommodate regional growth. Although these services have generally been planned assuming the potential for future feed into HSR, Metro services would affect and increase overall service levels even if the No Project Alternative is chosen. Planned local and regional rail and bus improvements under the No Project Alternative are illustrated on Figure 2-26.



Sources: ESRI 2020; Metro n.d.

Figure 2-26 No Project Alternative Planned Local and Regional Fixed Guideway Passenger Rail Improvements in Los Angeles and Orange Counties

Local

Rail

There are several local transit projects under evaluation and expected to operate in the near future. The SCAG 2020 RTP/SCS lists some of these projects. Other projects were identified from agency websites. Other relevant plans were identified from transportation authorities and agencies.

Link Union Station

Metro is proposing the Link Union Station (Link US) project to increase the regional and intercity rail service capacity of LAUS and to improve schedule reliability at LAUS through implementation of a run-through tracks configuration and elimination of the existing stub-end tracks configuration while preserving current levels of freight rail operations, accommodating the planned HSR system in Southern California, increasing the passenger/pedestrian capacity, and enhancing the safety of LAUS. Additionally, the Link US project includes a new passenger concourse that meets the multimodal transportation demands at LAUS (Metro 2024d). The Metro Board of Directors certified the Final EIR in June 2019.[19] In October 2019, Metro and the Authority, as the federal lead agency under NEPA assignment, began preparation of the Draft EIS. In December 2022, Metro began preparing a Supplemental EIR to disclose minor additions or changes that occurred since the Final EIR certification. Metro released the joint Draft EIS/Supplemental EIR for public review and comment in June 2024. Metro is currently preparing a Final EIS/Supplemental EIR. The project has an anticipated opening year as early as 2026 for the first phase and 2031 for the second final phase (Metro 2024d). The Link US project includes tracks that HSR trains would run on through LAUS to First Street, and it accommodates the space needed for HSR OCS infrastructure, which the Authority would be responsible for when the HSR project is implemented.

Southeast Gateway Line (Previously known as West Santa Ana Branch Transit Corridor)

Metro is evaluating a new light rail transit system connecting southeast Los Angeles County to downtown Los Angeles via the abandoned Pacific Electric right-of-way/West Santa Ana Branch Transit Corridor, and a combination of local streets and Metro-owned rail right-of-way (Metro 2024f). The study area stretches approximately 12 miles from LAUS to the Pacific Electric right-of-way/West Santa Ana Branch Corridor in Paramount and 8 miles south along the corridor to Artesia. The Final EIS/EIR was certified by the Metro Board in April 2024, and the Record of Decision was received in August 2024. The project is expected to open in 2035.[20]

Metro 2028 Games Mobility Concept Plan

Metro's 2028 Games Mobility Concept Plan is an agency-wide strategic plan for transforming mobility in Los Angeles County through the year 2028 (Metro 2023). In preparation for the 2028 Los Angeles Olympics, where there will be approximately 1 to 15 million tickets sold for more than 700 events, Metro completed a multidisciplinary needs assessment and identified the top 50 projects for Metro Board approval and Games Mobility Executives consideration. The Games Mobility Executives represent LA28 (the organizing committee of the 2028 Olympics) and transit operators in the region. The Games Mobility Executives then selected and presented to the U.S. Department of Transportation the priority mobility projects for the 2028 Los Angeles Olympics games. These projects are:

- Transit to Venue First/Last Mile
- Regional Mobility Hubs
- Key Station Improvements
- Light Rail Speed and Operational Improvements

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[19] Date as indicated on Link US project website (www.metro.net/projects/link-us/). Dates are tentative and subject to change.

[20] https://www.metro.net/projects/southeastgateway/

- Games Route Network Design & Implementation
- Open Streets Programs
- Countywide and Freight Transportation Demand Management Program
- Universal Basic Mobility
- Access Services Electric Vehicle (EV) Fleet and Infrastructure
- Automated Traffic Surveillance and Control and Los Angeles Regional Transportation Management Center Integration & Operations Enhancements
- Inglewood Transit Connector
- Metrolink Fleet and Track Capacity Improvements: SCORE Phase I Completion

Refer to the Local Bus Service section below for more information on bus projects that are part of the Metro 2028 Games Mobility Concept Plan.

Metro Green (C) Line Extension

Metro is studying an extension of the C Line into the South Bay, connecting the existing Redondo Beach (Marine) Station and the Torrance Transit Center (Metro 2024a). This extension's purpose is to provide congestion relief along the busy I-405 corridor. It will also improve mobility in southwestern Los Angeles County by providing access to the regional rail network through connections to the Metro A and E Lines. Metro released the Draft EIR in January 2023, and a locally preferred alternative was selected in May 2024. Metro is preparing the Final EIR to be released in the second half of 2025.[21]

Metro C Line Extension to Norwalk

An extension of the existing C Line east to Norwalk had been studied by several agencies since the opening of the C Line, and Metro recently examined it in the Los Angeles County Rail Network Integration Study (Metro 2024e). The study looked at four options to connect the existing eastern terminus in Norwalk to the Norwalk/Santa Fe Springs Metrolink Station, which included an extension of the light rail. This extension is funded in Metro's Measure M, with a completion date of 2052.

Metro Purple (D) Line Extension

The Metro Purple (D) Line Extension Project will expand the existing Metro Purple Line subway from its current western terminus at Wilshire Boulevard/Western Avenue westward approximately 9 miles to the Veterans Affairs Medical Center in Westwood, Los Angeles (Metro 2024b). The extension will provide seven new stations. In April and May 2012, the Metro Board of Directors certified its Final EIS/EIR. Construction began in 2019 and is proceeding in three phases. Section 1 is expected to open in 2025, Section 2 in 2026, and Section 3 in 2027.

OC Streetcar

The OC Streetcar is a $289 million, Measure M2-initiated, streetcar project being led by OCTA. The OC Streetcar is expected to open in 2026. The approximately 4-mile route will travel from the Santa Ana Regional Transportation Center to a new multimodal hub in Garden Grove on the corner of Harbor Boulevard and Westminster Avenue. The project's primary purpose is to provide "last-mile" connections to Orange County's Metrolink and Amtrak service at the Santa Ana Regional Intermodal Transportation Center. The streetcar will travel along a combination of local streets and a dedicated OCTA right-of-way that once formed part of the defunct Pacific Electric Railway. The streetcar will serve downtown Santa Ana and the Civic Center, which includes government offices; federal, state, and local courthouses; restaurants and shops; several colleges; and a variety of community enrichment organizations. The project began construction in October 2018 and is anticipated to be complete in 2026 (OCTA 2025).

[21] https://www.metro.net/projects/green-line-extension/

Local Bus Service

Various entities and agencies are currently studying, or are in the process of designing several local bus service projects. Local agencies are pursuing other potential projects but have not made them available for public review.

Metro 2028 Games Mobility Concept Plan

As discussed above, Metro's 2028 Games Mobility Concept Plan (Metro 2023) also includes the following bus projects:

- Countywide Bus Only Lanes & Transit Signal Priority Improvements
- Supplemental Bus System
- Phase I Zero Emissions Bus Program

Regional

Rail

Los Angeles – San Diego – San Luis Obispo Corridor Plans

Several recent studies and plans detail potential near-term improvements to the LOSSAN Corridor. These include numerous grade separation and crossing improvements between Fullerton and Irvine as described in the LOSSAN Rail Corridor Agency Business Plan, Fiscal Year [FY] 2019 – 2020 and FY 2020–21 (LOSSAN Rail Corridor Agency 2019).

The 2021 LOSSAN Optimization Study establishes a framework for delivering an integrated rail system in Southern California. The LOSSAN study consolidates past and ongoing planning efforts across the LOSSAN Corridor to develop optimized operating strategies aimed at achieving planned service levels (LOSSAN Rail Corridor Agency 2021).

The 2013 Pacific Surfliner South Corridor Service Development Plan evaluates the potential for transit-oriented development, joint use, and joint development opportunities at each station along the LOSSAN Corridor. The report includes evaluations of additional transit-oriented development and joint use/development potential beyond existing conditions at the Fullerton, Anaheim, and Santa Ana Stations (Caltrans 2013).

The 2012 LOSSAN Corridorwide Strategic Implementation Plan, as reflected later in the LOSSAN Business Plan, expresses the County of Orange's and OCTA's desire to remove as many at-grade crossings as possible along the LOSSAN Corridor (LOSSAN Rail Corridor Agency 2012). This is especially important in light of the ridership growth forecast for Amtrak, Metrolink, and HSR operations by 2030.

The plan also calls for enhanced connections between ARTIC and Los Angeles International Airport, and between Santa Ana Regional Transportation Center and John Wayne Airport. According to preferred service plans in the LOSSAN Corridorwide Strategic Implementation Plan, and under the plan's long-term operational analysis, passenger intercity (Amtrak) and commuter (Metrolink) rail service in Orange County are expected to grow from 57 trains (2014) to 100 trains per day by 2030.

Additionally, the LOSSAN Corridorwide Strategic Implementation Plan includes the following new services:

- New Coast Starlight service: one round-trip per day
- New East Ventura to Santa Barbara commuter service: four round-trips per day
- New Los Angeles to San Diego commuter service: five round-trips per day split between Metrolink and Coaster
- New express service: four round-trips per day split between Metrolink and Pacific Surfliner
- New Metrolink service to San Jacinto: eight round-trips per day

The 2023 LOSSAN Strategic Plan Update calls for increased frequency on LOSSAN's Pacific Surfliner service, and an expansion of service along three emerging corridors: the Coast Corridor

Route, the Salinas Extension, and the Coachella Valley Route. The plan describes an increase in the number of daily Pacific Surfliner round trips from 13 to 18 by 2030. The plan also calls for integrated ticketing between agencies, an interest in expanding the amount of double tracking along the corridor, and expansion of the Surfliner fleet to at least 20 trainsets. Lastly, the 2023 update proposes the removal of at-grade crossings at prioritized locations along the LOSSAN Corridor.

Metrolink 10-Year Strategic Plan

In 2015, the Southern California Regional Rail Authority adopted the *10-Year Strategic Plan*, a conceptual planning document aimed at aiding Metrolink in meeting future ridership demands through 2025. The strategic assessment forecasts Metrolink will grow from 165 current daily trains to 240 by 2025 systemwide (SCRRA 2015). The plan aims to:

- Strengthen core institutional functions, focused 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
- Evaluate the potential for additional reverse-commute trips to address the growth balance of travel patterns in the region
- Initiate discussions with host railroads on 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

Metrolink 5-Year Short-Range Transit Plan

The Metrolink 5-Year Short-Range Transit Plan (SCRRA 2016) assesses the current Metrolink system, based on projected growth and proposed improvements between 2015 and 2020. The Short-Range Transit Plan advances the Southern California Regional Rail Authority toward achieving the 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 measures the plan's performance. Although the timeline of this plan would not overlap with HSR implementation in the project section, HSR would support Metrolink's goal of increasing regional mobility.

Metrolink Strategic Business Plan

In 2021, the Southern California Regional Rail Authority adopted the Strategic Business Plan, a forward-looking tool for the Southern California Regional Rail Authority (Metrolink 2021), outlining a sustainable vision for the agency over the next 30 years as it aims to become the preferred rail travel option in Southern California. Building on previous strategic plans (including 5-year and 10-year plans), the Strategic Business Plan adopts a dual approach, balancing short-term growth options with long-term aspirational goals. It acknowledges Metrolink's recent successes in safety, ridership, and reliability while aiming to enhance efficiency and resilience. Considering the impacts of COVID-19, the Strategic Business Plan incorporates a Recovery Plan Framework, emphasizing a triple bottom line approach (Economy, Environment, Equity) alongside financial results. The plan identifies strategies to attract and retain riders, aligning with regional goals, and outlines capital investments to provide immediate benefits to the system.

Southwest Multi-State Rail Planning Study

The Southwest Multi-State Rail Planning Study (FRA 2014) was the first high-performance rail planning study led by the FRA. The Southwest Multi-State Rail Planning Study was a case study that informed the FRA's subsequent activities as well as the overall national rail planning effort. Representatives from key transportation organizations across Arizona, California, Colorado, Nevada, New Mexico, and Utah worked through the challenges of developing multistate rail plans and outlined a common preliminary technical vision for high-performance rail in the Southwest as part of this study. The study demonstrated an analytical framework for developing early-stage high-performance rail network planning concepts and examining the institutional context for

establishing and implementing a long-range rail vision providing integrated rail network connectivity among the rail organizations' planning efforts. Additionally, the study offered a planning framework, recommendations, and valuable insights that can serve as a model for similar initiatives in other regions.

Coachella Valley – San Gorgonio Pass Rail Corridor Service

The Riverside County Transportation Commission is working with the California Department of Transportation and FRA to provide approximately 144 miles of extended passenger rail service from Los Angeles to the Coachella Valley with the proposed Coachella Valley – San Gorgonio Pass Rail Corridor Service, serving Southern California communities in Los Angeles, Orange County, and the Inland Empire (RCTC 2022). The Coachella Valley – San Gorgonio Pass Rail Corridor Service would run on an existing rail corridor, with a western endpoint at LAUS and an eastern endpoint in Coachella in Riverside County. The passenger rail service is considering multiple alignments, including segments where service would operate in the LOSSAN Corridor between LAUS and Fullerton. The service would operate two round trips daily with an approximate trip time of 3 hours and 15 minutes. The Riverside County Transportation Commission released a draft Tier 1/Program EIS/EIR for public review in spring 2021. The final Tier 1 document was certified in June 2022. The Riverside County Transportation Commission is actively seeking funding to proceed with preparing Future Tier 2/project NEPA/CEQA documents to advance the project.

Regional Bus Service

Various entities and agencies are currently studying or are in the process of designing several regional bus service projects. Local agencies are pursuing other potential projects but have not made them available for public review.

2.6.1.5 Planned Freight Rail Improvements

The project section vicinity includes part of the Metro-owned East Bank, the BNSF San Bernardino Subdivision, as well as the commuter rail corridor owned by OCTA. BNSF has track usage rights along the OCTA commuter rail corridor. The BNSF San Bernardino Subdivision is used to connect freight rail with the regional and national rail network. In the year 2040, under the No Project Alternative, freight train volume along the San Bernardino Subdivision between LAUS and Fullerton Junction is estimated to be 165 freight trains each weekday (Authority 2019b).[22] Neither UPRR nor BNSF have published information on planned rail projects in or near the project section.

The regional goods movement strategy presented in the SCAG 2020 RTP/SCS consists of the following major elements.

California Department of Transportation High Desert Operational Efficiency Project

The HDOE project, originally proposed in Lenwood (also potentially referred to as Barstow), is now proposed in Hesperia and unincorporated areas of San Bernardino County within BNSF right-of-way, extending for approximately 11.2 miles between railroad mile post 41.8 to the north and mile post 53.0 to the south on the BNSF Cajon Subdivision. The project includes the construction of two 22,500-foot-long staging tracks and an 11-mile extension of the existing Main Track 1, matching the lengths of Main Tracks 2 and 3 between control point Martinez and control point Thorn. This project was approved in April 2024 and has received funding through the State of California's Port and Freight Infrastructure Program and Trade Corridor Enhancement Program.

This project will increase operational efficiency of freight rail movement to and from the San Pedro Bay ports, through the Los Angeles Basin, and within the High Desert Freight

[22] For LAUS to Fullerton, existing conditions are provided by BNSF, based on data from August 2016; 2040 Horizon Year projections are based on 2 percent annual growth. This is consistent with the 2018 California State Rail Plan (page 28), which anticipated growth to compound annually at a rate of 1.7 percent and 2.9 percent for carload and intermodal services, respectively.

Corridor. The HDOE staging tracks allow freight trains to be staged outside and east of the LOSSAN Corridor during routine maintenance in the LOSSAN Corridor and during periods of construction in the LOSSAN Corridor, instead of having to stage them on tracks within the constrained 30-mile portion of the LOSSAN Corridor at issue in this Draft EIR/EIS (Authority 2019b, 2024c).

Freight trains held on the HDOE tracks would be scheduled so they are in the correct operating window when they reach Fullerton Junction, minimizing delay for all passenger and freight operators in the LOSSAN Corridor.

In addition, the third main track will allow freight and passenger trains to more easily pass one another, alleviating delays and improving operations. The HDOE staging tracks will be in approximately the same area the Authority had previously considered for staging tracks mitigation, as described in Section 2.5.2, Range of Potential Alternatives Considered and Findings. The HDOE staging tracks will allow for more efficient shared operations within the 30-mile segment of the LOSSAN Corridor under consideration in this Draft EIR/EIS, as well as along the entire freight network in Southern California. The project is expected to begin construction in 2025 and to complete construction by July 2027, prior to construction of the project section (Authority 2024c).

Rail Strategy

The railroad system in the SCAG region provides a critical connection between the largest port complex in the country and producers and consumers throughout the U.S. The BNSF-owned portion of the corridor between Redondo Junction and Fullerton Junction is a critical component of the intermodal rail connection between the Port of Los Angeles and the Port of Long Beach, and the rest of the country. Over half of the international cargo arriving at the Ports of Los Angeles and Long Beach uses rail (including on-, near-, and off-dock). Railroads also serve a myriad of domestic industries, predominantly for long-haul freight leaving the region. The extensive rail network in the SCAG region is a critical link in the regional supply chain, offering shippers the ability to move large volumes of goods over long distances at lower costs versus other transportation options.

Goods Movement Environmental Strategy

The SCAG 2020 RTP/SCS proposes an environmental strategy to tackle challenges meeting federal air quality standards caused by emissions from goods movements, while ensuring efficient and safe goods transportation. Central to this strategy is the integration of advanced technologies with benefits such as improved air quality, energy security, and economic growth. The plan outlines a process to accelerate the development and deployment of these technologies, emphasizing the importance of considering their full life-cycle impacts.

The SCAG 2020 RTP/SCS does not include freight-related projects (excluding roadway-rail grade separation projects) along or connecting to the corridor.

California Transportation Plan 2050

California Transportation Plan 2050 (CTP 2050), prepared by the California Department of Transportation, provides a long-range policy framework for guiding transportation decisions and investments by all levels of government and the private sector. CTP 2050 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 2021b).

CTP 2050 was initiated in early 2020 in response to Senate Bill 391 (Caltrans 2021b). The California Interregional Blueprint accompanies CTP 2050 and 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 2050, which concluded with the plan's approval by the Secretary of the California State Transportation Agency in 2021 (Caltrans 2021a).

CTP 2050 would carry forward *California Transportation Plan 2040*'s focus on meeting emerging trends and economic and job growth, climate change, freight movement, and public health challenges.

LAUS Master Plan

The Metro-owned LAUS is a regional transit hub and serves as a point of connectivity for Amtrak, Metro, and municipal buses/shuttles; Metro Rail (Red, Purple, and Gold Lines); and Metrolink. After purchasing LAUS in 2011, Metro began a 2-year process (2012 to 2014) to develop a master plan for the historic station. The *Union Station Master Plan* sought to implement three programmatic goals: transit optimization, creation of a great destination, and improved connectivity. In 2015, Metro released a synopsis of the 2-year master planning process titled *Transforming Los Angeles Union Station, a Summary Report* (Metro 2015).

In October 2015, Metro approved an action that called for the Link US project (formerly the Southern California Regional Interconnector Project) to incorporate the master plan's multimodal passenger concourse in its environmental analysis and for the Link US project and master plan to accommodate for HSR at the rail yard. For further information on the Link US project, refer to Section 2.6.1.4, Planned Local and Regional Fixed Guideway Transit Rail and Bus Improvements.

2.6.1.6 Planned Port Improvements

The Port of Los Angeles is the largest port in California and the U.S. and is ranked the 16th largest in the world in terms of its container volume, moving nearly 9 million 20-foot container units a year (Port of Los Angeles 2024). It encompasses 7,500 acres of land and water along 43 miles of waterfront, and features 27 passenger and cargo terminals, including automobile, breakbulk, container, dry and liquid bulk, multiuse, and warehouse facilities. The Port's planned $2.6 billion investment in capital improvements over the next decade will ensure its continued ability to provide superior cargo terminals, rail, and warehouse infrastructure, and attract top business tenants from around the world (Port of Los Angeles 2024).

The Port of Long Beach is the second largest port in California, moving more than 9 million 20-foot equivalent units annually (Port of Long Beach 2024). It encompasses 3,200 acres of land and water along 25 miles of waterfront in Long Beach. Planned port improvements consist of terminal development, environmental projects, port-wide safety and security projects, streets, bridges and railways, and miscellaneous projects. Current major capital projects include the Long Beach-East LA Corridor Mobility Investment Plan and the Pier B On-Dock Support Facility (in final design phase) (Port of Long Beach 2020). Some of the current and ongoing major capital projects that are under construction include Middle Harbor (Piers D/E/F) Project; Sewer, Street, Water, and Storm Water Capital Improvement Program; Port Wide Rail Program; and Fire Safety/Security Projects (Port of Long Beach 2020). The Port of Los Angeles and other Port of Long Beach projects would contribute to additional rail traffic along the project rail corridor.

Long Beach-East LA Corridor Mobility Investment Plan

The Long Beach Freeway (I-710) is a vital transportation artery, linking the Ports of Long Beach and Los Angeles to major Southern California distribution centers and intermodal rail facilities. Studies are currently under way to find solutions to congestion and safety along this corridor (Metro 2012). The LOSSAN Corridor and the project section run diagonally across the I-710 corridor, which traverses or passes adjacent to 15 cities and unincorporated areas in Los Angeles County. The improvement of the I-710 corridor would further facilitate the movement of people and freight in the area of the project section and would provide persons living south of Los Angeles better access to the HSR connection in Los Angeles.

In 2012, a Draft EIR/EIS for the I-710 Corridor Project identified a preferred alternative for the project (Metro 2012). On further review of traffic patterns and new information gathered during public review of the Draft EIR/EIS, Metro began further evaluation of the alternatives for the I-710 Corridor Project. Because of this new data and information, Metro decided in March 2013 to prepare a Recirculated Draft EIR/EIS to analyze the range of possible improvement alternatives

for the I-710 corridor. The I-710 Corridor Project Recirculated Draft EIR/Supplemental EIS studied 19 miles of I-710 between the Ports of Long Beach and Los Angeles and the Pomona Freeway (SR 60), encompassing 15 cities and unincorporated areas in Los Angeles County adjacent to the freeway corridor. Metro released the Recirculated Draft EIR/Supplemental EIS in July 2017 for public comment, which ended in October 2017 (Metro 2017). However, in fall 2021, the I-710 Corridor Project was suspended (Metro 2024c).

Following the suspension of the I-710 Corridor Project and in response to community stakeholders who voiced a vision for mobility that advances equity and sustainability, Metro launched the Long Beach-East LA Corridor Mobility Investment Plan process. Its vision is to provide an equitable, shared Long Beach Freeway (I-710) South Corridor transportation system that provides safe, quality multimodal options for moving people and goods that will foster clean air (zero emissions), healthy and sustainable communities, and economic empowerment for all residents, communities, and users in the corridor. The task force has developed an initial list of 218 candidate programs and projects for the corridor that include goods movement, active transportation, roadway and freeway improvements, travel demand management, community programs, and transit. The Draft Long Beach-East LA Corridor Mobility Investment Plan was released in January 2024, and the Final Corridor Mobility Investment Plan was released in April 2024 (Metro 2024c).

2.6.2 High-Speed Rail Build Alternatives – Overview

2.6.2.1 Relationship to Surrounding High-Speed Rail Projects

The project section connects logical termini at planned passenger stations where HSR service would be provided, at LAUS to the north and at ARTIC to the south. The Authority evaluated the environmental impacts associated with an HSR station at LAUS as an element of the Burbank to Los Angeles Project Section EIR/EIS, and the Authority Board approved this station in January 2022. Any LAUS elements discussed in this Draft EIR/EIS are included for context and reference and to provide additional information. For more information about LAUS, please refer to the Burbank to Los Angeles Project Section Final EIR/EIS, available on the Authority's website.

As described in Section 2.6.1.4, the Metro Link US project involves Metro's construction of tracks that HSR trains would run on through LAUS to First Street. Environmental impacts associated with Metro's construction of common rail infrastructure that would serve HSR and other passenger traffic from just north of U.S. Highway (US 101) to First Street is analyzed in the Link US environmental document (Metro 2024d). The Link US improvement area is presented in green on Figure 2-27.

The physical construction elements of the Shared Passenger Track Alternatives would begin south of LAUS, at the northern edge of US 101, where the viaduct built as part of the Metro Link US project would begin. This location is the match line between the Burbank to Los Angeles and Los Angeles to Anaheim Project Sections. From this northern edge of US 101 to First Street, the Authority would build the OCS on the existing rail infrastructure to power HSR trains, presented as a dashed blue line on Figure 2-27. The OCS north of US 101 was part of the Burbank to Los Angeles Project Section and was approved in connection with the Authority's January 2022 decision-making discussed above, and is presented as a dashed gray line on Figure 2-27.

From First Street south to ARTIC, the Shared Passenger Track Alternatives would include construction of the HSR project tracks and all other project infrastructure, which is presented in a solid blue line on Figure 2-27. The operation of HSR service from the northern edge of US 101 to ARTIC is fully evaluated in this Draft EIR/EIS.

Source: Authority 2025
Metro = Los Angeles County Metropolitan Transportation Authority; LAUS = Link Union Station; Link US = Link Union Station project; OCS = overhead contact system; US 101 = U.S. Highway 101

Figure 2-27 High-Speed Rail and Link Union Station Project

2.6.2.2 Overview and Summary of Design Features

As stated in Chapter 1, one of the objectives of the project section is to "maximize the use of existing transportation corridors and rights-of-way, to the extent feasible." The 2005 Statewide Program EIR/EIS and subsequent alternatives analyses for Los Angeles to Anaheim have studied an alignment within the existing LOSSAN Corridor to minimize impacts on surrounding communities and the environment.

The project proposes new and upgraded track, OCS, maintenance and traction power facilities, grade separations, drainage improvements, communications towers, security fencing, modifications to passenger train facilities, and other necessary facilities to introduce HSR service into the LOSSAN Corridor from LAUS to ARTIC. New and upgraded tracks would allow other freight and passenger trains to share tracks with HSR. This shared-track arrangement is known

as a "blended operations." The project footprint would primarily be within the existing railroad right-of-way, typically 100 feet wide, and include both a northbound and southbound electrified track for HSR. The project footprint includes all project components and consequential physical changes, including existing and potential station facilities, potential maintenance sites, other ancillary HSR facilities, areas needed for construction mobilization and material laydown, roadway and utility relocations, power supply connections, and associated property rights.

This Draft EIR/EIS analyzes two build alternatives: Shared Passenger Track Alternative A and Shared Passenger Track Alternative B. Table 2-9 summarizes the main elements of the project, with full descriptions included in Sections 2.6.3, Shared Passenger Track Alternative A, and 2.6.4, Shared Passenger Track Alternative B. The Preliminary Engineering for Project Definition design drawings in Volume 3 provide additional information. As presented in Table 2-9, Shared Passenger Track Alternatives A and B would have the same alignment and design features, and their only difference would be the location of the LMF. Figure 2-20 depicts an overview of the project section.

Both alternatives propose up to two HSR trains per hour servicing each direction between LAUS and ARTIC; this level of service was analyzed in the 2023 SAA and is necessary to maintain the current and projected freight and passenger rail volumes within the corridor.

Table 2-9 Summary of Design Features of Shared Passenger Track Alternative A and Shared Passenger Track Alternative B

Feature	Total
Total length (linear miles)	29.7
At-grade profile (linear miles)	23.8
Elevated profile (linear miles)	5
Below-grade/braced trench profile (linear miles)[1]	0.9
Number of straddle bents[2]	16
Number of at-grade railroad crossings[3]	8
Number of major water crossings[4]	9
Number of roadway overcrossings and undercrossings	58

[1] Shared Passenger Track Alternative B also includes 0.18 mile of trench alignment for the 15th Street light maintenance facility yard lead tracks.
[2] A straddle bent is a pier structure that spans (or "straddles") the functional/operational limit of a roadway, highway, or railway. More information on straddle bents is included in Section 2.4.4.6, Straddle Bents.
[3] Railroad crossings means a railroad crossing another railroad.
[4] Features considered major water crossings are Los Angeles River, Rio Hondo (and basins), San Gabriel River, North Fork Coyote Creek, La Mirada Creek, Coyote Creek, Brea Creek, Fullerton Creek, and Carbon Creek.

Alignment

The two alternatives would have the same track alignment, which follows the existing LOSSAN Corridor from LAUS to ARTIC. Currently throughout the corridor, there are two to three mainline tracks, with a variable number of freight siding tracks. The HSR project seeks to maintain existing operations in the corridor while minimizing impacts outside of the existing right-of-way. To accomplish this, the HSR project would add one new mainline track from LAUS to Fullerton Junction, and would use existing tracks where possible, so that there would be two electrified tracks throughout the corridor used for HSR and shared with other operators. These two electrified tracks are referred to as "shared tracks" throughout the rest of this chapter.

For both alternatives, the shared-track vertical profile would be a combination of at-grade, elevated, and below-grade track, depending on corridor and design constraints. The at-grade track segments would consist of track set on ballasted railroad ties, compacted earth, or retained fill (contained earth with retaining walls). Fill material would be obtained from permitted sites and

quarries. The elevated track segments would consist of concrete columns and concrete box girder either cast-in-place or precast. The height of the elevated track section would vary and could be up to 60 feet high, with columns spaced approximately on average 90 feet apart. Track centers would have a minimum spacing of 14 feet. The below-grade track segment (braced trench in Fullerton) would vary in depth from 4 feet to 30 feet. Tracks would be set between two retaining walls with the greatest depth at the Fullerton Airport. Track centers would have a minimum spacing of 15 feet.

The train speed would vary throughout the corridor, depending on design and land use constraints, from 45 to 90 mph. Because this project section is not on the route between the San Francisco Bay Area and the Los Angeles Basin, lower speeds would not affect Proposition 1A travel times.

Ancillary Features

Both alternatives would have the same ancillary features, which include two TPSS sites (in Los Angeles and Anaheim), one switching station (in Santa Fe Springs), two paralleling stations (in Montebello and Fullerton), and two sets of layover tracks (near LAUS and near ARTIC).

High-Speed Rail Station Facilities

The project section would connect HSR service to the HSR station at LAUS, which was approved as part of the Burbank to Los Angeles Project Section. Both alternatives would include an HSR station platform and facilities at ARTIC.

Light Maintenance Facility

Although the build alternatives would differ in the location and size of the LMF, the alternatives would include the same LMF facilities and provide the same operations and maintenance functions. Shared Passenger Track Alternative A proposes an LMF at 26th Street in Vernon. It would accommodate 24 single trainsets and would be double-ended, providing trains access from the mainline to both ends of the facility, which allows for greater operational flexibility in the event of train backups.

Shared Passenger Track Alternative B proposes an LMF at 15th Street in Los Angeles. It would accommodate 20 single trainsets and would be single-ended, providing only access for trains from the mainline tracks to one end of the facility. The 15th Street LMF would require extensive excavation and grading across the site, as well as a below-grade segment for the yard lead tracks.

Shared Passenger Track Alternative A would affect more freight container parking by Hobart Yard compared to Shared Passenger Track Alternative B, because of the 26th Street LMF yard lead and storage tracks. The 15th Street LMF would be closer to LAUS than the 26th Street LMF, which could reduce train deadhead mileage.[23] However, the 15th Street LMF would provide less storage capacity (by four trainsets), require additional right-of-way acquisitions, and require extensive excavation and grading. In addition, the 15th Street LMF would only provide single-ended access for trains from the mainline tracks to the maintenance facility, increasing the chance of track fouling[24] and decreasing operational efficiency compared to a double-ended LMF like the 26th Street LMF.

Freight and Passenger Railroad Modifications

Both alternatives would require modifications to freight and passenger railroad facilities. Table 2-10 summarizes the freight and passenger rail facilities that would be modified for both

[23] *Train deadhead* refers to a train movement where the train is traveling without passengers, often to reposition itself for a new schedule or service.

[24] *Track fouling* means the placement of an individual or an item of equipment in such proximity to a track that the individual or equipment could be struck by a moving train or on-track equipment.

alternatives. Additionally, Shared Passenger Track Alternative B would add a new at-grade crossing, but through a private Amtrak yard access road.

Both alternatives require modifications to the existing Norwalk/Santa Fe Springs Metrolink Station and the Fullerton Metrolink/Amtrak Station (which would not be served by HSR) to allow for HSR to pass through. Both alternatives would also require the Commerce Metrolink Station and Buena Park Metrolink Station to be relocated to accommodate the changes in trackwork through those areas.

Table 2-10 Freight and Passenger Rail Modification Summary Table

Feature	Totals
Miles of existing railroad track realigned	9.2
Miles of existing railroad track removed	22.34
Miles of non-high-speed-rail railroad track built	35.65
Number of existing freight rail yards modified	5
Number of existing at-grade railroad crossings to remain at grade	8
Number of existing at-grade railroad crossings modified to be grade separated	6[1]
Number of at-grade railroad crossings closed	0

Source: Authority 2025
[1] For one of the crossings (Lakeland Road), passenger rail would be on elevated structure while the freight tracks would remain at grade.

Roadway Modifications

Both alternatives would fully grade separate 5 existing at-grade crossings, partially grade separate 1 existing at-grade crossing, modify 9 existing grade separations with roadway vertical realignments, modify 13 existing grade separations by adding a new railroad bridge, and maintain 8 existing at-grade crossings. As part of the Hobart Yard modifications, both alternatives would also realign 26th Street and close segments of 10 local roadways. At the Fullerton Metrolink/Amtrak Station, both alternatives would realign Walnut Street. At Commerce Yard, the alternatives would relocate an existing BNSF yard gate, requiring the closure of a short portion of 26th Street.

Shared Passenger Track Alternative B would have an additional roadway modification at the 15th Street LMF site, where a small portion of 16th Street would be closed.

Modifications to Waterways

Both alternatives would cross and potentially affect 11 waterways (Los Angeles River, Hobart Channel, Rio Hondo Channel, San Gabriel River, North Fork Coyote Creek, La Mirada Creek, Coyote Creek, Brea Creek, Balcom Avenue Storm Drain, Fullerton Creek, and Carbon Creek). Modifications would be required at eight crossings.

2.6.2.3 Safety and Security

Both Shared Passenger Track Alternatives would apply risk-based System Safety and System Security programs that identify, assess, and reduce or avoid hazards and vulnerabilities for the HSR system. Using domestic regulations, international experience, and industry best practices, the objective of the HSR System Safety and System Security programs is to adequately and consistently apply risk-based hazard avoidance measures. HSR operations would follow safety and security plans developed by the Authority in cooperation with the FRA, including a System Safety Program Plan and a Safety and Security Certification Program; a Threat and Vulnerability Assessment; a Preliminary Hazard Analysis; a Vehicle Hazard Analysis; a Fire and Life Safety Program; and a System Security Plan. Detailed information about these safety and security plans is included in Section 2.4.1, System Design Performance, Safety, and Security.

2.6.2.4 Impact Avoidance and Minimization Features

As part of the Tier 1 decision, the Authority committed to integrate programmatic impact avoidance and minimization features (IAMF) into the HSR project. IAMFs include standard engineering or industry practices, actions, and design features that the Authority has employed during the design of the project section or will employ as part of standard agency requirements during design and construction.

The following IAMFs will be incorporated into the project design, construction, and operation to avoid or minimize environmental and community impacts for both Shared Passenger Track Alternative A and Shared Passenger Track Alternative B. Most of these IAMFs are programmatic and will be incorporated across the entire HSR system; Appendix 2-A, Impact Avoidance and Minimization Features, presents detailed descriptions of all the IAMFs. Community analysis–specific IAMFs have been developed specifically for the Los Angeles to Anaheim Project Section and are described briefly below and in more detail in Chapter 5 of this Draft EIR/EIS. IAMFs are listed below by resource topic, but they may also apply to additional topics as described in each applicable section of Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures. The IAMFs are considered to be part of the project and are included as applicable in each of the alternatives for purposes of the environmental impact analysis.

- Transportation
  - TR-IAMF#1: Protection of Public Roadways During Construction
  - TR-IAMF#2: Construction Transportation Plan
  - TR-IAMF#3: Off-Street Parking for Construction-Related Vehicles
  - TR-IAMF#4: Maintenance of Pedestrian Access
  - TR-IAMF#5: Maintenance of Bicycle Access
  - TR-IAMF#6: Restriction on Construction Hours
  - TR-IAMF#7: Construction Truck Routes
  - TR-IAMF#8: Construction During Special Events
  - TR-IAMF#9: Protection of Freight and Passenger Rail During Construction
  - TR-IAMF#11: Maintenance of Transit Access
  - TR-IAMF#12: Pedestrian and Bicycle Safety
  - TR-IAMF#13: Stakeholder Coordination with Transportation Agencies
- Air Quality and Global Climate Change
  - AQ-IAMF#1: Fugitive Dust Emissions
  - AQ-IAMF#2: Selection of Coatings
  - AQ-IAMF#3: Renewable Diesel
  - AQ-IAMF#4: Reduce Criteria Exhaust Emissions from Construction Equipment
  - AQ-IAMF#5: Reduce Criteria Exhaust Emissions from On-Road Construction Equipment
- Noise and Vibration
  - NV-IAMF#1: Noise and Vibration
- Electromagnetic Fields and Electromagnetic Interference
  - EMF/EMI-IAMF#1: Preventing Interference with Adjacent Railroads
  - EMF/EMI-IAMF#2: Controlling Electromagnetic Fields/Electromagnetic Interference
- Public Utilities and Energy
  - PUE-IAMF#1: Design Measures
  - PUE-IAMF#3: Public Notifications
  - PUE-IAMF#4: Utilities and Energy
- Biological and Aquatic Resources
  - BIO-IAMF#1: Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors, and General Biological Monitors

  - BIO-IAMF#3: Prepare Worker Environmental Awareness Program (WEAP) Training Materials and Conduct Construction Period WEAP Training
  - BIO-IAMF#4: Conduct Operation and Maintenance Period WEAP Training
  - BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan
  - BIO-IAMF#6: Establish Monofilament Restrictions
  - BIO-IAMF#7: Prevent Entrapment in Construction Materials and Excavations
  - BIO-IAMF#8: Delineate Equipment Staging Areas and Traffic Routes
  - BIO-IAMF#9: Dispose of Construction Spoils and Waste
  - BIO-IAMF#10: Clean Construction Equipment
  - BIO-IAMF#11: Maintain Construction Sites and Best Management Practice Training
  - BIO-IAMF#12: Design the Project to Be Bird Safe
- Hydrology and Water Resources
  - HYD-IAMF#1: Stormwater Management
  - HYD-IAMF#2: Flood Protection
  - HYD-IAMF#3: Prepare and Implement a Construction Stormwater Pollution Prevention Plan
  - HYD-IAMF#4: Prepare and Implement an Industrial Stormwater Pollution Prevention Plan
- Geology, Soil, Seismicity, and Paleontological Resources
  - GEO-IAMF#1: Geologic Hazards
  - GEO-IAMF#2: Slope Monitoring
  - GEO-IAMF#3: Gas Monitoring
  - GEO-IAMF#6: Ground Rupture Early Warning Systems
  - GEO-IAMF#7: Evaluate and Design for Large Seismic Ground Shaking
  - GEO-IAMF#8: Suspension of Operations During an Earthquake
  - GEO-IAMF#9: Subsidence Monitoring
  - GEO-IAMF#10: Geology and Soils
  - GEO-IAMF#11: Engage a Qualified Paleontological Resources Specialist
  - GEO-IAMF#12: Perform Final Design Review and Triggers Evaluation
  - GEO-IAMF#13: Prepare and Implement Paleontological Resources Monitoring and Mitigation Plan
  - GEO-IAMF#14: Provide WEAP Training for Paleontological Resources
  - GEO-IAMF#15: Halt Construction, Evaluate, and Treat if Paleontological Resources Are Found
- Hazardous Materials and Wastes
  - HMW-IAMF#1: Property Acquisition Phase I and Phase II Environmental Site Assessments, Additional Preconstruction Investigations, and Associated Actions to Control Site Contamination
  - HMW-IAMF#2: Landfill
  - HMW-IAMF#3: Work and Vapor Barriers
  - HMW-IAMF#4: Known, Suspected, and Unanticipated Environmental Contamination
  - HMW-IAMF#5: Demolition Plans
  - HMW-IAMF#6: Spill Prevention
  - HMW-IAMF#7: Storage and Transport of Materials
  - HMW-IAMF#8: Permit Conditions
  - HMW-IAMF#9: Environmental Management System
  - HMW-IAMF#10: Hazardous Materials Plans
- Safety and Security
  - SS-IAMF#1: Construction Safety Transportation Management Plan
  - SS-IAMF#2: Safety and Security Management Plan
  - SS-IAMF#3: Hazard Analyses
  - SS-IAMF#4: Oil and Gas Wells
  - SS-IAMF#5: Aviation Safety

- Socioeconomics and Communities
  - SOCIO-IAMF#1: Construction Management Plan
  - SOCIO-IAMF#2: Compliance with Uniform Relocation Assistance and Real Property Acquisition Policies Act
  - SOCIO-IAMF#3: Relocation Implementation Plan
- Station Planning, Land Use, and Development
  - LU-IAMF#1: HSR Station Area Development: General Principles and Guidelines
  - LU-IAMF#2: Station Area Planning and Local Agency Coordination
  - LU-IAMF#3: Restoration of Land Used Temporarily During Construction
- Parks, Recreation, and Open Space
  - PK-IAMF#1: Parks, Recreation, and Open Space
- Aesthetics and Visual Quality
  - AVQ-IAMF#1: Aesthetic Options
  - AVQ-IAMF#2: Aesthetic Review Process
- Cultural Resources
  - CUL-IAMF#1: Geospatial Data Layer and Archaeological Sensitivity Map
  - CUL-IAMF#2: WEAP Training Session
  - CUL-IAMF#3: Preconstruction Cultural Resource Surveys
  - CUL-IAMF#4: Relocation of Project Features when Possible
  - CUL-IAMF#5: Archaeological Monitoring Plan and Implementation
  - CUL-IAMF#6: Preconstruction Conditions Assessment, Plan for Protection of Historic Built Resources, and Repair of Inadvertent Damage
  - CUL-IAMF#7: Built Environment Monitoring Plan
  - CUL-IAMF#8: Implement Protection and/or Stabilization Measures
- Community Analysis
  - CA-IAMF#1: Authority Community Ombudsperson and Contractor's Community Liaison
  - CA-IAMF#2: Business Spotlighting
  - CA-IAMF#3: Community-Inclusive Development of Aesthetic Treatments and Community Cohesion Enhancements
  - CA-IAMF#4: Business Relocation/Displacement Assistance
  - CA-IAMF#6: Nonregulatory Supplemental and Informational Monitoring

2.6.3 Shared Passenger Track Alternative A

2.6.3.1 Alignment

The project section would use and electrify existing tracks in most of the corridor and would also add new tracks in some areas. From LAUS to I-10, there would be two electrified tracks, to be shared with HSR and passenger rail; refer to Section 2.6.2.1, Relationship to Surrounding High-Speed Rail Projects, for more information on the electrified tracks near LAUS and the HSR project's relationship to the Link US project. From I-10 to Downey Road, two existing tracks would be electrified for shared use. From Downey Road to Fullerton Junction, two new mainline tracks would be added in the corridor, with two tracks to be electrified and shared. From Fullerton Junction to ARTIC, the two existing tracks would be electrified for shared use.

The alignment is described from north to south by city, for ease of reference.

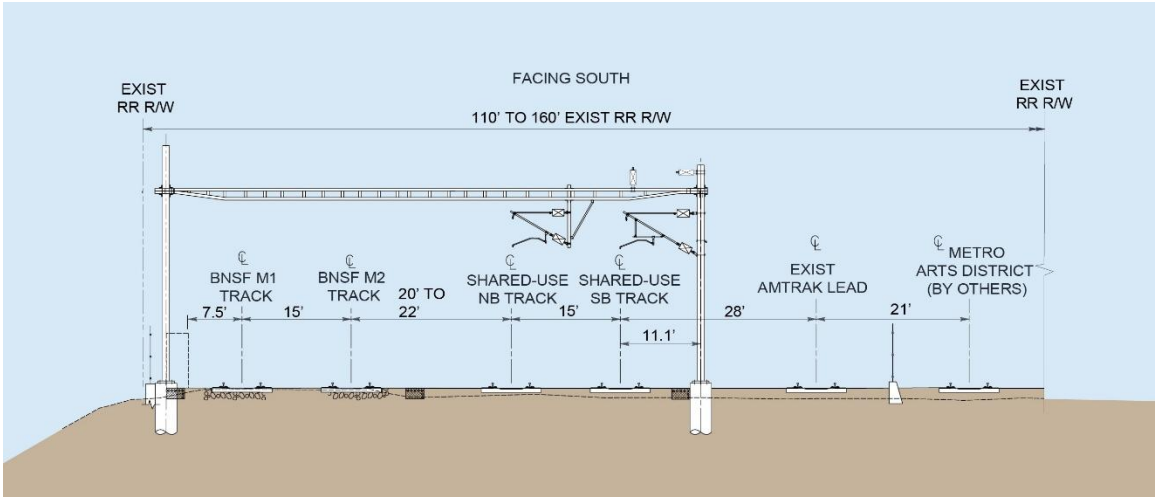
Los Angeles and Vernon

An overview of Shared Passenger Track Alternative A is presented on Figure 2-28.

Source: Authority 2025

Figure 2-28 Shared Passenger Track Alternative A: Los Angeles to Vernon Overview

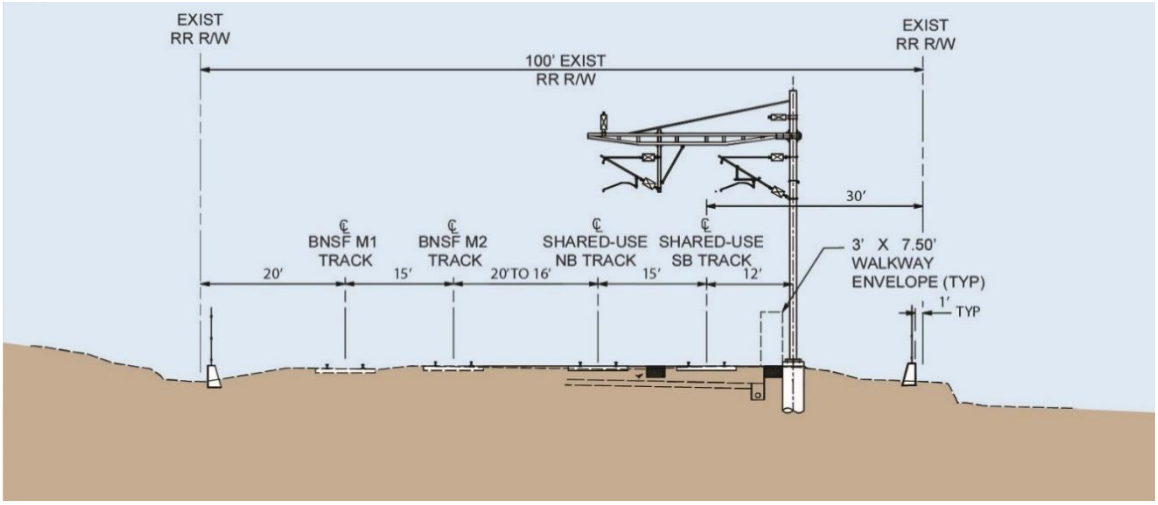
Starting at the LAUS platforms, HSR trains would run on the tracks built by the Link US project, which cross over US 101, Commercial Street, and Ducommun Street on viaduct; and come down to grade just before First Street, joining the existing railroad right-of-way. Beginning at First Street, trackwork built under Shared Passenger Track Alternative A would run adjacent to the existing Metrolink and Amtrak service, immediately east of the Metro B (Red) Line Yard. Between First Street and Fourth Street, the HSR tracks would merge into the existing tracks nearest the west bank of the Los Angeles River that are used by Metrolink and Amtrak. From this tie-in point south, the HSR trains would use the existing tracks, which would be upgraded with an OCS to allow for shared operations. The existing railroad right-of-way along the predominantly industrial Los Angeles River west bank is approximately 200 feet wide. Figure 2-29 is an illustration of a cross section of the track configuration, representative of the halfway point between First Street and Fourth Street. Between Seventh Street and I-10, two HSR layover tracks would be added west of the shared tracks, which would require right-of-way acquisitions; refer to Section 2.6.3.2 for more information on the layover tracks. The BNSF Eighth Street Yard storage tracks between First Street and I-10 would be removed and relocated to the new consolidated storage area adjacent to Hobart Yard, described in more detail in Section 2.6.3.5, Freight or Passenger Railroad Modifications.



Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

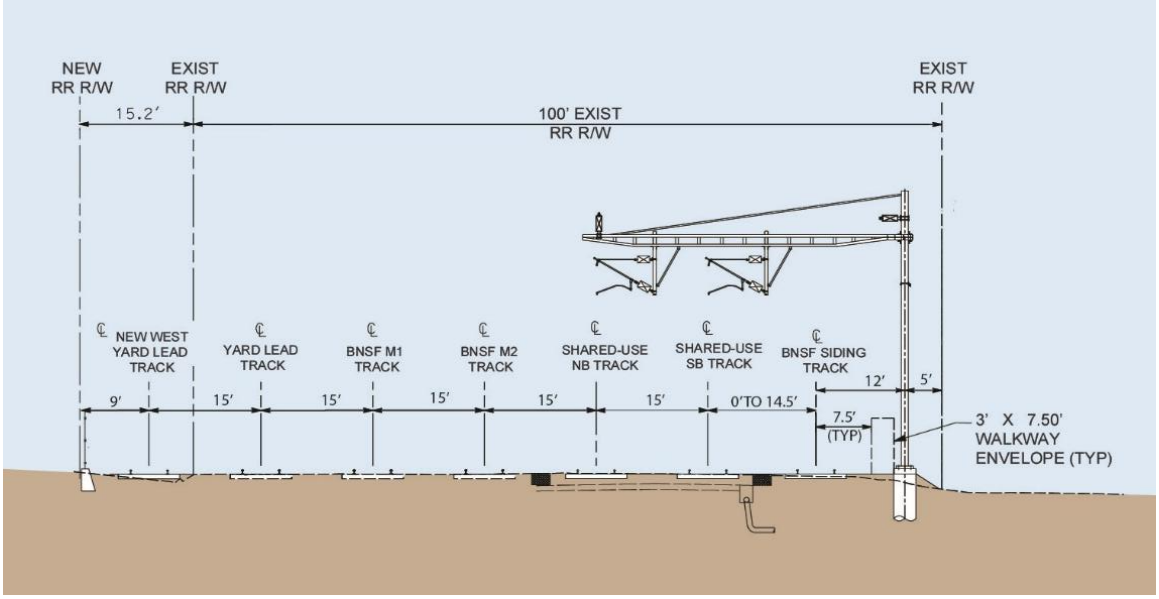
Figure 2-29 At-Grade Cross Section Between First Street and Fourth Street

The shared tracks would cross under the Olympic Boulevard roadway overcrossing and approach Redondo Junction. The tracks would rise onto an existing railroad bridge that crosses Washington Boulevard and the Los Angeles River, before curving east to cross over Soto Street. This existing bridge would be upgraded with an OCS. The alignment would come back to at grade east of Soto Street to run along the southern side of the corridor adjacent to the existing BNSF tracks, and enter Vernon. Figure 2-30 depicts the cross section east of Soto Street, with a total of four mainline tracks, two of which could be shared between HSR and passenger rail. Just west of Downey Road, a new BNSF yard lead track would be added on the northern side to serve Hobart Yard farther east, which would require additional right-of-way, presented on Figure 2-31. The tracks would continue east, crossing over Downey Road on the existing railroad bridge, with a new bridge added for the new BNSF yard lead track on the northern side of Downey Road.



Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-30 At-Grade Cross Section East of Soto Street

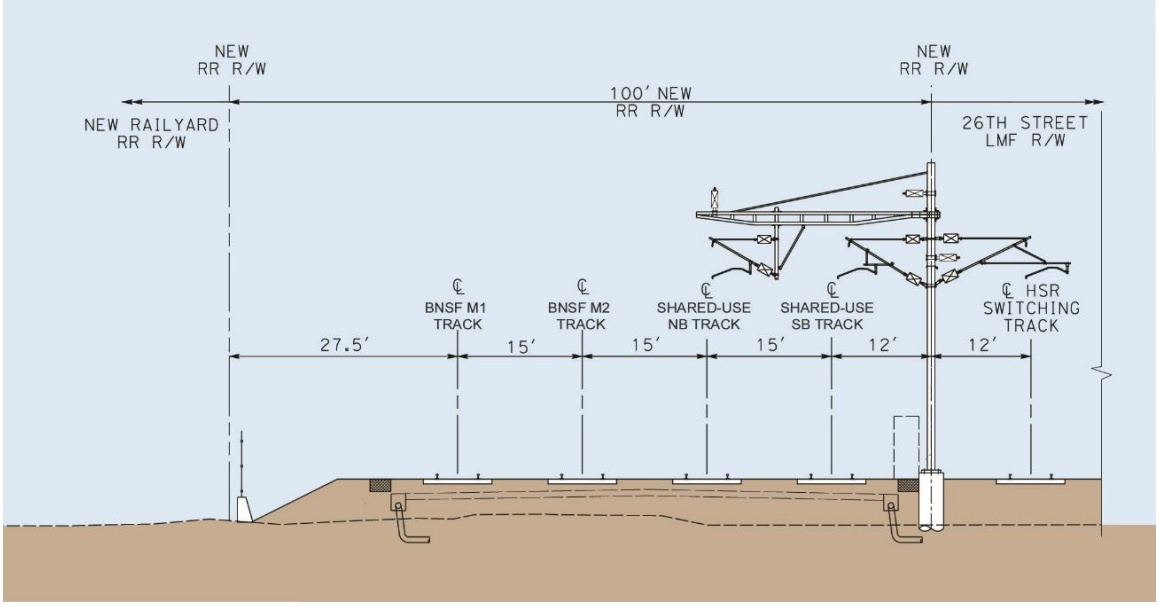


Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-31 Cross Section West of Downey Road

East of Downey Road, the tracks would cross the UPRR San Pedro Subdivision line and pass by the BNSF Los Angeles Intermodal Facility (referred to as Hobart Yard); refer to Section 2.6.3.5 for more information on the modifications to Hobart Yard and BNSF facilities. The new BNSF yard lead track would merge into realigned tracks serving the existing Hobart Yard. The four mainline tracks, a new UPRR San Pedro Subdivision connector track, and two 26th Street LMF yard lead tracks would veer south out of the existing railroad right-of-way, requiring property acquisitions. The 26th Street LMF lead tracks would continue south to connect to the LMF tracks; refer to Section 2.6.3.4 for more information. The four mainline tracks would continue east, adjacent to other tracks used for the UPRR connector or HSR switching; Figure 2-32 depicts the general configuration of the tracks through the Hobart Yard area. The tracks would cross under an

existing private Hobart Yard roadway and over Hobart Channel. The existing open channel would be modified with closed concrete box structures that would support the tracks and the 26th Street realignment. The two LMF yard lead tracks would merge with the four mainline tracks just west of I-710.

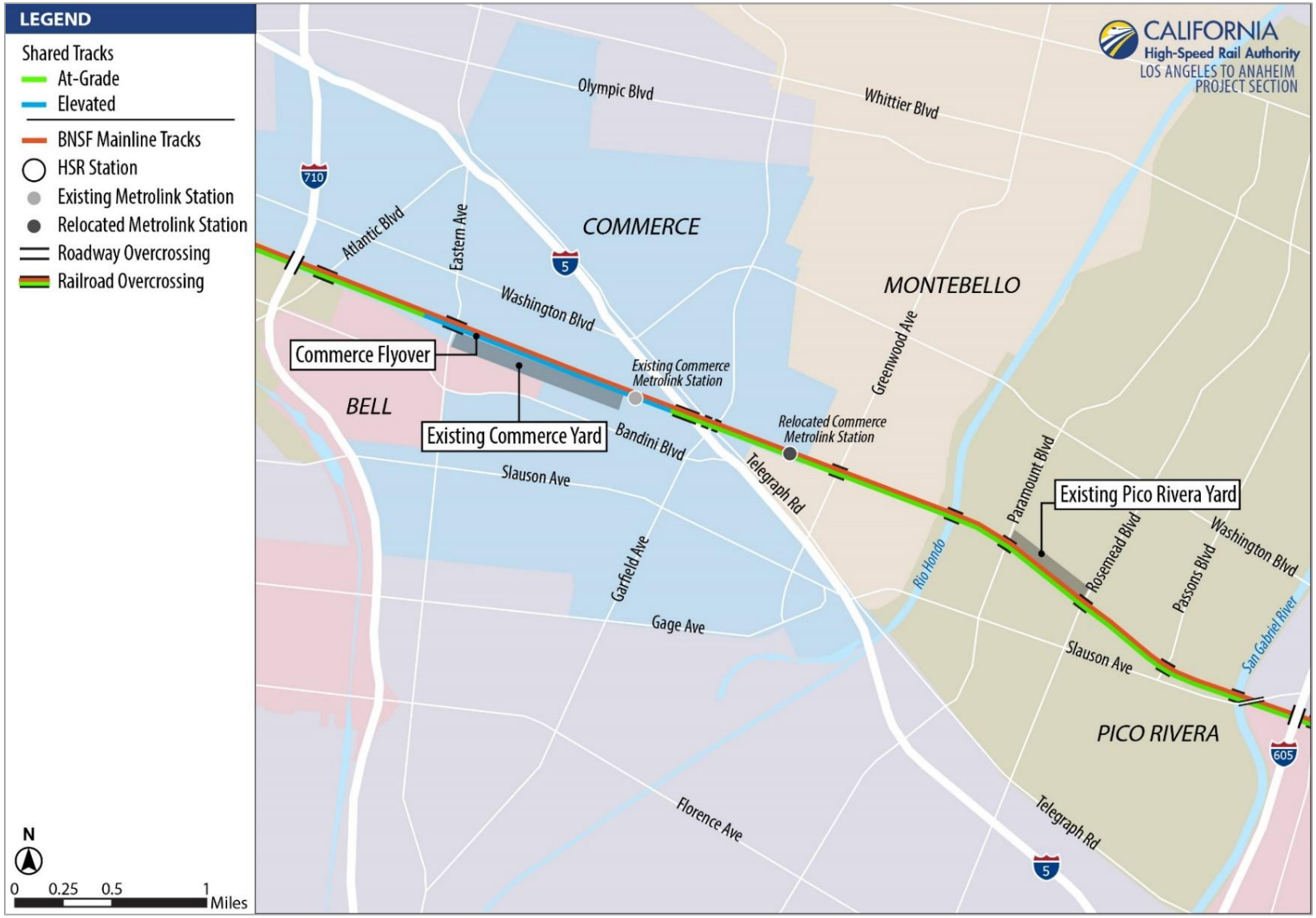


Source: Authority 2025
HSR = high-speed rail; LMF = light maintenance facility; M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-32 Cross Section Adjacent to Modified Hobart Yard

Commerce, Bell, Montebello, and Pico Rivera

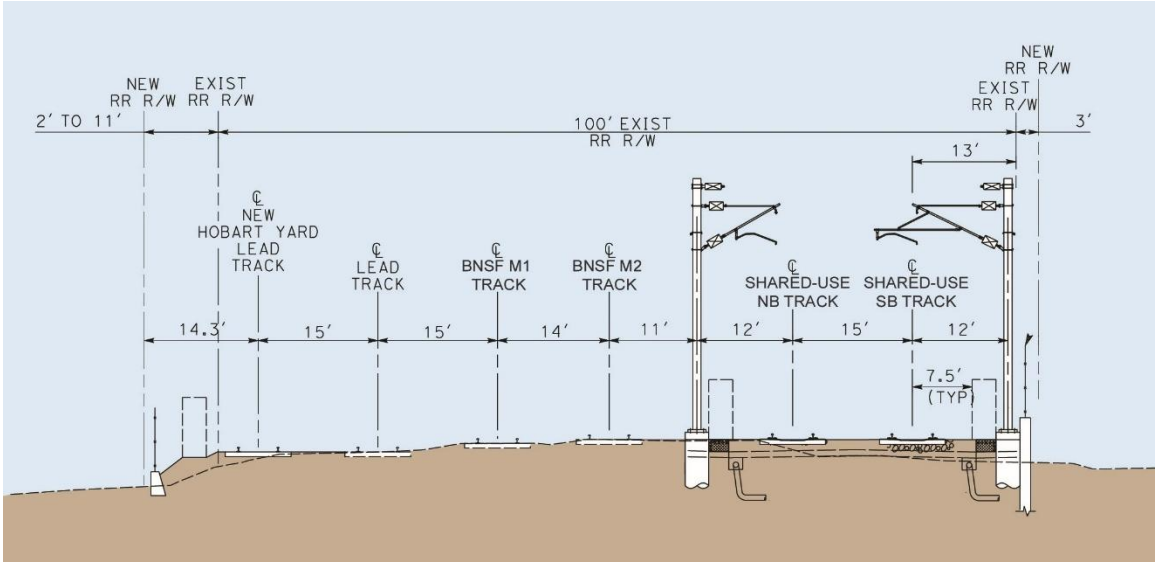
An overview of Shared Passenger Track Alternative A from Commerce to Pico Rivera is presented on Figure 2-33.



Source: Authority 2025

Figure 2-33 Shared Passenger Track Alternative A: Commerce to Pico Rivera Overview

East of Hobart Yard, the tracks would cross at grade under I-710 and enter Commerce. The tracks would cross Atlantic Boulevard on the existing railroad bridge, which would need to be widened on the northern side for a new Hobart Yard lead track (which extends farther east to BNSF's Commerce Yard), and also widened on the southern side for the new shared tracks. East of Atlantic Boulevard, a small portion of Bell is south of and adjacent to the corridor, where a small amount of additional right-of-way would be needed to accommodate the new shared tracks, presented on Figure 2-34.

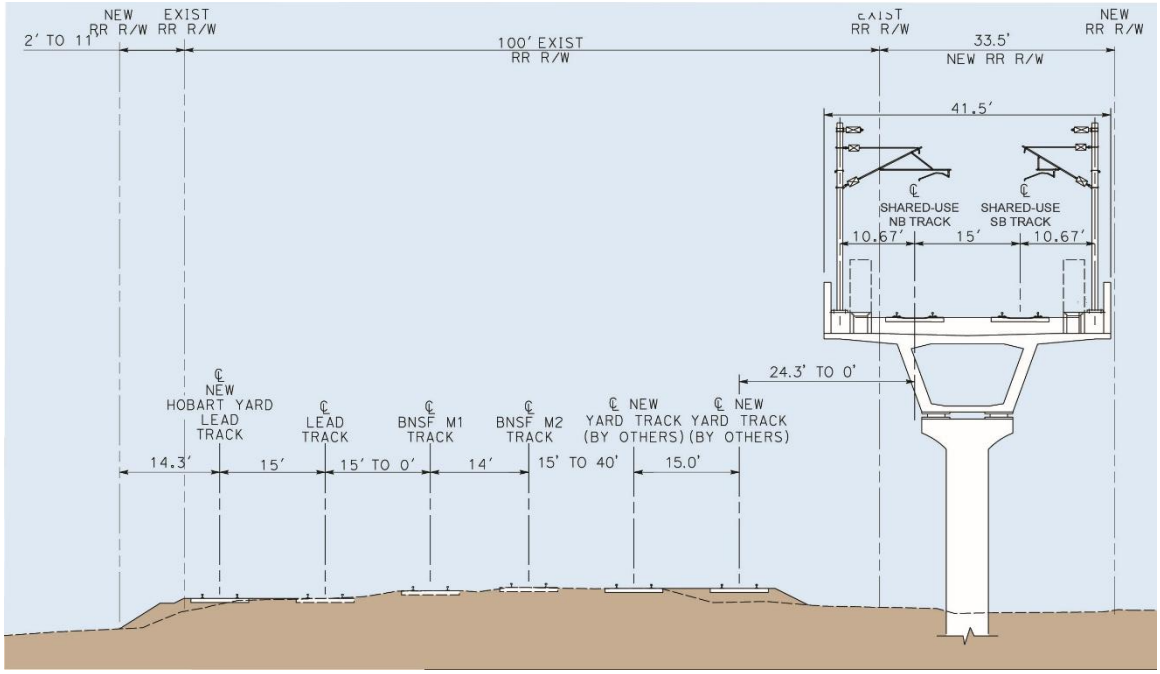


Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-34 At-Grade Cross Section East of Atlantic Boulevard

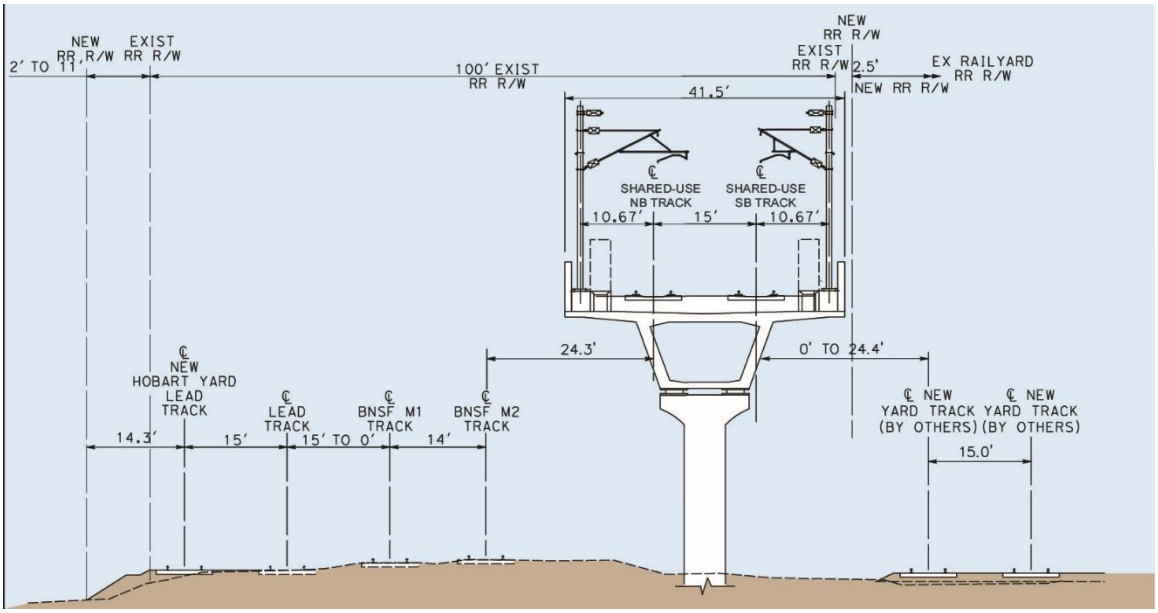
The two shared tracks would then rise onto an elevated structure, referred to as the Commerce Flyover. Figure 2-35 depicts the cross section of this elevated structure and adjacent BNSF mainline and yard tracks. The Commerce Flyover is designed to pass by the BNSF Commerce Intermodal Facility (referred to as Commerce Yard) and to separate passenger train operations from freight operations, reducing train traffic congestion through the Commerce Yard area. The elevated structure eliminates the need for passenger trains to wait for freight trains serving Commerce Yard to cross the passenger tracks, reducing delays and improving efficiency along the corridor. Refer to Section 2.6.3.5 for more information on the modifications throughout Commerce Yard and on the Commerce Flyover. BNSF is also planning improvements throughout the Commerce Yard area, and the HSR project would not preclude BNSF's plans.

The elevated structure would cross over Eastern Avenue. The at-grade BNSF tracks would also cross Eastern Avenue on the existing railroad bridge, which would need to be widened on both the northern and southern sides to accommodate the new BNSF yard tracks. The tracks would continue east, passing by the BNSF Commerce Yard. Throughout this area, there would be up to eight tracks within the corridor, some of which are existing and some which would be new, including new BNSF yard tracks, connector tracks, and a stub lead. Additional right-of-way would be required on both sides of the corridor. The general configuration throughout the Commerce Yard area is presented on Figure 2-36.



Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-35 Elevated Cross Section Between Atlantic Boulevard and Eastern Avenue (Commerce Flyover)



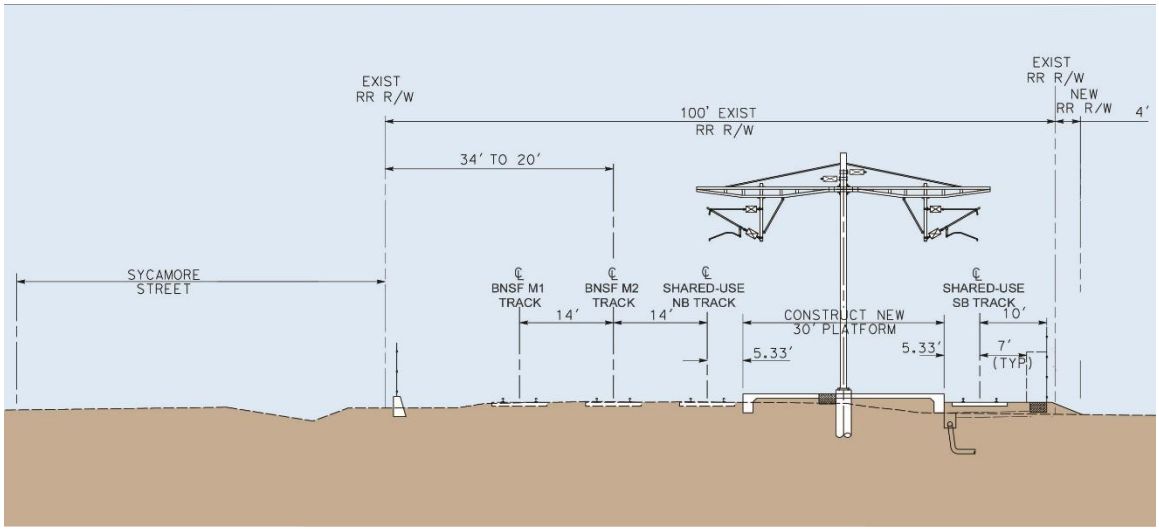
Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-36 Elevated Cross-Section Between Eastern Avenue and Commerce Yard

Continuing east, the tracks would pass the existing Commerce Metrolink Station. Because the shared tracks would be on the elevated structure, they would not connect with the Commerce Metrolink Station at its existing location. Therefore, the Commerce Metrolink Station would be

relocated on the mainline tracks at the border of Commerce and Montebello, less than a mile to the east of its current location; refer to Section 2.6.3.5 for more information on the Metrolink Station relocation, which could be completed as an early action project.

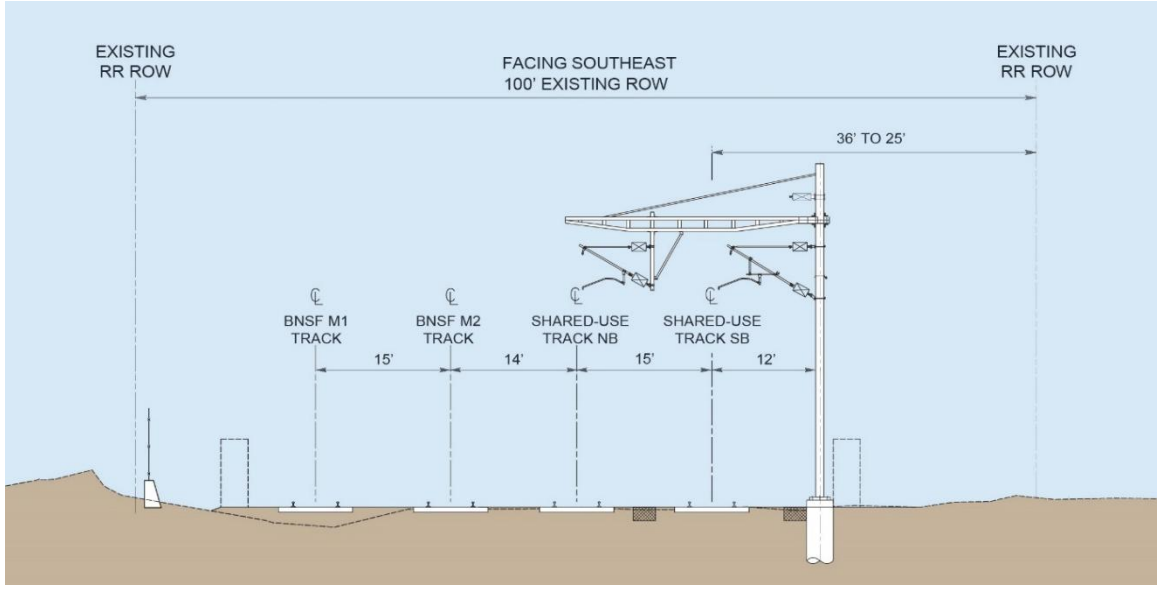
The elevated tracks would rejoin the existing railroad right-of-way and return to grade just before I-5. The four mainline tracks would cross over I-5, Telegraph Road, and Garfield Avenue on the existing railroad bridges. East of Garfield Avenue, the shared tracks would pass the relocated Commerce Metrolink Station, but HSR trains would not stop there; Figure 2-37 depicts the cross section at the station. The relocated Commerce Metrolink Station would require the removal of a BNSF support track between Vail Street and Minson Way, which would be replaced adjacent to Hobart Yard (described in more detail in Section 2.6.3.5).



Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-37 Cross Section at the Relocated Commerce Metrolink Station

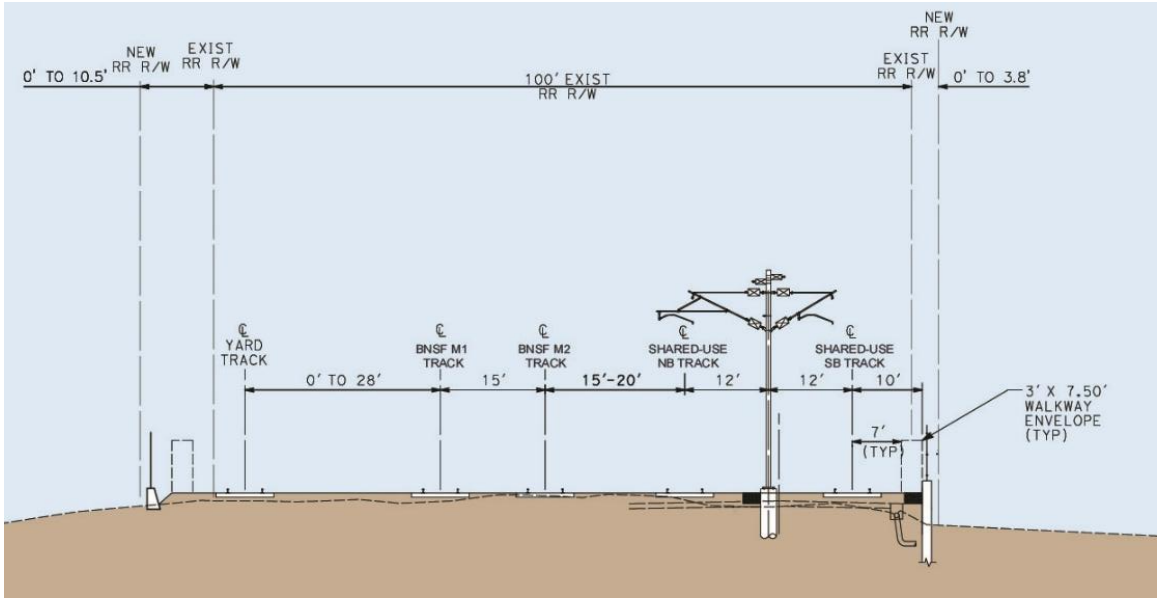
The tracks would then enter Montebello, remain at grade, and cross over Greenwood Avenue on an existing railroad bridge. Figure 2-38 depicts the configuration of tracks through Montebello.



Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-38 At-Grade Cross Section through Montebello

The tracks then enter Pico Rivera and cross over the Rio Hondo Channel, where the existing railroad bridge would be widened on the northern side to accommodate the new mainline track. Section 2.6.3.7, Modifications to Waterways, describes all waterway crossings in more detail. Immediately east of the Rio Hondo Channel, there would be modifications to BNSF tracks leading into the BNSF Pico Rivera Yard; an existing yard lead track at the western end of the yard would be realigned and one existing storage track would be removed, for a total of five tracks within the corridor. Storage capacity at Pico Rivera Yard would be replaced adjacent to Hobart Yard (described in more detail in Section 2.6.3.5). The tracks would then cross over Paramount Boulevard on the existing railroad bridge, and then pass by the BNSF Pico Rivera Yard on the northern side of the corridor. The yard lead track at the eastern end of the yard would be realigned and shifted. Figure 2-39 depicts the track configuration between the Rio Hondo Channel and Pico Rivera Yard.



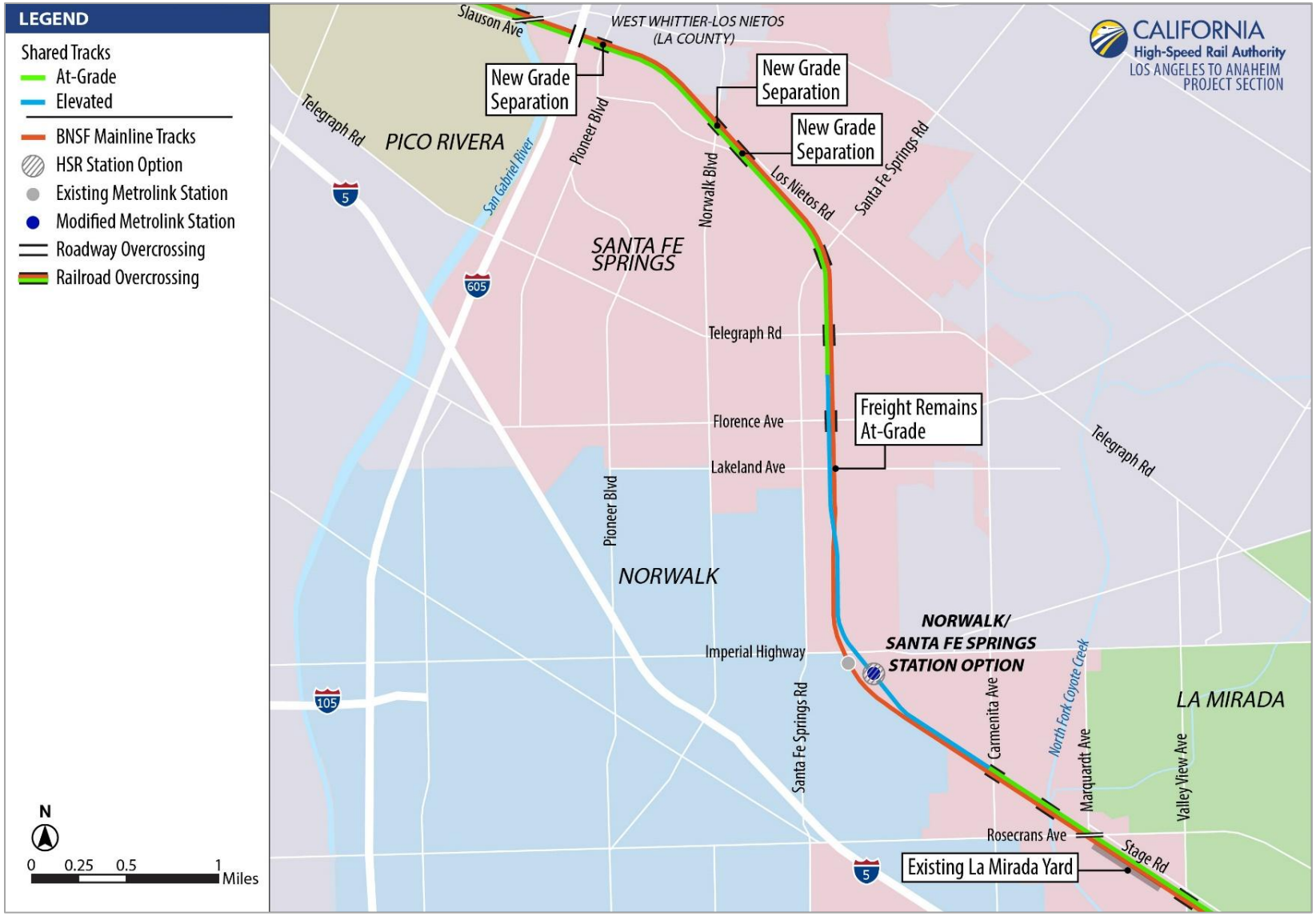
Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-39 Cross Section Between Rio Hondo Channel and Pico Rivera Yard

The tracks would continue east to cross over Rosemead Boulevard, where a new railroad bridge would be added north of the existing railroad bridge to accommodate a realigned spur track. The realigned spur track would connect to a new BNSF yard lead track, for a total of five tracks in this area. Just west of Passons Boulevard, the yard lead track would converge with the mainline track and the four tracks would continue east, crossing over Passons Boulevard and the San Gabriel River, where both existing railroad bridges would need to be widened on the southern side for the new shared track.

Santa Fe Springs and Norwalk

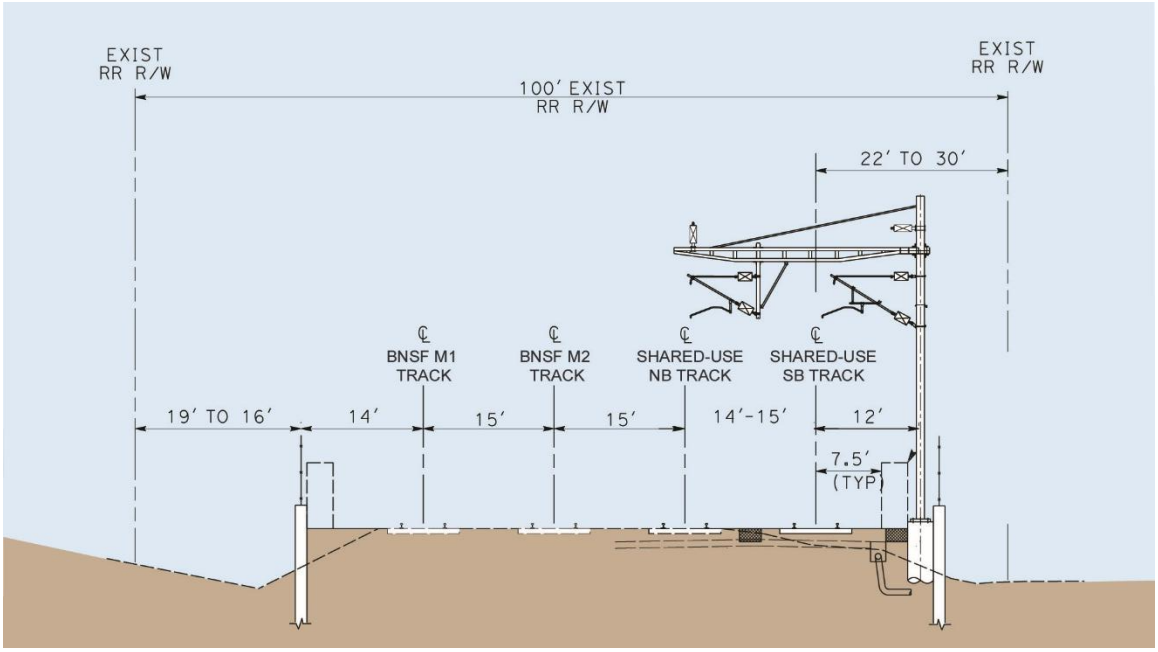
An overview of Shared Passenger Track Alternative A from Santa Fe Springs to Norwalk is presented on Figure 2-40.



Source: Authority 2025

Figure 2-40 Shared Passenger Track Alternative A: Santa Fe Springs to Norwalk Overview

The tracks would continue east underneath the Slauson Avenue roadway overcrossing, entering Santa Fe Springs. One of the Slauson Avenue bridge piers would need to be modified to accommodate the widened railroad bridge over the San Gabriel River. Underneath the Slauson Avenue bridge, the tracks would cross the UPRR Los Nietos Subdivision track, which would require a new diamond-shaped configuration at the point where the new shared track crosses the UPRR track. From Slauson Avenue to Telegraph Avenue, the track configuration would remain consistent with four tracks, presented on Figure 2-41. The tracks would cross under I-605 and then over Pioneer Boulevard, which would be a new grade separation. Continuing east, the tracks would cross the UPRR La Habra Subdivision track (requiring another diamond-shaped track configuration), and then over Norwalk Boulevard and Los Nietos Road, which would be new grade separations. Refer to Section 2.6.5, Early Action Projects, for more information on the grade separations and the modifications required to surrounding roads and land uses, which could be completed as early action projects. The tracks would continue east within the existing corridor, curving south to cross over Santa Fe Springs Road and Telegraph Road, where the existing railroad bridges would be widened on the western side to accommodate the new fourth mainline track.



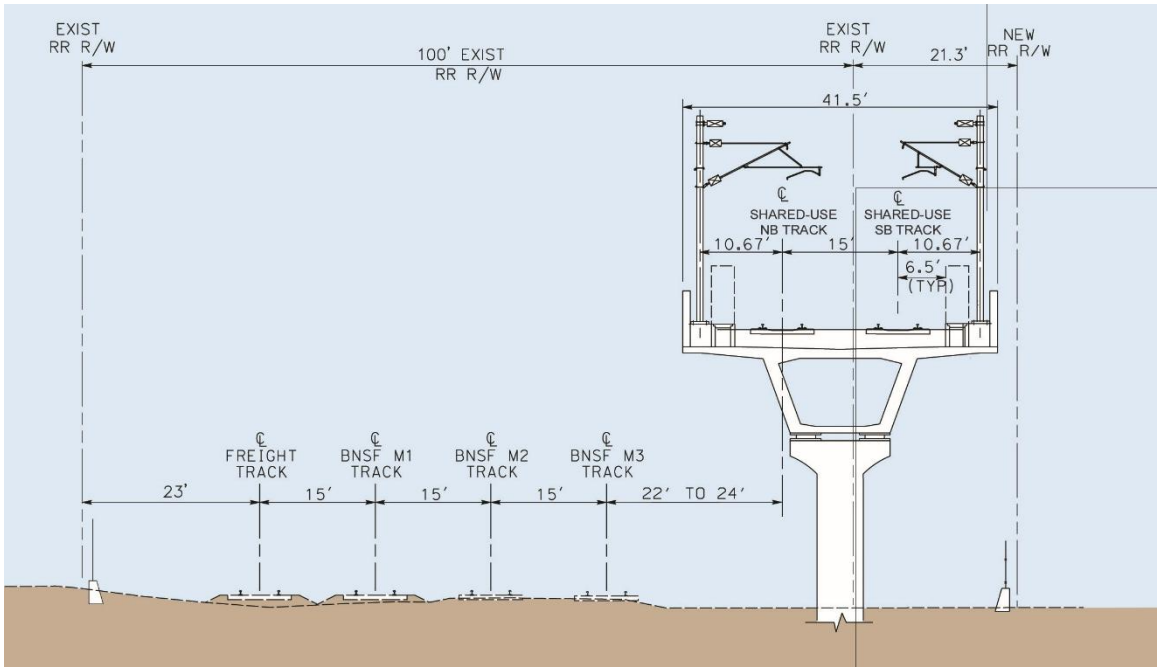
Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-41 Cross Section from Slauson Avenue to Telegraph Road

South of Telegraph Road, the two shared tracks and BNSF mainline tracks would have different vertical profiles. The shared tracks would diverge slightly outside of the existing railroad right-of-way and rise onto retained fill to cross over Florence Avenue on a new bridge, while three BNSF mainline tracks would cross Florence Avenue on the existing railroad bridge. An existing BNSF support track on the eastern side of the corridor between Telegraph Road and Florence Avenue would be maintained. BNSF currently uses the mainline tracks in this area to also stage trains, but that function would be removed with the introduction of HSR; therefore, that staging capacity would need to be replaced adjacent to Hobart Yard (refer to Section 2.6.3.5).

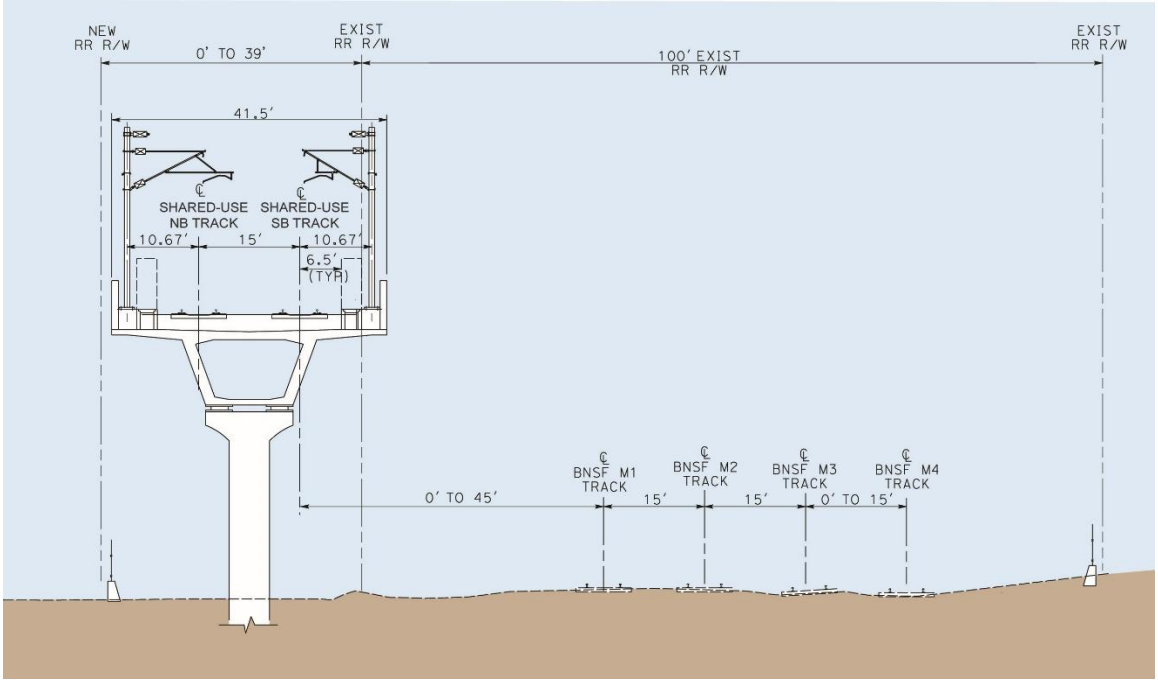
The two shared tracks would continue to rise up and transition from retained fill onto an elevated structure that crosses over Lakeland Road, while the BNSF tracks would remain at grade in their current configuration throughout this area. The elevated structure would continue south and transition from the western side of the corridor over to the eastern side. Transitioning the shared

tracks from the western to the eastern side of the corridor is necessary to avoid impacts on two BNSF freight yards farther south along the corridor, and the elevated structure allows this transition with minimal impacts on operations in the existing corridor. Figure 2-42 depicts north of Lakeland Road with the elevated structure on the western side of the corridor, and Figure 2-43 depicts south of Lakeland Road, after the structure has crossed over to the eastern side of the corridor. The top of rail of this elevated structure would reach up to approximately 60 feet at its highest point (excluding OCS poles).



Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-42 Elevated Cross Section North of Lakeland Road



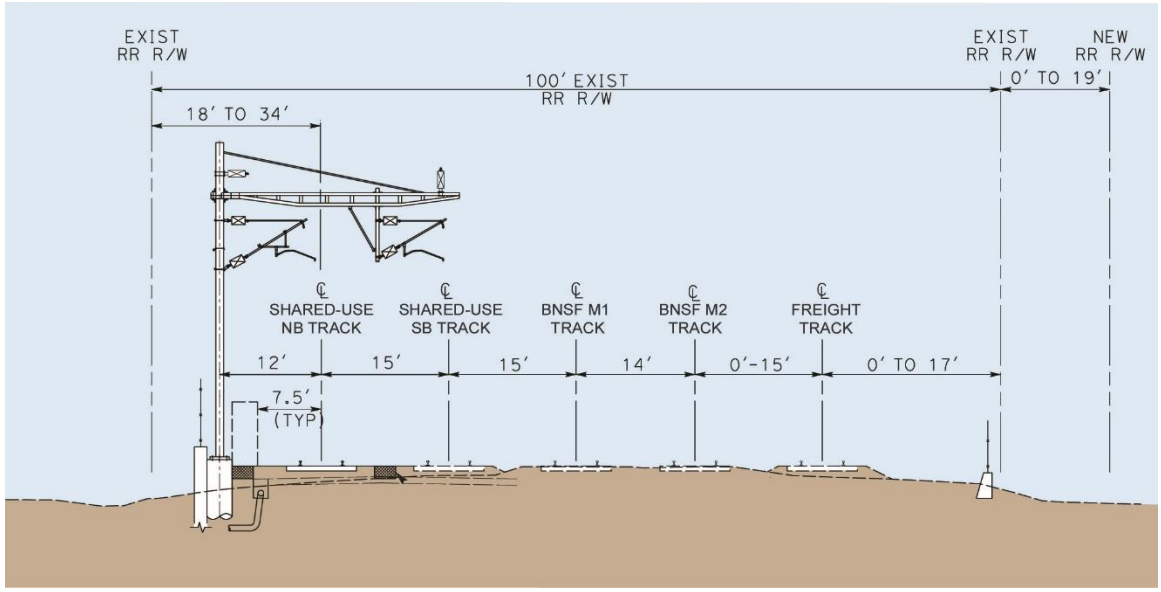
Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-43 Elevated Cross Section South of Lakeland Road

The elevated structure would veer east out of the existing railroad corridor and cross over Imperial Highway. This elevated structure would necessitate modifications to the existing Norwalk/Santa Fe Springs Metrolink Station. The location of the existing Metrolink platforms at this station would not be able to easily accommodate an additional mainline track and shared-track operations. Additionally, the existing Metrolink platforms are in an area where the corridor curves, and any new platforms would need to be on a straight section of track, which would be challenging to implement along the existing curved corridor. Therefore, the HSR project would shift the Norwalk/Santa Fe Springs Metrolink platforms to the east, to be served by the new elevated tracks. Section 2.6.3.5 describes the modifications to the Norwalk/Santa Fe Springs Metrolink Station.

Freight trains would continue to operate at grade on the existing tracks through the existing Norwalk/Santa Fe Springs Metrolink Station site. BNSF currently uses the mainline tracks in this area to also stage trains, but that function would be removed with the introduction of HSR; therefore, that staging capacity would need to be replaced adjacent to Hobart Yard (refer to Section 2.6.3.5). The elevated structure would continue south to meet the existing railroad corridor, where it would run along the eastern side of the corridor until it transitions back down to at grade just west of Carmenita Road. The shared tracks would rejoin the existing railroad right-of-way on the eastern side of the corridor.

The tracks would cross Carmenita Road and North Fork Coyote Creek, where both existing railroad bridges would be widened on the northern side to accommodate the new shared track. The tracks would continue at grade and cross under Rosecrans Avenue roadway overcrossing. Figure 2-44 depicts the track configuration through this area.



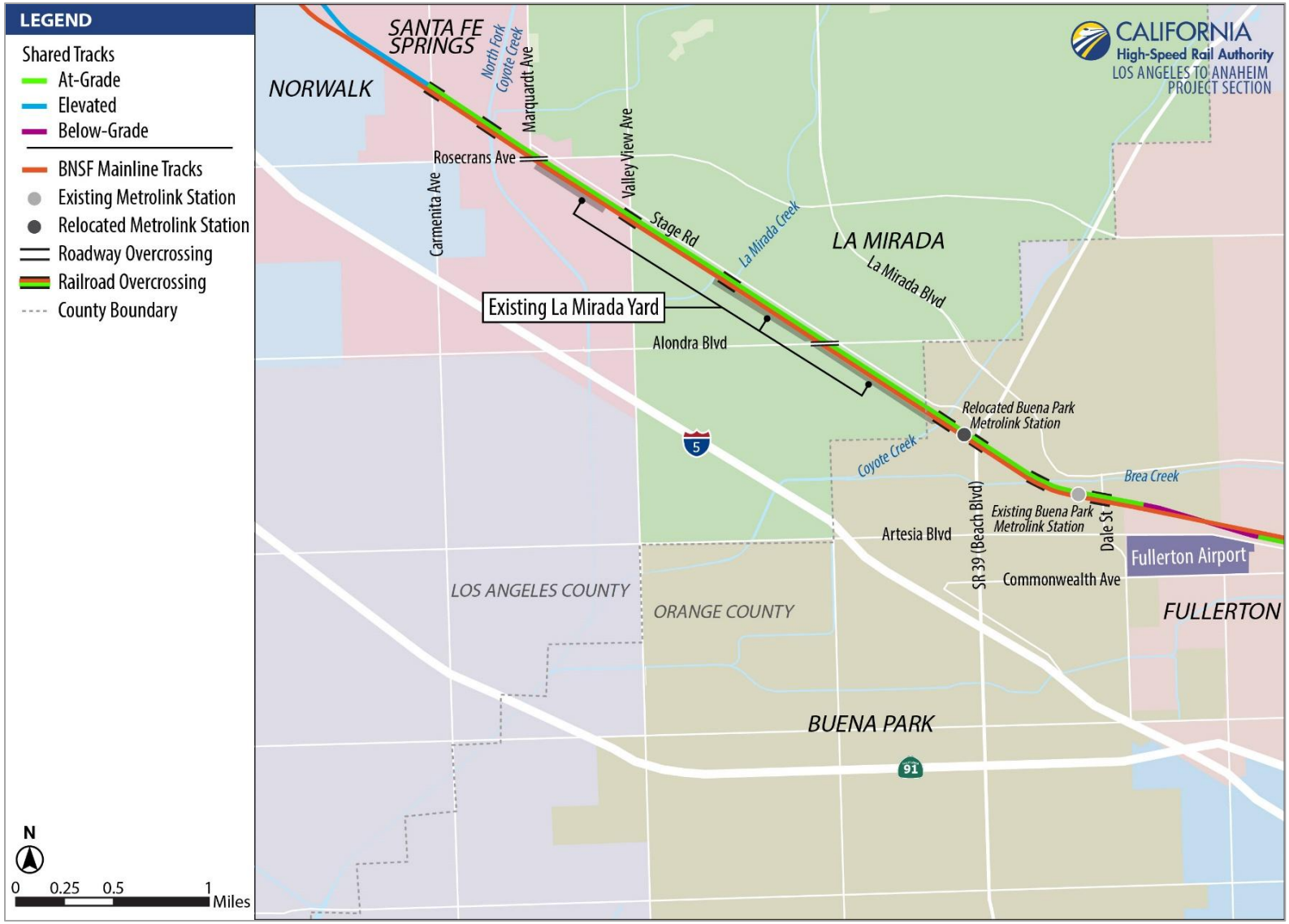
Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-44 Cross Section from Carmenita Road to Rosecrans Avenue/Marquardt Avenue

From Rosecrans Avenue to Valley View Avenue, the four mainline tracks would run alongside the first yard of BNSF's La Mirada Yard (which consists of three noncontiguous yards), and an existing western yard lead track would be slightly realigned and connected to an existing freight track on the southern side of the corridor. This southernmost track would connect farther east to a relocated yard lead track for the second La Mirada Yard. The five tracks would cross over Valley View Avenue, where the existing railroad bridge would be widened on the southern side to accommodate the new yard lead track.

La Mirada and Buena Park

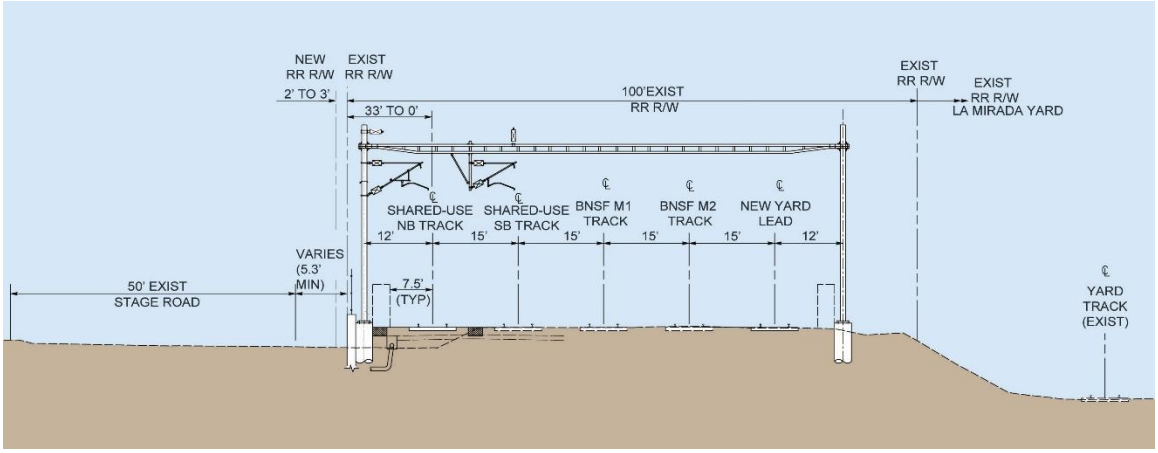
An overview of Shared Passenger Track Alternative A from La Mirada to Buena Park is presented on Figure 2-45.



Source: Authority 2025

Figure 2-45 Shared Passenger Track Alternative A: La Mirada to Buena Park Overview

East of Valley View Avenue, the five tracks enter La Mirada. The tracks would cross over La Mirada Creek, where the existing railroad bridge would be widened on the northern side to accommodate the new shared track. The tracks would continue east and pass by the second yard of BNSF's La Mirada Yard on the southern side of the corridor, into which the relocated yard lead track would connect. Figure 2-46 depicts an example of the five-track cross section by the yard. The tracks would then cross under Alondra Boulevard, where the existing roadway bridge would be replaced with a wider one to accommodate the new mainline track on the north.

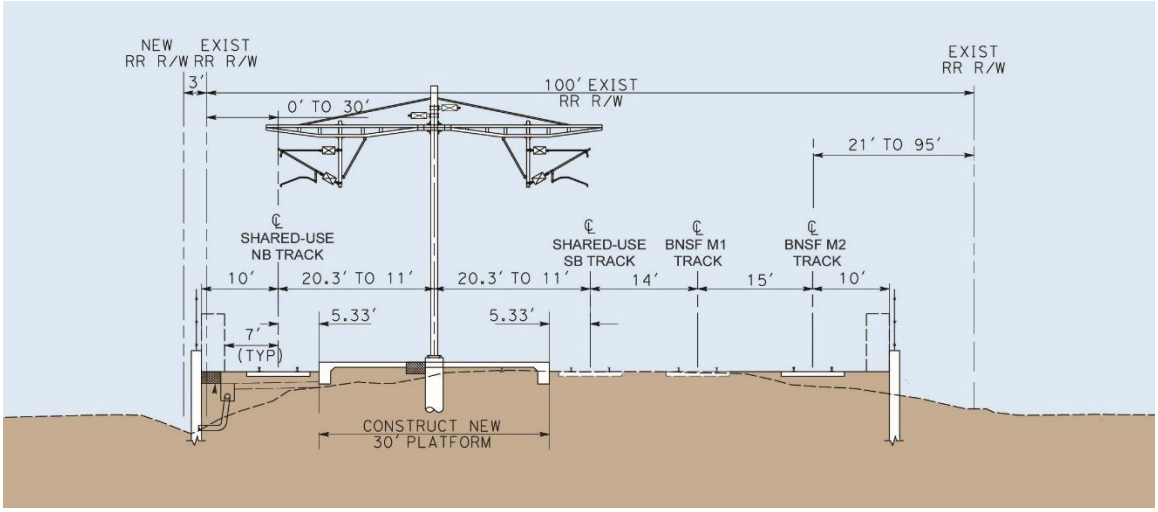


Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-46 Cross Section by La Mirada Yard

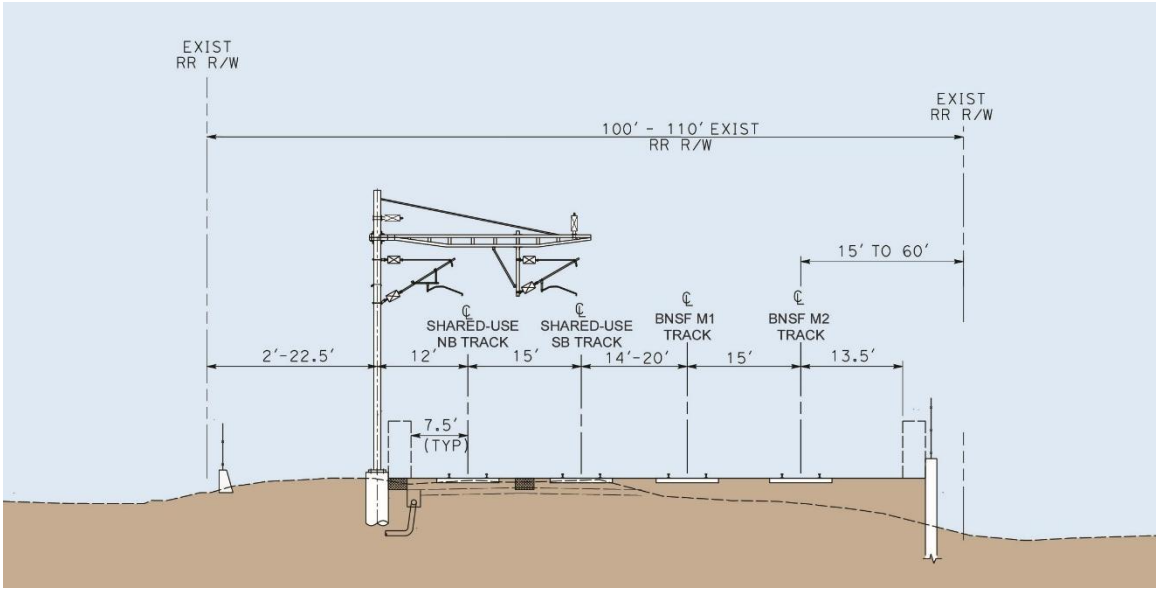
Continuing east of Alondra Boulevard, the five tracks would pass by the third yard of BNSF's La Mirada Yard. The existing freight tracks and connectors would be realigned in this area, and an existing storage track would be relocated to the western side of the yard. The tracks would then cross into Buena Park and over Coyote Creek, where the existing railroad bridge would be widened on both sides. At this point, the BNSF yard track on the southern side of the corridor converges with the mainline track, and the four tracks would then pass the relocated Buena Park Metrolink Station, just west of State Route (SR) 39 (Beach Boulevard). The existing Buena Park Metrolink Station is west of Dale Street but, because the HSR project would add and realign tracks through that area, the existing Buena Park Metrolink Station would need to be relocated. HSR trains would not stop at the relocated Buena Park Metrolink Station. Figure 2-47 illustrates the tracks adjacent to the relocated Buena Park Metrolink Station. The relocated station is described in more detail in Section 2.6.3.5.

The tracks would cross over SR 39 (Beach Boulevard), where the existing railroad bridge would be widened on the northern side, and then continue at grade. Figure 2-48 depicts the cross section east of SR 39, which is representative of the four-track configuration throughout Buena Park. The tracks would then cross Brea Creek, where the existing railroad bridge would be widened on the southern side, and then Dale Street, where the existing railroad bridge would be widened on the northern side.



Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-47 Cross Section at Relocated Buena Park Metrolink Station

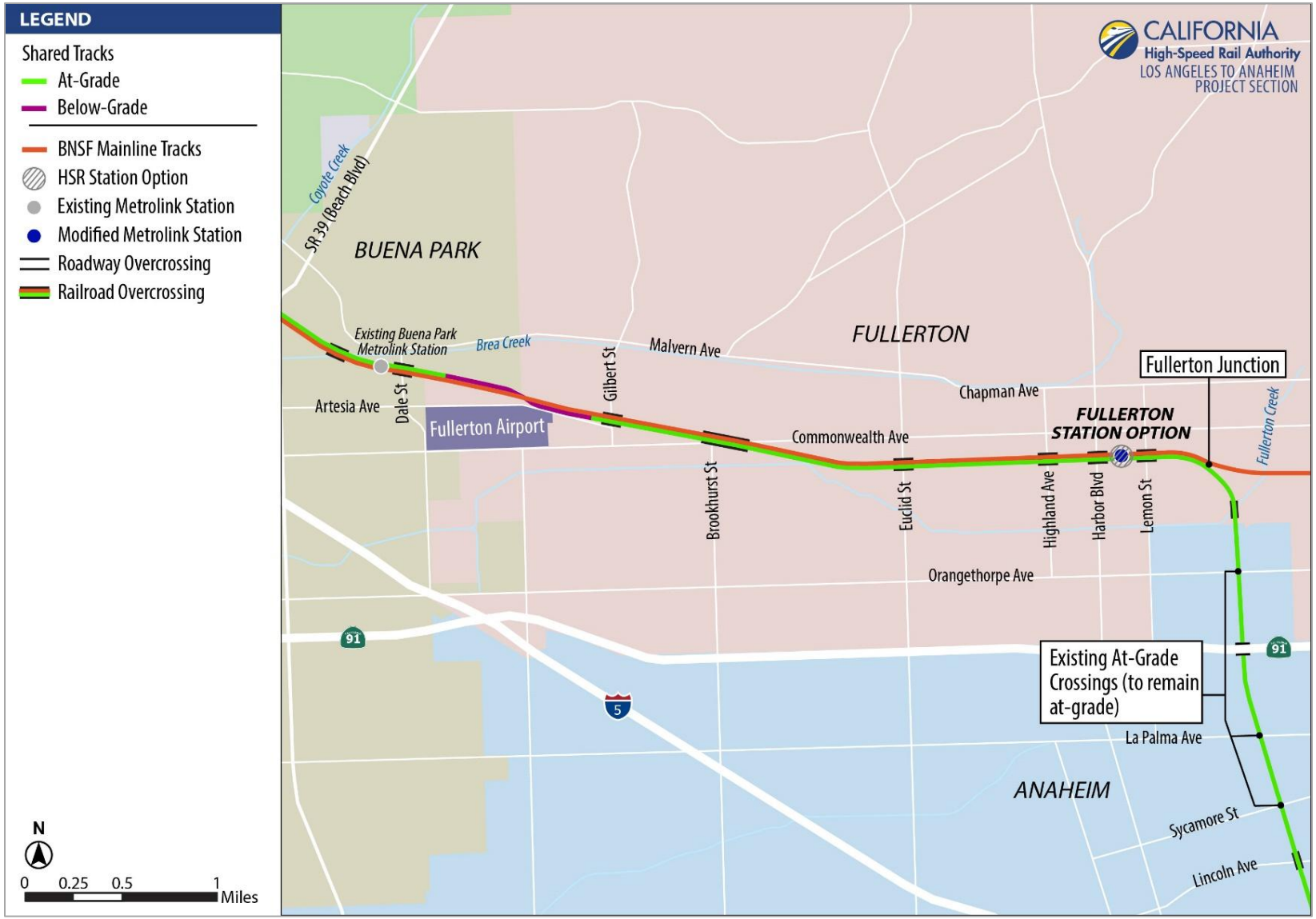


Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-48 Cross Section East of State Route 39 through Buena Park

Fullerton

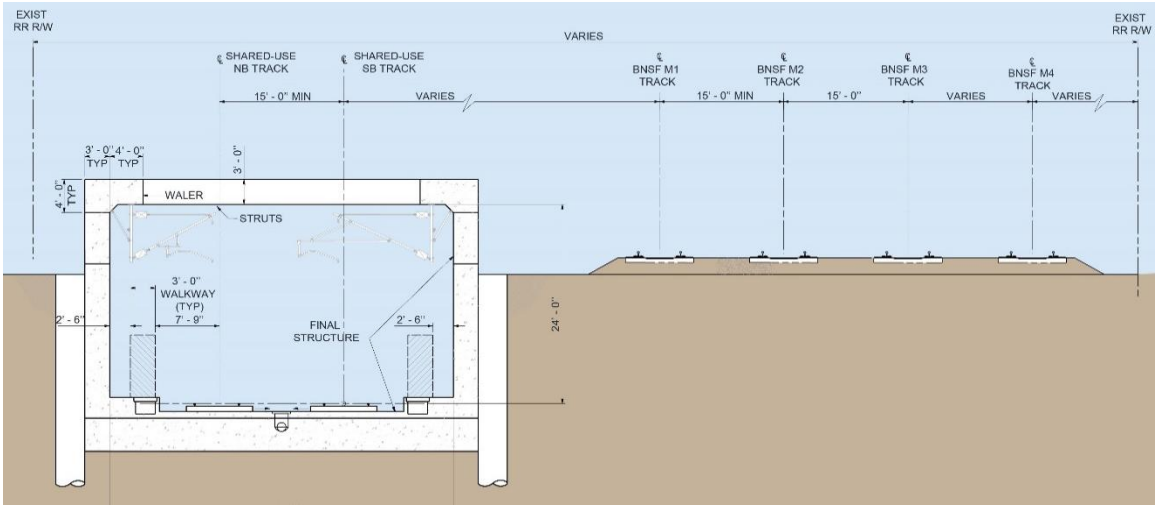
An overview of Shared Passenger Track Alternative A in Fullerton is presented in Figure 2-49.



Source: Authority 2025

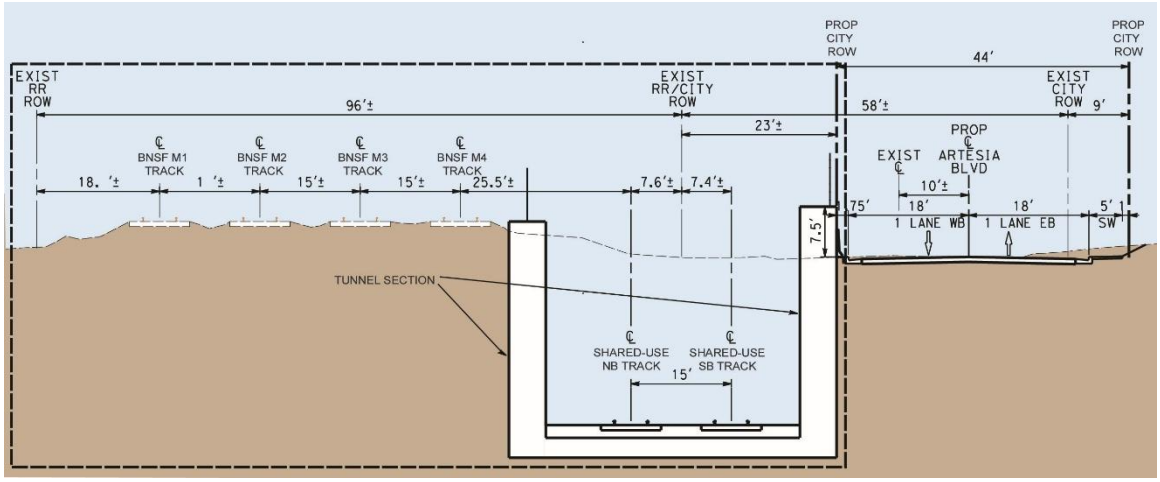
Figure 2-49 Shared Passenger Track Alternative A: Fullerton Overview

East of Dale Street, the tracks enter Fullerton. Fullerton Municipal Airport is south of the railroad corridor, and the shared tracks would need to be lowered as they pass by the airport so that the HSR project, including the OCS, trains, and all other project components, would not conflict with the airport runway protection zone. Additionally, the shared tracks on the northern side of the corridor would need to transition to the southern side to serve the existing Fullerton Metrolink/Amtrak Station farther south. The shared tracks would make the transition via a short below-grade section, in a braced trench. The trench would start approximately 850 feet east of Dale Street, and as it approaches the eastern end of Fullerton Municipal Airport, would cross under the BNSF tracks to the southern side of the corridor, where it would continue adjacent to the existing BNSF tracks, which would remain at grade. Figure 2-50 illustrates the shared tracks transitioning into the trench with the tracks on the northern side of the corridor. Figure 2-51 depicts the cross section after the shared tracks have transitioned to the southern side. Figure 2-51 also depicts how the trench would be partially outside of the existing railroad corridor within the existing Artesia Avenue right-of-way, and Artesia Avenue would need to be realigned slightly south. There would be total of four BNSF mainline tracks throughout this segment. HSR modifications throughout this area would result in a loss of BNSF staging capacity, which would be replaced at the new consolidated yard adjacent to Hobart Yard described in Section 2.6.3.5.



Source: Authority 2025
M = main track; R/W = right-of-way; NB = northbound; SB = southbound

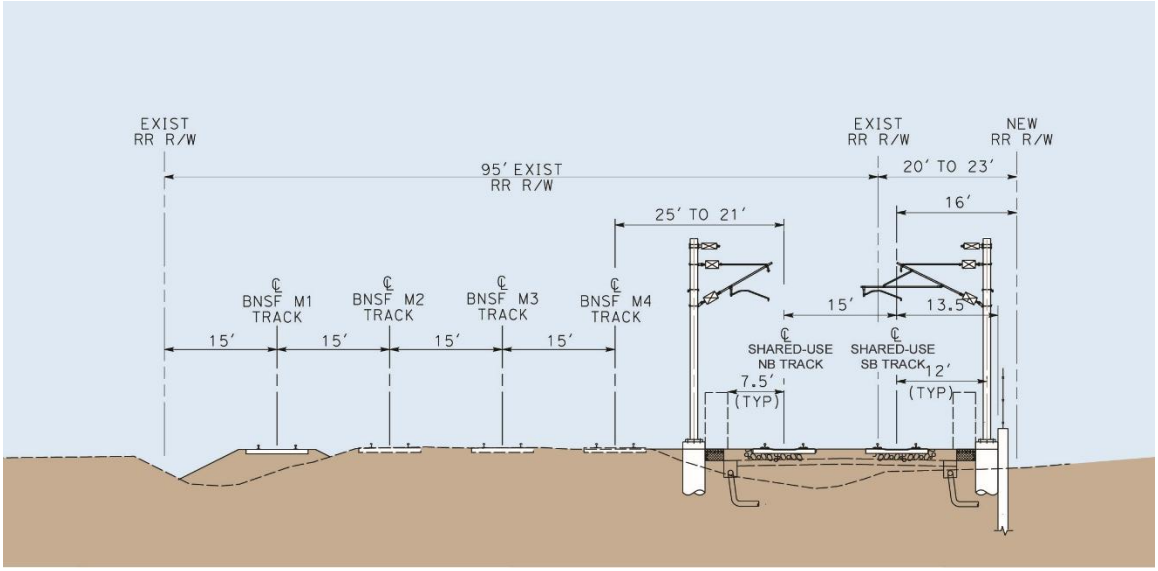
Figure 2-50 Braced Trench Cross Section Adjacent to Fullerton Airport



Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-51 Braced Trench Cross Section East of Fullerton Municipal Airport

The shared tracks would return to at grade just west of the Gilbert Street undercrossing. A new railroad bridge would be built south of the existing railroad bridge to accommodate the two shared tracks. The intersection of Gilbert Street and the realigned Artesia Avenue would also need to be reconfigured to accommodate the new bridge structure (refer to Section 2.6.3.6). The four mainline BNSF tracks would continue east, for a total of six tracks within the corridor in this area. Figure 2-52 illustrates an example of this six-track configuration through this segment. This track configuration would continue east and cross over Commonwealth Avenue, where the existing railroad bridge would be widened on both sides.



Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-52 At-Grade Cross Section between Gilbert Street and Commonwealth Avenue

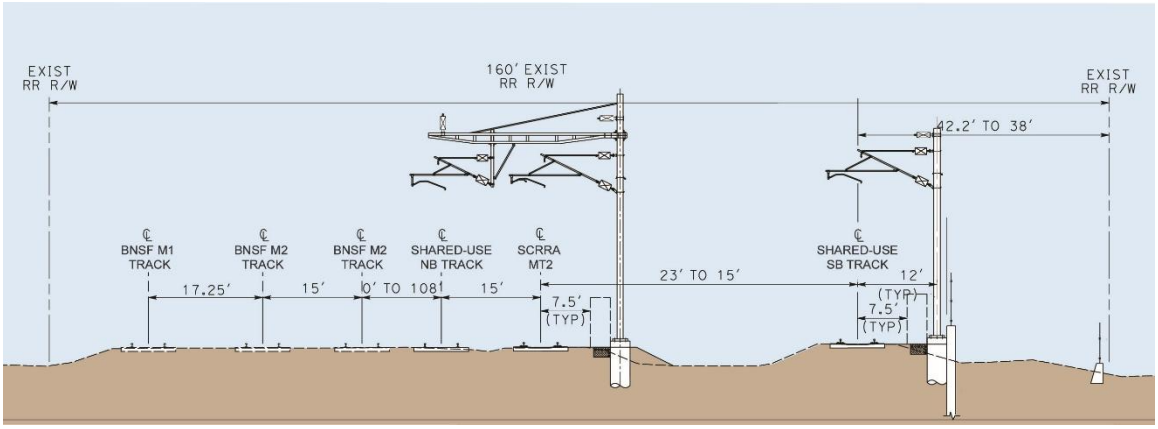
East of Commonwealth Avenue, an existing BNSF storage track currently on the southern side of the corridor would be relocated to be north of the shared tracks, adjacent to the four BNSF mainline tracks, while the shared tracks would diverge out of the existing railroad right-of-way, for

a total of seven tracks in this area. This track configuration would cross Euclid Street, where an existing railroad bridge on the southern side of the corridor would be replaced with a new, wider bridge to accommodate the two shared tracks. East of Euclid Street, the BNSF storage track would converge with the adjacent BNSF mainline track, and the two shared tracks would rejoin the existing railroad right-of-way.

Continuing east, the tracks would approach the Fullerton Metrolink/Amtrak Station, which currently has three mainline tracks. Shared Passenger Track Alternative A would add a fourth mainline track on the southern side of the corridor. The new mainline track would require the existing railroad bridge over Highland Avenue to be widened on the southern side. At Highland Avenue, two of the BNSF mainline tracks would merge into the other tracks, for a total of two BNSF tracks and two shared tracks adjacent to the Fullerton Metrolink/Amtrak Station. The Fullerton Metrolink/Amtrak Station would require modifications, described in more detail in Section 2.6.3.5. Under Shared Passenger Track Alternative A, HSR trains would not stop at the Fullerton Metrolink/Amtrak Station. The tracks would cross over Harbor Boulevard, where a new railroad bridge would be built south of the existing railroad bridge to accommodate the southernmost track and modified Metrolink/Amtrak platform. East of Lemon Street, a BNSF maintenance-of-way spur, approximately 500 feet long, would be added on the north side of the corridor to replace a BNSF spur that would be removed near the Fullerton Metrolink/Amtrak Station.

East of the station, the tracks would head toward Fullerton Junction, which is a critical node in the Southern California rail network, where freight and passenger trains converge into the LOSSAN Corridor. The four tracks would cross Lemon Street on the existing railroad bridges, and new track turnouts would connect to a total of six tracks: three realigned BNSF mainline tracks on the northern side of the corridor that would be dedicated to BNSF trains traveling east-west through the junction; two shared tracks that would be dedicated to passenger trains traveling northwest-southeast from Los Angeles to ARTIC; and one existing Metrolink track on the southern side. The junction currently has four tracks, and the track changes would allow trains traveling in different directions to pass through the Fullerton Junction area more efficiently by separating BNSF and passenger rail trains onto the northern and southern sides of the corridor, respectively.

The Fullerton Junction track cross section is presented on Figure 2-53. The BNSF mainline track added throughout the Fullerton Metrolink/Amtrak Station area would continue past Fullerton Junction, and would be directly south of the two existing tracks. This new track would cross the existing railroad bridge over Raymond Avenue and connect to an existing track, which currently ends east of Raymond Avenue.



Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound; SCRRA = Metrolink

Figure 2-53 Cross Section of Fullerton Junction

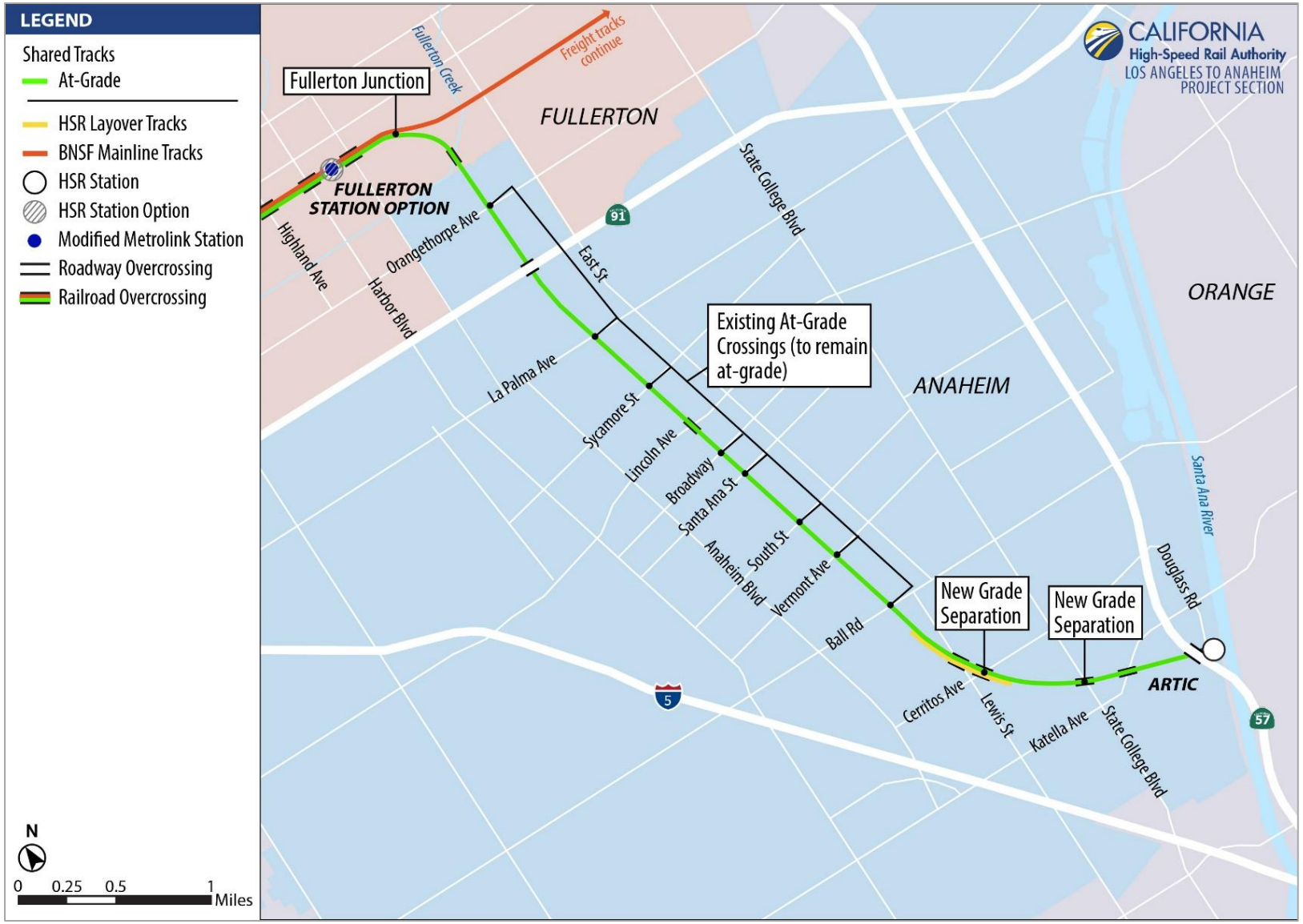
Continuing south from Fullerton Junction, the Metrolink track would merge into the existing western track, for a total of two tracks within the corridor. From this point south, the HSR project would electrify these two existing tracks to allow for shared operations with Metrolink. Throughout the Fullerton Junction area south to ARTIC, the HSR project would not add tracks, but would maintain and use existing infrastructure to the greatest extent possible to minimize impacts. Several freight trains per day currently run on the existing tracks and would retain operation rights in the future. Potential conflicts between passenger and freight rail would be avoided by temporal separation.[25]

The tracks would cross Fullerton Creek on the existing railroad bridge.

Anaheim

An overview of Shared Passenger Track Alternative A in Anaheim is presented on Figure 2-54.

[25] *Temporal separation* is the separation of train traffic by the time of day.

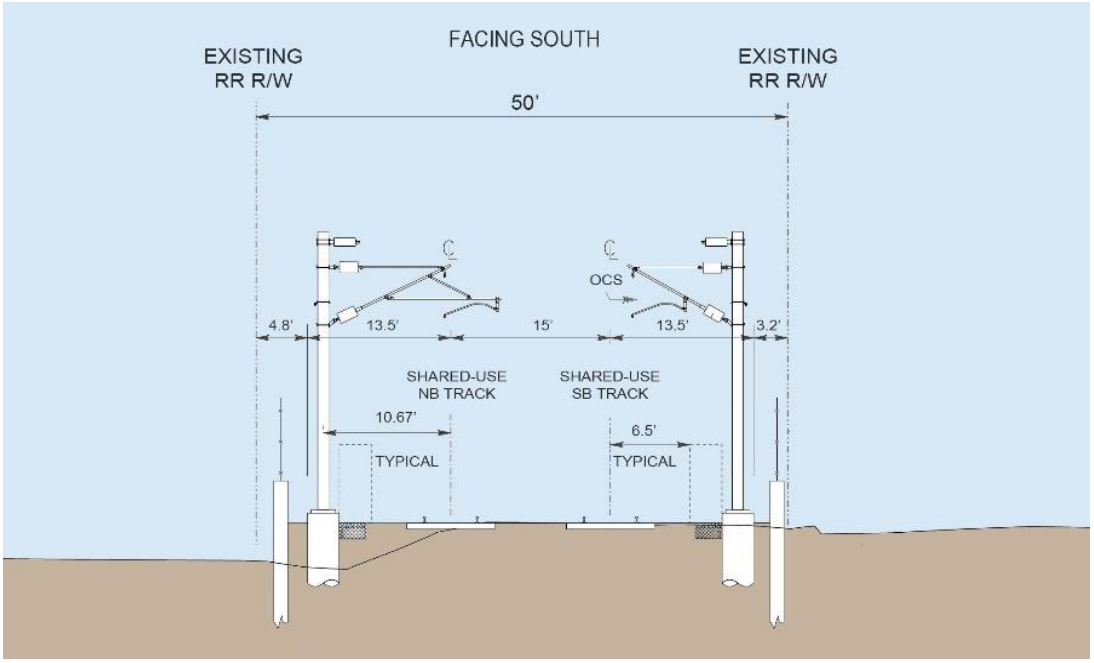


Source: Authority 2025

Figure 2-54 Shared Passenger Track Alternative A: Anaheim Overview

South of Fullerton Creek, the tracks enter Anaheim. The two shared tracks would run south, crossing Orangethorpe Avenue at grade and under SR 91; existing BNSF siding and storage tracks would be maintained throughout this segment.

Continuing south, the tracks would cross the Carbon Creek channel on the existing bridge and then La Palma Avenue and Sycamore Street at grade. The two shared tracks would cross Lincoln Avenue on the existing railroad bridge and then cross Broadway, Santa Ana Street, South Street, Vermont Avenue, and Ball Road at grade in the existing at-grade crossings. Figure 2-55 depicts the cross section that is representative of the two-track configuration throughout this segment in Anaheim.



Source: Authority 2025
OCS = overhead contact system; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-55 At-Grade Cross Section between La Palma Avenue and Ball Road

From south of Ball Road to south of Cerritos Avenue, two layover tracks would be added to the western side of the corridor, for a total of four tracks in the area. Refer to Section 2.6.3.2 for more information on the layover tracks. The shared tracks would cross Lewis Street on the existing railroad bridge, while the layover tracks would cross the roadway on a new bridge to the south. Continuing south, the shared tracks and layover tracks would cross Cerritos Avenue, which would be grade separated; the roadway would be lowered and a new railroad bridge would be built for the shared tracks and layover tracks. Additionally, a new railroad bridge would be needed for an existing UPRR siding track to the east, because the lowered Cerritos Avenue would also cross under the UPRR track.

The two HSR layover tracks would merge into a single track, which would serve as an HSR lead track as well as a UPRR connector track, for a total for three tracks in the corridor, and cross the UPRR Tustin Branch (diamond-shaped configurations would be added for the track crossings). The tracks would curve to the east and cross State College Boulevard, which would be grade separated, with the roadway lowered and a new railroad bridge built over it. Continuing east, the HSR lead/UPRR connector track would turn out into two tracks and the four tracks would cross Katella Avenue, where the existing railroad bridge would be replaced with two new bridges to accommodate the four tracks. The two tracks on the northern side of the corridor would merge with the existing Metrolink tracks to serve the existing Metrolink platforms at ARTIC. The two

tracks on the southern side would serve the new HSR platforms, south of the Metrolink platforms. The HSR tracks and station platform would extend under SR 57 and over Douglass Road, where a new bridge would be added. The HSR tracks and platform would terminate just west of the Santa Ana River Trail at the Anaheim and Orange city borders, which is the project section's southern limit.

2.6.3.2 Ancillary Facilities

Systems Facilities

Trains would draw power for the California HSR System from California's existing electricity grid and distributed via an OCS.[26] The project would not include the construction of a separate power source, although it would include the extension of underground or overhead transmission lines to a series of power substations positioned along the HSR corridor. The transformation and distribution of electricity would occur in three types of stations:

- TPSSs transform high-voltage electricity supplied by public utilities to the train operating voltage. TPSS sites would be adjacent to existing utility transmission lines and outside of the existing right-of-way and would be located approximately every 30 miles along the project alignment.
- Switching stations connect and balance the electrical load between tracks, and switch OCS power on or off in the event of a power outage or emergency. Switching stations would be midway between TPSS sites, approximately 15 miles from the nearest TPSS. Each switching station would be adjacent to the HSR right-of-way.
- Paralleling stations, or autotransformer stations, provide voltage stabilization and equalize current flow. Paralleling stations would be between the TPSS sites and the switching stations. Each paralleling station would be adjacent to the project section railroad right-of-way.

Table 2-11 lists the proposed TPSSs, switching station, and paralleling stations. Refer to Figure 2-56 for a map of the proposed TPSSs, switching station, and paralleling stations. A more detailed description of each facility is included below.

Table 2-11 Traction Power, Paralleling, and Switching Station Locations

Facility	Location
Traction power substations (two sites)	City of Los Angeles: South of Washington Blvd and west of Soto St in Los Angeles, adjacent to the existing railroad viaduct City of Anaheim: On the northeast corner of Lewis St and Cerritos Ave, southwest of the HSR tracks
Paralleling stations (two sites)	City of Montebello: Southwest corner of Maple Ave and Sycamore St, south of the HSR tracks (co-located with the relocated Commerce Metrolink Station) City of Fullerton: Northwest corner of Dale St and Artesia Ave, south of the HSR tracks
Switching station	City of Santa Fe Springs: Northeast corner of Los Nietos Rd and Santa Fe Springs Rd, north of BNSF Railway tracks

Source: Authority 2025
HSR = high-speed rail

[26] OCS is part of the traction power electrification system, which supplies electric energy coming from a TPSS to non-self-powered rail vehicles operating beneath the overhead wires through roof-mounted current collection equipment.

Source: Authority 2025

Figure 2-56 Traction Power, Paralleling, and Switching Station Locations

Los Angeles Traction Power Substation Site

The Los Angeles TPSS would be south of Washington Boulevard and west of Soto Street in Los Angeles, adjacent to the existing railroad viaduct. The surrounding area is primarily industrial, with several warehouse and distribution centers, a concrete production and transit mixer hauling facility, a fast-food restaurant, and a strip mall.

Access to the site would be provided via Washington Boulevard and power would be supplied from an overhead grid layout with power poles on each side of Washington Boulevard. The poles would also carry communication lines.

The nearest existing power source is LADWP Receiving Station No. 5, on the corner of De La Torre Way and E 15th Street, approximately 1.2 miles from the TPSS. Modifications are proposed at the LADWP substation; a receiving station would be added to the south of the existing substation, which would require acquisition of a parcel currently used for LADWP parking, as well as closure of the segment of Emery Way between De La Torre Way and Spence Street. It is assumed that power to the TPSS from the receiving station would be supplied via two 115-kV circuits, which would need to cross the UPRR tracks south of the LADWP substation and be built along the southern side of Washington Boulevard. The steel tubular poles would be

approximately 75 to 80 feet in height (65 feet above grade) and spaced at a maximum interval of 200 feet along Washington Boulevard. Each pole would be placed within a 10- by 40-foot area to allow for flexibility and relocation to avoid potential conflicts with underground utilities such as water, storm, and sanitary sewers. Approximately 35 poles would be required to connect the TPSS to the LADWP substation on De La Torre Way and 15th Street. Existing poles and utility lines may be left in place or transferred to the new pole lines. It should be noted that because there are no formal agreements in place between the Authority and LADWP, assumptions about capacity and site access have been made based on the Authority's design requirements and the available space in the vicinity of the city substation.

It is anticipated that a single travel lane and existing street parking would be used for the storage of poles (at each pole installation site) to connect the proposed TPSS to the power substation. Erection and pole foundation would require temporary closure of one lane and approximately 10 street parking stalls. Construction work for the TPSS and connections is expected to last 6 to 8 months.

Anaheim Traction Power Substation Site

The Anaheim TPSS site would be on the northeast corner of Lewis Street and Cerritos Avenue in Anaheim, in an area composed of office complexes and mixed commercial/light manufacturing facilities. Anaheim Public Utilities owns and operates a power substation on an approximately 16-acre site on the southwest corner of Lewis Street and Cerritos Avenue. It is assumed that this substation would be the source of power for the HSR TPSS approximately 0.1 mile northeast of the substation, on the opposite corner of Lewis Street and Cerritos Avenue. It should be noted that because there are no formal agreements in place between the Authority and Anaheim Public Utilities, assumptions about capacity and site access have been made based on the Authority's design requirements and the available space in the vicinity of the city substation.

Modifications are proposed at the Anaheim substation; a receiving station would be added to the southeastern side of the existing substation, within city property. Because the general area has underground power distribution along Cerritos Avenue, it is assumed that the two 115-kV circuits would be routed to the TPSS site underground. Additionally, because Cerritos Avenue would be grade separated as part of the HSR project, two 30-inch power conduits would be installed during construction of the grade separation.

Beginning at the Anaheim substation, the 30-inch conduits would be installed in Lewis Street and run north for approximately 750 feet to Cerritos Avenue. Junction/bending structures would be required to complete the installation of conduit and conductors. Access to this TPSS would be provided via Cerritos Avenue.

It is anticipated that work for the conduit installation would be done during construction of the Cerritos Avenue grade separation. Complete conduit installation is expected to take up to 3 months.

Paralleling and Switching Station Site

Paralleling and switching stations are sited based on distance requirements described in Section 2.4.6.2, Traction Power Switching and Paralleling Stations, and they are co-located with other project elements, if feasible, to minimize property impacts. Only one switching station would be required for the project section.

Based on the distance requirements, a switching station would be needed between the two TPSS sites and would need to be sited in Santa Fe Springs. It would need a site of approximately 9,600 square feet (generally 120 by 80 feet). The switching station would be at Los Nietos Road 0.1 mile northeast of the project alignment. Additional right-of-way would be needed for the switching station because there are no other project elements in that area that would allow for co-location.

A paralleling station would be needed between a TPSS and switching station every 5 miles. Based on the distances between the TPSSs in Los Angeles and Anaheim and the switching station in Santa Fe Springs, two paralleling stations would be needed for the project section; they

would be sited in Montebello and Fullerton. Each paralleling station would need to be approximately 8,000 square feet (generally 100 by 80 feet) in size adjacent to the proposed HSR tracks. The Montebello paralleling station would be co-located with the relocated Commerce Metrolink Station, on the southern side of the corridor. The Fullerton paralleling station would be 0.3 mile northwest of Fullerton Municipal Airport and Artesia Boulevard and east of Dale Street, and would require additional right-of-way south of the corridor.

Signaling and Train-Control Elements

To reduce the safety risks associated with freight and passenger trains, the National Transportation Safety Board, FRA, and other agencies mandated PTC. PTC is a train safety system designed to automatically implement safety protocols and provide communication with other trains to reduce the risk of a potential collision. The U.S. Rail Safety Improvement Act of 2008 requires the implementation of PTC technology across most railroad systems by December 31, 2018. The FRA published the Final Rule with regulations on January 15, 2010.

This project section would include communication towers and ancillary facilities to implement the FRA PTC requirements. PTC infrastructure consists of integrated command, control, communications, and information systems for controlling train movements. The intent is to improve railroad safety by substantially reducing the probability of collisions between trains, personal injuries, damage to equipment, and over-speed accidents. Because of the lower operating speed of HSR trains in this project section compared to other HSR project sections, this project section would operate using conventional PTC signaling rather than a specialized HSR signaling system.

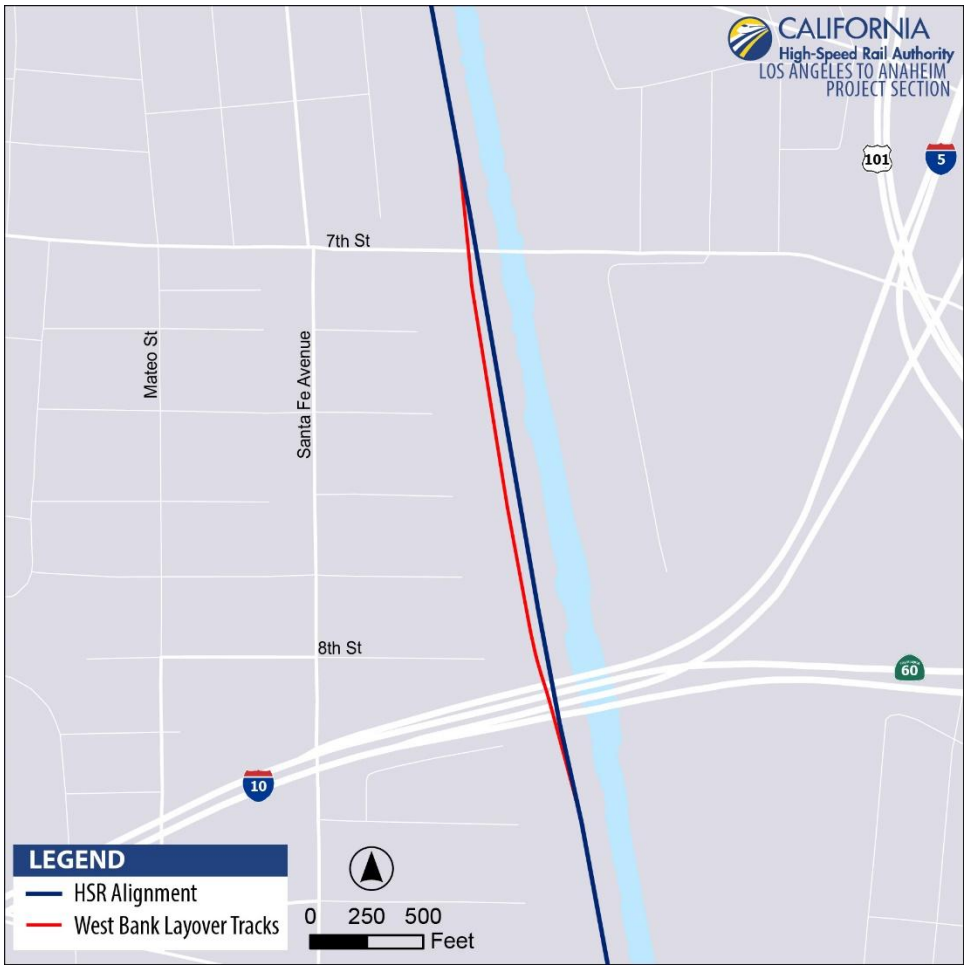
This project section would use a radio-based communications network including a fiber optic backbone and communications towers approximately every 2 to 3 miles, depending on the terrain and selected radio frequency. The towers would be in the HSR corridor in a fenced area of approximately 20 feet by 15 feet, including a 10- by 8-foot communications shelter and a 6- to 8-foot-diameter, 100-foot-tall communications pole. These communications facilities could be collocated within the traction power substations. Where communications towers cannot be located with traction power substations or other HSR facilities, the communications facilities would be within or near the HSR corridor in a fenced area of approximately 20 feet by 15 feet.

Layover Tracks

Layover tracks are used to store and restock trains during the day in between service runs, and at terminus stations they are also used to store trains at night when they are not in service. Layover tracks are required where high-speed trains would be ending their runs, near LAUS and ARTIC, to support layover functions. Two layover locations are proposed along the project section, along the west bank of the Los Angeles River (near LAUS) and in Anaheim (near ARTIC), which support Level 1 maintenance activities such as daily testing and diagnostics of certain safety apparatus on the train. Each layover track location could hold up to four HSR trainsets.

Two layover tracks would be along the west bank of the Los Angeles River, west of and parallel to the mainline tracks, within the existing railroad right-of-way. The layover tracks could be used for turning HSR trains around without having to run the trains through the LMF. These locations could support additional maintenance facilities on future coordination with Amtrak. Figure 2-57 depicts the location of the layover tracks in Los Angeles on the west bank of the Los Angeles River between Seventh and Eighth Streets.

At ARTIC, there would be two layover tracks west of and parallel to the mainline track between Ball Road and State College Boulevard. Additional right-of-way would be needed in this area. A layover support facility would be included at the northeastern corner of Lewis Street and Cerritos Avenue. Figure 2-58 depicts the location of the layover tracks in Anaheim.



Source: Authority 2025

Figure 2-57 Los Angeles River West Bank Layover Tracks

Source: Authority 2025

Figure 2-58 Anaheim Layover Tracks

2.6.3.3 High-Speed Rail Station Facilities

Because the project section is within an existing corridor with passenger rail service, Shared Passenger Track Alternative A does not propose new HSR stations but rather modifies existing passenger rail stations to allow for shared operations with HSR. Shared Passenger Track Alternative A would include an HSR station platform and facilities at ARTIC, described below. As described in Section 2.6.2.1, an HSR station at LAUS was approved as a part of the Burbank to Los Angeles Project Section.[27] Although the Los Angeles to Anaheim Project Section would connect to this station, this Draft EIR/EIS does not analyze impacts associated with adding HSR service to LAUS.

ARTIC High-Speed Rail Platform and Station Facilities

At ARTIC, HSR station platforms and other facilities would be added, including:

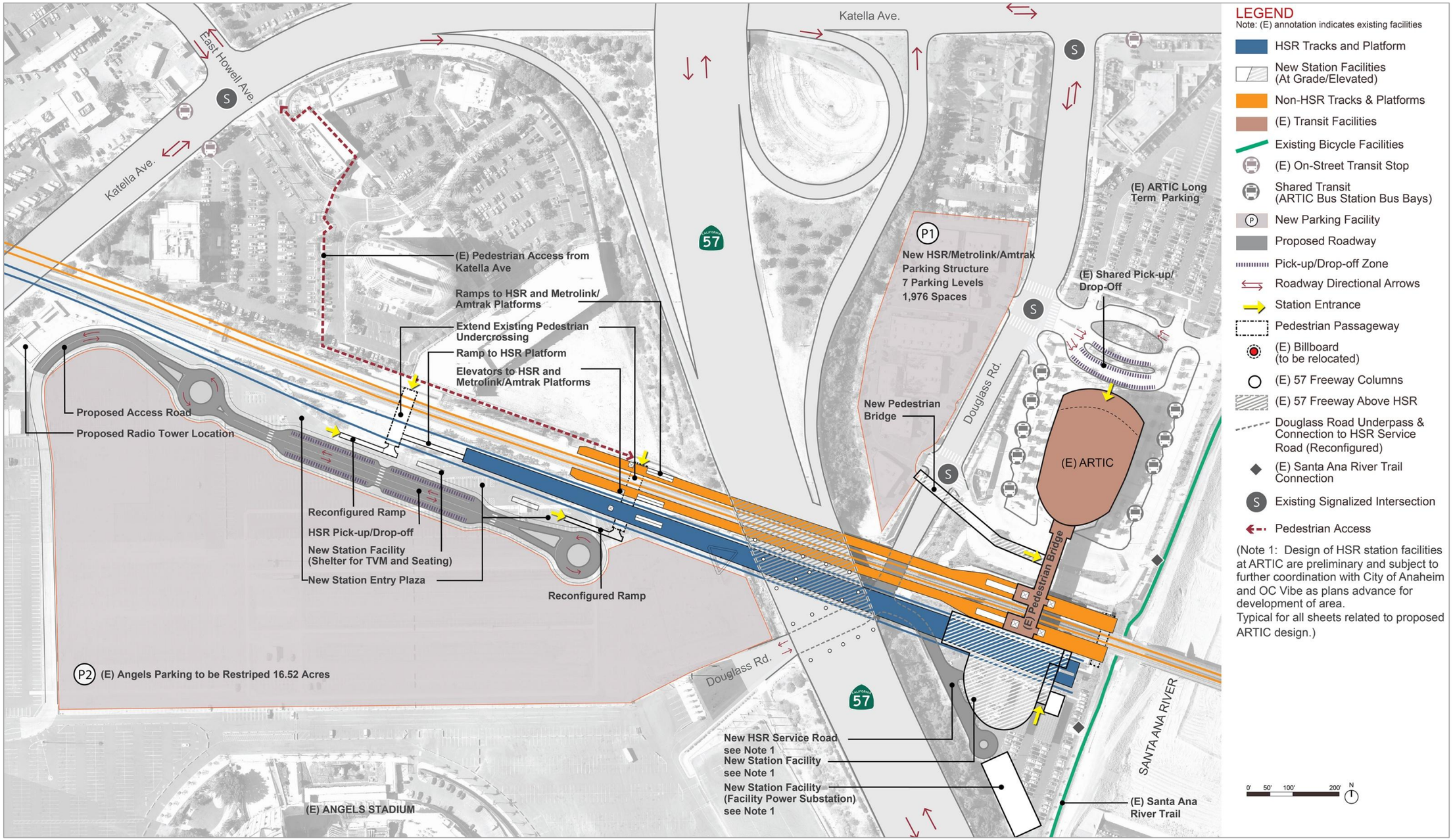
- Passenger boarding and alighting platforms (both high level and low level)

[27] For more information on the Burbank to Los Angeles Project Section, refer to website, Burbank to Los Angeles Project Section: Environmental Documents – California High Speed Rail.

- Station building with ticketing, waiting areas, passenger amenities, vertical circulation, administration, and employee areas
- Vehicle parking (short-term and long-term)
- Pick-up and drop-off areas
- Bicycle parking
- Waiting areas and queuing space for taxis, ride app services, and buses
- Pedestrian walkway connections
- Facility power substation to provide electricity to the HSR station building

Detailed information on HSR station area development policies can be found in Section 2.9.1, High-Speed Rail, Land Use Patterns, and Development Around High-Speed Rail Stations. Built at the existing ARTIC station, the proposed HSR platform and station facilities would be at grade, with two new HSR tracks and a single 1,410-foot center platform for HSR, south of and parallel to the existing Metrolink/Amtrak tracks and platforms. The HSR platform would be accessed through an extension of ARTIC's existing pedestrian bridge from the northeast and through an extension of two existing pedestrian tunnels on the western end of the existing ARTIC platforms. The Authority would work with the City of Anaheim, as the ARTIC passenger terminal owner, to share the passenger amenities such as ticketing offices, restrooms, waiting areas, and food and beverage services inside ARTIC in the near term. Once ridership increases enough that combined HSR and local-provider passenger volumes exceed the design capacity of the ARTIC passenger terminal building, then the Authority would build a separate HSR passenger terminal. This new HSR station building, included within the footprint and presented on Figure 2-59, would be at the southern end of the pedestrian bridge, along with a facility power substation to provide electricity to the building. The existing Metrolink/Amtrak parking lot north of Angel Stadium would be reconfigured into a pick-up/drop-off area and connected to the existing access road from Katella Avenue. The project would maintain the two existing access points between the Santa Ana River Trail and ARTIC. The existing pick-up/drop-off area and bus bays around the outside of the existing ARTIC building would be shared with HSR passengers. Additionally, radio towers would be built adjacent to the access road at Katella Avenue. Radio towers are required for HSR communications with the overall HSR system.

This project would include a new parking structure adjacent to SR 57 and Katella Avenue, providing 1,350 HSR parking spaces and 626 replacement parking spaces to account for existing parking spaces at ARTIC that would be displaced by the HSR tracks and platform, for a total of 1,976 parking spaces. Figure 2-59 provides an illustration of the HSR platform and station facilities at ARTIC. In light of the uncertainty regarding the need for station area parking, the Authority has conservatively identified parking facilities based on the maximum forecast for parking demand at each station and the local conditions affecting access planning. This approach results in providing the upper range of actual needs and the maximum potential environmental impacts of that range. To attract, support, and retain high ridership levels, the Authority is working with transportation service providers and local agencies to promote transit-oriented development around HSR stations and expand multimodal access to the HSR system.



Source: Authority 2025

Figure 2-59 High-Speed Rail Platform and Facilities at ARTIC

2.6.3.4 Light Maintenance Facility

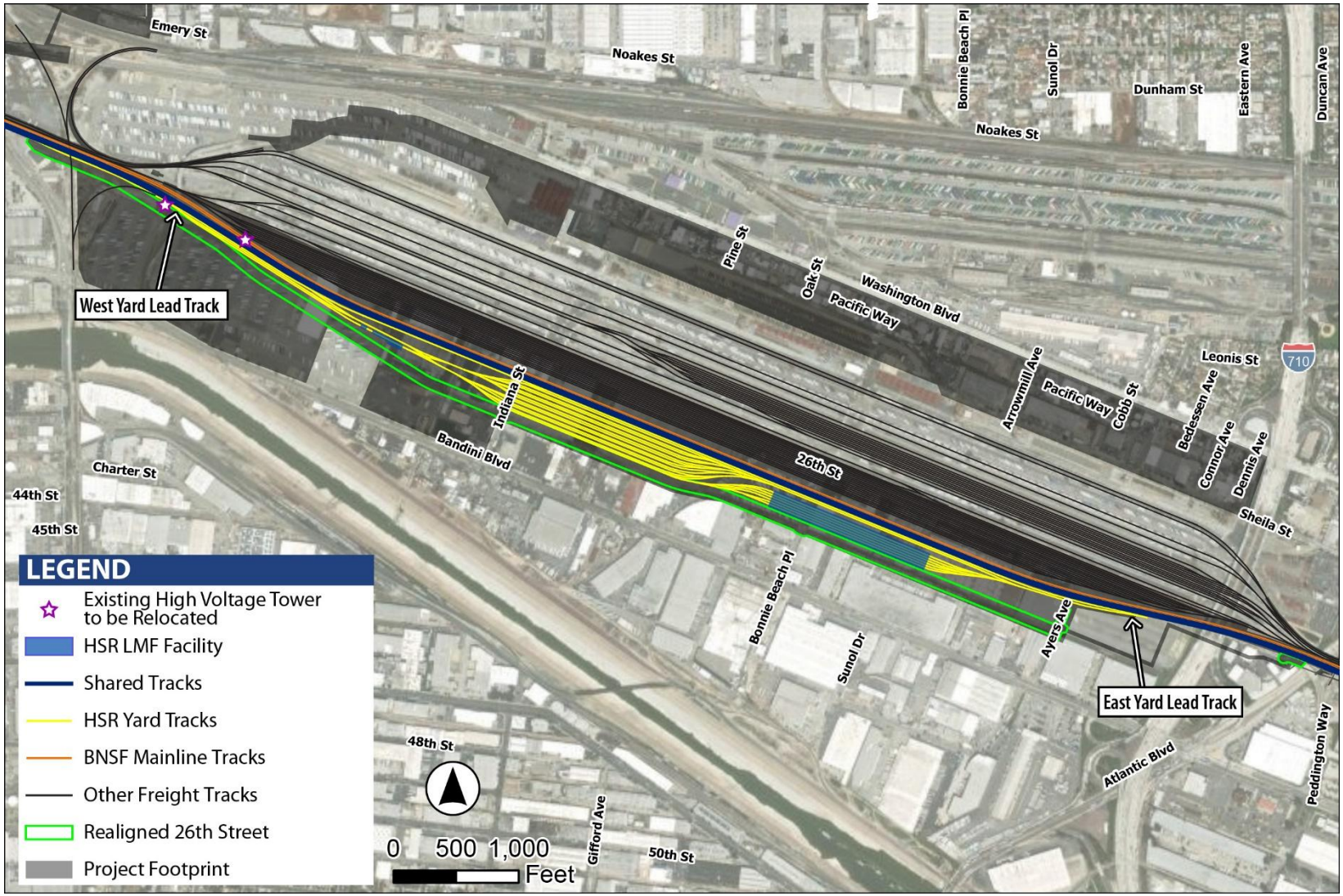
The 26th Street LMF is designed to follow the Authority's *Requirements for High-Speed Trainset Fleet and Infrastructure Maintenance Facilities Technical Memorandum* (Authority 2024b). The LMF would service trains for the entire HSR system, primarily during the evening. The Authority's minimum requirements for maintenance operation facilities, all of which would be provided at the 26th Street LMF, include the following:

- 30,000-square-foot, two-story administrative building
- Right-of-way access to storage tracks for crews
- Train washer
- 100 employee parking spaces
- 20,000 square feet of sewerage
- 30,000 square feet of power facilities
- 20,000-square-foot water storage cistern
- 35,000 square feet of bulk storage area
- 45,000 square feet for stormwater treatment
- 45,000 square feet of paved area for deliveries/materials
- 6,500 square feet for a collection point
- 32,500 square feet miscellaneous area

Refer to Figure 2-60 for an overview of the 26th Street LMF. The 26th Street LMF would have an overall size of 49 acres and be roughly bounded by the realigned mainline tracks on the north, a relocated 26th Street on the south, Downey Road on the west, and I-710 on the east. The changes on the south side of Hobart Yard would require 26th Street to be realigned, which would provide access to the LMF. Two high-voltage utility towers would be relocated to accommodate the 26th Street realignment. Refer to Section 2.6.3.5 for more details on changes adjacent to Hobart Yard and Section 2.6.3.6 for more details on the roadway modifications in this area.

The LMF would be double-ended, with all tracks having access from the mainline on both the eastern and western sides, which is advantageous because it allows for more efficient maneuvering of trains in and out of the yard. HSR trains would access the LMF from the east and west on two new yard lead tracks, described in Section 2.6.3.1, which would be south of the mainline tracks.

Within the 26th Street LMF, there would be an outdoor train yard with 12 yard tracks to allow for the storage of 24 single trainsets, along with a 1,410-foot-long, six-track shop building, which can accommodate 12 trainsets. The internal LMF access roads would be wide enough to accommodate service vehicles, consolidate commissary functions, and provide more clearance from the OCS poles to the yard tracks.



Source: Authority 2025; ESRI 2020

Figure 2-60 Shared Passenger Track Alternative A: 26th Street Light Maintenance Facility

2.6.3.5 Freight or Passenger Railroad Modifications

Shared Passenger Track Alternative A would be built and operated within and adjacent to an existing freight and passenger rail corridor, creating a corridor that is primarily four mainline tracks (two electrified and shared with other passenger rail operators) from Los Angeles to Fullerton, and two mainline tracks (electrified and shared with both passenger rail and freight operators) from Fullerton to Anaheim. Freight rail would operate primarily on the nonelectrified tracks, although the electrified tracks could accommodate freight traffic if necessary (up to 10 BNSF freight trains per day would be able to use the two passenger rail tracks while maintaining service and operation levels for all operators within the corridor). Sections 2.6.3.1 describes in general the modifications to BNSF freight tracks and yards throughout the corridor. The following sections describe the freight and passenger railroad modifications in more detail, which include modifications to BNSF storage and intermodal facilities as well as modifications to and relocations of existing passenger rail stations.

BNSF Railway Storage and Intermodal Facilities

To add and electrify tracks in the existing right-of-way, the Authority would need to remove or modify track and right-of-way that is currently used or planned for future use by BNSF for train storage and intermodal operations. This requires modifications to BNSF's plans for expansion at its yards in Vernon and Commerce. In several locations throughout the project section, Shared Passenger Track Alternative A would require removal/relocation of existing BNSF infrastructure. To maintain BNSF capacity and avoid disruptions to operations, Shared Passenger Track Alternative A would replace the affected BNSF infrastructure, primarily adjacent to Hobart Yard. Table 2-12 lists the BNSF storage capacity that would be removed from the corridor and relocated to the new consolidated storage area adjacent to Hobart Yard.

The new storage area would provide 101,094 track feet of storage, including 5,850 track feet for a new runaround track,[28] which is slightly more than the amount removed from the corridor (90,940 track feet). This is a result of the layout and overall length of the new consolidated area. The tracks need to be operational while fitting in the new yard space and maintaining the removed storage capacity, and therefore some replacement tracks would be longer than the ones that are being removed from the corridor (Authority 2025). Figure 2-61 provides an overview of the BNSF infrastructure that would be removed and relocated.

In addition to the relocations described in Table 2-12, several BNSF yard lead and storage tracks throughout the corridor would be relocated because of the introduction of the additional mainline or other changes in the corridor to accommodate HSR. These tracks would be replaced in the same areas, with the same level of storage capacity and operational functionality maintained. This includes the Pico Rivera Yard north and south lead tracks, La Mirada Yard lead track and storage track, and a Fullerton storage track on the southern side between Commonwealth Avenue and Highland Avenue. Table 2-13 describes existing rail spurs serving industry along the corridor that would be affected by the project.

More detailed plans can be found in Volume 3.1 of this Draft EIR/EIS.

[28] Runaround tracks allow a locomotive to move around the train and attach to the opposite end, enabling the train to be switched or moved in the desired direction. The runaround track must be as long as the longest set of cars that would be pulled. A runaround track is generally recommended for all modern rail yards to reduce overall freight congestion.

Table 2-12 BNSF Railway Facility or Track to Be Removed or Modified

HSR Project Element Affecting BNSF Infrastructure	BNSF Facility/Track to Be Removed/Modified	Length of Tracks Removed (track feet)
HSR mainline and layover tracks	BNSF 8th St Yard (between 1st St and I-10 along west bank)	35,000
Relocated Commerce Metrolink Station	South Vail support track (between Vail St and Minson Way)	3,800
4th mainline track	Pico Rivera storage tracks	4,000
4th mainline track	Norwalk Support Track (between Telegraph Rd and Florence Ave)	4,400
4th mainline track	Santa Fe Springs staging track (through existing Norwalk/Santa Fe Springs Metrolink Station area)	14,600
Fullerton braced trench	Buena Park/Fullerton staging track	15,840
4th mainline track	Fullerton support track (north of Fullerton Amtrak/Metrolink Station)	4,500
4th mainline track	Fullerton staging track (between Commonwealth Ave and Highland Ave)	8,800
Total		**90,940**

Source: Authority 2025
BNSF = BNSF Railway; HSR = high-speed rail; I = Interstate

Table 2-13 Industry Spur Relocations

Spur Track per HSR Stationing[1]	Actively Serving Industry?	Spur Length (track feet)	Proposed Modifications to Track
SBY 285+00.00[2]	Yes	1,000	Realign
SBY 377+50.00[2]	Yes	250	Realign
SBY 417+75.00[2]	Yes	900	Realign
SBY 469+00.00	No	1,000	Remove turnout
SBY 495+00.00	No	600	Remove turnout
SBY 496+00.00	No	1,500	Remove turnout
SBN 1030+00.00[2]	Yes	300	Realign
SBN 1040+00.00[2]	Yes	200	Realign
SBN 1289+00.00	Yes	500	Relocate

Spur Track per HSR Stationing[1]	Actively Serving Industry?	Spur Length (track feet)	Proposed Modifications to Track
SBN 1352+00.00[2]	Yes	500	Realign
SOC 1525+00.00	No	600	Remove turnout

Source: Authority 2025
[1] Refer to Volume 3.1 of the Draft Environmental Impact Report/Environmental Impact Statement for stationing locations.
[2] Spur not directly on HSR alignment, but on adjacent track(s).
HSR = high-speed rail; SBN = Southbound Burlington Northern; SBY = Southbound Burlington Yard; SOC = South Orange County

Source: Authority 2025

Figure 2-61 BNSF Railway Infrastructure Affected by the Los Angeles to Anaheim Project Section

BNSF Railway Los Angeles Intermodal Facility (Hobart Yard)

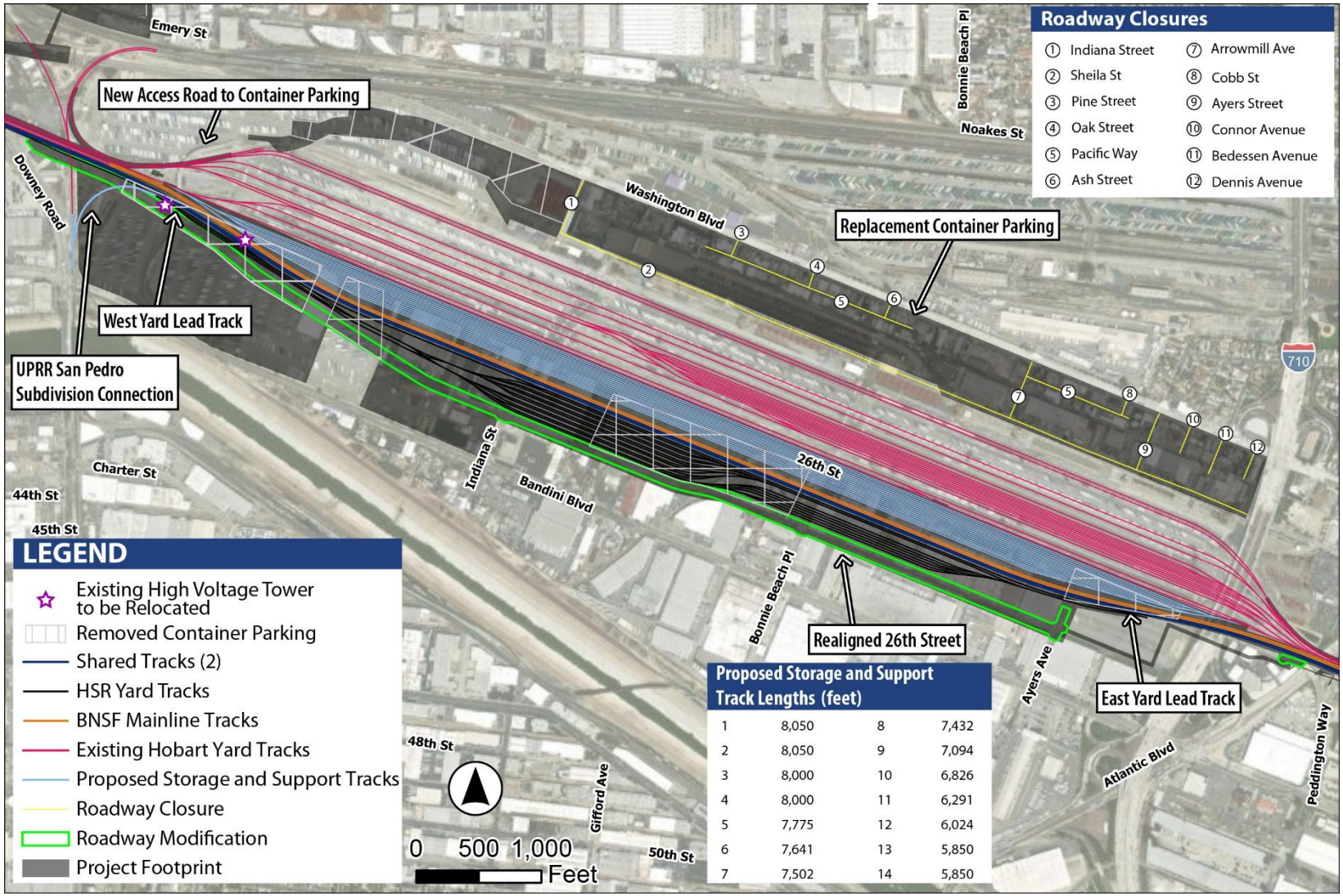
To add and electrify tracks in the existing right-of-way, right-of-way used by BNSF must be modified for use primarily by passenger rail, including HSR. Right-of-way modifications would include the addition of a fourth track, OCS poles, fencing, and any other grading, drainage, and utility removal. Although freight trains could run on the tracks electrified for HSR, BNSF would no longer be able to use the modified right-of-way to store trains or make any planned improvements for additional storage capacity and intermodal operations within that area.

As a result, the HSR project is proposing to replace the storage affected by modifying the right-of-way in a new consolidated storage area adjacent and parallel to BNSF's Hobart Yard. This storage area would include replacement track for all of the BNSF storage, support, and staging tracks affected along the project section, described in Table 2-12. The Hobart Yard area was chosen as the location for the replacement BNSF infrastructure because it is BNSF's main facility that serves Southern California. Providing replacement storage tracks adjacent to Hobart Yard would also help reduce the miles that empty trains would need to travel to be stored; currently, many trains are unloaded at Hobart Yard, but they then need to travel on the mainline tracks to storage tracks farther east down the corridor. By consolidating the storage tracks adjacent to Hobart Yard, the operations with the corridor are improved for both freight and passenger rail.

Figure 2-62 presents the proposed changes at Hobart Yard. The consolidated storage area, BNSF mainline tracks, shared tracks, and the new connection to the UPRR San Pedro Subdivision would be up to 250 feet south of the current southern limit at Hobart Yard and into properties south of 26th Street. New second lead tracks into Hobart Yard from the west and east would also be added. These additional lead tracks would allow freight trains to move off the mainline tracks at speed and avoid delays and backups in an already heavily congested corridor. These track changes would require the vacation and realignment of the 26th Street right-of-way from Downey Road to Atlantic Boulevard.

The changes described above, along with LMF yard lead tracks, would displace some existing BNSF container parking south of the railroad corridor. This container parking would be replaced by acquiring properties north of Hobart Yard along the southern side of Washington Boulevard. This requires a new access road north of Hobart Yard as well as the closure of several roads between Washington Boulevard and Sheila Street (refer to Section 2.6.3.6 for more details on roadway changes related to Hobart Yard). The new access road would also displace some existing container parking that would be replaced in the new container parking area.

Additionally, two high-voltage utility towers would be relocated to accommodate the 26th Street realignment.



Sources: Authority 2025; ESRI 2020

Figure 2-62 Hobart Yard Modifications (Shared Passenger Track Alternative A)

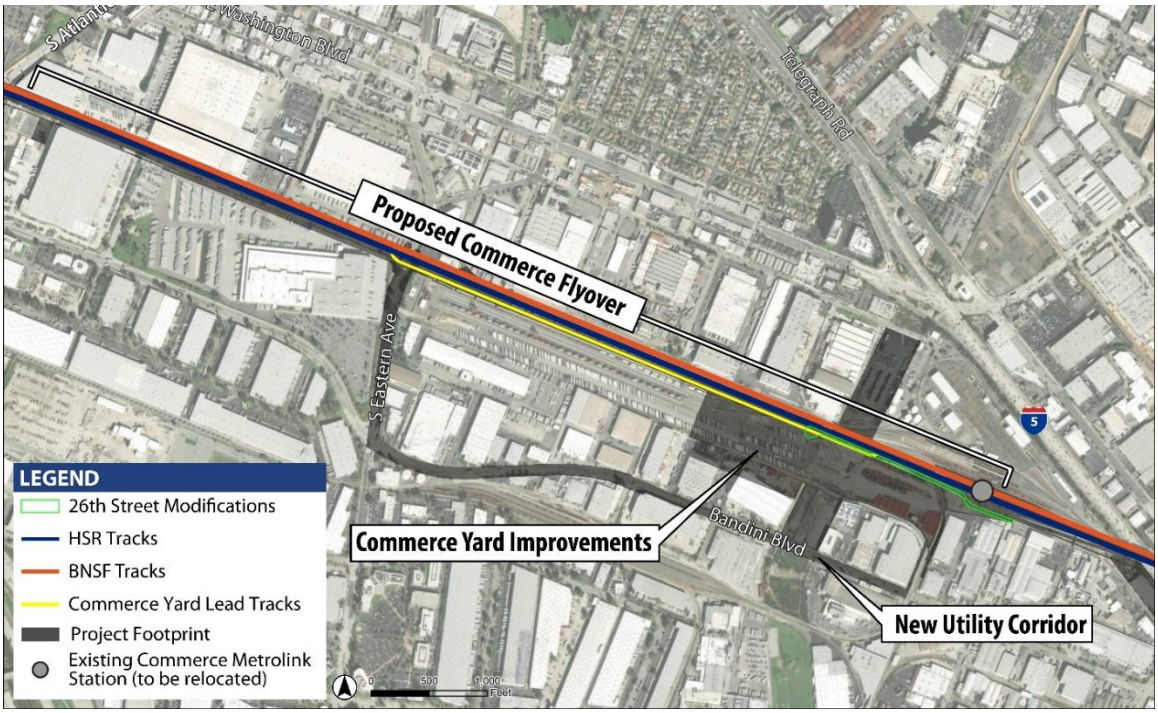
BNSF Railway Commerce Intermodal Facility (Commerce Yard)

As described in Section 2.6.3.1, approximately 1,000 feet southeast of Atlantic Boulevard in Commerce, two shared tracks would rise onto an elevated structure south of the existing mainline, referred to as the Commerce Flyover. Separating passenger trains on an elevated structure from the freight trains running at grade allows for more efficient operations and minimizes potential conflicts because the freight trains would not need to cross the passenger tracks as they enter Commerce Yard. It also would avoid affecting BNSF's planned future improvements at Commerce Yard.

Figure 2-63 presents the modifications required throughout the Commerce Yard area. Adjacent to Commerce Yard, the existing mainline tracks would be realigned and new yard lead tracks would be added to maintain Commerce Yard operations. Starting at Eastern Avenue and running eastward for approximately 3,900 feet, two at-grade BNSF yard tracks would be added south of the flyover structure within the existing railroad right-of-way north of Commerce Yard. The new yard tracks would converge into a new BNSF stub lead track that would end west of I-5, and new BNSF connector tracks would also be added throughout this area.

In addition to the track modifications described above, other modifications to Commerce Yard include reconstructing several of the lead tracks, relocating the truck entrance gates and internal access road, adding additional truck storage parking, and adding a switching tail track. These yard improvements would require a portion of 26th Street to be closed; 26th Street currently provides access to the yard from the east, but the new entrance to the yard would require approximately 1,300 feet of the road to be closed.

Existing utilities along the southern side of the railroad corridor would be relocated to the south in a new utility corridor, within Bandini Boulevard. Additionally, the high-voltage power lines currently running south of and parallel to the railroad corridor must be raised to provide the required clearance from the Commerce Flyover structure.



Sources: Authority 2025; ESRI 2020

Figure 2-63 Commerce Flyover and Commerce Yard Modifications

Modified Passenger Rail Stations

Shared Passenger Track Alternative A would pass through the Norwalk/Santa Fe Springs Metrolink Station and Fullerton Metrolink/Amtrak Station, but would not stop at these stations. Even though the trains would not stop at these stations, Shared Passenger Track Alternative A requires the modification of these existing passenger rail stations to accommodate the trackwork changes needed to support HSR service within the corridor.

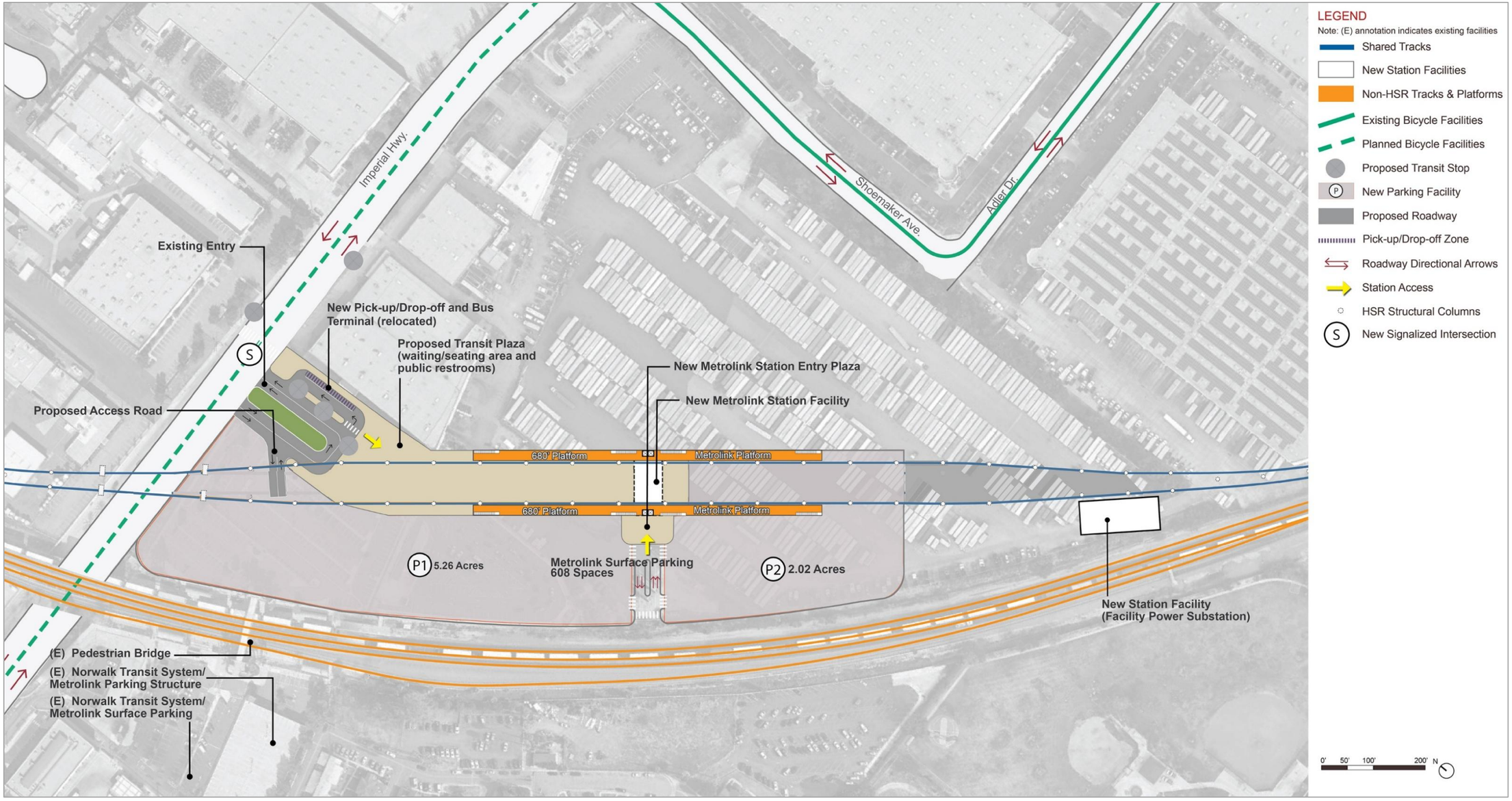
Norwalk/Santa Fe Springs Metrolink Station Modifications

The existing Norwalk/Santa Fe Springs Metrolink Station (also referred to as the Norwalk Santa Fe Springs Transportation Center) is at 12700 Imperial Highway, on the border between Norwalk and Santa Fe Springs. The Norwalk/Santa Fe Springs Metrolink Station currently serves Metrolink Orange County and 91 Line riders with park-and-ride lots and limited local bus connections. Vehicle access to the station and its parking area are currently available via two driveways just east and west of the LOSSAN Corridor along Imperial Highway. Pedestrian access to the station is available via sidewalks to Imperial Highway.

An overview of the modified Norwalk/Santa Fe Springs Metrolink Station is presented on Figure 2-64. As stated in Section 2.6.3.1, the existing platforms are in an area that would not be able to accommodate an additional mainline track and shared operations between HSR and Metrolink. To add the additional mainline track for BNSF freight rail, the existing platforms will need to be shifted and located in an area with a straight section of track. Therefore, the Metrolink platforms would be moved to be served by the shared HSR and Metrolink tracks on the new elevated structure, approximately 350 feet to the east of the existing alignment (at their farthest points). The modified station would be elevated, with two 680-foot side platforms, capable of future extension to 1,000 feet; the future platforms are not evaluated as part of the HSR project, but the space for the future extension is included within the project footprint.

A new Metrolink station plaza would be added at the lower level and stairs, escalators, and elevators would provide access to the modified Metrolink platforms. The project would provide 608 surface parking spaces west of the modified platforms to replace parking spaces at the existing Norwalk/Santa Fe Springs Metrolink Station that would be displaced by the HSR modifications. The existing Metrolink parking lot and parking structure west of the existing railroad corridor would remain, along with the pedestrian overpass. A facility power substation would be added at the southern end of the station. The station's design would not preclude the proposed extension of the Metro C (Green) Line to the Norwalk/Santa Fe Springs Metrolink Station.

The parking and bus drop-off currently located west of the existing railroad corridor would be moved to the east of the elevated structure to provide better access to the modified Metrolink station. On Imperial Highway, the existing traffic signal providing access to the site would require modifications, as required by the City of Norwalk.



Source: Authority 2025

Figure 2-64 Modified Norwalk/Santa Fe Springs Metrolink Station Site Plan

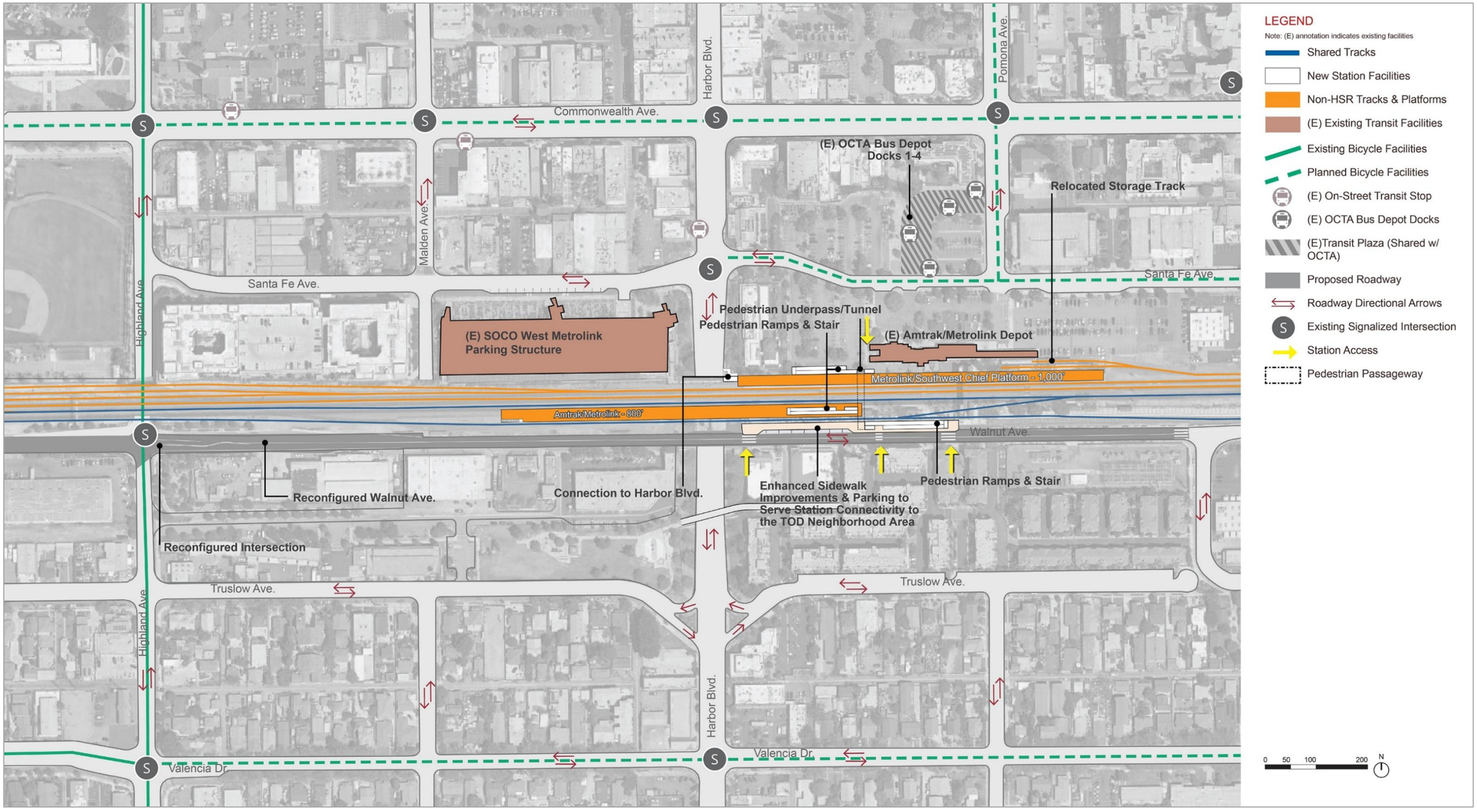
Fullerton Metrolink/Amtrak Station Modifications

The existing Fullerton Metrolink/Amtrak Station (also referred to as the Fullerton Transportation Center) is at 120 E Santa Fe Avenue, and is bounded by Santa Fe Avenue to the north, Lemon Street to the east, Walnut Avenue to the south, and Malden Avenue to the west. The station is served by the Amtrak Pacific Surfliner and Southwest Chief lines, the Metrolink Orange County and 91/Perris Valley Lines, and OCTA transit. The existing station consists of two side platforms, a pedestrian overpass that connects the Los Angeles-bound and Oceanside-bound platforms, and an Amtrak station adjacent to the Los Angeles-bound platform.

An overview of the modified Fullerton Metrolink/Amtrak Station is presented on Figure 2-65. For HSR trains to pass through the station, a fourth mainline track would need to be added on the southern side of the corridor, outside of the existing railroad right-of-way. The two southern tracks would be the shared passenger tracks. A new railroad bridge would be built over Highland Avenue to accommodate the new shared track, which requires Walnut Avenue to be slightly realigned to the south, and the intersection of Walnut Avenue and Highland Avenue would need to be reconfigured.

Several modifications would occur for the Metrolink/Amtrak station platforms. The two existing platforms on the southern side would be removed, and a new 800-foot center platform would be added over Harbor Boulevard. The existing pedestrian bridge east of Harbor Boulevard that connects the two side platforms would be removed and replaced by a new pedestrian underpass that connects the existing northern platform to the new center platform and Walnut Avenue to the south, with ramps and stairs providing access. South of the new Metrolink/Amtrak center platform, Walnut Avenue would be slightly narrowed, and sidewalk improvements and crosswalks would be added east of Harbor Boulevard to improve station connectivity to the neighborhood.

Some of the modifications at this station could be completed as an early action project; refer to Section 2.6.5.3, Fullerton Metrolink/Amtrak Modifications (Fullerton Interlocker), for more details on the early action project.



Source: Authority 2025

Figure 2-65 Modified Fullerton Metrolink/Amtrak Station Site Plan

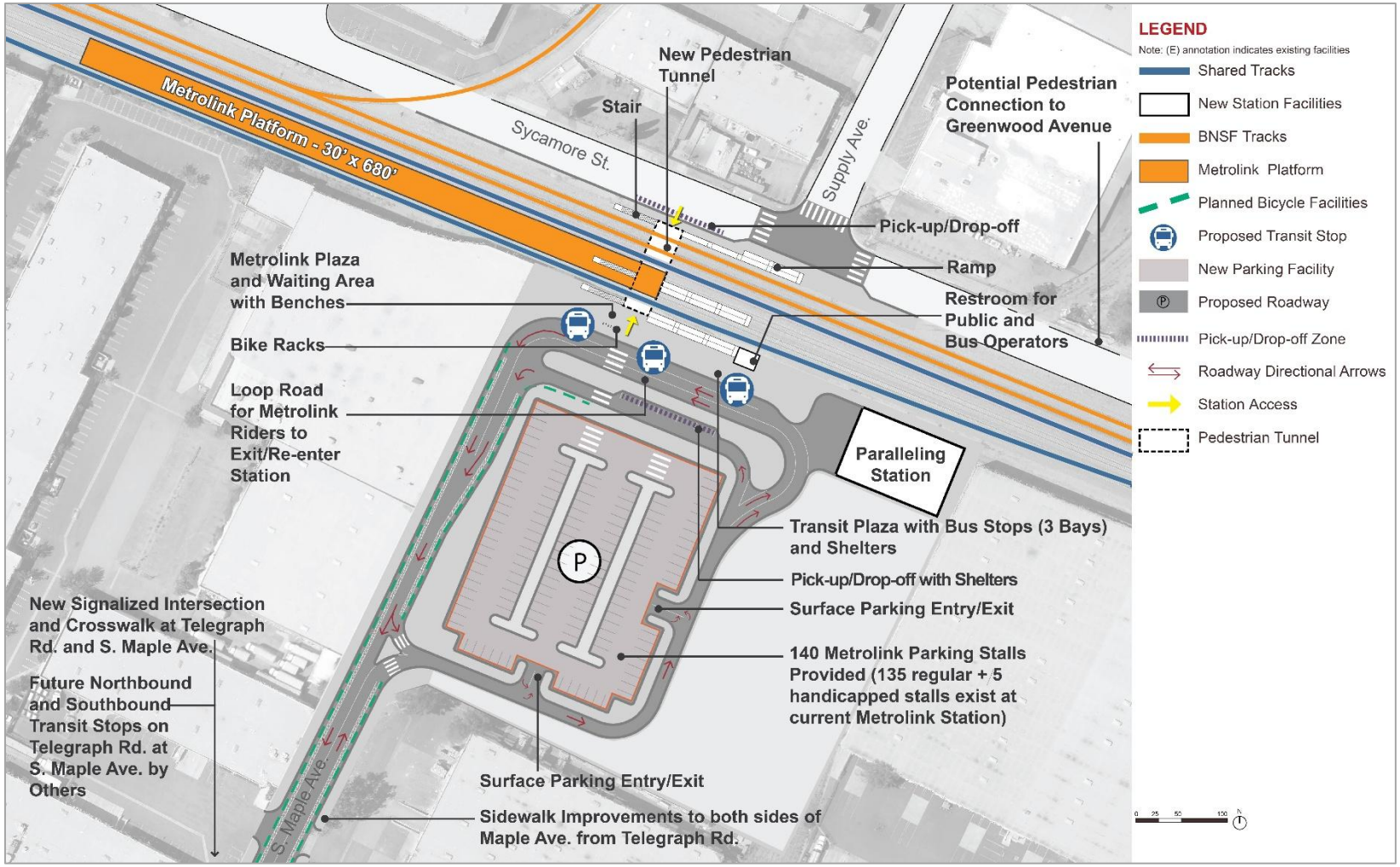
Relocated Metrolink Stations

Shared Passenger Track Alternative A would require two Metrolink stations to be relocated (Commerce and Buena Park). Appendix 2-C, Buena Park Metrolink Station Relocation and Commerce Metrolink Station Relocation Analysis, provides additional information on the site selection analysis for the two relocated stations, which was conducted in May 2018.

Commerce Metrolink Station Relocation

As stated in Section 2.6.3.1, the Commerce Flyover would require the Commerce Metrolink Station to be relocated, as presented on Figure 2-33, to an area northeast of the intersection of Telegraph Road and Maple Avenue, which is approximately 0.75 mile to the east of its current location. The relocated Commerce Metrolink Station would serve Metrolink trains only; no HSR trains would stop at this station. An HSR paralleling station would be co-located at the relocated station site; the paralleling station is described in more detail in Section 2.6.3.2. Most of the relocated station would be within Montebello, including the replacement surface parking, plaza, and internal access roads; the platform and nonpublic station facilities north of the railroad corridor would be within Commerce.

The relocated station would have a center platform along the southern side of the rail corridor. The platform would be accessible from the north via Sycamore Street via a new pedestrian underpass, and from the south via Maple Avenue, as illustrated by Figure 2-66. The intersection of Sycamore Street and Supply Avenue would be modified with pedestrian crosswalks and the intersection of Telegraph Road and Maple Avenue would have a new signal and crosswalks to provide safe access to the new station location. All the existing station facilities, such as a transit plaza for buses, bicycle parking, vehicle parking, and a pick-up/drop-off area for motorists, would be replaced south of the corridor, to be accessed via Maple Avenue. The new station location would provide 140 parking spaces for Metrolink passengers, consistent with the number of parking spaces at the existing station location.



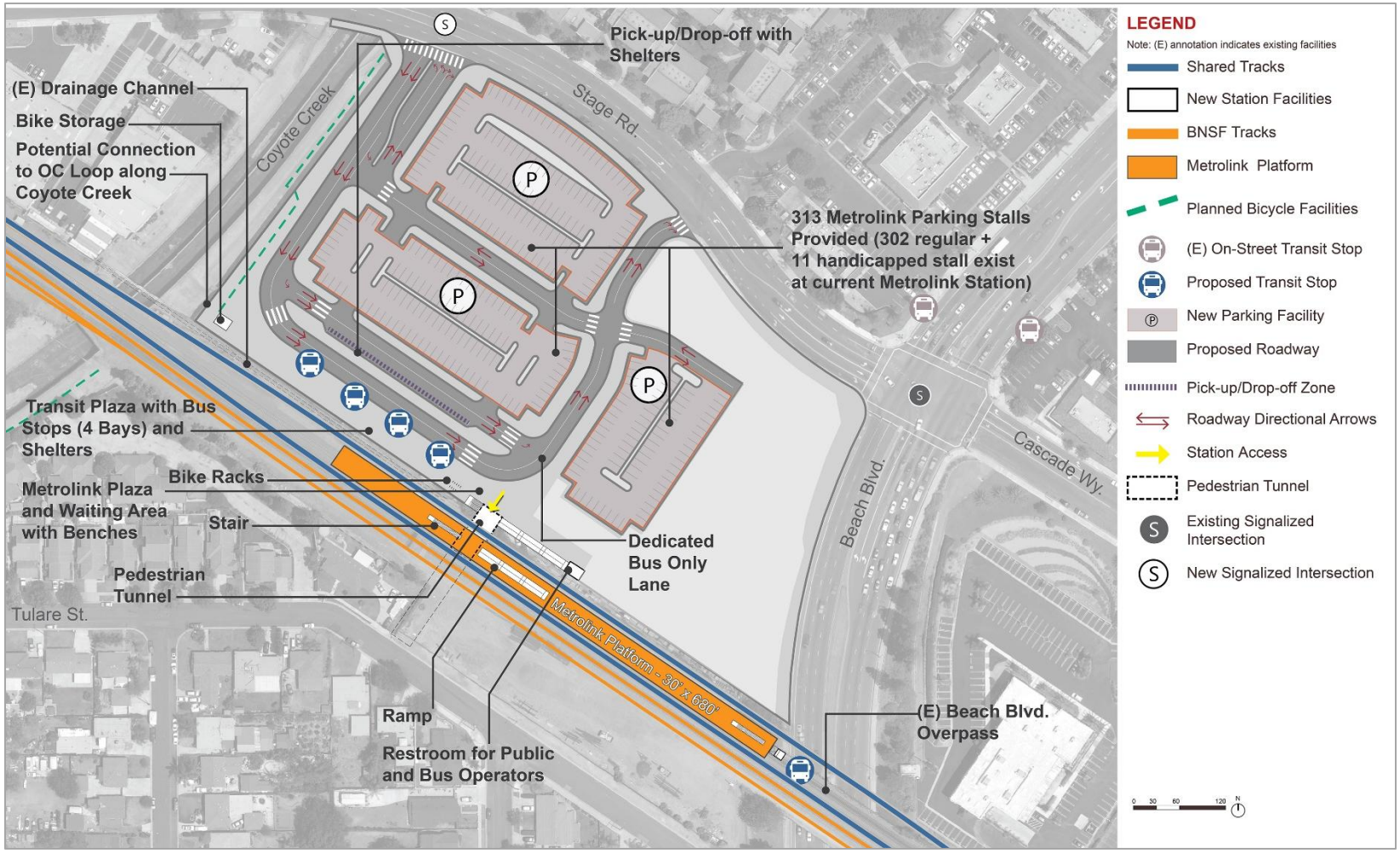
Source: Authority 2025

Figure 2-66 Proposed Relocated Commerce Metrolink Station

Buena Park Metrolink Station Relocation

As stated in Section 2.6.3.1, the HSR project would add and realign tracks through the existing Buena Park Metrolink Station, necessitating the relocation of the station. The Buena Park Metrolink Station would be relocated to an area between South Coyote Creek and Beach Boulevard, approximately 0.75 mile northwest of its current location, presented on Figure 2-67. The new station location would be in Buena Park. The proposed relocated Buena Park Metrolink Station would be for Metrolink trains only; no HSR trains would stop at this station.

The relocated station would have a center platform provided along the northern side of the existing rail corridor. The platform would be accessible from the north via Stage Road, as illustrated by Figure 2-67. A new signalized intersection is proposed at the intersection of Coyote Creek and Stage Road. All existing station facilities would be replaced, including a transit plaza for buses, bicycle parking, vehicle parking, and a pick-up/drop-off area for motorists. The new station location would provide 313 parking spaces for Metrolink passengers, consistent with the number of spaces provided at the existing station location.



Source: Authority 2025

Figure 2-67 Proposed Relocated Buena Park Metrolink Station

2.6.3.6 State Highway or Local Roadway Modifications

Modifications at Roadway Crossings

As discussed in Section 2.6.2.2, Overview and Summary of Design Features, Shared Passenger Track Alternative A would cross 58 federal, state, and locally controlled roadways, most of which are currently grade separated.

In general, three types of roadway modifications would occur as part of Shared Passenger Track Alternative A:

- **New grade separations:** There are six roadway crossings where new railroad grade separations (railroad bridge crossings) would be needed. Five of the existing at-grade roadways would be fully grade separated and lowered to cross under the proposed railroad bridges; these could occur as early action projects, described in more detail in Section 2.6.5. One roadway (Lakeland Road) would be partially grade separated and would not require vertical realignment, because the shared tracks would cross over the roadway on a new bridge.
- **Modified existing grade separations (roadway vertical realignment):** The alignment would use existing railroad bridges throughout the corridor, most of which would need to be widened and new bridges would need to be added adjacent to the existing bridges to accommodate new tracks. At nine of these existing grade separations, the roadways would require vertical realignments (i.e., lowered) to provide the required clearances between the road and the railroad bridge.
- **Modified existing grade separations (new piers and abutments):** Thirteen existing grade separations would require modified piers, abutments, or both to accommodate new or widened railroad bridges for Shared Passenger Track Alternative A. No vertical realignment of the roadway would be required.

Eight at-grade crossings at Orangethorpe Avenue, La Palma Avenue, Sycamore Street, Broadway, Santa Ana Street, Sixth Street, Vermont Avenue, and Ball Road would remain at grade. Pedestrian crossing infrastructure currently exists at these crossings, and the HSR project would not include additional pedestrian infrastructure. The only modification at these crossings would be that OCS would be added to the existing tracks.

Additionally, all existing roadway overcrossings that would span over the shared tracks would be modified to have protective barriers on the top to prevent people or objects from entering the HSR right-of-way from the bridge. Detailed plans of barrier type and installation details will be determined during the Preliminary Engineering for Procurement[29] design phase and coordination with the corridor stakeholders.

Figure 2-68 depicts the new grade separations and existing grade separations that would be modified with either roadway vertical realignments or new piers and abutments. Table 2-14 lists all the crossings and any modifications that would be required along the Shared Passenger Track Alternative A alignment.

Where the proposed HSR alignment would cross over or under state highway facilities, the possibility of encroachment into the California Department of Transportation right-of-way would depend on the type of work proposed, as described in Table 2-14.

[29] The Preliminary Engineering for Procurement defines a level of design required for the procurement of final design and construction services for the project under a Design-Build Strategy.

Source: Authority 2025

High-speed rail tracks would cross Lakeland Road on an elevated structure while freight tracks would continue to cross at grade.

Figure 2-68 Shared Passenger Track Alternative A: New and Modified Grade Separations

Table 2-14 Modifications to Roadway Crossings (from northwest to southeast)

Roadway	City	Current Crossing Configuration	Proposed Modification	Description of Proposed Work
1st St	Los Angeles	Overcrossing	None	N/A
4th St	Los Angeles	Overcrossing	None	N/A
6th St/Whittier Blvd	Los Angeles	Overcrossing	None	N/A
7th St	Los Angeles	Overcrossing	None	N/A
I-10 (Santa Monica freeway)	Los Angeles	Overcrossing	None	N/A
Olympic Blvd	Los Angeles	Overcrossing	None	N/A
Washington Blvd	Los Angeles	Undercrossing	None	N/A
Soto St	Los Angeles	Undercrossing	None	N/A
Downey Rd	Vernon	Undercrossing	New pier and abutments within roadway	The new railroad bridge is proposed north of the existing railroad bridge over Downey Rd, and a new pier and abutments would be required within the roadway; the roadway would otherwise not be modified.
Private access road	Vernon	Overcrossing	None	N/A
I-710 (Long Beach freeway)	Vernon	Overcrossing	None	N/A; protection of the existing structure may be required during construction and for the installation of HSR OCS.
Atlantic Blvd	Commerce	Undercrossing	New piers and abutments within roadway	The existing railroad bridge over Atlantic Blvd would be widened, and new piers and abutments would be required within the roadway; the roadway would otherwise not be modified.
Eastern Ave	Commerce	Undercrossing	New piers and abutments within roadway	The existing railroad bridge over Eastern Rd would be widened, and new piers and abutments would be required within the roadway. The Commerce Flyover structure would also cross over the road and require a new column in the roadway. The roadway would otherwise not be modified.
I-5 (Santa Ana freeway)	Commerce	Undercrossing	None	N/A
Telegraph Rd	Commerce	Undercrossing	None	N/A

Roadway	City	Current Crossing Configuration	Proposed Modification	Description of Proposed Work
Garfield Ave	Commerce	Undercrossing	None	N/A
Greenwood Ave	Montebello	Undercrossing	None	N/A
Paramount Blvd	Pico Rivera	Undercrossing	None	N/A
SR 19 (Rosemead Blvd)	Pico Rivera	Undercrossing	Road vertical realignment, new abutments within roadway	A new railroad bridge is proposed north of the existing railroad bridge over SR 19; to provide appropriate clearance under the new bridge, the roadway would be slightly lowered from Bermudez St to approximately 670 feet north of the bridge. The bridge would span over the roadway, similar to the existing bridge.
Passons Blvd	Pico Rivera	Undercrossing	New pier and abutments within roadway	The existing railroad bridge over Passons Blvd would be widened, and a new pier and abutments would be required within the roadway; the roadway would otherwise not be modified.
Slauson Ave	Santa Fe Springs	Overcrossing	Pier modifications	An existing pier of the roadway overcrossing would be removed and replaced to the east, to accommodate the new shared track. The roadway would otherwise not be modified.
I-605 (San Gabriel River freeway)	Santa Fe Springs	Overcrossing	None	N/A; protection of the existing structure may be required during construction and for the installation of HSR OCS.
Pioneer Blvd	Santa Fe Springs	At grade	New grade separation	The existing at-grade crossing would be grade separated, with Pioneer Blvd lowered to cross under the tracks. Additional modifications would be needed for Rivera Rd and surrounding roadways.
Norwalk Blvd	Santa Fe Springs	At grade	New grade separation	The existing at-grade crossing would be grade separated, with Norwalk Blvd lowered to cross under the tracks.
Los Nietos Rd	Santa Fe Springs	At grade	New grade separation	The existing at-grade crossing would be grade separated, with Los Nietos Rd lowered to cross under the tracks.
Santa Fe Springs Rd	Santa Fe Springs	Undercrossing	New piers and abutments within roadway	The existing railroad bridge over Santa Fe Springs Rd would be widened, and new piers and abutments would be required within the roadway; the roadway would otherwise not be modified.
Telegraph Rd	Santa Fe Springs	Undercrossing	New pier and abutments within roadway	The existing railroad bridge over Telegraph Rd would be widened, and a new pier and abutments would be required within the roadway; the roadway would otherwise not be modified.

Roadway	City	Current Crossing Configuration	Proposed Modification	Description of Proposed Work
Florence Ave	Santa Fe Springs	Undercrossing	New pier and abutments within roadway	A new bridge would be added for the shared tracks, and a new pier and abutments would be required within the roadway; the roadway would otherwise not be modified.
Lakeland Rd	Santa Fe Springs	At grade	New grade separation (for HSR only)	The shared tracks would be on an elevated structure over Lakeland Rd, and a new pier would be required within the roadway; the roadway would otherwise not be modified. The BNSF tracks would remain at grade with Lakeland Rd.
Imperial Hwy	Santa Fe Springs, Norwalk	Undercrossing	None	N/A
Carmenita Rd	Santa Fe Springs	Undercrossing	Roadway vertical realignment, new piers and abutments within roadway	The existing railroad bridge over Carmenita Rd would be widened, and new piers and abutments would be required within the roadway. Carmenita Rd would be lowered to provide the required clearance.
Rosecrans Ave/Marquardt Ave	Santa Fe Springs	Overcrossing	None	N/A
Valley View Ave	Santa Fe Springs, La Mirada	Undercrossing	New piers and abutments within roadway	A new railroad bridge is proposed south of the existing railroad bridge over Valley View Ave, and new piers and abutments would be required within the roadway; the roadway would otherwise not be modified.
Alondra Blvd	La Mirada	Overcrossing	Bridge replacement, roadway vertical realignment	The existing Alondra Blvd bridge over the railroad corridor would be replaced with a new, wider bridge that also provides increased clearance over the tracks. Alondra Blvd, Stage Rd, and Escalona Rd would all be regraded to meet the grade of the new Alondra Blvd roadway bridge.
SR 39 (Beach Blvd)	Buena Park	Undercrossing	New piers and abutments within roadway	The existing railroad bridge over SR 39 would be widened, and new piers and abutments would be required within the roadway; the roadway would otherwise not be modified.
Dale St	Buena Park	Undercrossing	Roadway vertical realignment, new piers and abutments within roadway	The existing railroad bridge over Dale St would be widened, and new piers and abutments would be required within the roadway. Dale St would be lowered to provide the required clearance.

Roadway	City	Current Crossing Configuration	Proposed Modification	Description of Proposed Work
Gilbert St	Fullerton	Undercrossing	Roadway vertical realignment, new pier and abutments within roadway	A new railroad bridge would be added south of the existing railroad bridge over Gilbert St, and a new pier and abutments would be required within the roadway. Gilbert St would be lowered to provide the required clearance, and the intersection with Artesia Ave would be reconfigured.
Commonwealth Ave	Fullerton	Undercrossing	Roadway vertical realignment, new piers and abutments within roadway	The existing railroad bridge over Commonwealth Ave would be widened, and new piers and abutments would be required within the roadway. Commonwealth Ave would be lowered to provide the required clearance.
Euclid St	Fullerton	Undercrossing	New pier and abutments within roadway	A new railroad bridge would be added south of the existing railroad bridge over Euclid St, and a new pier and abutments would be required within the roadway; the roadway would otherwise not be modified.
Highland Ave	Fullerton	Undercrossing	New abutments within roadway	A new railroad bridge would be added south of the existing railroad bridge over Highland Ave, and new abutments would be required within the roadway. The bridge would span over the roadway, similar to the existing bridge. The intersection of Highland Ave and Walnut Ave would be modified.
Harbor Blvd	Fullerton	Undercrossing	New piers and abutments within roadway	A new railroad bridge would be added south of the existing railroad bridge over Harbor Blvd, and new piers and abutments would be required within the roadway; the roadway would otherwise not be modified.
Lemon St	Fullerton	Undercrossing	None	N/A
Orangethorpe Ave	Anaheim	At grade	None	N/A
SR 91 (Riverside freeway)	Anaheim	Overcrossing	None	N/A; protection of the existing structure may be required during construction and for the installation of HSR OCS.
La Palma Ave	Anaheim	At grade	None	N/A
Sycamore St	Anaheim	At grade	None	N/A
Lincoln Ave	Anaheim	Undercrossing	None	N/A
Broadway	Anaheim	At grade	None	N/A

Roadway	City	Current Crossing Configuration	Proposed Modification	Description of Proposed Work
Santa Ana St	Anaheim	At grade	None	N/A
South St	Anaheim	At grade	None	N/A
Vermont Ave	Anaheim	At grade	None	N/A
Ball Rd	Anaheim	At grade	None	N/A
Lewis St	Anaheim	Undercrossing	Roadway vertical realignment, new piers and abutments within roadway	A new railroad bridge would be added south of the existing railroad bridge over Lewis St, and new pier and abutments would be required within the roadway. To provide appropriate clearance under the bridges, Lewis St would be lowered starting from south of Cerritos Ave, and Cerritos Ave would also be lowered to meet the new lowered grade at the intersection.
Cerritos Ave	Anaheim	At grade	New grade separation	The existing at-grade crossing would be grade separated, with Cerritos Ave lowered to cross under the tracks. Additional modifications would be needed for Vernon St and surrounding roadways.
State College Blvd	Anaheim	At grade	New grade separation	The existing at-grade crossing would be grade separated, with State College Blvd lowered to cross under the tracks.
Katella Ave	Anaheim	Undercrossing	Roadway vertical realignment, roadway widening, new piers and abutments within roadway	The existing railroad bridge over Katella Ave would be replaced by two new bridges, and new piers and abutments would be required within the roadway. Katella Ave would be lowered to provide the required clearance, and would also be widened from six lanes to eight, per the city's standards. The intersections with Stadium Crossing and Howell Ave would also be reconfigured.
SR 57 (Orange freeway)	Anaheim	Overcrossing	None	N/A
Douglass Rd	Anaheim	Undercrossing	Roadway vertical realignment, new piers and abutments within roadway	A new railroad bridge would be added south of the existing railroad bridge over Douglass Rd and new piers and abutments would be required within the roadway. To provide appropriate clearance under the bridges, Douglass Rd would be lowered.

Source: Authority 2025
Authority = California High-Speed Rail Authority; BNSF = BNSF Railway; HSR = high-speed rail; I = Interstate; N/A = not applicable; OCS = overhead contact system; overcrossing = road over train tracks; SR = State Route; undercrossing = road under train tracks

New Grade Separations

As presented in Table 2-14, five existing at-grade roadways would be fully grade separated for passenger rail and freight, with the roadway lowered to cross under new railroad bridges. These new grade separations are described in detail below, with the temporary and permanent footprints presented on the figures. The temporary project footprint includes areas such as utility easements and construction staging areas, while the permanent project footprint includes areas that would be needed permanently for operation of HSR or areas that would permanently lose access from changes in roadway elevation. These grade separations could be built as early action projects, which are described further in Section 2.6.5.1, Grade Separations.

Lakeland Road would be partially grade separated for HSR and passenger rail on a new elevated structure, but the freight tracks would remain at grade, with a minimal area of temporary and permanent impacts. Therefore, it is not described in the text below, which is focused on the full grade separations with roadway vertical realignments.

Pioneer Boulevard

The existing roadway configuration at the Pioneer Boulevard crossing in Santa Fe Springs consists of two northbound and two southbound traffic lanes and left-turn lanes to Rivera Road (which is immediately adjacent and to the north of the railroad corridor) in both directions, with sidewalks on both sides of the road. The at-grade crossing would be grade separated as a roadway undercrossing, with the railroad tracks on a bridge structure. Approximately 1,275 feet of Pioneer Boulevard would be lowered, with the roadway approximately 20 feet below its current elevation at the lowest point of the undercrossing. Additional excavation depths would be required for bridge footings, utilities, pump station, and roadway subbase. Direct access to Rivera Road would be removed and a new roadway that loops west and south just north of the crossing would provide access from Pioneer Boulevard to Rivera Road. Figure 2-69 depicts the crossing and temporary and permanent footprint areas.

Sources: Authority 2025; ESRI 2020

Figure 2-69 Pioneer Boulevard Grade Separation

Norwalk Boulevard

The existing roadway configuration at the Norwalk Boulevard crossing in Santa Fe Springs consists of two northbound and two southbound traffic lanes and a southbound left-turn lane to eastbound Los Nietos Road (which is immediately south of the crossing), with sidewalks on both sides of the roadway. The at-grade crossing would be grade separated as a roadway undercrossing, with the railroad tracks on a bridge structure. Approximately 1,325 feet of Norwalk Boulevard would be lowered below its current elevation, up to 20 feet at the lowest point. Roadway clearance from bottom of bridge to top of pavement would be approximately 15 to 16.5 feet. Additional excavation depths would be required for bridge footings, utilities, pump station, and roadway subbase. The intersection of Norwalk Boulevard and Los Nietos Road would also be lowered, as also described below. Figure 2-70 depicts both crossings and the temporary and permanent footprint areas.

Sources: Authority 2025; ESRI 2020

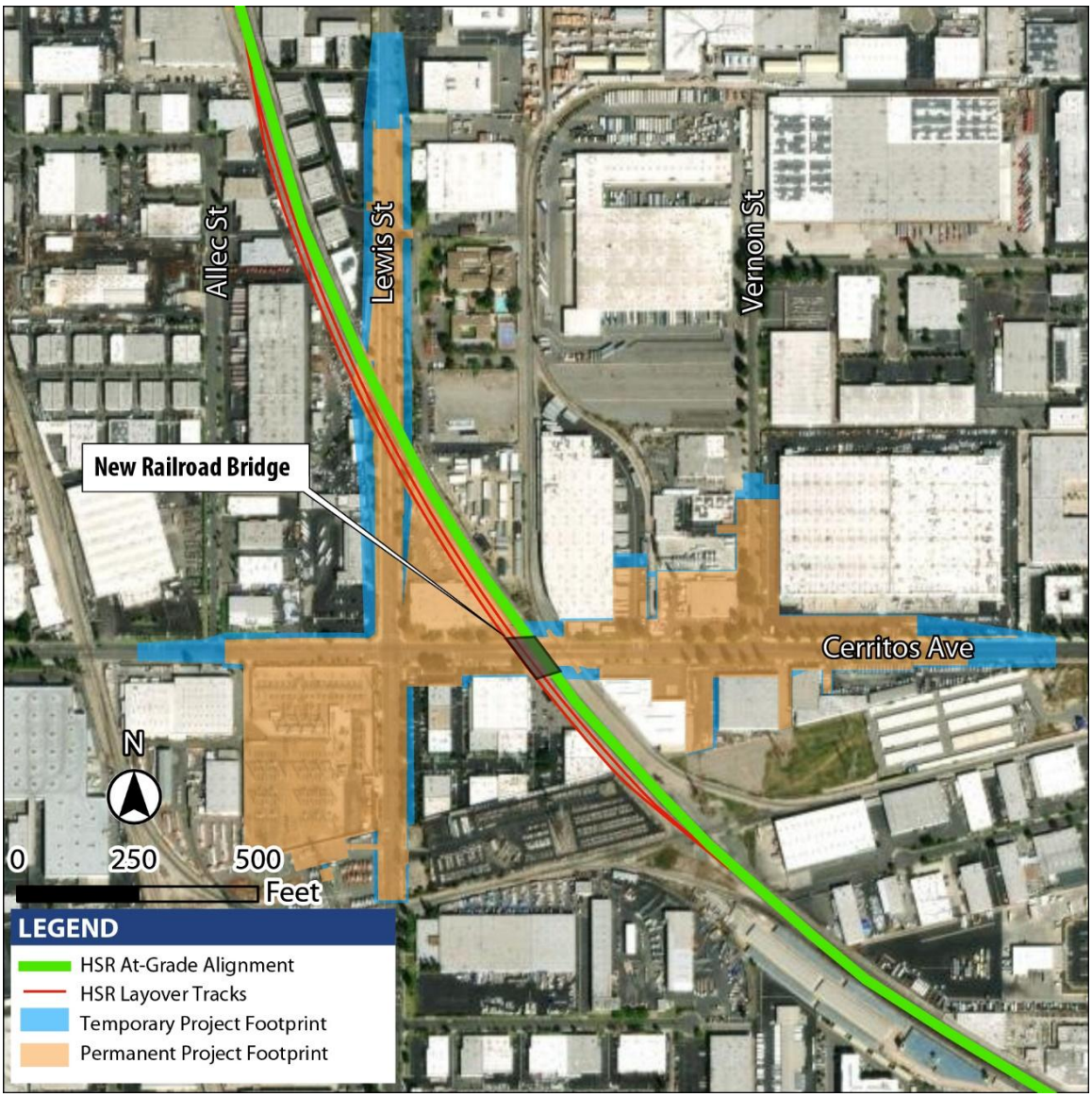
Figure 2-70 Norwalk Boulevard and Los Nietos Road Grade Separations

Los Nietos Road

The existing roadway configuration at the Los Nietos Road crossing in Santa Fe Springs consists of two westbound and two eastbound traffic lanes and a westbound left-turn lane to Norwalk Boulevard (which is immediately west of the crossing), with sidewalks on both sides of the roadway. The at-grade crossing would be grade separated as a roadway undercrossing, with the railroad tracks on a bridge structure. Approximately 1,700 feet of Los Nietos Road would be lowered, with the roadway elevation approximately 25 feet below its current elevation at the lowest point. Roadway clearance from bottom of bridge to top of pavement would be approximately 15 to 16.5 feet. Additional excavation depths would be required for bridge footings, utilities, pump station, and roadway subbase. The intersection of Norwalk Boulevard and Los Nietos Road would also be lowered as part of this and the Norwalk Boulevard grade separation. Figure 2-70 depicts both crossings and the temporary and permanent footprint areas.

Cerritos Avenue

The existing roadway configuration at the Cerritos Avenue crossing in Anaheim consists of two westbound and two eastbound traffic lanes with sidewalks on both sides of the roadway. The at-grade crossing would be grade separated as a roadway undercrossing, with the railroad tracks on a bridge structure. Approximately 1,850 feet of Cerritos Avenue would be lowered below its current elevation, up to 25 feet at the lowest point. Roadway clearance from bottom of bridge to top of pavement would be approximately 15 to 16.5 feet. Additional excavation depths would be required for bridge footings, utilities, pump station, and roadway subbase. To maintain its intersection with Cerritos Avenue, Vernon Street would need to be lowered about 5 feet below its existing elevation. Similarly, Lewis Street would need to be lowered to maintain the intersection with Cerritos Avenue. Figure 2-71 illustrates the crossing and the temporary and permanent footprint areas.



Sources: Authority 2025; ESRI 2020

Figure 2-71 Cerritos Avenue Grade Separation

State College Boulevard

The existing roadway configuration at the State College Boulevard crossing in Anaheim consists of three northbound and three southbound traffic lanes with sidewalks on both sides of the roadway. The at-grade crossing would be grade separated as a roadway undercrossing, with the railroad tracks on a bridge structure. Approximately 1,660 feet of State College Boulevard would be lowered below its current elevation, up to 25 feet at the lowest point. Roadway clearance from bottom of bridge to top of pavement would be approximately 17.5 feet. Additional excavation depths would be required for bridge footings, utilities, pump station, and roadway subbase. To maintain intersections with State College Boulevard, Howell Avenue and Wright Circle would also need to be lowered below their existing elevation, along with multiple driveways and access roads along State College Boulevard. Figure 2-72 depicts the crossing and the temporary and permanent project footprint areas.

Sources: Authority 2025; ESRI 2020

Figure 2-72 State College Boulevard Grade Separation

Modifications to Other Roadways

In addition to modifications to roadway crossings described above, several other roadways along the alignment would require modifications as a result of other project elements.

Roadway Modifications by Hobart Yard

The addition of new storage tracks and realignment of existing tracks throughout the Hobart Yard area would require 26th Street to be realigned. The roadway currently forms the southern boundary of Hobart Yard. At the eastern end of the yard, at Atlantic Boulevard, 26th Street connects to Pennington Way. From the UPRR San Pedro Subdivision track to Atlantic Boulevard, 26th Street would be realigned about 500 feet south from its existing location, at the farthest point. The realigned 26th Street would provide access to the 26th Street LMF, just north of the street. Currently, 26th Street intersects with Indiana Avenue, Bonnie Beach Place, and Ayers Avenue. Indiana Avenue and Bonnie Beach Place would connect with the realigned 26th Street, and the segments north of the realigned 26th Street would be closed. The realigned 26th Street would not connect to Pennington Way; it would end at Ayers Avenue, and Pennington Way would end in a cul-de-sac west of Atlantic Boulevard, accessible only from Bandini Boulevard. The existing segment of 26th Street between Ayers Avenue and Pennington Way would be closed.

Several roads between Sheila Street and Washington Boulevard are proposed to be closed because of the relocated BNSF truck parking. These roadway closures include the following, and are presented on Figure 2-62 in yellow:

- Indiana Street
- South Pine Street
- Pacific Way
- Oak Street
- Ash Street
- Arrowmill Avenue
- Ayers Avenue
- Bedessen Avenue
- Connor Avenue
- Dennis Avenue

Roadway Modifications by Commerce Yard

26th Street provides access to BNSF's Commerce Yard from the east, but the yard improvements would require the entrance to the yard to be relocated approximately 1,300 feet to the east. This 1,300-foot segment of 26th Street between the existing and proposed gate would be closed, and a new cul-de-sac would be provided at the end of the road.

Roadway Modifications by the Fullerton Braced Trench

The braced trench in Fullerton would be partially outside the existing railroad right-of-way along the southern side of the corridor, within the existing Artesia Boulevard right-of-way. Artesia Boulevard would be realigned slightly south, from approximately Pritchard Avenue to Gilbert Street. The intersection of Artesia Avenue and Gilbert Street would be reconfigured.

Roadway Modifications by Fullerton Metrolink/Amtrak Station

The changes at the Fullerton Metrolink/Amtrak Station would require Walnut Avenue to be realigned. Walnut Avenue currently runs east-west from Richman Avenue to Lawrence Avenue, south of and adjacent to the existing railroad corridor. With the addition of a fourth mainline track and new railroad bridge over Highland Avenue, Walnut Street would be slightly realigned south, from Richman Avenue to Lemon Street. All existing lanes and sidewalks would be maintained. At Highland Avenue, Walnut Street would be lowered slightly to meet the new, lowered grade of Highland Avenue, and the intersection would be reconfigured.

2.6.3.7 Modifications to Waterways

Shared Passenger Track Alternative A would cross over or modify 11 waterways, 5 of which are U.S. Army Corps of Engineers facilities regulated under Section 14 of the Rivers and Harbors Act of 1899, as amended and codified in 33 U.S Code 408. Section 2.11, Permits and Approvals, describes the Authority's agreement with the U.S. Army Corps of Engineers on Section 408 permitting. U.S. Army Corps of Engineers review is required where the HSR project would occupy, alter, or use any federal flood-control facility to ensure that its usefulness is not impaired and that the proposed alteration will not be injurious to the public interest. Figure 2-73 depicts the location of the 11 waterways that would be crossed or potentially affected by the Shared Passenger Track Alternative A alignment. Table 2-15 lists the water features, as well as any modifications that would be required.

Source: Authority 2025

Figure 2-73 Shared Passenger Track Alternative A Waterway Crossings

Table 2-15 Waterways Crossed by or Potentially Affected by High-Speed Rail

Feature	Facility Owner/ Overseer	Shared Passenger Track Alternative A Component	Modifications to Waterway
Los Angeles River	USACE	The project would include HSR layover tracks and mainline tracks on the west bank and a communications tower on the east bank.	None
		The shared tracks would cross the Los Angeles River at Redondo Junction on an existing bridge, which would have OCS added.	None
Hobart Channel	LACFCD	At Hobart Yard, new BNSF mainline tracks, shared tracks, LMF tracks, and a realigned 26th Street would need to cross the channel.	Existing open culvert would be modified with the installation of closed concrete box structures that would support the tracks and realigned 26th Street.
Rio Hondo (including east and west basins, and the channel)	USACE/LACFCD	West Basin: The existing railroad bridge would be widened on the northern side to accommodate the new mainline track.	Within the West Basin, retained fill would be needed for the new mainline track. The existing culvert over a private BNSF access road would be extended on the northern side.
		Channel: On the western side of the channel, the additional mainline track would be within the existing railroad right-of-way, but would widen the track cross-section.	New piers and abutments would be added within the channel.
		East Basin: On the eastern side of the channel, an existing Pico Rivera yard track would be realigned north of the new mainline track, which would widen the railroad right-of-way.	Within the East Basin, retained fill would be needed for the realigned Pico Rivera yard track.
San Gabriel River	USACE/LACFCD	The existing railroad bridge would be widened on the southern side to accommodate the new mainline track.	New piers and abutments would be added within the river.
		To accommodate the wider railroad bridge, an existing Slauson Ave bridge pier would be removed and replaced further east.	None; construction would be immediately adjacent to the river.
North Fork Coyote Creek	USACE/LACFCD	The existing railroad bridge would be widened on the northern side to accommodate the new mainline track.	New piers and abutments would be added within the creek.
La Mirada Creek	LACFCD	The existing railroad bridge would be widened on the northern side to accommodate the new mainline track.	New piers and abutments would be added within the creek.
Coyote Creek	USACE/OCFCD	The existing railroad bridge would be widened on both sides to accommodate the new mainline track and realigned existing tracks.	The existing bridge is a double box culvert; it would be extended on both the northern and southern sides, which includes extending the middle wall within the creek.

Feature	Facility Owner/ Overseer	Shared Passenger Track Alternative A Component	Modifications to Waterway
Brea Creek	OCFCD	The existing railroad bridge would be widened on the southern side to accommodate the new mainline track.	New piers and abutments would be added within the creek.
Balcom Avenue Storm Drain	OCFCD	The existing railroad bridge would be widened on the southern side to accommodate the new mainline track.	The existing bridge is a box culvert, which currently does not span across the entire channel (there is a gap within the railroad corridor where the channel is not covered). The culvert would be extended to completely cover the channel.
Fullerton Creek	OCFCD	The tracks on the existing railroad bridge would be electrified.	None.
Carbon Creek	OCFCD	The tracks on the existing railroad bridge would be electrified.	None.

Source: Authority 2025
BNSF = BNSF Railway; HSR = high-speed rail; LACFCD = Los Angeles County Flood Control District; LMF = light maintenance facility; OCFCD = Orange County Flood Control District; OCS = overhead contact system; USACE = U.S. Army Corps of Engineers

2.6.3.8 Land Use and Community Modifications

Although the design of Shared Passenger Track Alternative A uses the existing railroad right-of-way to the greatest extent possible, it would require the conversion of several nontransportation land uses to a permanent transportation use. Table 2-16 summarizes the land use conversions for Shared Passenger Track Alternative A and for the two HSR station options, also described in more detail in Section 3.13, Station Planning, Land Use, and Development. Table 2-17 summarizes the business and residential unit displacements that would occur in each city for Shared Passenger Track Alternative A, also described in more detail in Section 3.12, Socioeconomics and Communities.

Table 2-16 Maximum Amount of Land Permanently Converted to Transportation Use (acres)[1,2]

Existing Land Use Category	Maximum Amount of Land Converted (Acres)		
	Shared Passenger Track Alternative A	HSR Station Option: Norwalk/Santa Fe Springs[33]	HSR Station Option: Fullerton[3]
Commercial, services, and offices	23.53	0	0.32
Facilities[4]	7.80	0	0
Industrial and mixed commercial	201.37	0	3.87
Multifamily residential	0.07	0	0
Open space and recreation	3.62	0	0
Single-family residential	3.78	0	0
Grand total	**240.17**	**0.0**	**4.19**

Sources: SCAG 2023a; Los Angeles County Assessor 2022; ESRI Aerial Imagery 2024
[1] Values are rounded to the nearest hundredth.
[2] Converted land area calculations do not include land that is designated for transportation, communications, and utilities that would be acquired.
[3] If the HSR station option is included, the acreage would be additive to the Shared Passenger Track Alternative A acreage. The Norwalk/Santa Fe Springs HSR Station Option would not require conversion of additional land beyond what is already required by the Shared Passenger Track Alternatives within the station area.
[4] Facilities land use designation includes public facilities, such as government offices, police and sheriff stations, fire stations, major medical health care facilities, religious facilities, public parking facilities, special use facilities, correctional facilities, special care facilities, other special use facilities, and other public facilities.
HSR = high-speed rail

Table 2-17 Business and Residential Displacements from Shared Passenger Track Alternative A

City	Businesses Displaced	Residential Units Displaced
Los Angeles County	**178**	**3**
Los Angeles	--	--
Vernon	37	--
Commerce	115	--
Bell	--	--
Montebello	2	--
Pico Rivera	1	--
West Whittier–Los Nietos CDP	--	3
Norwalk	--	--

City	Businesses Displaced	Residential Units Displaced
Santa Fe Springs	17	--
South Whittier CDP	--	--
La Mirada	6	--
Orange County	**78**	**0**
Buena Park	12	--
Fullerton	23	--
Anaheim	43	--
Orange	--	--
Total	**256**	**3**

Sources: Reference USA 2023; Costar 2023
CDP = census-designated place

Land use along the corridor is primarily industrial with warehouses, manufacturing facilities, and rail-related uses composing the majority of adjacent properties. As a result, the project would affect relatively few residential properties. As noted in Table 2-17, the majority of property acquisitions would be industrial land uses. Most of the right-of-way acquisitions along the corridor would be slivers of adjacent property where the existing railroad right-of-way would be expanded to accommodate additional or realigned tracks. However, larger areas of acquisitions would need to occur along the major elements of the project, which are summarized below.

- **Hobart Yard modifications and 26th Street LMF:** The existing surrounding land uses are industrial and mixed commercial. There are no historic properties adjacent to the existing yard or areas that would be modified to build the new consolidated storage area, shifted mainline tracks, LMF yard, realigned 26th Street, and displaced/replaced container parking areas. These areas would require acquisitions of industrial and commercial land. Planned land uses surrounding Hobart Yard and the 26th Street LMF would not change. Approximately 115 businesses in Commerce and 37 businesses in Vernon would be displaced, for a total of 152 businesses displaced by the Hobart Yard modifications and 26th Street LMF.
- **Modifications to the Norwalk/Santa Fe Springs Metrolink Station:** The elevated structure and modifications to the Metrolink station under Shared Passenger Track Alternative A would require multiple acquisitions, all industrial and commercial parcels. If the HSR station option is implemented at Norwalk/Santa Fe Springs, no additional displacements are required.
- **Modifications to the Fullerton Metrolink/Amtrak Station:** The modifications to the Metrolink/Amtrak Station under Shared Passenger Track Alternative A would not require property acquisitions. However, if the HSR station option is included at Fullerton, it would require acquisitions of industrial and commercial parcels for the HSR station facilities south of the corridor, and would result in the displacement of nine additional commercial and industrial businesses.
- **New grade separations:** The new grade separations at Pioneer Boulevard, Norwalk Boulevard, Los Nietos Road, Cerritos Avenue, and State College Boulevard would require industrial, commercial, and residential acquisitions; the permanent footprints of each are presented on Figure 2-69 through Figure 2-72. The residential acquisitions would occur as a result of the Pioneer Boulevard grade separation in the West Whittier–Los Nietos community, with three residential units displaced.
- **Relocated Commerce Metrolink Station:** The relocated station platform and replacement parking on the southern side of the railroad corridor, as well as the co-located paralleling station, would require acquisition of an industrial property. One business would be displaced.

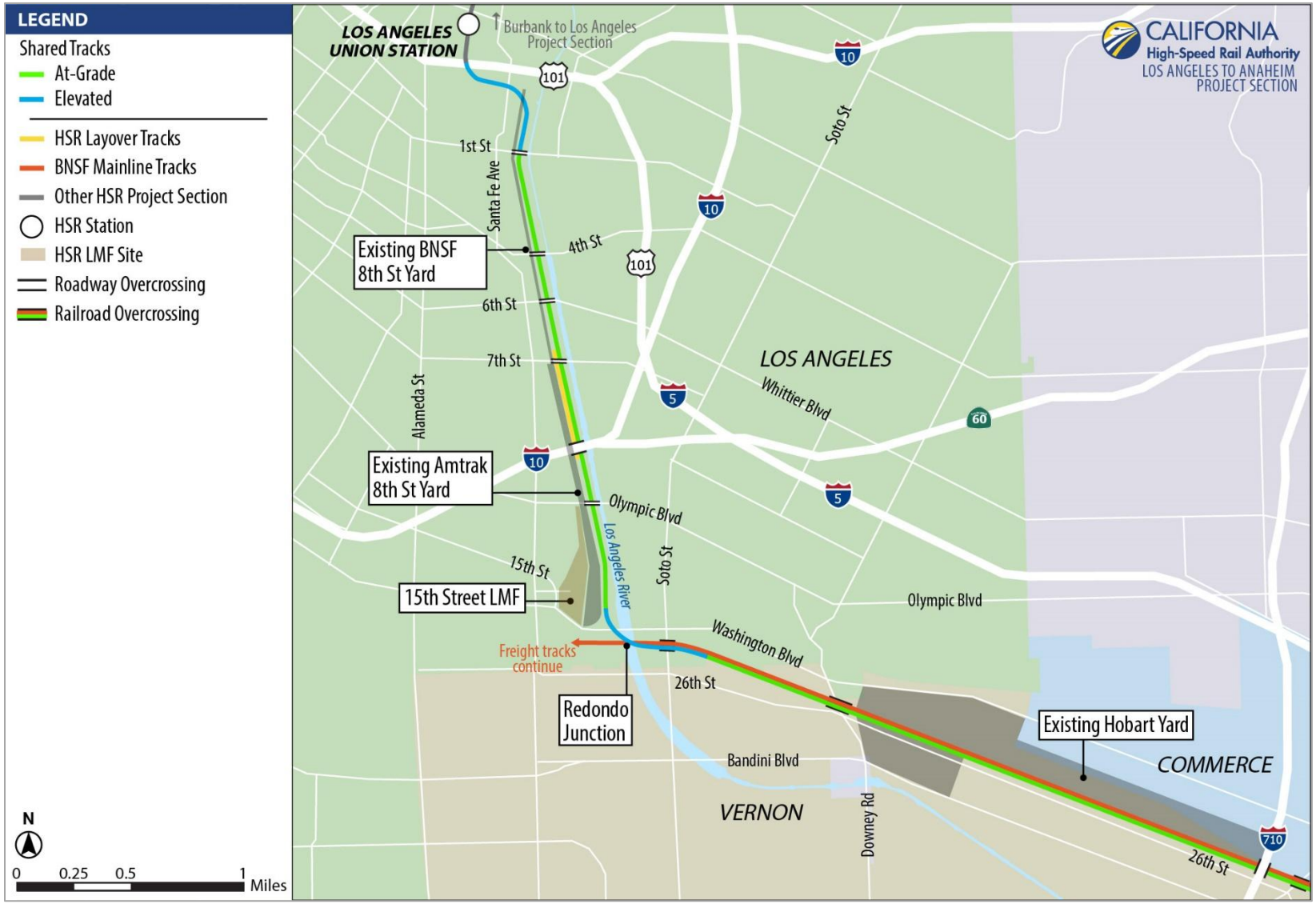
- **Buena Park Metrolink Station Relocation:** The relocated station platform and replacement parking on the northern side of the existing railroad right-of-way would require acquisitions of six industrial properties.

2.6.4 Shared Passenger Track Alternative B

Shared Passenger Track Alternative B would follow the same alignment and share the same project features and operational assumptions as Shared Passenger Track Alternative A, with the exception of the LMF location as discussed below.

2.6.4.1 Alignment

Shared Passenger Track Alternative B has the same alignment and track infrastructure as Shared Passenger Track Alternative A, as described in Section 2.6.3.1, because the LMF location does not affect the BNSF mainline and shared tracks. An overview of the 15th Street LMF site, which is a component of Shared Passenger Track Alternative B in Los Angeles and Vernon, is presented on Figure 2-74.



Source: Authority 2025

Figure 2-74 Shared Passenger Track Alternative B: Los Angeles to Vernon Overview

2.6.4.2 Ancillary Facilities

The proposed ancillary facilities for Shared Passenger Track Alternative B would be the same as for Shared Passenger Track Alternative A, as described in Section 2.6.3.2.

2.6.4.3 High-Speed Rail Station Facilities

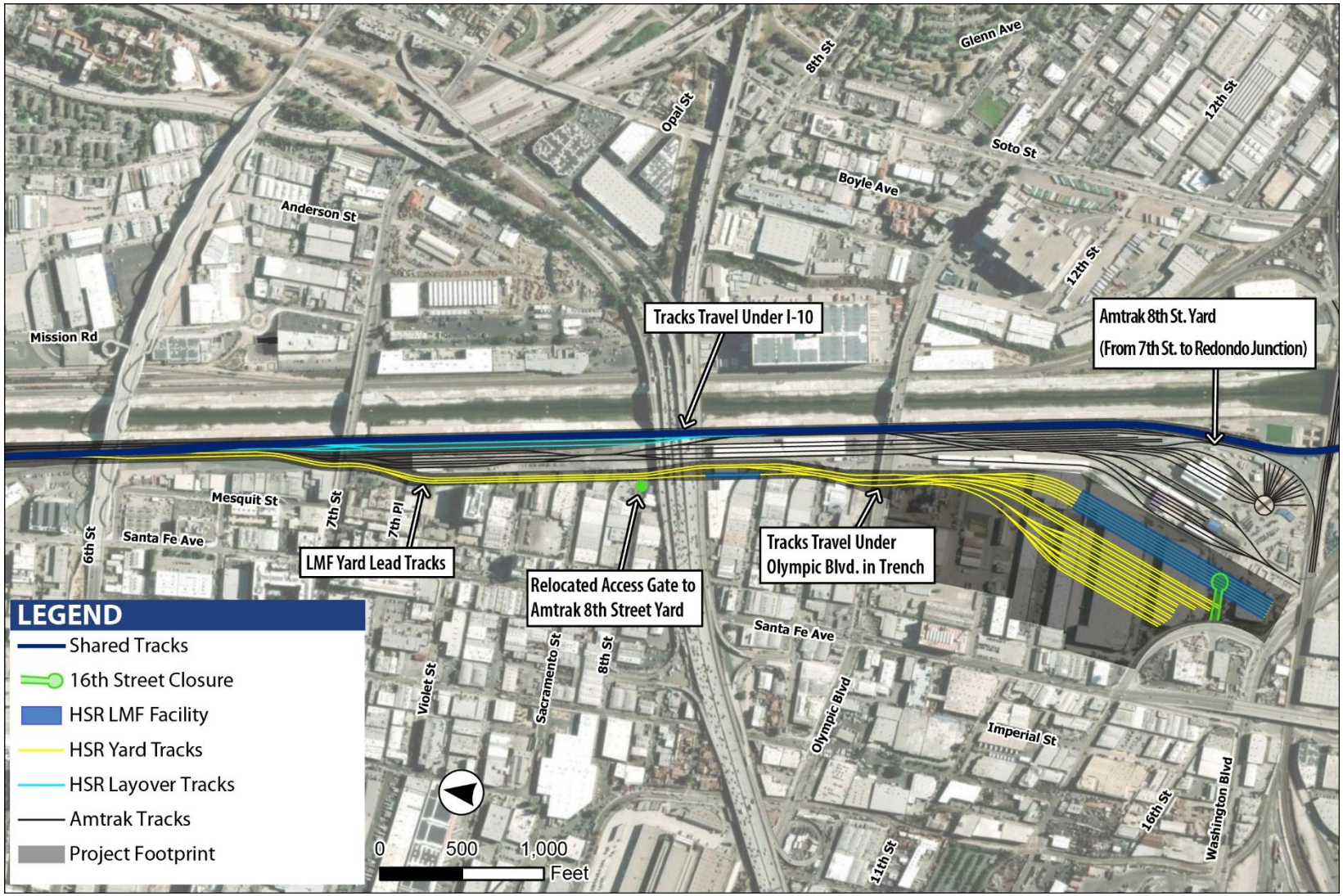
Under Shared Passenger Track Alternative B, the proposed HSR station facilities at ARTIC would be the same as for Shared Passenger Track Alternative A as described in Section 2.6.3.3.

2.6.4.4 Light Maintenance Facility

The 15th Street LMF is in Los Angeles between Olympic Boulevard and 15th Street, immediately adjacent to the existing Amtrak Eighth Street Yard. The 15th Street LMF would include the same maintenance operation facilities as the 26th Street LMF under Shared Passenger Track Alternative A, described in Section 2.6.3.4. Refer to Figure 2-75 for an overview of the 15th Street LMF.

The 15th Street LMF would have an overall size of 52 acres and would include a six-track shop building able to accommodate 12 trainsets, along with an outdoor train yard with a storage capacity of 20 HSR trainsets. The 15th Street LMF would be a single-ended yard, which means that access to and from the mainline tracks is provided only from one side, at the northern end.

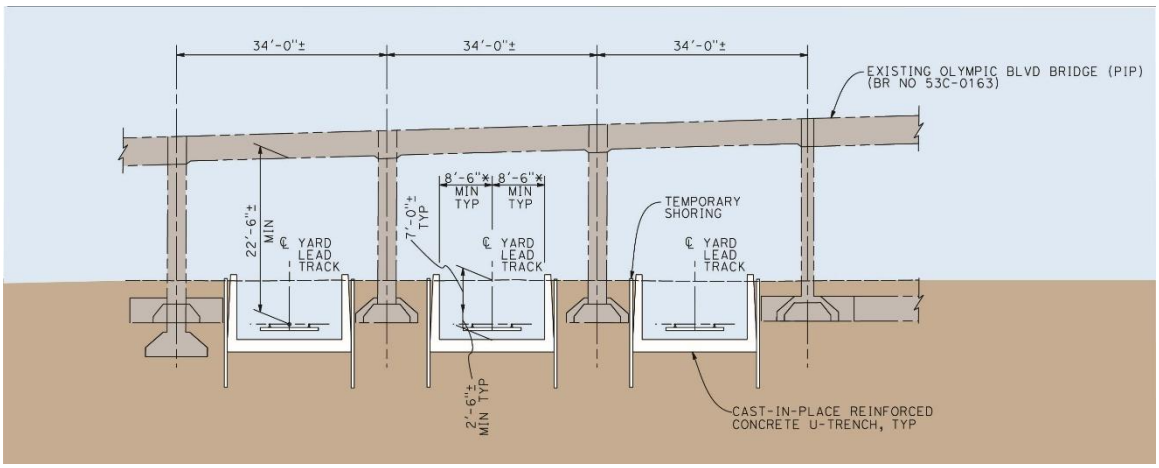
Primary roadway access to the 15th Street LMF would be from Washington Boulevard and 15th Street. HSR trains would access the yard via new yard lead tracks, which would start north of Seventh Street; the HSR project has been designed in coordination with Metro, so that it would not conflict with the planned Metro Arts District Station proposed north of Seventh Street. Two yard lead tracks would diverge from the mainline tracks out of the existing railroad right-of-way, cross under Seventh Street, and then branch into three tracks. Continuing south, the tracks would cross through part of Amtrak's existing primary access road to its Eighth Street Yard, which is currently gated at Eighth Street; these gates would need to be relocated to the west, but Amtrak would still be able to use the road to access its Eighth Street Yard. The three 15th Street LMF yard lead tracks would continue south to cross under I-10.



Sources: Authority 2025; ESRI 2020

Figure 2-75 Shared Passenger Track Alternative B: 15th Street Light Maintenance Facility

As the tracks approach Olympic Boulevard, they would begin to descend to provide enough clearance between the OCS and the historic Olympic Boulevard overpass to avoid impacts on the historic structure. The Olympic Boulevard overpass has four piers, and only one track would fit between each pier. As presented on Figure 2-76, each track would be within a separate trench to pass through the piers, at a finished depth of 7 feet. Refer to Section 2.10.5.3 for more information on the trench construction. The existing Olympic Boulevard piers would not be altered during construction and would remain in place during HSR operations.



Source: Authority 2025

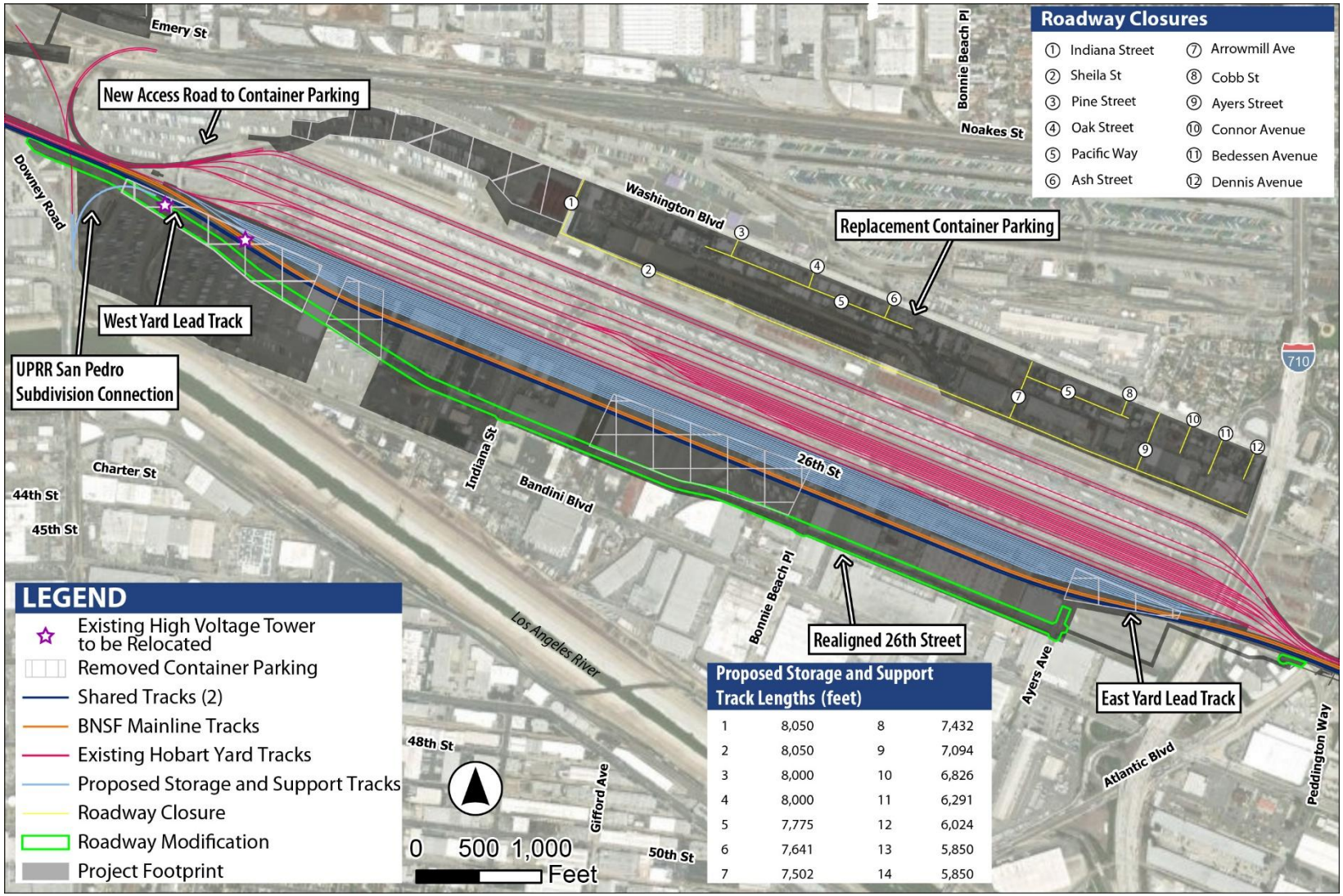
Figure 2-76 Trenches for 15th Street Light Maintenance Facility Yard Lead Tracks Under Olympic Boulevard

South of Olympic Boulevard, the 15th Street LMF yard lead tracks would connect to the yard on a curve, which requires special trackwork (turnout tracks). To make this connection, the LMF site would need to be lowered to meet the yard lead tracks. This is because the yard lead tracks would still be below grade as they come out of the Olympic Boulevard trenches and there would not be enough room to transition the tracks back up to the existing elevation of the LMF site. Additionally, the special trackwork to connect the yard leads to the LMF tracks needs to be on flat sections of track, not on a slope. Therefore, to make the connection between the below-grade yard lead tracks and the yard tracks, the northern portion of the LMF site (approximately 25 acres) would need to be excavated up to a depth of approximately 8 feet and regraded to a finished depth of approximately 5 feet to match the grade of the yard lead tracks. Refer to Section 2.10.5.3 for more information on excavation required.

2.6.4.5 Freight or Passenger Railroad Modifications

Shared Passenger Track Alternative B would have the same modifications to freight tracks and facilities as Shared Passenger Track Alternative A as described in Section 2.6.3, except for one difference at Hobart Yard. Figure 2-77 illustrates Hobart Yard without the 26th Street LMF. Because there would not be LMF lead tracks or yard tracks running through BNSF's existing container parking areas, Shared Passenger Track Alternative B would displace slightly less container parking compared to Shared Passenger Track Alternative A.

The two passenger rail station modifications (Norwalk/Santa Fe Springs and Fullerton) and two Metrolink station relocations (Buena Park and Commerce) would be the same for Shared Passenger Track Alternative B as described for Shared Passenger Track Alternative A in Section 2.6.3.5.



Sources: Authority 2025; ESRI 2020

Figure 2-77 Shared Passenger Track Alternative B: Hobart Yard

2.6.4.6 State Highway or Local Roadway Modifications

The proposed modifications to roadways for Shared Passenger Track Alternative B would be the same as for Shared Passenger Track Alternative A, described in Section 2.6.3.6, except for the area around the 15th Street LMF site. Note that although the 26th Street LMF would not be included under Shared Passenger Track Alternative B, the realignment of 26th Street would still occur.

At the 15th Street LMF, Shared Passenger Track Alternative B would cross through part of Amtrak's access road to its Eighth Street Yard and through its existing access gate at Eighth Street. The access gate would be shifted to the west, and Amtrak would still be able to use its access road, but it would have to cross the three HSR yard lead tracks at grade to reach the road. The 15th Street LMF would also require the closure of a small portion of 16th Street, and the intersection of 15th Street and 16th Street would be reconfigured as a T-intersection. This portion of 16th Street, which is an existing cul-de-sac, serves the properties that would be acquired for construction of the 15th Street LMF. Refer to Figure 2-75, which depicts the portion of 16th Street that would be closed in green.

2.6.4.7 Modifications to Waterways

The proposed modifications to waterways for Shared Passenger Track Alternative B would be the same as for Shared Passenger Track Alternative A, as described in Section 2.6.3.7.

2.6.4.8 Land Use and Community Modifications

The changes in land use for Shared Passenger Track Alternative B would be the same as for Shared Passenger Track Alternative A, as described in Section 2.6.3.8, Land Use and Community Modifications, except there would be additional acquisitions and business displacements for the 15th Street LMF. Note that although the 26th Street LMF would not be included, the acquisitions in that area would still be needed to accommodate the changes to the mainline tracks and Hobart Yard modifications.

The 15th Street LMF is situated in a highly constrained area along the west bank of the Los Angeles River, between the existing Arts District neighborhood and Amtrak's Eighth Street Yard track and facilities. The 15th Street LMF would be in a primarily industrial area.

At the 15th Street LMF site, Shared Passenger Track Alternative B would convert an additional 38.36 acres of nontransportation land uses to a transportation use in Los Angeles, compared to Shared Passenger Track Alternative A. Shared Passenger Track Alternative B would displace 18 additional commercial and industrial businesses in the city of Los Angeles, for an overall total of 274 business displacements in Los Angeles and Orange Counties. The displacements associated with the HSR station option at either Norwalk/Santa Fe Springs or Fullerton would be the same for both Shared Passenger Track Alternative A and Shared Passenger Track Alternative B.

2.6.5 Early Action Projects

As described in the 2023 Project Update Report, the Authority has committed to investing in regionally important early action projects to provide early benefits to transit riders and local communities in Southern California, while laying a solid foundation for implementation of the HSR system. These early investments would be made by the Authority in collaboration with local and regional agencies. The types of projects include grade separations, track enhancements, and improvements at passenger rail stations, which would increase capacity, improve safety and air quality, and provide immediate mobility and reliability benefits for existing freight and passenger rail operations. The potential temporary construction and permanent operational environmental effects associated with these early action projects, which are project components of both Shared Passenger Track Alternatives, are included in the evaluation of both of the Shared Passenger Track Alternatives in this Draft EIR/EIS. These early action projects may be implemented by other local agencies relying on this Los Angeles to Anaheim Project Section EIR/EIS in advance of the HSR system as stand-alone projects. Therefore, potential early action projects relevant to this

project section are described in further detail below, and are analyzed in site-specific detail within this Draft EIR/EIS to allow the agencies ease of access to the applicable environmental analyses and potentially applicable mitigation measures. The early action projects described below would be the same for both Shared Passenger Track Alternatives.

Other individual elements of Shared Passenger Track Alternative A and Shared Passenger Track Alternative B could be identified in the future as potential early action projects to be built by other agencies.

2.6.5.1 Grade Separations

This Draft EIR/EIS includes the environmental analysis of five new full railroad/roadway grade separations as early action projects:

- Pioneer Boulevard
- Norwalk Boulevard and Los Nietos Road (considered a single early action project because of the adjacency of the two crossings)
- Cerritos Avenue
- State College Boulevard

Grade separating these roadways would provide safety benefits to all modes of transportation, as well as improve reliability of passenger rail service.

Grade separation work could include roadway profiling and striping, utility relocation, and structural work. The detailed descriptions of the grade separations are included in Section 2.6.3.6 along with Figure 2-69 through Figure 2-72, which depict the temporary and permanent project footprint of the grade-separation work. The temporary project footprint includes areas such as utility easements and construction staging areas while the permanent project footprint includes areas that would be needed permanently for operation of the grade separations. Grade separation design would be completed by the relevant cities, Metrolink, and BNSF.

2.6.5.2 Metrolink Station Relocations

Passenger rail currently operates within the LOSSAN Corridor and would continue to do so with the introduction of HSR service. The relocations of the existing Commerce and Buena Park Metrolink Stations are necessary for implementation of either of the Shared Passenger Track Alternatives for a variety of reasons, described in more detail in Section 2.6.3.1, including changes in existing tracks and modifications to adjacent BNSF yards.

Existing transit service to the current Metrolink station locations would need to be modified to serve the relocated Metrolink station locations. Future coordination with Metrolink, Amtrak, and transit service providers would be necessary to determine bus routes and schedules for the relocated Metrolink station locations and to inform final design of bus facilities at and near the station. Parking and station facilities would be replaced one-to-one based on existing station parking at the Metrolink facilities. Access roads, curb space, and passenger and operations facilities for buses have been included in the footprint in anticipation of this reconfigured service. More detailed descriptions of the station relocations are included in Appendix 2-C.

2.6.5.3 Fullerton Metrolink/Amtrak Modifications (Fullerton Interlocker)

The Shared Passenger Track Alternatives would modify the tracks and platforms throughout the Fullerton Metrolink/Amtrak Station, as well as the tracks east to Fullerton Junction, as described in Sections 2.6.3.1 and 2.6.3.5. However, some of these proposed HSR modifications could be completed as an early action project to support the Metrolink Fullerton Interlocker Project, which is being planned by BNSF in coordination with Metrolink and the Authority. This project is critical to Metrolink's Southern California Optimized Rail Expansion Program and will allow for more frequent and regular service in Southern California. The Authority has incorporated the Fullerton Interlocker Project design as part of HSR's Fullerton/Metrolink Amtrak modifications, based on coordination with BNSF and Metrolink and on the anticipated timelines of the two projects.

Therefore, the Draft EIR/EIS analyzes environmental impacts associated with the Fullerton Interlocker Project and the environmental impacts associated with the fourth mainline track that would need to be added to accommodate HSR service.

The early action project would consist of the same modifications described in Section 2.6.3.5 to the Fullerton Metrolink/Amtrak Station, except the fourth mainline track on the southern side of the corridor would end at Highland Avenue, instead of extending farther west. All other modifications would be included: the removal of the southern side platforms, addition of a new center platform over Harbor Boulevard, new pedestrian underpass, and realignment and modifications to Walnut Avenue. If the HSR project is implemented later, the southern track would be extended west past Highland Avenue to connect to the fourth mainline track of the HSR alternatives.

As noted in Section 2.6.3.1, this early action project would separate BNSF and passenger trains and allow trains traveling in different directions to move more efficiently through the junction area. The early action project would provide earlier benefits to all operators in the corridor, while also building a portion of the infrastructure that would be needed for HSR operations.

2.6.5.4 Reconfiguration of Freight Rail Facilities

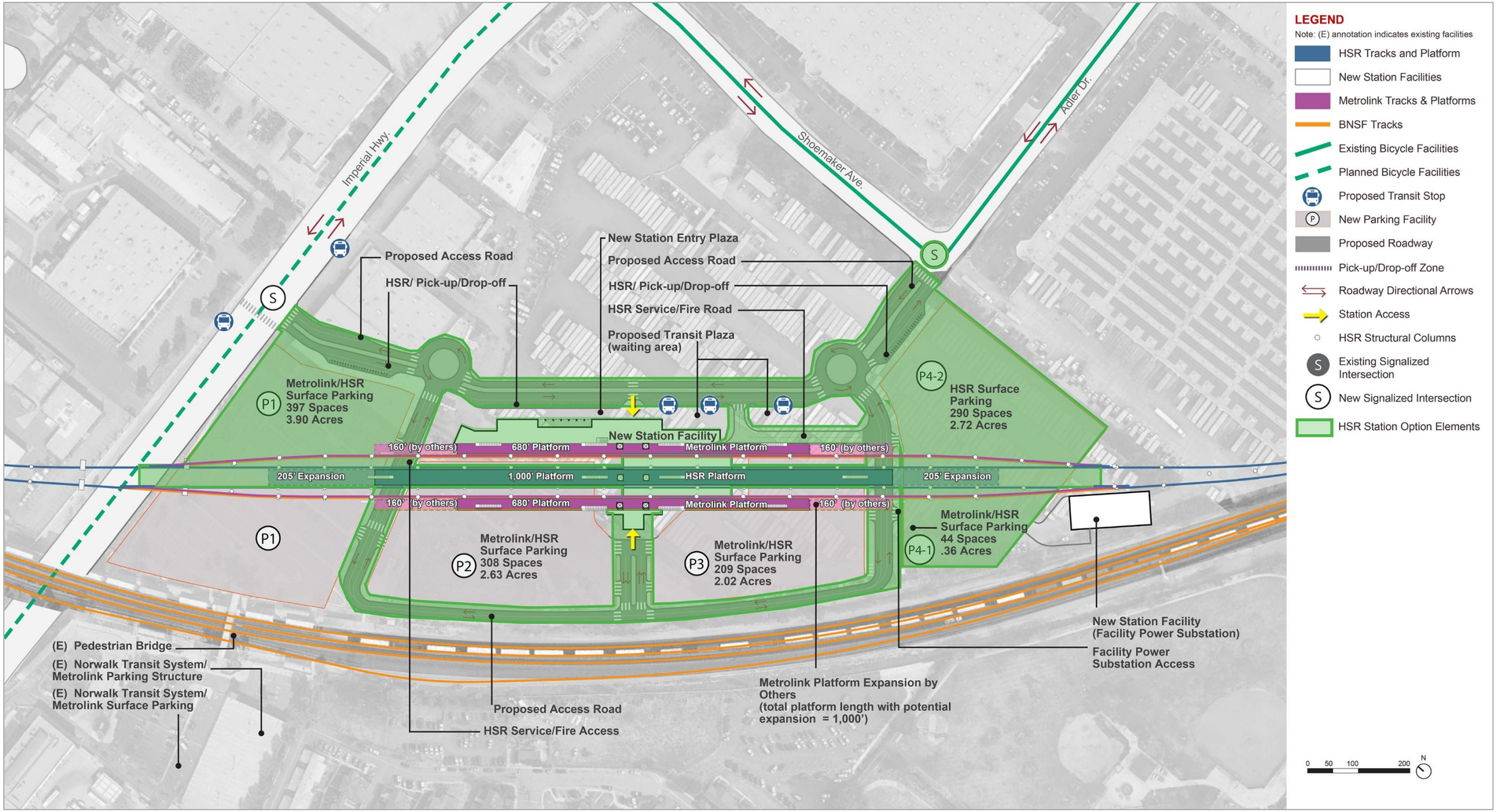
As discussed in Section 2.6.3.5, the project requires new or modified BNSF facilities to add and electrify tracks in the existing BNSF right-of-way between Los Angeles and Fullerton. The Hobart Yard modifications and Commerce Yard modifications (including the Commerce Flyover) could be implemented as early action projects to allow for improvements to existing Amtrak and Metrolink service in the LOSSAN Corridor. Currently, freight trains are sometimes staged along the mainline tracks in the corridor, and slow freight movements into BNSF yards can delay passenger rail operations. These early action projects would provide earlier benefits to all operators in the corridor by connecting freight trains more efficiently from mainline tracks to the new consolidated storage area, while also building a portion of the infrastructure that would be needed for HSR operations.

2.6.6 Optional High-Speed Rail Station

HSR trains would not stop at the Norwalk/Santa Fe Springs Metrolink Station or Fullerton Metrolink/Amtrak Station under either Shared Passenger Track Alternative A or Shared Passenger Track Alternative B. However, in line with the Authority's alternative development process (refer to Section 2.5, Alternatives Considered During Alternatives Screening Process), an option for a full-stop HSR station was considered separately and evaluated in this Draft EIR/EIS should the Authority Board decide to select one of these HSR station option locations for inclusion in one of the build alternatives. This Draft EIR/EIS analysis presents the effects from building one HSR station option at either Norwalk/Santa Fe Springs or Fullerton. The inclusion of the HSR station option would require additional elements to support full-stop HSR service, in addition to the modifications described in Section 2.6.3.5. These HSR station elements are described in detail below.

2.6.6.1 High-Speed Rail Station Option: Norwalk/Santa Fe Springs

If the Norwalk/Santa Fe Springs HSR Station Option is selected in conjunction with Shared Passenger Track Alternative A or B, several additional elements would be included along with the station modifications described in Section 2.6.3.5. An overview of the HSR station option elements is presented on Figure 2-78, with the additional HSR station elements highlighted in green. The other elements presented on Figure 2-78 would be completed as part of Shared Passenger Track Alternative A or B.



Source: Authority 2025

Figure 2-78 Norwalk/Santa Fe Springs High-Speed Rail Station Option Platform and Station Facilities

The two tracks described under Section 2.6.3.1 would serve the modified Metrolink side platforms. Two more electrified passenger rail tracks would be added, for a total of four tracks through the station. The two tracks added as part of the HSR station option would serve the HSR center platform in between the modified Metrolink side platforms. The HSR platform would be 1,000 feet long, capable of future extension to 1,410 feet. Figure 2-79 depicts a cross section of the center HSR platform and the two side Metrolink platforms. The new station facility at the platforms would be larger than the one for Shared Passenger Track Alternative A or B, because it would serve both HSR and Metrolink passengers.

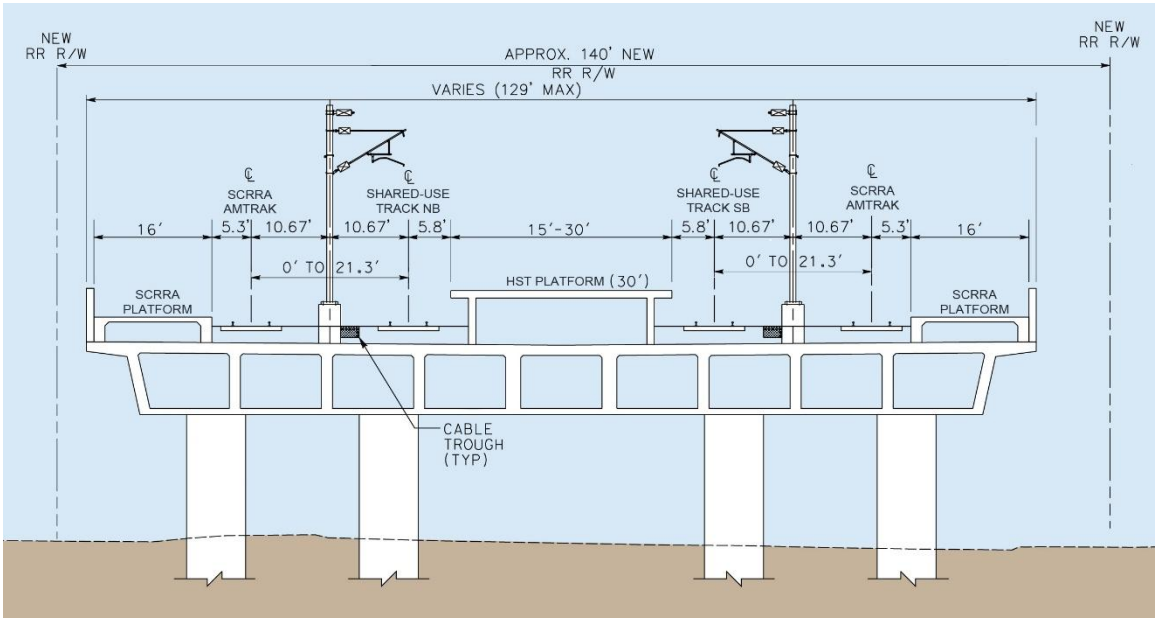
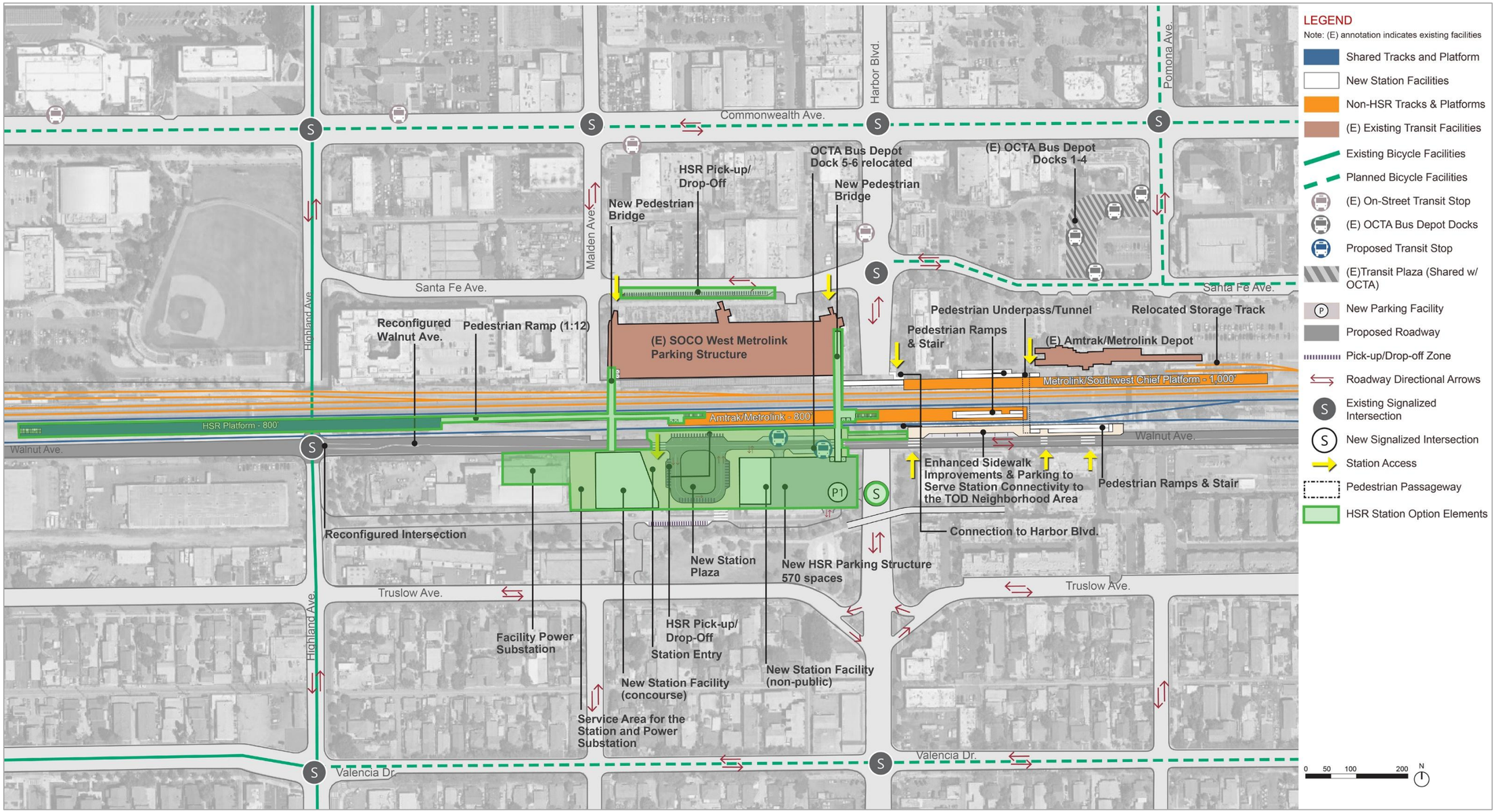


Figure 2-79 Cross Section of High-Speed Rail Station Option at Norwalk/Santa Fe Springs Metrolink Station

The HSR station option would also require more parking to be added to serve HSR passengers. Parking and pick-up/drop-off for HSR and Norwalk/Santa Fe Springs Metrolink passengers would be combined within new surface parking lots. The intermediate station option at Norwalk/Santa Fe Springs would provide 640 more parking spaces compared to what Shared Passenger Track Alternative A or B would provide, for a total of 1,248 parking spaces. A new access road would be provided from Imperial Highway, along the eastern side of the site, to the Shoemaker Avenue/ Adler Drive intersection, with new signalized intersections.

2.6.6.2 High-Speed Rail Station Option: Fullerton

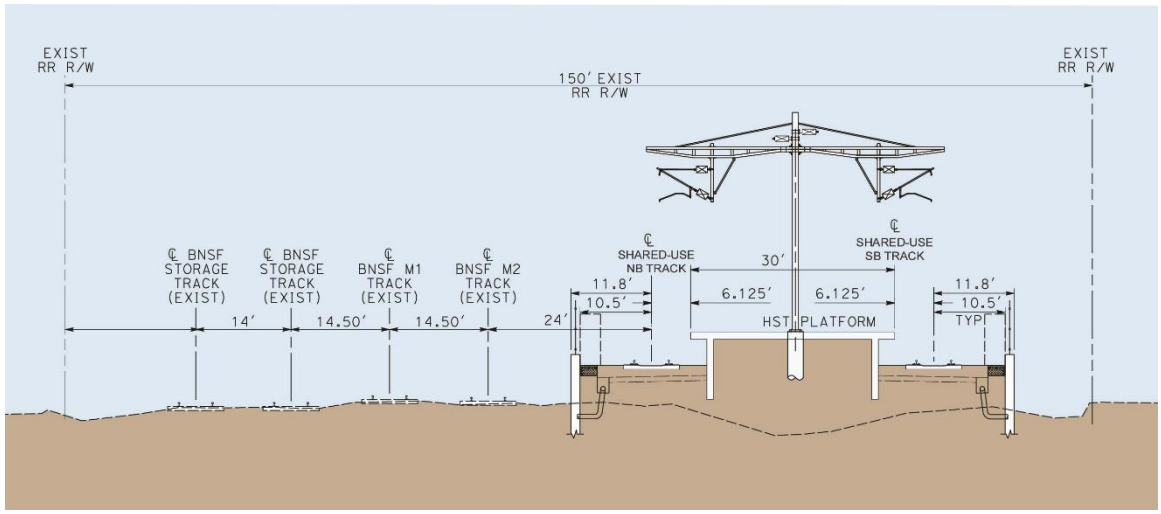
If the Fullerton HSR Station Option is selected in conjunction with Shared Passenger Track Alternative A or B, several additional elements would be included along with the station modifications described in Section 2.6.3.5. An overview of the HSR station option elements is presented on Figure 2-80, with the additional HSR station elements highlighted in green. The other elements presented on Figure 2-80 would be completed as part of Shared Passenger Track Alternative A or B.



Source: Authority 2025

Figure 2-80 Fullerton High-Speed Rail Station Option Platform and Station Facilities

The overall track configuration would be the same as described under Section 2.6.3.1, with two shared tracks on the southern side of the corridor and four BNSF tracks on the northern side, but implementation of the HSR station option would place the southernmost shared track slightly farther south to allow room for a center HSR platform. The HSR platform would extend approximately 1,000 feet west over Highland Avenue and would be built with a height of 48 inches above the top of rail to accommodate the HSR train boarding height. The height of the platform would require the shared tracks to be on retained fill, 10 feet high at the highest point, starting from approximately 1,600 feet west of Highland Avenue to approximately 600 feet east of Highland Avenue. Figure 2-81 provides a cross section of the HSR platform, with the two shared tracks on a slightly higher elevation compared to the BNSF tracks to the north. A new pedestrian ramp would be added to connect the HSR platform to the Metrolink/Amtrak platform to the east.



Source: Authority 2025
M = main track; RR = railroad; R/W = right-of-way; NB = northbound; SB = southbound

Figure 2-81 Cross-Section of High-Speed Rail Station Option at Fullerton Metrolink/Amtrak Station

South of Walnut Avenue between Highland Avenue and Harbor Boulevard, the HSR station option would add HSR station buildings, a facility power substation, and a new multilevel parking structure that would provide a total of 570 HSR parking spaces. Similar to Shared Passenger Track Alternative A or B, the intersection of Highland Avenue and Walnut Avenue would need to be reconfigured to accommodate the southernmost track and new Highland Avenue railroad bridge. Additional improvements would be made along the northern side of Walnut Avenue, west of Harbor Boulevard, to provide transit stops and pedestrian crossings.

The HSR station option would add two new pedestrian bridges to connect existing Metrolink facilities with new HSR facilities. One new pedestrian bridge would be west of Harbor Boulevard, connecting the existing Metrolink parking structure on the north to the new HSR parking structure on the south. The second pedestrian bridge would be just east of Malden Avenue, connecting the existing Metrolink parking structure to the HSR station building on the south. Installation of a new signalized intersection on Harbor Boulevard would be needed to facilitate access to the new HSR parking garage entrance. This intersection would be on Harbor Boulevard, just south of the tracks.

2.7 Travel Demand and Ridership Forecasts

Ridership forecasts were prepared to support ongoing planning for the HSR system and the analysis in this Draft EIR/EIS. As noted in Chapter 1, this Draft EIR/EIS uses the ridership forecasts that were developed for the 2023 Project Update Report (Authority 2023b) by Early

Train Operator using a new ridership and revenue model, the California Rail Ridership Model.[30] The Authority first updated data and assumptions to prepare ridership model runs at 2030, 2040, and 2050 time horizons.

The California Rail Ridership Model incorporates revised population and employment growth forecasts, which have flattened substantially over the last decade. This, along with changes in travel behavior from COVID-19, has reduced transit ridership among all California transit agencies. Development of the California Rail Ridership Model involved an extensive new data collection process including updated population and employment forecasts for a 2040 horizon year based on the California Department of Finance and the California Department of Transportation's Economics Branch estimates. These updated forecasts reflect a trend indicating that population and employment growth are flattening and not expected to grow as fast as previously projected and used in the previous model. In addition to updated demographic data, a new "stated preference survey" was conducted, and the new model framework now includes sensitivity testing and risk analysis capabilities.

To streamline ticketing and fares for passengers, the Authority plans to implement a unified fare system across bus and rail services, as evaluated using the California Rail Ridership Model. The California Rail Ridership Model includes operations and maintenance cost modeling. It is important to note that these assumptions are tailored to generate the initial ridership forecasts for the 2023 Project Update Report using the new business model with the unified fare system. Subsequent adjustments will be made through continuous discussions and agreements involving all partners.

The ridership forecasts presented in this Draft EIR/EIS are based on the 2023 Project Update Report. For the year 2040, the 2023 Project Update Report forecasts 31.3 million passengers. The 2040 forecasts correspond to the horizon year used for impacts analysis in this Draft EIR/EIS. Ridership forecasts are based on demographic forecasts, such as population and employment growth. Therefore, this Draft EIR/EIS focuses on the 2040 forecasts in the 2023 Project Update Report.

As noted in Chapter 1, the Authority released the 2024 Business Plan in April 2024, which had reduced ridership estimates (29 million) compared to the 2023 Project Update Report. The lower ridership levels would result in fewer trains operating in 2040. Therefore, the impacts associated with train operations in 2040 would be somewhat less than the impacts presented in this EIR/EIS, and the benefits accruing to the project (e.g., reduced vehicle miles traveled, reduced greenhouse gas emissions, reduced energy consumption) also would be less than the benefits presented in this EIR/EIS. Refer to Appendix 1-A, Changes in Project Benefits and Impacts, for more information on the modeling data used in this Draft EIR/EIS.

Ridership forecasts support the development of specific aspects of the HSR system's design and certain elements of the environmental analysis, described in more detail below. Because the ultimate ridership of the HSR system would depend on many uncertain factors, such as the price of gasoline or population growth, the HSR system described in this document has been designed to accommodate the varying ridership levels expected over the coming decades.

2.7.1 Ridership and High-Speed Rail System Design

The HSR system analyzed in this Draft EIR/EIS reflects the fact that the system is a long-term transportation investment for the State of California. The Authority is designing the project with state-of-the-art infrastructure and facilities that would serve passengers over many decades. Although most of the infrastructure components are being designed and built for full utility, certain components are more flexible and can change and adapt to meet ridership demand as it grows over time.

[30] The Draft EIR/EIS analyses primarily relied on 2023 Project Update Report data, but some topics used the data from the 2024 Business Plan ridership model, such as Section 3.2, Transportation, for the 2040 statewide vehicle miles traveled analysis. Refer to Appendix 1-A for more information on ridership data used for analysis.

While the Authority and FRA weighed ridership and revenue potential in evaluating alignment and station alternatives in the Tier 1 Program EIR/EIS documents and Tier 2 alternatives screening, the primary driver influencing design of the HSR system is not the total forecasted annual ridership, but rather the performance objectives and safety requirements. Those requirements stipulated to by the Authority, FRA, the U.S. Department of Transportation, and the regional transportation partners—including Caltrain, Metrolink, Amtrak, Metro, BNSF, and other operators—whose systems will either use the shared segments of the HSR alignment (blended system) or provide connections to the HSR service are dictated by the agencies' performance objectives and safety requirements, rather than by total annual ridership.

In keeping with these objectives and requirements, the HSR system would comprise a four-track system for most of the statewide system, with four tracks at intermediate stations regardless of total annual ridership. Individual project sections, such as Los Angeles to Anaheim, would have different configuration based on local conditions and agency requirements. Track geometry and profile, power distribution systems, train control/signal systems, type of rolling stock, and certain station elements would be the same in both the dedicated and blended systems regardless of how many riders use the HSR system. The locations of the HMF and LMF also follow the mandates set forth by technical operating requirements rather than ridership.

Although the performance objectives and safety requirements are the main factors affecting HSR system design, ridership does influence some aspects of the system's design, including the size of the HMF and LMF, which are based on the 2040 ridership forecast so that these facilities would be sufficient to accommodate maximum future needs. This approach is consistent with general planning and design practices for large infrastructure projects in which resilience and adaptability are incorporated by acquiring enough land for future needs up front rather than trying to purchase property at a later date when it may no longer be available or may be impractical to acquire. The use of ridership forecasts facilitates the early phases of maintenance facility construction as well as subsequent expansion of the facility as fleet size and maintenance requirements grow.

Forecasted annual ridership and peak-period ridership also play a role in determining the size of some station components, such as the size of the public accessway/egressway to the HSR system. The 2040 ridership forecast formed the basis for the conceptual service plan, which in turn influenced station site planning by designing station facilities to be sufficient to accommodate the anticipated increase over time of HSR use.

The Authority used the 2040 ridership scenario, along with local conditions, to determine the maximum amount of parking needed at each station. Parking demand and supply were analyzed by considering many factors, including ridership demand, station area development opportunities, and availability of alternative multimodal access improvements, to inform the size of the parking facilities at each station and the anticipated schedule for the phased implementation of these facilities. The use of the 2040 ridership scenario provides flexibility to change or even reduce the amount of station parking as these factors become more defined and resolved over time. (Refer to Section 2.7.3, Ridership and Station-Area Parking, for additional information.) Because ridership forecasts were not designed to produce detailed access and egress mode shares at specific stations, forecasting model outputs for the allocation of HSR access and egress trips among modes were refined to provide detailed information for station facility sizing. The refinements were based on the following factors: location-specific data for existing rail stations and airports near each station; comparisons with other rail stations and airports in California and the nation; local, regional, and state plans for transportation and land use; and consultation with local jurisdictions, including review of preliminary estimates. Additional information on mode-share adjustments is provided in the *California High-Speed Rail Station Access and Egress Southern California Mode Share Adjustment Methodology and Review Process* 2018 memorandum (Appendix 2-D, Station Access Methodology Report). The process described in Appendix 2-D was applied to the ridership forecasts used in this document.

2.7.2 Ridership and Environmental Impact Analysis

The forecasts of annual HSR ridership play a role in the analysis of environmental impacts and benefits related to traffic, air quality, noise, and energy. This Draft EIR/EIS uses ridership forecasts to analyze potential adverse environmental impacts on traffic, air quality, noise, and energy resulting from the construction and operation of the HSR system. Specifically, with respect to air quality, this Draft EIR/EIS used ridership from the 2023 Project Update Report to model emissions. Noise analysis considered the modeled number of one to two train passes per hour (per the 2023 Project Update Report). Finally, ridership was used to model energy use for the 2040 full operation of Phase 1. Section 3.3, Air Quality and Global Climate Change; Section 3.4, Noise and Vibration; and Section 3.6, Public Utilities and Energy, discuss air quality, noise, and energy impacts, respectively, in more detail.

Analysis using the ridership forecasts ensures the disclosure of the higher level of potential environmental effects (e.g., noise from passing trains and from traffic in areas near stations) that could occur if ridership reaches the 2040 forecast of 31.3 million passengers. If HSR ridership proves to be lower than the 2040 forecast, adverse environmental impacts will also be lower. However, although a lower level of ridership could reduce adverse environmental impacts, these lower levels could also reduce the environmental benefits of the HSR system (e.g., transportation, air quality, and energy).

2.7.3 Ridership and Station-Area Parking

HSR system ridership, parking demand and supply, and development around HSR stations are intertwined and anticipated to evolve as ridership increases from the forecasted 2.3 million passengers anticipated at the start of revenue service in 2030 to as many as 31.3 million passengers in 2040 when the HSR system is in full operation. The Authority's goals are to support HSR ridership by promoting, in partnership with local agencies, transit-oriented development around HSR stations and expansion of multimodal access to the HSR system including the expansion of local transit to bring riders to HSR stations, and the environmental clearance of, and land for, potential parking facilities. This is a delicate balance that will evolve over time and vary by station, because some cities and regions will develop their station areas and local transit systems more than others by 2040.

The implementation of these activities could vary at each station because some cities and regions may be able to develop their station areas and local transit systems at a faster rate than others by the 2040 start-up of HSR revenue service and before 2040 when the HSR system would be fully operational. In addition, parking demand and supply at each station could also be affected by technological advances, such as multimodal trip planning/payment software and autonomous vehicles, as well as changes in the bundle of services available to consumers, such as ride-hailing services and bike- and car-sharing programs.

Research suggests that the percentage of transit passengers arriving/departing transit stations by car and needing parking accommodations decreases as land-use development and population around the stations increases. The Authority has adopted station-area development policies that recognize the inverse relationship between parking demand and HSR station-area development. In keeping with these policies, the Authority is working with regional planners and planners in the station cities to maximize the success of the HSR system by locating stations in areas where there is, or could be, a high density of population, jobs, commercial development, entertainment venues, and other activities that generate trips. Encouraging development in high-density areas around HSR stations would allow the Authority to attain its dual goal of supporting system ridership while reducing parking demand.

However, land use development around HSR stations will not occur immediately. Although the HSR system would be a catalyst for such development, actual construction would be dictated by local land-use decisions and market conditions. The Authority would work in partnership with local governments to encourage station-area development, exemplified by the station-area planning funding agreements it has provided to the City of Fresno and the City of Bakersfield, but its power

in this regard is limited. The actual demand for parking facilities, moreover, will depend on how HSR ridership grows over time.

In light of the uncertainty regarding the need for station-area parking, this Draft EIR/EIS conservatively identifies parking facilities based on the maximum forecast for parking demand at each station, the local conditions affecting access planning (refer to Section 2.7.1, Ridership and High-Speed Rail System Design, for additional information on parking and station access forecasts), and practical means for delivering required parking. This approach identifies the upper range of actual needs and the maximum potential environmental impacts of that range.

The Authority, in consultation with local communities, would have the flexibility to make decisions regarding what parking facilities would be built initially and how additional parking could be phased in or adjusted depending on how HSR system ridership increases over time. For example, some parking facilities could be built at the 2040 opening and subsequently augmented or replaced in whole or in part based on future system ridership, station-area development, and parking management strategies.

2.8 Operations and Service Plan

2.8.1 High-Speed Rail Service

Per the *California High-Speed Rail Authority Statewide Operations and Service Plan* (Appendix 2-E, Operations and Service Plan), the conceptual HSR service plan for Phase 1 describes service starting in Anaheim, running north through the Central Valley from Bakersfield to Merced, and traveling northwest into the San Francisco Bay Area. Subsequent phases of the HSR system include a southern extension from Los Angeles to San Diego via the Inland Empire and an extension from Merced north to Sacramento.

HSR train service would run in diverse patterns between various terminals. Three basic service types are envisioned:

- Express trains, which would serve major stations only, providing fast travel times (for example between downtown San Francisco and LAUS)
- Limited-stop trains, which would skip selected stops along a route to provide faster service between stations served
- All-stop trains, which would focus on regional service and connection from/to faster trains

Most trains would provide express services or limited-stop service and offer a relatively fast run time between the largest metropolitan areas while connecting various intermediate stations by all-stop service. Numerous limited-stop pattern runs would be provided to achieve a balanced level of service at the intermediate stations. The *California High-Speed Rail Authority Statewide Operations and Service Plan* (Appendix 2-E) envisions at least four limited-stop trains per hour in each direction, all day long, on the main route between San Francisco and Los Angeles. Select intermediate stations would be served by one all-stop and at least two limited-stop trains every hour—offering at least two reasonably fast trains per hour to both San Francisco and Los Angeles. Selected limited-stop trains would be extended south of Los Angeles as appropriate to serve projected demand.

Including the limited-stop trains on the routes between Sacramento and Los Angeles, and Los Angeles and San Diego, and the frequent-stop local trains between San Francisco and Los Angeles/Anaheim, and Sacramento and San Diego, every station on the HSR network would be served by at least one train per hour per direction throughout the day. Stations with higher ridership demand would generally be served by more trains than those with lower estimated ridership demand.

The *California High-Speed Rail Authority Statewide Operations and Service Plan* (Appendix 2-E) provides for direct-train service between most station pairs at least once per hour. These service plans provide a useful initial estimate of the level of service that matches projected long-range demand on the high-speed system. As the high-speed system is implemented and both the

operating plan and the ridership estimates are refined, it will be possible to make informed benefit and cost tradeoffs to develop the most appropriate mix of limited, express, and all-stop services, which will affect the trip times between stations and the frequency of service offered at each station for each route.

Phase 1 is scheduled to start operations in 2040 and would complete the HSR system from a north terminal in San Francisco to the south terminal at Anaheim, including the Los Angeles to Anaheim Project Section. For the Los Angeles to Anaheim Project Section, estimated trip time would be up to 34 minutes between Los Angeles and Anaheim. Train service in the corridor is anticipated to run from approximately 6:00 a.m. to midnight. Nonservice activities required to maintain the system are anticipated to occur during nonrevenue service hours.

In 2040, the service plan concept for Phase 1 estimates that the main HSR line through the Central Valley would have up to six trains per hour in each direction during the peaks, and three trains per hour during the off peaks. Because of capacity constraint coming from the shared-use operations between Caltrain regional rail service and the HSR service, the level of HSR service along the Peninsula Corridor would be limited to four trains per hour in each direction. In the peak periods, the base level of service would include (in each direction):

- Three trains per hour between San Francisco and Los Angeles
- One train per hour between San Francisco and Anaheim
- One train per hour between San Jose and Merced
- One train per hour between Merced and Anaheim

Under Shared Passenger Track Alternative A and Shared Passenger Track Alternative B, there would be two passenger trains per hour in each direction between Los Angeles and Anaheim during peak periods, and up to two trains during off-peak periods. The Shared Passenger Track Alternatives would allow current and projected freight train volumes to be retained within the corridor. HSR train service for the project section may be operated by the Authority or, to the extent legally permitted by applicable HSR funding requirements, by another passenger rail operator that meets the HSR performance criteria for blended operations as specified in Table 2-1.

2.8.2 Other Rail Services in the Shared Corridor

In the Los Angeles to Anaheim Project Section, HSR trains will operate in a shared corridor with other passenger rail operators (Metrolink, Amtrak[31]) and with freight rail operators (BNSF, UPRR).

For the year 2040, this EIR/EIS bases train volumes for other passenger rail operators at the levels allowed under the existing applicable 1992 RCTC-ATSF Shared Use Agreement north of Fullerton, and extrapolation of existing conditions south of Fullerton. Year 2040 train volumes for freight operators are based on year 2016 volumes, escalated by 2 percent annually (Authority 2019b).

The Authority coordinated closely with the California Department of Transportation during development of the 2018 State Rail Plan (SRP), which was finalized and released in September 2018 (Caltrans 2018). The SRP is one of several mode-specific companion documents to CTP 2050, which provides a long-range policy framework to meet the state's future mobility needs and reduce greenhouse gas emissions. Building on the goals and policies in CTP 2050, the SRP presents a vision for California's future passenger and freight rail network intended to support implementation of an integrated rail network, including high-speed rail.

The updated draft SRP was first released in March 2023 for public comment (Caltrans 2023). The 2024 SRP was then finalized in December 2024 (Caltrans 2024). The SRP confirms the state's commitment to an interconnected rail and transit system that aligns with California's ambitious

[31] There is both state-supported and national-supported Amtrak service within the corridor, each requiring coordination with distinct sets of stakeholders.

economic, environmental, and equity objectives. Aligned with CTP 2050 and the 2021 California State Transportation Agency's *Climate Action Plan for Transportation Infrastructure*, this integrated rail network, centered on future HSR corridors, promotes economic development, enhances environmental sustainability, and advances equity by offering seamless mobility options for Californians. This approach encourages the transition to zero-emission, high-capacity transportation, facilitating efficient and sustainable land use. Regional planning and project implementation further build on the SRP, empowering communities to benefit from improved services, develop interconnected regional networks, and formulate land use strategies that capitalize on enhanced connectivity.

The project elements of the Los Angeles to Anaheim Project Section provide benefits beyond the HSR program. As a critical component of California's vision for an integrated statewide rail network, the project section may benefit expanded freight and passenger rail investment by delivering discrete improvements necessary to enable future projects within the authority of other regional freight and passenger rail providers. These future investments can leverage the HSR program's improvements to accommodate anticipated increases in freight or other passenger rail movements. Although benefiting from the HSR improvements in the project section, the freight and passenger rail providers may need to make additional improvements to accommodate any of the corridor's non-HSR projects. These future improvements, if determined by freight or other passenger rail providers to be necessary, will be studied and approved in future environmental documents in accordance with federal and state law.

2.8.3 Maintenance Activities

The Authority would regularly perform maintenance along the track and railroad right-of-way as well as on the power systems, train control, signalizing, communications, and other vital systems required for the safe operation of the HSR system. Maintenance activities along the HSR system would consider land use restrictions because of existing and potential contaminated soils. The Authority expects maintenance methods to be similar to those of existing European and Asian HSR systems, adapted to the specifics of the California HSR System. Therefore, these brief descriptions of maintenance activities are based on best professional judgment about future practices in California:

- Track and right-of-way: The track at any point would be inspected several times a week using measurement and recording equipment aboard special measuring trains. These trains are of similar design to the regular trains but would operate at a lower speed. They would run between midnight and 5:00 a.m. and would usually pass over any given section of track once in the night.
- Most adjustments to the track and routine maintenance would be accomplished in a single night at any specific location with crews and material brought by work trains along the line. When rail resurfacing (i.e., rail grinding) is needed, perhaps several times a year, specialized equipment would pass over the track sections at 5 to 10 mph.
- Approximately every 4 to 5 years, ballasted track would require tamping. This more intensive maintenance of the track uses a train with a succession of specialized cars to raise, straighten, and tamp the track, and uses vibrating "arms" to move and position the ballast under the ties. The train would typically cover a 1-mile-long section of track in the course of one night's maintenance. Slab track, which is expected to comprise track at elevated sections, would not require this activity. No major track components are expected to require replacement through 2040.
- Other maintenance of the right-of-way, aerial structures, and bridge sections of the alignment would include drain cleaning, vegetation control, litter removal, and other inspection that would typically occur monthly to several times a year.
- Power: The OCS along the right-of-way would be inspected nightly, with repairs being made when needed, which would typically be accomplished during a single night's maintenance period. Other inspections would occur monthly. Many of the functions and statuses of substations and smaller facilities outside of the trackway would be remotely monitored.

However, staff would visit to repair or replace minor items, and would also schedule visits several times a month to check the general site. Once facilities are installed, no major component replacement for the OCS or the TPSSs is expected through 2040.

- Structures: Visual inspections of the structures along the right-of-way and testing of fire- and life-safety systems and equipment in or on structures would occur monthly, while inspections of all structures for structural integrity would occur at least annually. Steel structures would also require painting on a routine basis. For tunnels and buildings, repair and replacement of lighting and communication components would be performed on a routine basis. Once structures are built, no major component replacements or reconstruction of structures are expected through 2040.
- Signaling, Train Control, and Communications: Inspection and maintenance of signaling and train control components would be guided by FRA regulations and standards to be adopted by the Authority. Typically, physical in-field inspection and testing of the system would occur four times a year using hand-operated tools and equipment. Communication components would be routinely inspected and maintained, usually at night, although daytime work may occur if the work area is clear of the trackway. No major component replacement of these systems is expected through 2040.
- Stations: Each station would be inspected and cleaned daily. Inspections of the structures, including the platforms, would occur annually. Inspections of other major systems, such as escalators, the heating and ventilation system, ticket-vending machines, and closed-circuit television, would be according to manufacturer recommendations. Major station components are not expected to require replacement through 2040.
- Perimeter Fencing and Intrusion Protection: Fencing and intrusion protection systems would be remotely monitored and inspected periodically. Maintenance would be performed as needed, but the fencing or intrusion protection systems are not expected to require replacement through 2040.

2.9 Additional High-Speed Rail Development Considerations

2.9.1 High-Speed Rail, Land Use Patterns, and Development Around High-Speed Rail Stations

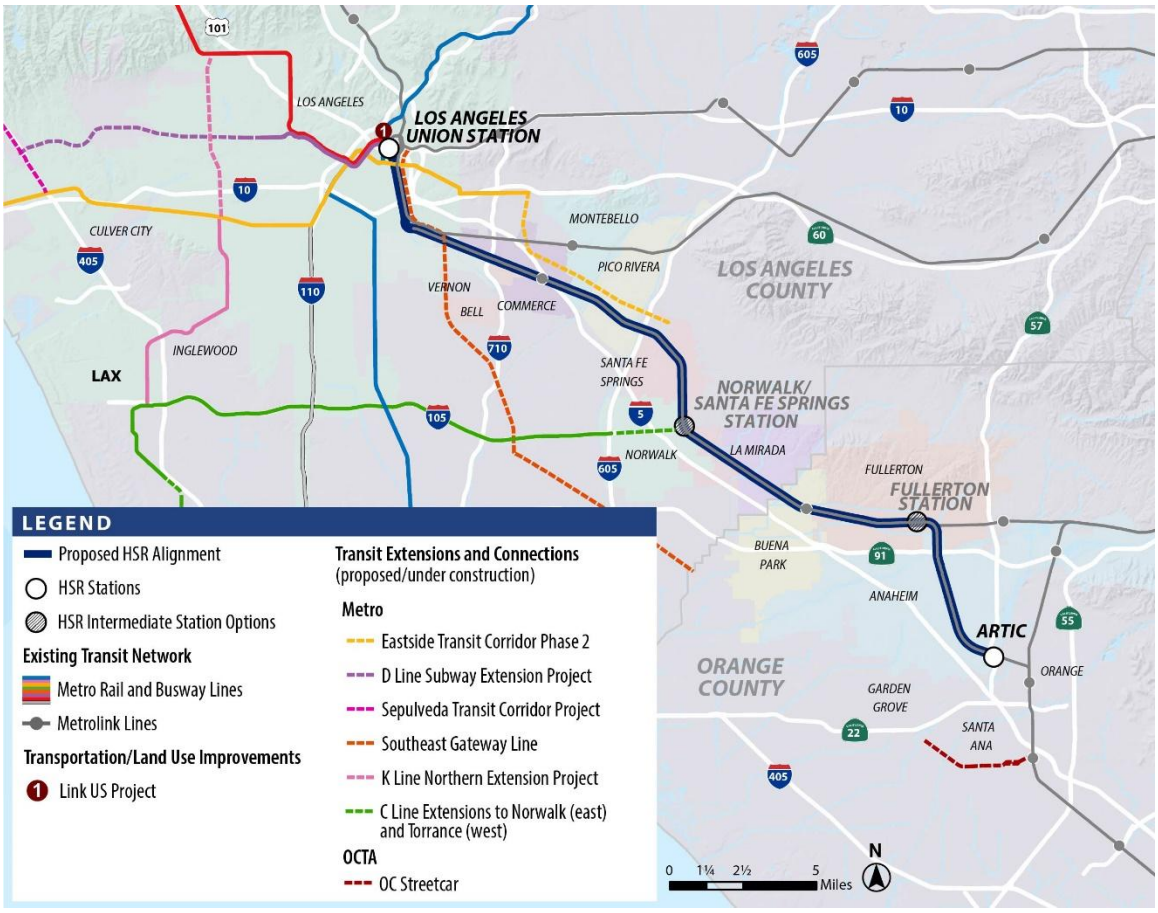
Proposition 1A, the Safe, Reliable, High-Speed Passenger Train Bond Act, adopted by California voters in November 2008, called for HSR stations to “be located in areas with good access to local mass transit or other modes of transportation and further required that the HSR system be planned and constructed in a manner that minimizes urban sprawl and impacts on the natural environment.” The Authority embraced these policies in Proposition 1A by adopting *HST Station Area Development: General Principles and Guidelines* on February 3, 2011 (Authority 2011b). The purpose of the guidance was to provide “international examples where cities and transit agencies have incorporated sound urban design principles as integral elements of large-scale transportation systems.”

To meet these guidelines, the Authority has established a station-area planning program that provides cities that would have an HSR station with funding to study ways to promote economic development, encourage station area development, and enhance multimodal connections between the station and the city. The guidelines go on to state that “the attention paid to the ‘edges’ and interface between improvements…will greatly determine the character and function of the station as a ‘place.’” Typical issues that lie at this “edge” or interface that are addressed in station planning include:

- Coordination of architectural design of station area infrastructure components with surrounding context
- High-quality pedestrian connections to and from the station and into the surrounding community
- Traffic calming and high-quality aesthetic design of station district streets

- Preservation of important view corridors
- Design and preservation of station district signage and wayfinding
- Design and provision of station district open space

Figure 2-82 illustrates how the HSR system would connect with existing and planned transit service areas throughout Southern California.



Source: Authority 2025

Figure 2-82 Southern California Phase 1 Transit Connectivity Map

2.9.2 Right-of-Way Acquisition for Construction, Operation, and Maintenance of High-Speed Rail

The Authority or a designated implementing entity would acquire right-of-way, including areas for permanent acquisition, to operate and maintain the HSR system, as well as areas temporarily needed to build the project.

Table 2-18 summarizes the right-of-way to be acquired as part of the project section, for each of the two build alternatives as well as for each of the two HSR station options. The Authority has specific processes for acquiring property and right-of-way to build, secure, operate, and maintain the HSR system and facilities in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act. Milestones in the process are environmental assessment and due diligence, design/survey, appraisal, acquisition, and relocation. Figure 2-83 illustrates this process.

The Authority would develop the right-of-way acquisition plan on confirmation of the final design. Once the Authority identifies a property owner being in the path of the publicly noticed designated preferred alternative, the Authority may move forward with the appraisal process, the first step in acquiring the required property.

The Authority also has a Relocation Assistance Program for residences, mobile homes, businesses, farms, and nonprofit organizations. These program resources are available on the HSR website at http://www.hsr.ca.gov/Programs/private_property.html.

Additional information on right-of-way acquisitions can be found in Section 3.12; Volume 2, Appendix 3.1-B, Los Angeles to Anaheim: Footprint Mapbook; and the Draft Relocation Impact Report.

Table 2-18 Temporary Construction Easements and Right-of-Way Acquisitions (acres)

Acquisition Type	Shared Passenger Track Alternative A	Shared Passenger Track Alternative B	HSR Station Option: Norwalk/Santa Fe Springs[1]	HSR Station Option: Fullerton[1]
Temporary Construction Easement				
Commercial, services, and offices	1.42	1.42	0	0
Facilities[2]	0.01	0.01	0	0
Industrial and mixed commercial	2.73	2.73	0	0
Multifamily residential	0.19	0.19	0	0
Single-family residential	3.01	3.01	0	0
Open space and recreation	0.04	0.04	0	0
Totals[3,4]	**7.40**	**7.40**	**0**	**0**
Permanent Acquisition				
Commercial, services, and offices	23.53	23.85	0	0.32
Facilities[2]	7.80	7.80	0	0
Industrial and mixed commercial	201.37	239.73	0	3.87
Multifamily residential	0.07	0.07	0	0
Single-family residential	3.78	3.78	0	0
Open space and recreation	3.62	3.62	0	0.01
Totals[3,4]	**240.17**	**278.85**	**0**	**4.19**

Source: SCAG 2023a; Los Angeles County Assessor 2022; ESRI 2024

[1] If the HSR station option is included, the acreage would be additive to the Shared Passenger Track Alternative A or B acreages. The Norwalk/Santa Fe Springs HSR Station Option would not require conversion of additional land beyond what is already required by the Shared Passenger Track Alternatives within the station area.

[2] Facilities land use designation includes public facilities, government offices, police and sheriff stations, fire stations, major medical health care facilities, religious facilities, public parking facilities, special use facilities, correctional facilities, special care facilities, other special use facilities, and other public facilities.

[3] For purposes of the land use compatibility analysis, the land designated as transportation, communications, and utilities as well as transportation – railroad has been filtered out of the permanent acquisitions. The analysis considers the permanent conversions of nontransportation-related land. Accordingly, the transportation-related land use designations of transportation, communications, and utilities and transportation – railroad are not relevant to the analysis.

[4] Values are rounded to the nearest hundredth; therefore, the grand totals are rounded as well.

HSR = high-speed rail

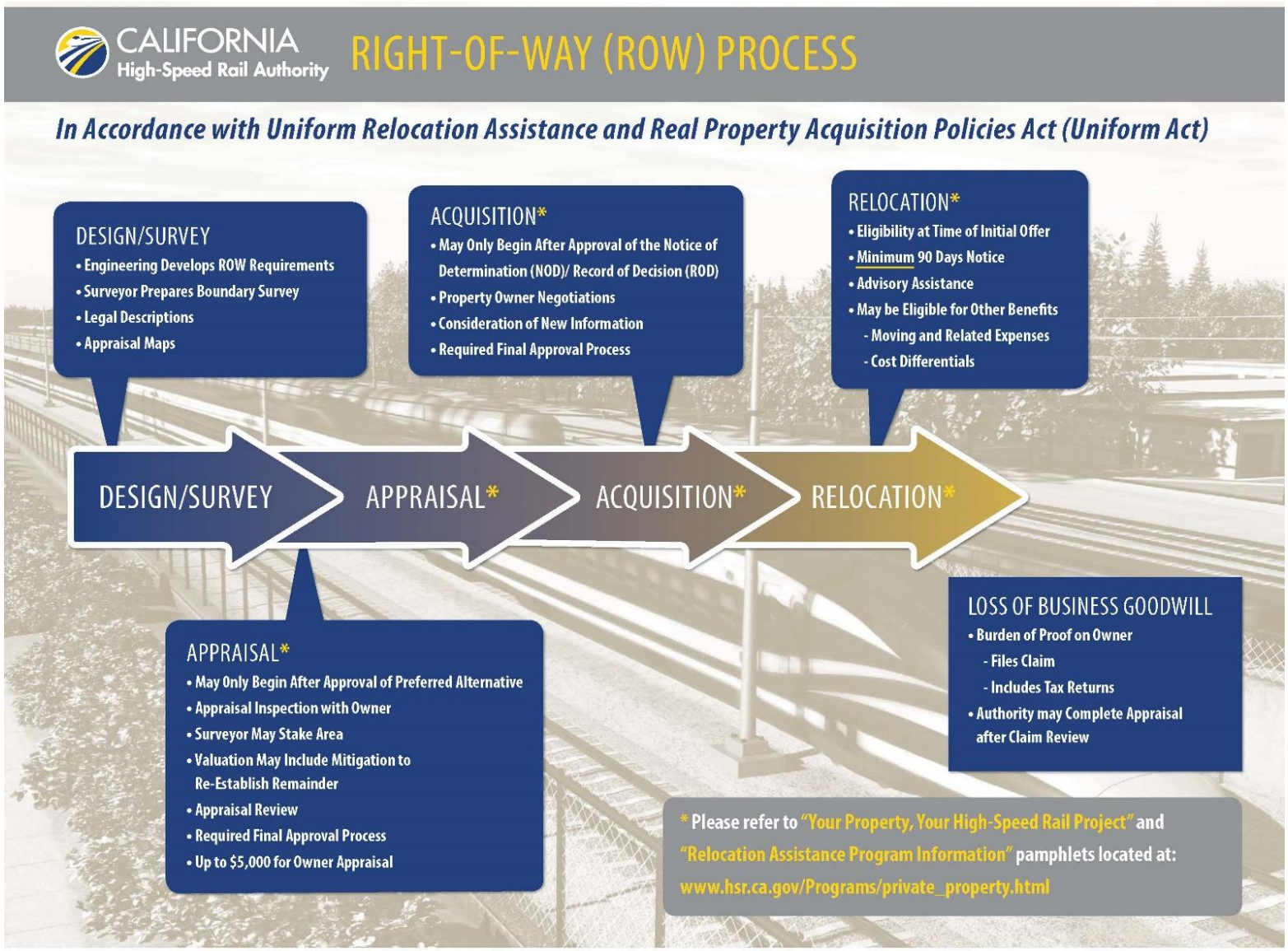


Figure 2-83 Right-of-Way Process

2.10 Construction Plan and Phased Implementation Strategy

This section describes the Authority's general approach to building the HSR system, including activities associated with preconstruction and construction of major system components, and describes the Authority's phased implementation strategy.

2.10.1 Project Delivery

For purposes of describing potential construction impacts, this Draft EIR/EIS assumes that the project section would be divided into eight construction phases, with certain phases occurring concurrently, as described later in this section. The following construction phases are the same for both Shared Passenger Track Alternative A and Shared Passenger Track Alternative B:

- Phase 1A: Relocate Commerce Metrolink Station; build fourth mainline track from Fullerton Metrolink/Amtrak Station to Fullerton Junction
- Phase 1B: Initial Hobart Yard modifications—26th Street relocation and mainline track realignment
- Phase 2: Build Commerce Flyover
- Phase 3: Train signaling and interlocking improvements
- Phase 4: Grade separations of roadways at Pioneer Boulevard, Norwalk Boulevard, Los Nietos Road, and Lakeland Road
- Phase 5: Bridge/infrastructure upgrades at waterways; BNSF second Hobart Yard west lead track; BNSF second Hobart Yard east lead track; modify BNSF Commerce Yard with replacement lead tracks
- Phase 6: Hobart Yard storage modifications: new storage yard tracks and train signaling and interlocking improvements, replacement container parking
- Phase 7: Build fourth mainline track between Rio Hondo Channel and Passons Boulevard, between Rosemead Boulevard and Telegraph Road, between Rosecrans Avenue and Commonwealth Avenue, and between Telegraph Road and North Fork Coyote Creek; relocate Buena Park Metrolink Station; build Fullerton braced trench section
- Phase 8: Track realignment on west bank of Los Angeles River; build HSR LMF; electrification of the tracks from US 101 to First Street; build modifications to Fullerton Metrolink/Amtrak Station (if HSR station option is selected, also include HSR station platform and facilities); build modifications to Norwalk/Santa Fe Springs Metrolink Station (if HSR station option selected, also include HSR station platform and facilities); build ARTIC station HSR platform and facilities; build layover tracks; grade separations and other grade crossing improvements in Anaheim; build and install systems facilities; build and install communication towers; test traction power, substations, and vehicles

Detailed information on the specific components of each construction package is included in Table 2-19. This Draft EIR/EIS provides this information for illustrative purposes; the exact number and timing of the construction packages has not yet been determined.

Table 2-19 Los Angeles to Anaheim Project Section Construction Schedule

Activity	Tasks	Schedule[1]
Right-of-way acquisition	Commencement of right-of-way acquisitions once State Legislature appropriates funds in annual budget, environmental due diligence	Prior to construction
Survey and preconstruction	Location of utilities, establishment of right-of-way and project control points and centerlines, establishment or relocation of survey monuments	Prior to construction

Activity	Tasks	Schedule[1]
Mobilization	Safety devices and special construction equipment mobilization	Prior to construction
Site preparation	Utilities relocation; clearing/grubbing right-of-way; establishment of detours and haul routes; preparation of construction equipment yards, stockpile materials, and precast concrete segment casting yard	January 2031–January 2034
Earth moving	Excavation and earth support structures	April 2031–October 2036
Construction of road crossings	Surface street modifications, grade separations	July 2031–July 2037
Construction of aerial structures	Aerial structure and bridge foundations, substructure, and superstructure	July 2032–July 2036
Construction of underground structures	Braced trench	October 2032–April 2036
Track laying	Includes backfilling operations and drainage facilities	July 2033–December 2037
Systems	Train control systems, overhead contact system, communication system, signaling equipment	October 2035–October 2037
Demobilization	Includes site cleanup	At completion of construction
HSR station(s) and station relocations	Demolition, site preparation, foundations, structural frame, electrical and mechanical systems, finishes	Commerce Metrolink Station Relocation: January 2031–January 2032
		Buena Park Metrolink Station Relocation: January 2034–March 2035
		Norwalk/Santa Fe Springs HSR/Metrolink Station: July 2033–July 2036[2]
		Fullerton HSR/Metrolink Station: January 2033–June 2035[2]
		ARTIC Platform and Facilities: November October 2034–September 2037

[1] Schedule as of September 2023
[2] Construction schedule for Norwalk/Santa Fe Springs and Fullerton Stations dependent on whether the HSR station option is included.
ARTIC = Anaheim Regional Transportation Intermodal Center; BNSF = BNSF Railway; HSR = high-speed rail

2.10.2 Statewide High-Speed Rail Phased Implementation Strategy

As described in Chapter 1, the Authority has developed a phased implementation strategy to deliver the HSR system, with a priority of completing Phase 1 of the HSR system between San Francisco and Anaheim while also continuing planning for Phase 2 sections. As reinforced in the Authority's 2020 Business Plan, as well as subsequent business plans and the 2023 Project Update Report, the Authority is focusing on delivering short-term improvements to local corridors, mid-term regional corridor benefits, and full-term integration of HSR into key high-capacity urban corridors to complete the integrated statewide passenger rail network. An integrated, phased approach would bring more benefits sooner.

This project section is a key link to an integrated network. LAUS and ARTIC link to major area transportation systems. Phase 2 of the HSR system in Southern California would connect from Los Angeles to San Bernardino, Riverside, and San Diego.

2.10.3 General Approach

The Authority would begin its construction plan after receiving the required environmental approvals and permits and securing funding. Given the size and complexity of the HSR project, the design and construction work could be divided into several procurement packages in geographically distinct locations, some of which would be built concurrently. These packages will be defined in the Preliminary Engineering for Procurement phase of the project.

In the project section, the Authority would issue construction requests for proposals, begin right-of-way acquisition, and procure construction management services to oversee physical construction of the project. During peak construction periods, work would occur concurrently in different subsections, with overlapping construction of various project elements. Working hours and workers present at any time would depend on the activities being performed. Construction fencing would be restricted to areas designated for construction staging and areas where public safety or environmentally sensitive resources are a concern. The total construction duration of either Shared Passenger Track Alternative A or B would be between 7.5 and 8 years depending on whether the HSR station option is selected.[32] Although the actual schedule would be set by the contractor for construction, an illustrative schedule for specific construction activities is provided in Table 2-19. Certain construction activities would occur concurrently.

Consistent with the *California High-Speed Rail Authority Sustainability Policy* (Authority 2020), the Authority will continue to implement sustainability practices that inform and affect the planning, siting, designing, construction, mitigation, operation, and maintenance of the HSR system. The Authority is committed to:

- Net-zero greenhouse gas and criteria pollutant emissions during construction
- Operating the system entirely on renewable energy
- Net-zero energy, Leadership in Energy and Environmental Design Platinum Facilities
- Planning for climate adaption and resilience
- Prioritizing life-cycle considerations
- Planning for climate change risks and vulnerabilities through sustainable infrastructure
- Build infrastructure that reinforces Sustainable Communities Strategies
- Build an HSR system that provides economic value to Californians

Applicable design standards, including compliance with laws, regulations, and industry standard practices, are included in Appendix 2-B, Applicable Design Standards, and are considered a part of the project.

2.10.4 Preconstruction Activities

2.10.4.1 Operational Right-of-Way

During final design, the Authority and its contractor would conduct a number of preconstruction activities to determine how best actual construction should be staged and managed. These activities include the following:

- Conducting geotechnical investigations to define precise geology, groundwater, and seismic conditions along the alignment. The results of this work would guide final design and construction methods for foundations, underground structures, braced trench, stations, grade crossings, aerial structures, systems, and substations.
- Identifying construction laydown and staging areas used for mobilizing personnel, stockpiling materials, and storing equipment for building HSR or related improvements. In some cases,

[32] Specific environmental resource sections in this Draft EIR/EIS use specific years as applicable for the purposes of environmental analysis.

these areas would also be used to assemble or prefabricate components of guideway or wayside facilities before transport to installation locations. Precasting yards would be identified for the casting, storage, and preparation of precast concrete segments; temporary spoil storage; workshops; and the temporary storage of delivered construction materials, would also be identified.

- Field offices and temporary jobsite trailers would also be at the staging areas. Construction laydown areas are part of the footprint that is evaluated for potential environmental impacts; however, actual use of the area would be at the discretion of the contractor. After completing construction, the staging, laydown and precasting areas would be restored to preconstruction condition.
- Initiating site preparation and demolition, such as clearing, grubbing, and grading, followed by the mobilization of equipment and materials. Demolition would require strict controls to ensure that adjacent buildings, infrastructure, or natural or community resources are not damaged or otherwise affected by the demolition efforts.
- Relocating utilities prior to construction. The contractor would work with the utility companies to relocate or protect in place high-risk utilities, such as overhead tension wires, pressurized transmission mains, oil lines, fiber optic conduits or cables, and communications lines or facilities, prior to construction.
- Implementing temporary, long-term, and permanent road closures to re-route or detour traffic away from construction activities. Handrails, fences, and walkways would be provided for the safety of pedestrians and bicyclists.
- Locating temporary batch plants to produce Portland Cement concrete or asphaltic concrete needed for roads, bridges, aerial structures, retaining walls, and other large structures. The facilities generally consist of silos containing fly ash, lime, and cement; heated tanks of liquid asphalt; sand and gravel material storage areas; mixing equipment; aboveground storage tanks; and designated areas for sand and gravel truck unloading, concrete truck loading, and concrete truck washout. The contractor would implement procedures for reducing air emissions, mitigating noise effects, and reducing the discharge of potential pollutants into storm drains or watercourses from the use of equipment, materials, and waste products.
- Conducting other studies and investigations, as needed, such as surveys of local business to identify usage, delivery, shipping patterns, and critical times of the day or year for business activities. This information will help develop construction requirements and worksite traffic control plans, and will identify potential alternative routes as well as necessary cultural resource investigations, and historic property surveys.

2.10.4.2 Nonoperational Right-of-Way

In certain negotiated right-of-way purchase situations, the Authority may enter into agreements to acquire properties or portions of properties that are not directly needed for the construction of the HSR project and are not intended to be part of the operational right-of-way. These are known as excess properties and are distinct from severed remnant parcels (which are evaluated as part of the footprint). Although eventually these properties would likely be sold as excess state property, these excess properties are not part of the project footprint and in the interim the Authority would need to conduct various management and maintenance activities on them (Authority 2018c).

The process for acquisition and disposal of excess property is detailed in Chapter 16 of the *California High-Speed Rail Authority Right of Way Manual* (Authority 2019a). Chapter 11 of the manual identifies the following management and maintenance activities that may occur on a given excess property. The activities required on a given parcel will be dependent on site conditions including the presence of buildings or other structures, existing land uses, and habitat conditions.

Structure Demolition

Various structures may be present on excess property including single and multifamily residences, mobile homes, mobile offices, warehouses and other light industrial structures, sheds, fences, concrete driveways, signs, other nondescript buildings, and related appurtenances and utilities (e.g., in-ground pools, septic systems, water wells, gas lines) as well as ornamental shrubs and trees.

If the Authority determines that existing uses of a particular structure are not going to continue, it may, following additional environmental review if/as necessary (for example, to confirm the structure is not considered historic), decide to demolish and remove the structure. Demolition of a structure may also be appropriate if the structure is in a state of disrepair or a potential safety and security concern exists from trespassers.

The properties may include utilities such as water wells, septic systems, gas, and electric lines that would require removal in accordance with local and state regulations. Local construction permits for demolition and removal would be secured from the local agency with jurisdiction (e.g., well demolition permit, septic removal).

Vegetation Management

Excess properties may have a variety of vegetation present including ornamental landscaping and natural habitats such as annual grassland. Vegetation management may occur as part of initial site-clearing efforts or as part of ongoing management.

Initial site clearing is likely to occur in conjunction with structure demolition. Ornamental landscaping may be removed to reduce ongoing maintenance needs. Vegetation removal or disturbance may be necessary for equipment access during structure demolition.

Ongoing vegetation management activities may include mowing, discing, or similar mechanical control; the clearing of firebreaks on larger properties; and, if noxious weeds are present, treatment with the use of approved herbicides. Mowing or other mechanical control may be used to maintain vegetation at a certain height or density based on site-specific concerns of security, visual appearance, or fire prevention. The mechanical control of weed species may also be appropriate depending on the relevant species and site conditions. All herbicide application would be conducted in a manner consistent with product labeling and applicable laws including application by a licensed pest control advisor if appropriate.

Pest Management

Pest management may include the mechanical control of insects, rodents, and other animals. Mechanical removal (trapping) of rodents and other animals may be appropriate in or around structures that exist on excess properties. Mechanical removal of animals would be conducted by a licensed pest control advisor and after obtaining appropriate local approvals. Rodenticide would not be used for the control of animals.

Chemical control of insects may occur in or around buildings on excess property or in agricultural areas to control pest species. Pesticide application would be conducted in a manner consistent with product labeling and applicable laws including application by a licensed pest control advisor if appropriate and after obtaining appropriate local approvals.

Site Security

Site security would primarily consist of the installation of fencing around the proposed LMF sites, laydown areas, and storage areas. The installation of fencing may be appropriate on properties where structures would remain or where there is a safety and security concern or particular risk of trespass. Fencing would consist of 6- to 12-foot-high chain-link fencing and may include barbed wire or similar features at the top. Fence posts may be either metal or wood and require an excavation up to 4 inches in diameter and 3 feet deep. Other security devices such as security lighting, an alarm system, or cameras may be implemented if specific conditions require it. If buildings or other structures are present on the site, windows and doors may be boarded up to prevent trespass. “No trespassing” or similar signs may be posted as appropriate.

Site security would also involve the periodic inspection of excess properties for signs of trespass and removal of accumulated trash or dumping.

Structure Maintenance

If buildings or other structures remain on site, they would be maintained in a clean and orderly condition so as not to detract from the general appearance of the neighborhood. If the property is rented or leased, maintenance activities would be undertaken as needed to ensure the health and safety of occupants. Maintenance and repair activities may include exterior and interior painting; yard maintenance; repair or replacement of plumbing, electrical facilities, roofs, windows, heaters, and built-in appliances; and other similar activities.

2.10.4.3 Staging and Laydown Areas

For each roadway crossing, water crossing, and aerial structure, the proposed staging and laydown areas would be in the general vicinity of the work site. These staging and laydown areas have been incorporated into the footprint for this project section. These areas are defined by quadrant at each work site. The proposed area for staging and laydown is defined in acres and access to these sites is addressed from nonresidential roadways. Table 2-20, Table 2-21, and Table 2-22 list these staging and laydown areas, the proposed areas needed for construction, and the available access roads to each site, which would be the same for both build alternatives. In many areas where linear construction is occurring (i.e., construction of mainline tracks), the existing railroad right-of-way could be used to stage construction. Construction of some project components would not need their own staging area because they would be able to use adjacent staging areas that have sufficient capacity, and therefore they do not have dedicated areas noted in the tables below.

Table 2-20 Contractor Staging and Laydown Areas at Roadway Crossings by City

Crossing Status	Street Crossing	Staging Area (quadrant)	Staging/Laydown Area (acres)	Street Access	Remarks
Los Angeles					
Existing OP	1st St	N/A	Linear construction	Santa Fe Ave	Can be staged within existing RR ROW
Existing OP	4th St	N/A	Linear construction	Santa Fe Ave & Metro St	Can be staged within existing RR ROW
Existing OP	6th St	N/A	Linear construction	Mesquit St	Can be staged within existing RR ROW
Existing OP	7th St	N/A	Linear construction	Mesquit St	Can be staged within existing RR ROW
Existing OP	I-10	N/A	Linear construction	Santa Fe Ave & 8th St	Can be staged within existing RR ROW
Existing OP	Olympic Blvd	N/A	Linear construction	Santa Fe Ave & Porter St	Can be staged within existing RR ROW
Existing OP	Washington Blvd	N/A	Linear construction	Soto St	Can be staged within existing RR ROW
Existing UP	Soto St	N/A	Linear construction	Soto St & 26th St	Can be staged within existing RR ROW
Vernon					
Existing UP	Downey Rd	SE	0.61	Washington Blvd & 26th St	None
Existing OP	I-710	N/A	Linear construction	26th St	Can be staged within existing RR ROW
Commerce					
Existing UP	Atlantic Blvd	SE	0.61	Bandini Blvd	None
Existing UP	Eastern Ave	SE	0.61	Eastern Ave & Commerce Way	None
Existing UP	I-5	N/A	Linear construction	Telegraph Rd & Garfield Ave	Can be staged within existing RR ROW
Existing UP	Telegraph Rd	N/A	Linear construction	26th St	Can be staged within existing RR ROW
Existing UP	Garfield Ave	N/A	Linear construction	26th St	Can be staged within existing RR ROW
Montebello					
Existing UP	Greenwood Ave	N/A	Linear construction	Greenwood Ave & Sycamore St	Can be staged within existing RR ROW
Pico Rivera					
Existing UP	Paramount Blvd	SW	0.5	Rosemead Blvd & Slauson Ave	None
Existing UP	Rosemead Blvd	NE	1.12	Rosemead Blvd & Slauson Ave	None

Crossing Status	Street Crossing	Staging Area (quadrant)	Staging/Laydown Area (acres)	Street Access	Remarks
Existing UP	Passons Blvd	SW	0.21	Slauson Ave & Rivera Rd	None
Santa Fe Springs					
Existing OP	Slauson Ave	SE	2	Slauson Ave & Rivera Rd	None
Existing OP	I-605	N/A	Linear construction	Pioneer Blvd & Rivera Rd	Can be staged within existing RR ROW
At grade	Pioneer Blvd	SW	0.69	Pioneer Blvd & Rivera Rd	None
At grade	Norwalk Blvd	SW	0.64	Los Nietos Rd & Norwalk Blvd	None
At grade	Los Nietos Rd	NE	0.25	Los Nietos Rd & Norwalk Blvd	None
Existing UP	Santa Fe Springs Rd	SW	0.56	Los Nietos Rd & Telegraph Rd	None
Existing UP	Telegraph Rd	SW	0.6	Santa Fe Springs Rd & Shoemaker Ave	None
Existing UP	Florence Ave	N/A	N/A	Bloomfield Ave & Shoemaker Ave	Can be staged within parcels identified for acquisition in modified Norwalk/Santa Fe Springs Metrolink Station area
At grade	Lakeland Rd	N/A	N/A	Bloomfield Ave & Shoemaker Ave	Can be staged within parcels identified for acquisition in modified Norwalk/Santa Fe Springs Metrolink Station area
Existing UP	Imperial Hwy	N/A	N/A	Imperial Hwy	Can be staged within parcels identified for acquisition in modified Norwalk/Santa Fe Springs Metrolink Station area
Existing UP	Carmenita Rd	NW	0.42	Rosecrans Ave	None
Existing OP	Rosecrans/ Marquardt	N/A	Linear construction	Rosecrans Ave & Marquardt	Can be staged within existing RR ROW
La Mirada					
Existing UP	Valley View Ave	NW	0.51	Rosecrans Ave	None
Existing OP	Alondra Blvd	NE	2.1	Trojan Way	None

Crossing Status	Street Crossing	Staging Area (quadrant)	Staging/Laydown Area (acres)	Street Access	Remarks
Buena Park					
Existing UP	Beach Blvd	SW	1.4	Stage Rd & Beach Blvd	None
Existing UP	Dale St	NW	2.84	Dale St	None
Fullerton					
Existing UP	Gilbert St	SW	0.5	Commonwealth Ave & Malvern Ave	None
Existing UP	Commonwealth Ave	NE	3.87	Brookhurst Rd & Commonwealth Ave	None
Existing UP	Euclid St	SE	0.5	Commonwealth Ave & Valencia Dr	None
Existing UP	Highland Ave	SW	0.6	Commonwealth Ave & Truslow Ave	None
Existing UP	Harbor Blvd	SW	1.69	Commonwealth Ave & Truslow Ave	None
Existing UP	Lemon St	N/A	Linear construction	Commonwealth Ave & Truslow Ave	Can be staged within existing RR ROW
Anaheim					
At grade	Orangethorpe Ave	NE	1.05	Lemon St & Raymond Ave	None
Existing OP	SR 91	N/A	Linear construction	Raymond Ave & Lemon St	Can be staged within existing RR ROW
At grade	La Palma Ave	NW	Linear construction	La Palma Ave & East St	Can be staged within existing RR ROW
At grade	Sycamore St	N/A	Linear construction	East St & Anaheim Blvd	Can be staged within existing RR ROW
Existing UP	Lincoln Ave	N/A	Linear construction	East St & Anaheim Blvd	Can be staged within existing RR ROW
At grade	Broadway	N/A	Linear construction	East St & Anaheim Blvd	Can be staged within existing RR ROW
At grade	Santa Ana St	N/A	Linear construction	East St & Anaheim Blvd	Can be staged within existing RR ROW
At grade	South St	N/A	Linear construction	East St & Anaheim Blvd	Can be staged within existing RR ROW
At grade	Vermont Ave	N/A	Linear construction	East St & Anaheim Blvd	Can be staged within existing RR ROW

Crossing Status	Street Crossing	Staging Area (quadrant)	Staging/Laydown Area (acres)	Street Access	Remarks
At grade	Ball Rd	N/A	Linear construction	East St & Anaheim Blvd	Can be staged within existing RR ROW
Existing UP	Lewis St	NE	3.9	Cerritos Ave & Ball Rd	None
At grade	Cerritos Ave	Same area as Lewis St	Same area as Lewis St	Same access as Lewis St	None
At grade	State College Blvd	NW, NE, SW	5.2	Katella Ave & Howell Ave	None
Existing UP	Katella Ave	SE	1.48	State College Blvd & Howell Ave	None
Existing OP	SR 57	N/A	N/A	Linear construction	Can be staged within existing RR ROW
Existing UP	Douglass Rd	NE	1.2	Katella Ave	None

Source: Authority 2025

For each new grade separation or modified existing grade separation, construction would be staggered so that no two adjacent crossings would be closed at the same time period unless the affected jurisdiction has approved such closures. Additionally, the Authority determines the final staging/laydown area and the size and location at the time of contract award. If the Authority determines the areas defined are not in the proper location or too small for their operation, the Authority would obtain land to fulfill its needs. The Authority must also comply with local and state regulations as well as the mitigation measures defined in the environmental document when acquiring property.

Authority = California High-Speed Rail Authority; HSR = high-speed rail; I = Interstate; N/A = not applicable; NE = northeast; NW = northwest; OP = overpass; ROW = right-of-way; RR = railroad; SE = southeast; SR = state route; SW = southwest; UP = underpass

Table 2-21 Contractor Staging and Laydown Areas for Waterway Crossings by City

Crossing Status	Waterway Crossing	Staging Area at Crossing (quadrant)	Staging/Laydown Area (acres)	Work Area Access	Remarks
Los Angeles					
Existing bridge	Los Angeles River	N/A	Linear construction	Washington Blvd	Can be staged within existing RR ROW
Vernon					
Existing concrete channel	Hobart Channel	N/A	N/A	Vacated 26th St	None

Crossing Status	Waterway Crossing	Staging Area at Crossing (quadrant)	Staging/Laydown Area (acres)	Work Area Access	Remarks
Pico Rivera					
Existing berm	Rio Hondo West Basin	N/A	0.71	Maynard Rd & Bluff Rd	0.71 acre includes areas for Rio Hondo and both basins
Existing bridge	Rio Hondo Channel	NW		Paramount Blvd & Industry Way	
Existing berm	Rio Hondo East Basin	N/A		Paramount Blvd & Industry Way	
Existing bridge	San Gabriel River	N/A	Linear construction	Slauson Ave & Rivera Rd	Can be staged within existing RR ROW
Santa Fe Springs					
Existing bridge	North Fork Coyote Creek	NW	0.7	Marquardt Ave & Bora Dr	None
La Mirada					
Existing bridge	La Mirada Creek	NE	0.5	Stage Rd	None
Buena Park					
Existing culvert	Coyote Creek	NE	0.2	Stage Rd	North end extension
		SW	0.35	Desman Rd	South end extension
Existing bridge	Brea Creek	NE	0.31	Malvern Rd	None
		SE	0.66	Dale St	None
Fullerton					
Existing culvert	Drainage channel	SW	0.35	E Walnut Ave	Extend south end
Existing culvert	Fullerton Creek	N/A	Linear construction	Orangethorpe Ave	Can be staged within existing RR ROW
Existing culvert	Carbon Creek	SW	0.2	La Palma Ave	Extend both ends

Crossing Status	Waterway Crossing	Staging Area at Crossing (quadrant)	Staging/Laydown Area (acres)	Work Area Access	Remarks
Anaheim					
Existing bridge[1]	Santa Ana River	N/A	Linear construction	Santa Ana River Trail	Can be staged within existing RR ROW

Source: Authority 2025
The Authority determines the final staging/laydown area and the size and location at the time of contract award. If the contractor determines the areas defined are not in the proper location or too small for their operation, the Authority would obtain land to fulfill its needs. The Authority must also comply with local and state regulations as well as the mitigation measures defined in the environmental document when acquiring property.
[1] At Santa Ana River, the Los Angeles to Anaheim Project Section would not cross the river but would modify the connection to the Santa Ana River Trail on the west bank.
Authority = California High-Speed Rail Authority; HSR = high-speed rail; N/A = not applicable; NE = northeast; NW = northwest; ROW = right-of-way; RR = railroad; SE = southeast; SW = southwest; UP = underpass

Table 2-22 Contractor Staging and Laydown Areas for Elevated Structures by City

Track Crossing Status	Length (feet)	Staging Area	Staging Laydown/Area (acres)	Work Area Access
Commerce Flyover	6,550	Can be staged within existing RR ROW, or parcels identified for acquisition for the Commerce Flyover structure	8.2	Atlantic Blvd, Eastern Ave, I-5
Elevated Structure through modified Norwalk/Santa Fe Springs Metrolink Station	10,145	Parcels identified for acquisition for modified Norwalk/Santa Fe Springs Metrolink Station	27 acres (within acquisition areas)	Imperial Blvd & Shoemaker Ave

Source: Authority 2025
The Authority determines the final staging/laydown area and the size and location at the time of contract award. If the contractor determines the areas defined are not in the proper location or too small for their operation, the Authority will obtain land to fulfill its needs. The Authority must also comply with local and state regulations as well as the mitigation measures defined in the environmental document when acquiring property.
Authority = California High-Speed Rail Authority; HSR = high-speed rail; I = Interstate; ROW = right-of-way; RR = railroad; SE = southeast; SW = southwest

2.10.5 Major Construction Activities

Major types of construction activities for the project include earthwork; bridge, aerial structure, and roadway crossings; railroad systems; and station construction, as briefly described in the following subsections.

2.10.5.1 Earthwork

Earthwork is the disturbance of soil or earth by any means, including grading, excavation, drilling, infilling, construction/reconstruction of track, embankment, and other activities. Earth support is an important factor in building deep excavations that would be encountered on several alignment sections. It is anticipated that the following excavation support systems may be used along the route. There are three general excavation support categories, which are described below.

- Open-Cut Slope: Open-cut slope is used in areas where sufficient room is available to open-cut the area and slope the sides back to meet the adjacent existing ground. The slopes are designed similar to any cut slope, taking into account the natural repose angle of adjacent ground material and global stability.
- Temporary: Temporary excavation support structures are designed and installed to support vertical or near-vertical faces of the excavation in areas where room to open-cut does not exist. This structure does not contribute to the final load carrying capacity of the trench structure and is either abandoned in place or dismantled as the excavation is being backfilled. Generally, it may consist of the following:
  - Soldier piles and lagging: materials used to retain soil in place, typically made of concrete, timber, or steel
  - Sheet pile walls: a wall used to retain soil in place, often thinner than other walls
  - Slurry walls: a wall used to retain soil in place while digging trenches or laying foundations by using a dense mixture of water and other materials
  - Secant piles: a retaining wall made of interlocking dense piles of material, inserted prior to excavation
  - Tangent piles: a version of secant piles with additional reinforcement measures
- Permanent: Permanent structures are designed and installed to support vertical or near-vertical faces of the excavation in areas where room to open-cut does not exist. This structure forms part of the permanent final structure. Generally, it consists of slurry walls, secant piles, or tangent pile walls.

Earthwork construction would be performed in a manner where soil removed through excavation (cut) would be reused, where feasible, in areas with embankments (fill). Excess cut or soils that are hazardous and cannot be reused as part of HSR construction (also referred to as spoils) would need to be hauled from the construction site to disposal sites, which are described more in Section 3.10, Hazardous Materials and Wastes. The number of haul trips is dependent on the amount of spoils and construction schedule, as well as the size of the truck.

Table 2-23 presents the cut/fill amounts and haul distances from the nearest major road or highway for the LMFs, roadway modifications, HSR and passenger rail stations, and Fullerton braced trench. The table includes roadway modifications where major earthwork would occur for excavation or grading/reprofiling; roadways with minor modifications, such as addition of a pier, are not included.

Table 2-23 Cut/Fill Amounts and Haul Roads for Light Maintenance Facilities, Roadways, High-Speed Rail and Passenger Rail Stations, and Fullerton Braced Trench

HSR Project Component	Earthwork		Haul Roads	Total Distance (Miles)
	Cut/Spoil (CY)	Import Fill (CY)		
Light Maintenance Facility				
26th Street light maintenance facility	18,000	0	East on Bandini Blvd to I-710	0.83
15th Street light maintenance facility	120,000	0	North on S Santa Fe Ave to I-10	0.68
Roadways				
Eastern Ave	980	550	South of Eastern Ave (0.31 mi), west on Bandini Blvd (1 mi) to I-710	1.3
Rio Hondo Bridge	950	460	South on River Maintenance Rd (0.47 mi); west on Slauson Ave (0.39 mi) to I-5	0.86
Rosemead Blvd	18,100	350	North or south on Rosemead Blvd	0
Passons Blvd	260	200	Assumed to be balanced	0
Slauson Blvd	75	40	Assumed to be balanced	0
San Gabriel River Bridge	1,050	500	North on River Maintenance Rd (0.75 mi); east on Washington Blvd (0.1 mi) to I-605	0.85
Pioneer Blvd	12,550	2,550	North on Pioneer Blvd (0.35 mi) to I-605	0.35
Norwalk Blvd	13,000	500	North on Norwalk Blvd (0.48 mi) to Slauson Ave	1.55
			West on Slauson Ave (0.72 mi) to Pioneer Blvd	
			North on Pioneer Blvd (0.35 mi) to I-605 on ramp	
Los Nietos Rd	13,200	650	West on Los Nietos Rd (0.15 mi) to Norwalk Blvd	1.74
			North on Norwalk Blvd (0.52 mi) to Slauson Ave	
			West on Slauson (0.72 mi) to Pioneer Blvd	
			North on Pioneer Blvd (0.35 mi) to I-605	
Santa Fe Springs Rd	180	150	Assumed to be balanced	0
Telegraph Rd	240	160	Assumed to be balanced	0

HSR Project Component	Earthwork		Haul Roads	Total Distance (Miles)
	Cut/Spoil (CY)	Import Fill (CY)		
Carmenita Rd	12,100	500	South on Carmenita Rd (0.35 mi) to Rosecrans Ave	1.32
			West on Rosecrans Ave (0.97 mi) to Bloomfield Ave	
			Northwest on Bloomfield Ave (0.30 mi) to I-5	
North Fork Coyote Creek	620	350	Assumed to be balanced	0
Valley View Ave	610	250	South on Valley View Ave (0.6 mi); west on Alondra Blvd (0.43 mi) to I-5	1.1
La Mirada Creek	290	160	Assumed to be balanced	0
Alondra Blvd, Stage Rd, Escalona Rd	13,800	29,900	West on Alondra Blvd (1.35 mi) to I-5	1.35
Artesia Ave	6,000	0	West on Alondra Blvd (1.35 mi) to I-5	1.35
Coyote Creek	160	135	Assumed to be balanced	0
Beach Blvd	650	550	Assumed to be balanced	0
Brea Creek	790	500	Assumed to be balanced	0
Dale St	5,750	400	South on Dale St (0.15 mi), west on Artesia Ave (0.7 mi) to SR 39	0.85
Gilbert St	600	570	Assumed to be balanced	0
Commonwealth Ave	33,860	1,500	West on Commonwealth Ave (2.47 mi) to Beach Blvd	3.33
			North on Beach Blvd (0.27 mi) to Artesia Blvd	
			West on Artesia Blvd (0.59 mi) to I-5	
Euclid St	690	220	South on Euclid St (0.98 mi) to SR 91	0.98
Highland Ave/Walnut Ave	9,500	2,000	South on Highland Ave (0.17 mi); east on W Valencia Dr (0.25 mi) to Harbor Blvd	1.25
			South on Harbor Blvd (0.83 mi) to SR 91	
Harbor Blvd	1,600	870	South of Harbor Blvd (1.00 mi) to SR 91	1
Lewis St	42,000	20,100	North on Lewis St (0.36 mi) to Ball Rd	1.65
			East on Ball Rd (1.29 mi) to SR 57	

HSR Project Component	Earthwork		Haul Roads	Total Distance (Miles)
	Cut/Spoil (CY)	Import Fill (CY)		
Cerritos Ave	141,400	26,400	East on Cerritos Ave (0.40 mi) to State College Blvd	1.68
			North of State College Blvd (0.52 mi) to Ball Rd	
			East on Ball Rd (0.76 mi) to SR 57	
State College Blvd	90,400	2,500	South on State College Blvd (0.17 mi) to Katella Ave East on Katella Ave (0.57 mi) to SR 57 OR North on State College Blvd (0.33 mi) to Cerritos West on Cerritos Ave (0.97 mi) to Anaheim St South on Anaheim St (0.17 mi) to I-5	0.74 OR 1.47
Katella Ave	29,800	8,850	Northeast on Katella Ave (0.34 mi) to SR 57	0.34
Douglass Rd	15,800	1,500	North of Douglass Rd (0.29 mi); west on Katella Ave (0.1 mi) to SR 57	0.39
HSR and Passenger Rail Stations				
Norwalk/Santa Fe Springs Metrolink Station Modifications[1]	65,900	8,400	West on Imperial Hwy to north I-5	1.71
Fullerton Metrolink/Amtrak Station Modifications[1]	3,700	1,500	South of Harbor Blvd (1.00 mi) to SR 91	1
ARTIC HSR Platform and Station Facilities	13,700	7,000	North of Douglass Rd (0.29 mi); west on Katella Ave (0.1 mi) to SR 57	0.39
Relocated Commerce Metrolink Station	7,600	100	South on Maple Ave (0.17 mi) and northwest on Telegraph Rd to I-5 (0.25 mi)	0.42
Relocated Buena Park Metrolink Station	18,500	150	East/southeast on Stage Rd (0.1 mi) to SR 39	0.1
Fullerton Trench				
Dale St to Gilbert St	252,000	46,500	Northwest to Dale St (0.18 mi.), south on Dale St to I-5 (1.3 mi)	1.48

Source: Authority 2025
[1] Amounts for Norwalk/Santa Fe Springs Metrolink Station and Fullerton Metrolink/Amtrak Station are the same with or without the HSR station option.
ARTIC = Anaheim Regional Transportation Intermodal Center; CY = cubic yard; HSR = high-speed rail; I = Interstate; mi = mile; SR = State Route

2.10.5.2 Bridge, Aerial Structure, and Road Crossing Construction

As is done for existing HSR systems around the world, it is anticipated that the elevated guideways would be designed and built using single box segmental girder construction. Where needed, other structural types and construction methods would be considered. This section provides an overview of the construction methods required for foundations, sub-structures, and superstructures of bridges, aerial structures, and roadway crossings. Two aerial guideway structures would be needed in this project section: one in Santa Fe Springs that would be 10,145 feet in length, and one in Commerce that would be 6,300 feet in length (Commerce Flyover). A typical aerial structure component is illustrated on Figure 2-9.

- Foundations: A typical aerial structure foundation pile cap is supported by an average of four large-diameter (5 to 9 feet) bored piles. Depth of piles depends on the geotechnical site conditions at each pile site. Pile construction can be achieved by using rotary drilling rigs, and either bentonite slurry or temporary casings may be used to stabilize pile shaft excavation. The estimated pile production rate is 4 days per pile installation. Additional pile installation methods available to the Authority include bored piles, rotary drilling cast-in-place piles, driven piles, and a combination of pile jetting and driving.
- Following completion of the piles, pile caps can be built using conventional methods supported by structural steel: either precast and prestressed piles or cast-in-drilled hole piles. For pile caps built near existing structures such as railways, bridges, and underground drainage culverts, temporary sheet piling (i.e., temporary walls) can be used to minimize disturbances to adjacent structures. It is anticipated that sheet piling installation and extraction would likely be achieved using hydraulic sheet piling machines.
- Substructure: A substructure refers to the portion of the bridge or aerial structure between the ground and the superstructure, which directly receives the load of a road or train. The substructure transfers the weight of the load from the superstructure to the ground. Typical aerial structures of up to 60 feet may be built using conventional jump form and scaffolding methods. A self-climbing formwork system may be used to build piers and portal beams over 60 feet high. The self-climbing formwork system is equipped with a winched lifting device, which is raised up along the column by hydraulic means with a structural frame mounted on top of the previous pour. In general, a 3-day cycle for each 12-foot pour height can be achieved. The final size and spacing of the piers depend on the type of superstructure and spans they are supporting.
- Superstructure: A superstructure refers to the portion of the bridge or aerial structure at the top, which directly receives the load of a road or train. Elevated track sections would use the precast, segmented construction method. In this construction method, large concrete bridge segments are mass-produced at an on-site, temporary casting yard. Precast segments are then elevated atop the already completed portions of the elevated viaduct or embankment and installed using a special crane positioned on the aerial structure. Although the precast segmental method is the favored technique for aerial structure construction, other methods may be used.
- Road crossings of existing railroads, roads, and the HSR would be built on the line of the existing road or offline at some locations. When built online, the existing road would be closed or temporarily diverted. When built offline, the existing road would be maintained in use until the new crossing is completed. Where new roadway undercrossings of existing railroads are required, a temporary shoofly track would be built to maintain railroad operations during undercrossing construction.
- Construction of foundations and substructure would be similar to that for the aerial structures, but reduced in size. The superstructure would likely be built using precast, prestressed, concrete girders and cast-in-place deck. Approaches to the bridges would be earthwork embankments, mechanically stabilized earth wall, or other retaining structures.

2.10.5.3 Trench Construction

Both Shared Passenger Track Alternatives would have one braced trench for electrified passenger tracks near the Fullerton Airport. This braced trench would be 40 feet below existing grade with an inside width dimension of 41 feet by 6 feet and is designed to avoid conflicts with the Fullerton Airport runway protection zone. The trench alignment would run northwest to southeast and cross under the BNSF-operated tracks from north to south. Section 2.6.3.1 describes the trench in more detail. The trench would consist of approximately 1,000 feet of trench structure, 1,800 feet of transitional trench structure, and 1,000 feet of braced trench. A transitional trench structure is an open trench with two walls between soil, in which the tracks descend from at grade to below grade. A braced trench uses forms of cross-beams known as struts, which span from one trench wall to the other to add bracing support against the soil on either side. A cross section of the trench is displayed on Figure 2-51 in Section 2.6.3.1.

The proposed trench would be built underneath the active railroad tracks and would use temporary track relocations and precast bridges prior to trench excavation. A sump would be located at the low point within the trench alignment to collect groundwater seepage and stormwater inflows into the completed trench. Construction staging areas would be at or near the western and eastern ends of the trench area and would total approximately 2.5 acres.

The soil and rock materials generated in excavation for this braced trench would need to be stockpiled for water-laden excavated material to dry without impeding construction progress because of limited construction area. Temporary stockpiles would eventually be trucked to licensed, permanent, off-site disposal areas that could include landfills or quarries that need backfilling or site restoration, or excavated material could be reused for potential local projects that could benefit from having fill. Table 2-23 provides the estimated excavated material volumes for the braced trench.

For Shared Passenger Track Alternative B, the 15th Street LMF yard lead tracks would cross under the Olympic Boulevard roadway overcrossing in three shallow trenches, as described in Section 2.6.4.4. The excavation required to lower the tracks to pass under the overcrossing would result in a need for temporary shoring to protect the piers of the Olympic Boulevard overpass, with a cast-in-place U-trench ultimately built for each trench. The length of the trench would be approximately 1,000 feet and consist of three single track U-trenches built in between the existing bridge piers. Excavation would be required to a depth of approximately 15 feet to account for soil improvements and the construction of formwork for the cast-in-place structures. Additionally, the LMF site would need to be excavated and regraded on the northern side to meet the elevation of the yard lead tracks; the trenches and LMF excavation would occur together within a single phase of work. Roadway traffic above on the Olympic Boulevard overpass is not expected to be affected, except for possible short-term lane closures as needed for construction. Table 2-23 presents the estimated excavated material volume for the 15th Street LMF, consisting of the trenches under the Olympic Boulevard overpass and excavation for the northern side of the LMF.

2.10.5.4 Railroad Systems Construction

The HSR system will include trackwork, traction power electrification, signaling, and communications. After completion of earthwork and structures, trackwork is the first rail system to be built, and it must be in place at least locally to start traction power electrification and railroad signalizing installation. Trackwork construction generally requires the welding of transportable lengths of steel running onto longer lengths (approximately 0.25 mile), which are placed in position on crossties or track slabs and field-welded into continuous lengths.

Both tie and ballast, and slab track construction would be used. Tie and ballast construction, which would be used for at-grade and minor structures, typically uses crossties and ballast that are distributed along the trackbed by truck or tractor. In sensitive areas, such as where the HSR is parallel to or near streams, rivers, or wetlands, and in areas of limited accessibility, this operation may be accomplished by using the built rail line for material delivery. For major civil structures, slab track construction would be used. Slab track construction is a nonballasted track form, employing precast track supports to which the track is directly fixed.

Traction electrification equipment to be installed includes TPSSs, traction power switching and paralleling stations, and the OCS. Traction power facility equipment and houses are typically fabricated and tested in a factory, then delivered by tractor-trailer to a prepared site adjacent to the rail alignment. It is assumed that substations are to be located every 30 miles along the alignment. The OCS is assembled in place over each track and includes poles, brackets, insulators, conductors, and other hardware. Signaling equipment to be installed includes the following:

- Wayside cabinets and bungalows: enclosures housing electronics and equipment for communications and systems required to operate trains
- Communications towers: towers providing radio communications required for train operations, communications, and safety
- Wayside signals (at track interlockings): visual signals that display instructions to train drivers regarding their authority to proceed
- Switch machines: small enclosures along the track that host electronic and mechanical equipment required to operate the switches where multiple tracks converge
- Insulated joints: material between rails that ensures electrical separation for signaling and safety purposes
- Impedance bonds: elements used to conduct and maintain electrical connections around insulated joints
- Connecting cables: cables that connect signaling and electrical equipment

The equipment would support automatic train protection; ATC or PTC to control train separation, routing at interlocking, and speed. Not all railroad system construction elements described in this section would occur throughout the geographic entirety of the project section. These elements would occur only where applicable within the project section.

2.10.5.5 Station Construction

As construction of HSR station facilities in the project section would occur at existing passenger rail station areas, existing train operations, including station capacity and passenger levels of service, would be maintained during construction. HSR stations require substantial coordination and planning to accommodate safe and convenient access to existing businesses and residences and to accommodate traffic control during construction periods. The typical construction sequence would be:

- **Demolition and Site Preparation:** The Authority would be required to build detour roadways, new station entrances, construction fences and barriers, and other elements required as a result of taking existing facilities on the worksite out of service. The Authority would be required to perform street improvement work, site clearing and earthwork, drainage work, and utility relocations. Additionally, substations and maintenance facilities are assumed to be newly built structures. For platform improvements or additional platform construction, the Authority may be required to realign existing track.
- **Structural Shell and Mechanical/Electrical Rough-Ins:** For these activities, the Authority would build foundations and erect the structural frame for the new station, enclose the new building, or build new platforms and connect the structure to site utilities. Additionally, the Authority would rough-in electrical and mechanical systems and install specialty items such as elevators, escalators, and ticketing equipment.
- **Finishes:** The Authority would install electrical and mechanical equipment, communications and security equipment, finishes, and signage.

2.11 Permits and Approvals

The Authority has entered into agreements with environmental resource agencies to facilitate the environmental permitting required during final design and construction. These agreements are

intended to identify the Authority's responsibilities in meeting the permitting requirements of the federal, state, and regional environmental resource agencies.

A memorandum of understanding was established in 2010 among the Authority, FRA, U.S. Army Corps of Engineers, and U.S. Environmental Protection Agency (Authority et al. 2010) regarding integration of NEPA, Clean Water Act Section 404, and Rivers and Harbors Act Section 14 (Section 408) processes. In addition, the Authority entered into a Section 106 Programmatic Agreement with the California State Historic Preservation Officer, Advisory Council on Historic Preservation, and FRA in 2011 (amended in 2021) to establish the process for considering the effects on historic properties during project-level environmental reviews (Authority et al. 2011). The Surface Transportation Board was added as a party to the Section 106 Programmatic Agreement in 2021 (Authority et al. 2021). A memorandum of understanding was established between the Authority and the State Water Resources Control Board regarding items that would require a Complete Application for Clean Water Act Section 401 Certification, Waste Discharge Requirements, or both; the delineation of nonfederal wetlands and other surface waters of the state that are not waters of the U.S.; and amendments (adopted in 2020) to the existing State Water Resources Control Board requirements regarding applications and delineation methods. Coordination with the U.S. Coast Guard was conducted, and the U.S. Coast Guard indicated that this project is not within its jurisdiction (Sulouff 2011).

Table 2-24 presents the major environmental reviews, permits, and approvals required for the project (as of November 2024), as well as the regional agencies that the Authority would need to coordinate with. The table identifies each agency's status as a NEPA cooperating agency or CEQA responsible agency, as applicable. As a state agency, the Authority is exempt from local permit requirements; however, to coordinate construction activities with local permit requirements, the Authority plans to pursue local permits as part of construction processes consistent with local ordinances. The agencies identified in the table are anticipated to rely on this EIR/EIS to support their permitting and approval processes. Other approvals may require new specific documentation.

Table 2-24 Anticipated Environmental Reviews, Permits/Approvals, and Coordination by Agency

Agency	Permit/Approvals
Federal	
U.S. Army Corps of Engineers (NEPA cooperating agency)	▪ Clean Water Act Section 404 Nationwide Permit Verifications – NWP 12, Utility Line Activities, NWP 14, Linear Transportation Projects, and NWP 39, Commercial and Institutional Developments[33] ▪ Rivers and Harbors Act of 1899 Section 14 (Section 408): Permission to make alterations to, or temporarily or permanently occupy or use, any U.S. Army Corps of Engineers federally authorized Civil Works project

[33] Nationwide Permit 12 has been included to acknowledge that several new structures are associated with utility realignments and may be considered under that Nationwide Permit, although it is more likely that all of the structures that would result in fill are associated with the linear transportation project. Furthermore, multiple Nationwide Permits could be used for any given structure for this project because the affected acreage thresholds would not be exceeded. Nationwide Permit General Condition 28 states, "Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is permitted when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit." For example, if a road crossing over tidal waters is constructed under Nationwide Permit 14, with associated bank stabilization authorized by Nationwide Permit 13, the maximum acreage loss of waters of the U.S. for the total project cannot exceed one-third of an acre. In addition, if one or more of the Nationwide Permits used to authorize the single and complete project has specified acreage limits, the acreage loss of waters of the United States authorized by those Nationwide Permits cannot exceed their respective specified acreage limits.

Agency	Permit/Approvals
U.S. Advisory Council on Historic Preservation and the California State Historic Preservation Office	▪ Section 106 Consultation (National Historic Preservation Act of 1966) and Memorandum of Agreement
U.S. Environmental Protection Agency	▪ Review of Environmental Impact Statement under Clean Air Act Section 309
U.S. Fish and Wildlife Service	▪ Federal Endangered Species Act – Section 7 (No Effect Determination; No Consultation Required)
Surface Transportation Board (NEPA cooperating agency)	▪ Authorization to build and operate new rail line pursuant to 49 U.S.C. 10901 or 49 U.S.C. 10502, as applicable.
U.S. Department of Transportation/Federal Railroad Administration	▪ General Conformity Determination for Air Quality ▪ Section 4(f) of the U.S. Department of Transportation Act of 1966
State	
California Department of Fish and Wildlife (CEQA responsible agency)	▪ California Fish and Game Code Sections 3511, 4700, 5050, and 5515 – Avoidance, minimization, and compensatory mitigation efforts for fully protected species ▪ California Fish and Game Code Sections 3503, 3503.5, 3511, and 3513 – Avoidance, minimization, and compensatory mitigation efforts for bird nesting protections ▪ California Fish and Game Code Sections 1600–1616 – Notification of Lake or Streambed Alteration ▪ California Fish and Game Code Section 2081 – Incidental Take Permit may be required depending on the results of biological field surveys
California Department of Transportation (CEQA responsible agency)	▪ Caltrans Encroachment Permits ▪ Caltrans Statewide Stormwater Permit (Order No. 2012-0011-DWQ, as amended by 2014-0006-EXEC, 2014-0077-DWQ, and 2015-0036-EXEC; NPDES No. CAS000003)
California Public Utilities Commission (CEQA responsible agency)	▪ Approval for construction and operation of rail crossing of public road and for construction of new or improved electrical lines and substations
California State Lands Commission	▪ Lease for crossing state sovereign lands
State Water Resources Control Board, Los Angeles and Santa Ana Regional Water Quality Control Boards (CEQA responsible agencies)	▪ Section 401 Water Quality Certification under the Clean Water Act of 1972 ▪ Construction General Permit (Order No. 2009-0009-DWQ, as amended by 2014-0006-EXEC, 2014-0077-DWQ, and 2015-0036-EXEC; NPDES No. CAS000002) ▪ Industrial General Permit (Order No. 2014-0057-DWQ) ▪ Phase II MS4 Permit (Order No. 2013-0001-DWQ, NPDES No. CAS000004) ▪ Discharges with Low Threat to Water Quality (Order No. R8-2015-0004) ▪ Spill Prevention, Control and Countermeasure (SPCC) Plan (part of Section 402 process)
California Department of Conservation, Division of Mine Reclamation	▪ Surface Mining and Reclamation Act compliance

Agency	Permit/Approvals
California Department of Toxic Substances Control (CEQA responsible agency)	Approval for removal, transport, and disposal of contaminated soil and groundwater, in accordance with applicable hazardous waste laws
Regional – Los Angeles to Anaheim	
South Coast Air Quality Management District (CEQA responsible agency)	▪ Rule 201 General Permit Requirements, Rule 403 Fugitive Dust, Rule 1113 Architectural Coatings, and Rule 902 Asbestos
Los Angeles County Metropolitan Transportation Authority (CEQA responsible agency)	▪ Approval for construction and use within its right-of-way
Orange County Transportation Authority (CEQA responsible agency)	▪ Approval for construction and use within its right-of-way and in coordination with their passenger operations in the corridor
Riverside County Transportation Commission (CEQA responsible agency)	▪ Approval for construction and use in coordination with its passenger operations in the corridor
Southern California Regional Rail Authority (Metrolink) (CEQA responsible agency)	▪ Approval for construction and use in coordination with its passenger operations in the corridor

CFR = Code of Federal Regulations; Caltrans = California Department of Transportation; CEQA = California Environmental Quality Act; MS4 = municipal separate storm sewer; NEPA = National Environmental Policy Act; NPDES = National Pollutant Discharge Elimination System; NWP = Nationwide Permit; U.S.C. = U.S. Code