

3.2 Transportation

3.2.1 Introduction

This section describes the regulatory setting, affected environment, and potential impacts on transportation in the San Francisco to San Jose Project Section (Project Section, or project) resource study area (RSA). The Project Section analyzed in this Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) would provide HSR service between San Francisco and San Jose as part of the statewide HSR system. This Draft EIR/EIS analyzes two project alternatives, which are similar for much of the Project Section. Alternative A would build a light maintenance facility (LMF) in Brisbane on the east side of the railroad tracks and without the addition of new passing tracks. Alternative B would build an LMF on the west side of the railroad tracks in Brisbane, approximately 6 miles of new passing tracks that would extend through San Mateo, Belmont, San Carlos, and into the northern portion of Redwood City, and a viaduct that would extend through portions of Santa Clara and San Jose.

The discussion of California Environmental Quality Act (CEQA) impacts reflects California's shift in transportation impact analysis away from a focus on automobile delay, most commonly analyzed in terms of level of service (LOS), to a focus on vehicle miles traveled (VMT). This shift is intended to promote reduction in greenhouse gas (GHG) emissions from transportation, the development of multimodal transportation networks, and a diversity of land uses.

The transportation resources likely to be affected by the project are the transportation networks, including pedestrian, bicycle, transit (e.g., San Francisco Municipal Railway [MUNI], San Mateo County Transit District [SamTrans], Santa Clara Valley Transportation Authority [VTA], Bay Area Rapid Transit [BART], and Caltrain), and vehicular facilities near the high-speed rail (HSR) stations. Development of the Brisbane LMF under both project alternatives would affect nearby transportation facilities. Increased gate-down time at existing at-grade rail crossings resulting from increased train service along the corridor would affect roadways and intersections that cross and are adjacent to the crossing locations. Caltrain station modifications resulting from track modifications, planned grade-separation projects, platform upgrades to eliminate hold-out rule restrictions, and development of the Brisbane LMF would affect station access and parking. The project alternatives would also modify the existing and planned roadway networks to accommodate the project.

The *San Francisco to San Jose Project Section Transportation Technical Report* (San Francisco to San Jose Transportation Technical Report) (California High-Speed Rail Authority [Authority] 2019a) provides additional support for this transportation analysis for the area between the 4th and King Street Station in San Francisco and Scott Boulevard in Santa Clara. From Scott Boulevard to West Alma Avenue in San Jose, the *San Jose to Merced Project Section Transportation Technical Report* (San Jose to Merced Transportation Technical Report)

Primary Transportation Impacts

- The project would decrease overall vehicle miles traveled throughout San Francisco, San Mateo, and Santa Clara Counties and improve transit linkages in the region and between Southern and Northern California.
 - Construction and operation of the project would result in increases in vehicular congestion, delays at intersections, and decreases in bus transit performance because of increased gate-down events at at-grade crossings from increased train service.
 - Operation of the project would result in increases in vehicle congestion and delay at intersections from increased traffic generated by project trips at the 4th and King Street Station, the Millbrae Station, the San Jose Diridon Station, and the light maintenance facility.
 - Construction of the passing track for Alternative B would result in temporary increases in congestion and delays at intersections during modifications to nine underpasses. Construction of the passing track for Alternative B would also result in the relocation of the San Carlos Station and substantial temporary delays to Caltrain service during peak hours as well as delays in freight service.
-

(Authority 2019b) provides support for the transportation analysis. The following appendices in Volume 2 of this Draft EIR/EIS provide additional details on transportation:

- Appendix 2-A, Roadway Crossings, Modifications, and Closures, describes road crossings and road relocations and closures resulting from construction of the project alternatives.
- Appendix 2-B, Railroad Crossings, describes railroad crossings of the project alternatives.
- Appendix 2-D, Applicable Design Standards, describes the relevant design standards for this project.
- Appendix 2-E, Project Impact Avoidance and Minimization Features, provides the list of all impact avoidance and minimization features (IAMF) incorporated into this project.
- Appendix 2-I, Regional and Local Plans and Policies, provides a list by resource of all applicable regional and local plans and policies.
- Appendix 2-J, Policy Consistency Analysis, provides a summary by resource of project inconsistencies and reconciliations with local plans and policies.
- Appendix 3.2-A, Transportation Data on Intersections, provides data used in the analysis of potential effects on roadways and intersections. A summary of intersection LOS and National Environmental Policy Act (NEPA) effects is also provided.
- Appendix 3.2-B, Vehicle Miles Traveled Forecasting, summarizes the methodology used to forecast the reduction in VMT due to project operations.

Transportation, including parking as well as the accommodation of regional growth and cumulative impacts, are important factors for the provision of safe, efficient, and adequate mobility within the RSA. The following Draft EIR/EIS resource sections provide additional information related to transportation:

- Section 3.3, Air Quality and Greenhouse Gases, evaluates transportation-related air quality and GHG impacts of the project.
- Section 3.4, Noise and Vibration, evaluates transportation-related noise and vibration impacts.
- Section 3.11, Safety and Security, evaluates impacts on safety and security, including hazards, emergency access and emergency vehicle response times, aviation safety, and facility security.
- Section 3.12, Socioeconomics and Communities, evaluates impacts on community character and cohesion, including those associated with changes in roadway networks that may affect communities.
- Section 3.13, Station Planning, Land Use, and Development, evaluates impacts related to changes in land use, including changes in parking.
- Section 3.17, Regional Growth, evaluates impacts on regional growth, construction and operation employment, and the potential for the project to induce growth related to population and employment.
- Section 3.18, Cumulative Impacts, evaluates the cumulative impacts of the project in combination with other plans, programs, and projects.
- Chapter 5, Environmental Justice, considers transportation effects in the context of low-income and minority communities.

This section and Volume 2, Appendix 3.2-A, includes discussion and analysis of automobile delay and congestion based on LOS and its related volume-to-capacity (V/C) ratio metric. California has adopted a policy through Senate Bill (SB) 743 and associated regulations (CEQA Guidelines § 15064.3) that delay and congestion increases, by themselves, are not significant impacts on the environment under CEQA. However, delay and congestion increases caused by a project can

lead to significant secondary impacts on the environment, such as air quality and noise. Accordingly, this document retains discussion and analysis of LOS and V/C changes the project might cause as an analytical input for evaluating the potential for significant environmental impacts in these other areas. In contrast, this analysis considers traffic congestion, including changes in LOS, to be an environmental effect under NEPA as described in Section 3.2.4.4, Method for Evaluating Impacts under NEPA.

3.2.2 Laws, Regulations, and Orders

This section presents federal and state laws, regulations, orders, and plans applicable to transportation. The Authority would implement the HSR system, including the project, in compliance with all federal and state regulations. Volume 2, Appendix 2-1 provides regional and local plans and policies relevant to transportation considered in the preparation of this analysis.

3.2.2.1 Federal

Federal law requires the State of California to prepare the Federal Statewide Transportation Improvement document covering a period of at least 4 years. This program compiles all projects that have been programmed throughout the state using federal funds.

In accordance with the Federal Passenger Rail Investment and Improvement Act of 2008, the State of California adopted the *2018 California State Rail Plan* in September 2018 (California Department of Transportation [Caltrans] 2018a). Federal law requires the State of California to update its California State Rail Plan every 5 years as a condition of eligibility for federal funding for HSR and intercity passenger rail programs.

Federal law does not directly stipulate criteria for the analysis of federal aid-eligible roadways and highways. However, certain conditions must be met in order to maintain the funding eligibility of facilities. Federal agencies such as the Federal Highway Administration, Federal Transit Administration, and the Federal Railroad Administration (FRA) are also delegated the authority to interpret and enforce most federal environmental protection laws.

Railroad Revitalization and Regulatory Reform Act of 1976 (49 U.S.C.)

The Railroad Revitalization and Regulatory Reform Act provides the means to rehabilitate and maintain the physical facilities, improve the operations and structure, and restore the financial stability of the nation's railway systems and to promote its revitalization.

Federal Transit Act (49 U.S.C.)

The Federal Transit Act fosters the development and revitalization of public transportation systems that maximize safe, secure, and efficient personal mobility; minimize environmental impacts; and minimize transportation-related fuel consumption and reliance on foreign oil.

Highways, Statewide Planning (23 U.S.C. § 135)

Title 23 of the United States Code for Highways and Statewide Planning provides the general requirements for statewide planning to encourage and promote the safe and efficient management, operation, and development of the surface transportation system.

Passenger Equipment Safety Standards (49 C.F.R. Part 238)

In 2018, the FRA updated the train safety requirements for passenger trains. The 2018 final rule added a new tier of passenger equipment safety standards (Tier III) to facilitate the safe implementation of nationwide, interoperable high-speed passenger rail service at speeds up to 220 miles per hour (mph). While Tier III trainsets must operate in an exclusive right-of-way without grade crossings at speeds above 125 mph, these trainsets can share the right-of-way with freight trains and other tiers of passenger equipment at speeds not exceeding 125 mph. This final rule also added standards for alternative compliance with crashworthiness and occupant protection performance requirements for Tier I passenger trainsets. Together, the new Tier III category and the added standards for alternative compliance with requirements for Tier I

passenger trainsets removed regulatory barriers and enabled use of new technological designs, allowing a more open U.S. rail market.

3.2.2.2 State

Designated state route and interstate highway facilities are under the jurisdiction of Caltrans and the California Transportation Commission except where management of the facility has been delegated to the county transportation authority. Caltrans and the commission are responsible for producing a long-range transportation plan for statewide facilities. Caltrans and the commission are also responsible under California law for assembling a short-term improvement plan called the Statewide Transportation Improvement Program. California law requires that the State of California update this 5-year plan every 2 years. The Statewide Transportation Improvement Program (which often is prepared prior to the Federal Statewide Transportation Improvement Program document) compiles all projects programmed through the state using state or federal funds.

California Transportation Plan 2040

The *California Transportation Plan 2040* was published in 2016 and provides a long-range policy framework to meet the state's future mobility needs and reduce GHG emissions. The California Transportation Plan defines goals, performance-based policies, and strategies to achieve the State's vision for California's future statewide, integrated, multimodal transportation system. The plan envisions a sustainable system that improves mobility and enhances the quality of life.

State Rail Plan (Gov. Code, § 14036)

This law requires Caltrans to produce a State Rail Plan that includes a passenger and freight rail component. The *2018 California State Rail Plan* (Caltrans 2018a) was developed to meet this requirement. It establishes a statewide vision and objectives, sets priorities, and develops policies and implementation strategies to enhance passenger and freight rail service in the public interest. It also details a long-range investment program for California's passenger and freight infrastructure.

Sustainable Communities and Climate Protection Act of 2008 (SB 375, Chapter 728, Statutes of 2008) and Global Warming Solutions Act (AB 32)

Adopted in September 2008, SB 375 provides a new planning process to coordinate community development and land use planning with regional transportation plans (RTP) to reduce sprawling land use patterns and dependence on private vehicles and thereby reduce VMT and GHG emissions associated with VMT. SB 375 is one major tool to meet the goals in Assembly Bill (AB) 32, Global Warming Solutions Act. Under SB 375, the California Air Resources Board sets GHG emissions reductions targets for 2020 and 2035 for metropolitan planning organizations in the state. Each metropolitan planning organization must then prepare a sustainable communities strategy that meets the GHG emissions reduction targets set by the board. Once adopted, the sustainable communities strategy is incorporated into the region's RTP.

California Streets and Highways Code (§ 1 et seq.)

California Streets and Highways Code Section 1 et seq. includes the provisions and standards for administration of the statewide streets and highway system. Designated state route and interstate highway facilities are under the jurisdiction of Caltrans, except where management of the facility has been delegated to local jurisdictions. Operations analysis of Caltrans facilities is conducted according to the methods set forth in the *Guide for the Preparation of Traffic Impact Studies* (Caltrans 2002).

Caltrans also uses the methods outlined in the *Highway Capacity Manual* (Transportation Research Board 2010) and has a target LOS threshold of LOS C for intersections and highway facilities. The Caltrans guide provides guidelines for determining project fair-share contributions (Caltrans 2002).

Senate Bill 743 and CEQA Guidelines Section 15064.3

SB 743, codified in California Public Resources Code Section 21099, created a shift in transportation impact analysis under CEQA from a focus on automobile delay as measured by LOS and similar metrics toward a focus on reducing VMT and GHG emissions. The Legislature required the California Office of Planning and Research (OPR) to propose new criteria for determining the significance of transportation under CEQA. The statute states that upon certification of the new criteria, automobile delay, as described solely by LOS or similar measures of vehicular capacity or traffic congestion, will not be considered a significant impact on the environment under CEQA, except in any locations specifically identified in the new criteria. Lead agencies are still required to analyze a project's potentially significant transportation impacts related to air quality, noise, safety, and other resource areas that may be associated with transportation. The statute states that the adequacy of parking for a project will not support a finding of significance.

The new criteria, provided in CEQA Guidelines Section 15064.3, were certified and adopted in December 2018. Section 15064.3 provides that VMT is the most appropriate metric to assess transportation impacts. With limited exceptions (applicable to roadway capacity projects, which this project is not), a project's effect on automobile delay does not constitute a significant environmental impact. Other relevant considerations may include the project's effects on transit and nonmotorized travel. Section 15064.3 further provides that transportation projects that reduce VMT should be presumed to cause a less-than-significant impact. A lead agency can elect to be governed by Section 15064.3 immediately, as the Authority has done, and is required to shift to a VMT metric by July 1, 2020.

OPR has provided a technical advisory on evaluating transportation impacts in CEQA (OPR 2018). The California Natural Resources Agency provided further information related to the change in the CEQA Guidelines in its 2018 Statement of Reasons supporting the guideline change (California Natural Resources Agency 2018). OPR also provided YouTube videos related to LOS and VMT (OPR 2019a, 2019b).

3.2.2.3 Regional and Local

City and county plans, including RTPs, general plans, downtown master plans, community plans, and specific plans address transportation. Goals, policies, and regulations include design guidelines, transportation system efficiencies, and strategies to improve circulation. Volume 2, Appendix 2-1, lists all regional and local policies that are applicable to the project.

Regional Transportation Plans (Gov. Code, § 65080)

The State of California requires each transportation planning agency to prepare and adopt an RTP directed at achieving a coordinated and balanced regional transportation system. Relevant objectives, policies, and goals for the nine-county San Francisco Bay Area (Bay Area) region are set forth in *Plan Bay Area 2040* and are detailed in Volume 2, Appendix 2-1.

3.2.3 Consistency with Plans and Laws

As indicated in Section 3.1.5.3, Consistency with Plans and Laws, the CEQA and Council on Environmental Quality (CEQ) regulations require a discussion of inconsistencies or conflicts between a proposed undertaking and federal, state, regional, or local plans and laws. As such, this Draft EIR/EIS describes the inconsistency of the project alternatives with federal, state, regional, and local plans and laws to provide planning context.

There are a number of federal and state laws and implementing regulations, listed in Section 3.2.2.1, Federal, and Section 3.2.2.2, State, that direct the transportation analyses for projects. A summary of the federal and state requirements considered in this analysis follows:

- FRA guidelines for environmental impact analysis.
- State of California requirements for preparation of transportation plans by regional agencies, and for design of transportation facilities.

- State of California comprehensive requirements for transportation planning by city and county government under the *State of California 2017 General Plan Guidelines* (OPR 2017).
- Federal and state permit processes that require an applicant to demonstrate compliance with these acts, laws, and plans prior to, during, and after construction.

The Authority, as the lead agency proposing to build and operate the HSR system, must comply with all federal and state laws and regulations and secure all applicable federal and state permits prior to initiating construction on the selected alternative. Therefore, there would be no inconsistencies between the project alternatives and these federal and state laws and regulations. The California HSR system, including this Project Section, is consistent with the *California Transportation Plan 2040* (Caltrans 2016), the *2018 California State Rail Plan* (Caltrans 2018a), and SB 743.

The Authority is not required to comply with local transportation regulations; however, it has endeavored to design and build the HSR project so that it is consistent with transportation goals. For example, the project alternatives incorporate IAMFs that include restricting construction hours and parking for construction vehicles, maintaining truck routes and access for special events during construction, maintaining bicycle and pedestrian access, protecting freight and passenger rail services, maintaining transit access, and meeting design standards and guidance for transportation facilities. A review of 32 plans and 211 policies found that the project alternatives would be consistent with 200 policies and inconsistent with the following 11 policies, programs, or objectives set forth in the general plans and area plans:

- **San Francisco General Plan, Transportation Element** (City and County of San Francisco 2010)—Policy 1.3 and Objectives 20 and 21. The project would cause five intersections under San Francisco’s jurisdiction to operate at worse than LOS D. San Francisco does not have an LOS standard for its intersections; however, added intersection delay may increase delay for transit vehicles, which would be inconsistent with San Francisco’s Transit First policy.
- **City of Brisbane General Plan** (City of Brisbane 2020)—Policy C.2. The project would cause one intersection under Brisbane’s jurisdiction to operate at worse than the target LOS of D or better, resulting in an inconsistency with the City’s LOS policy.
- **South San Francisco General Plan** (City of South San Francisco 2014)—Policy 4.2-G-15. The project would cause one intersection under South San Francisco’s jurisdiction to operate at worse than the target LOS of D or better, resulting in an inconsistency with the City’s LOS policy. General Plan Policy 4.2-G-16 directs the City to accept LOS E or F after finding that there is no practical or feasible way to mitigate the lower LOS and that the uses resulting in the lower LOS provide a clear public benefit.
- **City of San Mateo General Plan, Circulation Element** (City of San Mateo 2015)—Policy C 2.1. The project would cause eight intersections under San Mateo’s jurisdiction to operate at worse than the target LOS of D or better, resulting in an inconsistency with the City’s LOS policy.
- **City of San Mateo General Plan, Circulation Element** (City of San Mateo 2015)—Policy C 3.6. The project would be at grade through downtown San Mateo, resulting in an inconsistency with the general plan policy that calls for the rail line to be depressed below street level.
- **Redwood City General Plan** (City of Redwood City 2010)—Program BE-55. The project would cause one intersection under Redwood City’s jurisdiction to operate at worse than the target LOS of D or better, resulting in an inconsistency with the City’s LOS policy.
- **Menlo Park General Plan** (City of Menlo Park 2016)—Policy CIRC-3.4. The project would cause five intersections under Menlo Park’s jurisdiction to operate at worse than the target LOS of D or better, resulting in an inconsistency with the City’s LOS policy.

- **Santa Clara County General Plan** (County of Santa Clara 1994)—Policy C-TR 12. The project would cause some intersections within the County’s jurisdiction to operate at worse than the target LOS of D or better, resulting in an inconsistency with the County’s LOS policy.
- **City of San Jose General Plan** (City of San Jose 2018)—Policy TR-5.3. The project would cause some intersections within the City of San Jose’s jurisdiction to operate at worse than the target LOS of D or better, resulting in an inconsistency with the City’s LOS policy.

Volume 2, Appendix 2-J provides further details. While implementation of the project would result in an increase in congestion on certain roadway segments and intersections, it would reduce regional VMT. The project would also support a shift to transit-oriented development (TOD) in station areas to reduce reliance on the private automobile. The project would not address congestion through capacity improvements. It should also be noted that each of the jurisdictions listed in this section will become fully compliant with SB 743 by July 1, 2020, entailing a shift from LOS to VMT in their policies.

3.2.4 Methods for Evaluating Impacts

NEPA and CEQA require an evaluation of impacts on transportation. The following sections define the RSAs and summarize the methods used to analyze transportation impacts. As summarized in Section 3.2.1, Introduction, six other resource sections in this Draft EIR/EIS also provide information related to transportation.

3.2.4.1 Definition of Resource Study Area

As defined in Section 3.1, Introduction, RSAs are the geographic boundaries in which the Authority conducted the environmental investigations specific to each resource topic. The RSA for impacts on transportation encompasses the areas directly or indirectly affected by construction and operation of the project. These areas include the project footprint for each of the project alternatives and the transportation network facilities providing access to the project footprint.

Direct long-term transportation impacts on intersections, transit facilities, bicycle facilities, and pedestrian facilities are permanent changes necessary to implement the project alternatives. The RSA for direct impacts includes the project footprint for each project alternative. Indirect impacts on transportation facilities are changes to travel patterns resulting from implementation of the project alternatives (e.g., increases in traffic around stations and the LMF, increases in delay at at-grade crossings resulting from additional gate-down time associated with increased train service). The RSA for indirect impacts varies by facility type (i.e., intersections, transit, nonmotorized travel, and freight rail), as shown in Table 3.2-1. As there are no freeway segments in the RSA that would serve 100 or more project-generated trips during the AM or PM peak hour, the evaluation of transportation impacts for this section focuses on intersections adjacent to the station areas, LMF alternatives, and at-grade crossings.

Table 3.2-1 Definition of Transportation Resource Study Area

Type	General Definition
Roadways and Intersections (Vehicle Circulation)	
Direct impacts	Project footprint
Indirect impacts	Includes major state routes for regional access; regionally significant roadways as defined by the San Francisco County Transportation Authority, the City/County Association of Governments of San Mateo County, the Santa Clara Valley Transportation Authority, congestion management programs, and relevant general plans; and regional truck routes that could be affected by construction of the project alternatives. The indirect RSA for intersections includes critical intersections of access points and regionally significant roadways between a station or LMF and adjacent state highways, and critical intersections near at-grade crossings. The indirect RSA also includes freeway segments that would serve 100 or more project-generated trips and intersections of roadways classified as a collector or above that would be physically modified by the project or would serve 50 or more project trips in either the AM or PM peak hour. ¹
Transit	
Direct impacts	Project footprint
Indirect impacts	Includes regional and local bus transit service and passenger rail service that could be affected by construction of the project alternatives, including existing and planned public transit systems serving HSR stations in the Project Section and ground transit facilities affected by added gate-down time at or adjacent to at-grade crossings.
Nonmotorized Travel	
Direct impacts	Project footprint
Indirect impacts	Includes infrastructure for pedestrian and bicycle transportation that could be affected by construction of the project alternatives, as well as existing and planned pedestrian and bicycle facilities within 500 feet of the project footprint.
Freight Rail	
Direct impacts	Project footprint
Indirect impacts	Includes freight rail track and systems that would be affected by construction of the project alternatives and existing freight rail facilities within 500 feet of the project footprint.
Aviation	
Direct impacts	Includes airports within 2 miles of the project footprint.
Indirect impacts	Includes airports within the San Francisco Bay Area, and the State of California as a whole.

Authority = California High-Speed Rail Authority

HSR = high-speed rail

LMF = light maintenance facility

RSA = resource study area

¹ The Authority excluded some very low-volume intersections because impacts could not be reasonably anticipated at these locations. Typically, if an intersection had fewer than approximately 200 vehicles on the minor street, the Authority considered it low volume. Other factors considered included the context of the land use around that intersection, or the proximity to the project alignment or other geometric changes (i.e., some intersections had more volume but were ruled out based on distance from the project alignment, while some intersections had less volume but were near a station or roadway change).

3.2.4.2 Impact Avoidance and Minimization Features

IAMFs are project features that 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. Volume

2, Appendix 2-E provides the full text of the IAMFs that are applicable to the project. The following IAMFs are applicable to the transportation analysis:

- 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
- LU-IAMF#2: Station Area Planning and Local Agency Coordination

This environmental impact analysis considers these IAMFs as part of the project design. In Section 3.2.6, Environmental Consequences, each impact narrative describes how these project features are applicable and, where appropriate, effective at avoiding or minimizing potential impacts to less than significant under CEQA.

3.2.4.3 Methods for Impact Analysis

Overview of Impact Analysis

This section describes the sources and methods used to analyze potential project impacts on transportation.

Information on roadway modifications, crossings, and closures as a result of the project alternatives is presented in Volume 2, Appendix 2-A. The following sections present the analysis scenarios, data collection efforts, measures of effectiveness, travel demand forecasting methods, and means for the evaluation of impacts on transportation.

Travel Demand Forecasts and Calculation of Vehicle Miles Traveled

The Authority developed ridership forecasts for the HSR system using the statewide California High-Speed Rail Ridership and Revenue Model in *California High-Speed Rail Ridership and Revenue Model, Business Plan Model Version 3* (Authority 2016c).¹ The model incorporates socioeconomic growth assumptions (population, housing, and employment forecasts) consistent with the *California Statewide Travel Demand Model* and adjusts them for the 2029 and 2040 forecast years. The statewide conventional passenger rail and urban transit networks are consistent with current and planned routes in the *2013 California State Rail Plan* and plans for individual regional rail operators (Caltrans 2013). The Authority consulted with local jurisdictions and transit agencies when developing the station mode-of-access forecasts (Authority 2016b). Vehicle trip forecasts considered comparable systems, the local context at each HSR station, existing conditions and constraints, planned land uses, transportation facilities and services, vehicle parking availability, and the mode-of-access forecasts.

VMT on roadway networks is a performance measure highly correlated to transportation GHG emissions. VMT is calculated based on the number of vehicles multiplied by the distance traveled

¹ The model was used to produce 2040 ridership forecasts for the *Connecting and Transforming California: 2016 Business Plan* (2016 Business Plan) based on a similar set of growth and service assumptions. An analysis of 2040 conditions at the Millbrae Station, the San Jose Diridon Station, the LMF alternatives, and at-grade crossing intersections was conducted based on ridership forecasts from the 2016 Business Plan prior to development of the 2018 Business Plan. The 2040 ridership forecasts developed for the 2018 Business Plan are slightly lower than station ridership forecasts in the 2016 Business Plan. The analysis of 2040 conditions presented in this document is based on the higher ridership forecasts from the 2016 Business Plan and thus presents a slightly conservative assessment of project impacts under 2040 conditions. The analysis presented in this document for the 4th and King Street Station area for 2029 conditions is based on modified Silicon Valley to Central Valley ridership forecasts for this interim San Francisco terminus station.

by each vehicle. The Ridership and Revenue Model was used to forecast annual VMT for San Francisco, San Mateo, and Santa Clara Counties under 2029 and 2040 No Project and Plus Project conditions. Volume 2, Appendix 3.2-B summarizes the methodology used for forecasting the change in VMT due to project operations.

Forecasts of vehicles that would travel on the roads in the RSA were developed using a version of the model developed by VTA staff for the San Mateo City/County Association of Governments, and subsequently enhanced to develop ridership forecasts for the Caltrain *Peninsula Corridor Electrification Project* (PCEP) EIR (Peninsula Corridor Joint Powers Board [PCJPB] 2015). This forecasting tool was identified as the most appropriate for the project because it was used to develop Caltrain ridership forecasts and encompasses all of the RSA intersections.

The Authority enhanced the VTA model to include HSR in order to develop vehicle forecasts for this analysis. The socioeconomic datasets used as inputs to prepare the forecasts are based on *Projections 2013* (Association of Bay Area Governments [ABAG] 2013). These datasets are accepted by the Metropolitan Transportation Commission (MTC) to reflect regional model consistency for models used by the congestion management agencies and were used to develop the regional travel demand forecasts for *Plan Bay Area 2040*, the RTP, and sustainable communities strategy for the Bay Area (ABAG and MTC 2017). HSR was incorporated into the model by adding a new transit line along the planned alignment, with the four HSR stations in the Bay Area (i.e., San Francisco, Millbrae, San Jose Diridon, and Gilroy) and forecast HSR operating speeds by Project Section. The model was then adjusted to match the HSR ridership and mode-of-access forecasts. In addition to incorporating HSR, planned improvements to 2040 No Project highway and transit networks in the VTA model were reviewed and found to be consistent with the MTC RTP and sustainable communities strategy regional model.

Intersection LOS analytical methods were used to evaluate the vehicular traffic impacts for the HSR stations and the Brisbane LMF. The Authority determined the 2040 No Project traffic volumes for the HSR stations and LMF sites based on the incremental growth in vehicle trips as forecast by the VTA travel demand model. For intersections close to the 4th and King Street Station, 2029 No Project traffic volumes were based on forecasts generated by the SF-CHAMP travel demand model. Vehicle trips generated by the HSR stations and LMF sites were manually added to the 2040 No Project volumes based on distribution data derived from the VTA model to estimate the project-related traffic volumes.

Station Boardings and Alightings

The *Connecting and Transforming California: 2016 Business Plan* (2016 Business Plan) (Authority 2016a) documents 2029 and 2040 Plus Project ridership forecasts. Table 3.2-2 shows the Plus Project ridership (including boardings, alightings, and total daily passenger trips) for the 4th and King Street Station in downtown San Francisco (2029) and the Millbrae and San Jose Diridon Stations (2040).

Ridership is shown at the 4th and King Street Station for Silicon Valley to Central Valley service for the 2029 horizon year because this station would serve as an interim station until completion of the proposed DTX project. The DTX would extend the electrified peninsula rail corridor in San Francisco from the 4th and King Street Station to the SFTC and provide a new station at Fourth Street and Townsend Street. HSR would use the track built for the DTX to reach the SFTC. The DTX project was environmentally cleared as part of the *Transbay Terminal/Caltrain Downtown Extension/Redevelopment Project Final Environmental Impact Statement/Environmental Impact Report and Section 4(f) Evaluation* in March 2004 (U.S. Department of Transportation et al. 2004). The 2010 NEPA re-evaluation of DTX forecast and evaluated the effect of 48,200 daily HSR passenger trips at SFTC in 2035. The 2016 Business Plan forecasts 44,770 daily HSR passenger trips at SFTC in 2040, which is less than the level of ridership evaluated in the DTX NEPA evaluation. Because the DTX project is the subject of an approved environmental document that evaluated a higher level of HSR ridership, and the SFTC has been completed and is designed to accommodate HSR, this document does not address impacts associated with those projects.

Table 3.2-2 2029 and 2040 Ridership at High-Speed Rail Stations

Station	Daily Boardings ¹	Daily Alightings ²	Total Daily Passenger Trips
2029 Ridership			
4th and King Street ³	5,500	5,500	11,000
2040 Ridership			
Millbrae	5,570	5,570	11,140
San Jose Diridon	15,450	15,450	30,900

Source: Authority 2016c

¹ Boardings account for passengers departing on high-speed rail trains.

² Alightings account for passengers arriving on high-speed rail trains.

³ The 2029 daily boardings shown at the 4th and King Street Station are for Silicon Valley to Central Valley service.

Station Passenger Trip Generation by Mode of Access/Egress

The Authority applied station mode-of-access and egress forecasts to ridership estimates to determine the numbers of trips by mode at each station (Authority 2016b). Table 3.2-3 shows the passenger trips forecast by mode of access and egress at the 4th and King Street Station (2029) and the Millbrae and San Jose Diridon Stations (2040).

Table 3.2-3 2029 and 2040 Passenger Trip Generation at High-Speed Rail Stations¹

Station	Total Daily Passenger Trips ²	Daily Passenger Trips by Mode of Access/Egress ³						
		Parked Car On Site	Parked Car Off Site	Drop Off/ Pick Up	Taxi/ TNC	Rental Car Shuttle	Bus/ Rail	Walk/ Bike
2029 Passenger Trips								
4th and King Street ⁴	11,000	0	0	1,270	2,300	1,650	4,060	1,720
2040 Passenger Trips								
Millbrae	11,140	80	1,810	1,110	1,490	870	5,220	560
San Jose Diridon	30,900	340	2,000	3,700	5,900	2,300	12,300	4,300

Source: Authority 2016b

TNC = transportation network company

¹ Passenger trip generation values are rounded as follows: values presented in the hundreds are rounded to the nearest ten; values presented in the thousands are rounded to the nearest hundred except where necessary to make sure that values for the row sum correctly.

² Includes boardings and alightings by HSR passengers.

³ Mode of access refers to trips associated with boardings. Mode of egress refers to trips associated with alightings. Trips associated with privately operated off-site parking or rental car facilities are included as shuttle trips instead of individual vehicle trips.

⁴ The 2029 daily passenger trips shown at the 4th and King Street Station is for Silicon Valley to Central Valley service.

These estimates account for constrained vehicle parking; the provision of on-site parking would not meet total unconstrained project-related demand at all stations. Constrained vehicle parking could influence passengers to access the station area by transit rather than automobile. Unmet needs for parking would be accommodated off-site. Rental car facilities would not be located in the project footprint. Like unmet vehicle parking, all rental car facilities would be located off-site.

The project does not include the construction of off-site parking facilities for construction or operational purposes. Vehicle trips to existing off-site rental car or parking facilities were assigned to areas where these resources are currently available. Passenger trips associated with off-site satellite parking or rental car were included as shuttle trips on the street network surrounding the stations.

Station Vehicle Trip Generation

The Authority developed station vehicle trip generation estimates based on passenger trip generation estimates for vehicle access modes. Passenger trips were converted to vehicle trips using a vehicle occupancy factor for park-and-ride, drop off, pick up, taxi, transportation network company (e.g., Uber, Lyft), and shuttle trips. Peak hour vehicle trips were calculated by applying a peak hour conversion factor of 10 percent to daily trip totals.

Table 3.2-4 shows the average vehicle occupancy, or passengers per vehicle, for each mode of access at the 4th and King Street Station (2029) and the Millbrae and San Jose Diridon Stations (2040). Passenger trips associated with off-site parked cars and rental cars are included as shuttle trips at the station level.

Table 3.2-4 2029 and 2040 Passengers per Vehicle by Mode

Station	Passengers per Vehicle			
	Parked Car	Drop Off/ Pick Up	Rental Car	Taxi/TNC
4th and King Street (2029)	1.3	1.4	1.4	1.3
Millbrae (2040)	1.3	1.4	1.4	1.3
San Jose Diridon (2040)	1.3	1.4	1.4	1.3

Source: Authority 2016b

TNC = transportation network company

Table 3.2-5 shows the daily, AM peak hour, and PM peak hour vehicle trips generated by the 4th and King Street Station (2029) and the Millbrae and San Jose Diridon Stations (2040). Parked car trips result in one vehicle trip per boarding or alighting, while drop off/pick up and taxi/transportation network company trips result in two vehicle trips per boarding or alighting.

Table 3.2-5 2029 and 2040 Vehicle Trip Generation at High-Speed Rail Stations

Station	Daily Vehicle Trips	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
2029 Vehicle Trips							
4th and King Street	3,600	180	180	360	180	180	360
2040 Vehicle Trips							
Millbrae	2,800	140	140	280	140	140	280
San Jose Diridon	10,100	540	520	1,100	520	540	1,100

Source: Authority 2016b

Transit Trip Generation at Stations

Station transit trip generation estimates were based on passenger trip generation estimates for transit access modes. The project would generate approximately 410 peak hour transit trips at the 4th and King Street Station in 2029, approximately 520 peak hour transit trips at the Millbrae Station in 2040, and approximately 1,200 peak hour transit trips at the San Jose Diridon Station in 2040. The project would also generate approximately 170 peak hour shuttle trips at the 4th and King Street Station in 2029 and approximately 90 peak hour shuttle trips at the Millbrae Station in 2040.

Trip Generation at the Brisbane Light Maintenance Facility Sites

Trip generation for the Brisbane LMF sites was calculated based on an estimated 150 employees at the proposed facility. The employees were classified based on their operational function as

maintenance shop employees, management, or crew and support. The Brisbane LMF vehicle trip generation was based on trip rates identified in the Institute of Transportation Engineers *Trip Generation* for a general light industrial use² (Institute of Transportation Engineers 2012). It was assumed that full employment of 150 employees would be required by 2040 (Authority 2016d).

Table 3.2-6 shows trip generation at the proposed LMF forecast for 2040. Both LMF sites would have identical employee estimates and classifications and therefore would generate the same number of trips. The table shows that the facility would be expected to generate approximately 470 daily vehicle trips, with roughly 70 vehicle trips each during the AM and PM peak hours.

Table 3.2-6 2040 Vehicle Trip Generation at the Brisbane Light Maintenance Facility

Station	Daily Trips	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
East or West Brisbane LMF	470	57	12	69	14	52	66

Source: based on Authority 2016b
 LMF = light maintenance facility

Baseline Operational Analysis

Pursuant to CEQA requirements, an EIR must include a description of the existing physical environmental conditions near a project. Those conditions, in turn, “will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant” (CEQA Guidelines § 15125(a)). Accordingly, this document analyzes the impacts from project construction as compared to the existing conditions in 2016. Pursuant to NEPA requirements, an EIS must also include a description of existing and No Project conditions.

Since this project would not commence operation for almost 10 years and would not reach full operation for almost 25 years, use of only existing conditions as a baseline for traffic LOS effects from project operations would be misleading (initial Silicon Valley to Central Valley operations are planned for 2029 with Phase 1 service commencing in 2033). Therefore, the LOS traffic analysis from project operations in this section uses a multiple baseline approach. The Authority evaluated the project’s LOS traffic effects against existing and background (No Project) conditions forecast for 2029 (4th and King Street Station only) and 2040. More detail is provided in the Transportation Technical Reports (Authority 2019a, 2019b). The evaluation included the following scenarios:

- **Existing conditions**—Reflects transportation conditions based on 2016 counts and facilities. Caltrain operates 10 weekday peak hour trains (i.e., five in each direction) along the project corridor.
- **Existing Plus Project conditions**—Evaluates the effects of the physical alterations proposed by the project. All transportation network modifications necessary to build the project (e.g., roadway closures, roadway modifications) are reflected in this scenario. The project would not provide rail service, so ridership at stations is not reflected under this scenario. This evaluation is only conducted for the intersections of Bayshore Boulevard/Old County Road and Bayshore Boulevard/Valley Drive in Brisbane, as well as intersections within the San Jose Diridon Station Approach Subsection, as these are the only areas where intersections would be affected by permanent roadway modifications. This scenario assumes the existing level of Caltrain service, or 10 weekday peak hour trains, along the project corridor.
- **2029 No Project conditions**—Reflects future transportation conditions in 2029 for the 4th and King Street Station area only, including reasonably foreseeable land use changes and transportation network modifications. This scenario assumes operation of the Caltrain PCEP

² The Institute of Transportation Engineers uses land use code 110. Light industrial uses have a higher trip generation rate than heavy industrial uses (code 120), so use of this code represents a conservative assumption.

service improvements, which would increase the number of weekday peak hour trains along the project corridor from 10 to 12.

- **2029 Plus Project conditions**—Evaluates the potential effects of the project on 2029 baseline conditions with project ridership anticipated in the 2029 for initial Silicon Valley to Central Valley operations, for the 4th and King Street Station area, which is the interim northern HSR terminus for 2029. By 2040, with the Downtown Extension (DTX) project, the northern HSR terminus would be at the Salesforce Transit Center (SFTC). The Millbrae Station would not be operational in 2029. All transportation network modifications necessary to build the project along with HSR service and ridership at stations are reflected in this scenario. This scenario assumes operation of a total of 16 weekday peak hour trains along the project corridor, including 12 Caltrain trains and 4 HSR trains.
- **2040 No Project conditions**—Reflects future transportation conditions in 2040, including reasonably foreseeable land use changes and transportation network modifications, for all study locations other than the interim 4th and King Street Station area evaluated for 2029 conditions. This scenario assumes operation of the Caltrain PCEP service improvements, with 12 weekday peak hour trains in Caltrain service along the project corridor.
- **2040 Plus Project conditions**—Evaluates the full potential effects of the project on 2040 baseline conditions for all study locations, other than the interim 4th and King Street Station area that is evaluated only for 2029 conditions. All transportation network modifications necessary to build the project along with HSR service and ridership at the Millbrae and San Jose Diridon Stations are reflected in this analysis scenario. This scenario assumes operation of a total of 20 weekday peak hour trains along the project corridor, including 12 Caltrain trains and 8 HSR trains.

2029 versus 2040 Analysis

- **2029 Analysis**—Evaluates transportation effects for 2029 for the 4th and King Street Station area only, because the station would be the HSR terminus in San Francisco for an interim period.
 - **2040 Analysis**—Evaluates transportation effects between San Francisco and San Jose for 2040. This excludes the 4th and King Street Station area, because the terminus would be at the Salesforce Transit Center by 2040. This analysis provides a conservative analysis along the length of the Project Section.
-

Construction and operation activities were both analyzed as part of the LOS effects analysis for 2029 Plus Project conditions (4th and King Street Station area only) and 2040 Plus Project conditions (Millbrae Station, San Jose Diridon Station, Brisbane LMF, and at-grade crossing locations). Because temporary street closures and relocations would occur during the construction phase, these are described qualitatively for the 2029 and 2040 Plus Project conditions in Section 3.2.6. The combined effects from construction and operations are described quantitatively in Section 3.2.6 for the 2029 and 2040 Plus Project conditions.

To analyze the effect of gate-down times on traffic conditions, the peak hour train service assumptions in Table 3.2-7 were used. For the analysis of passenger and freight rail service, the daily train service assumptions in Table 3.2-7 were used.

Table 3.2-7 Existing and Planned Future Train Service Levels

Component	Condition ⁸			
	Existing (2017)	2029 No Project	2029 Plus Project	2040 Plus Project
Caltrain	5 trains per peak hour per direction 40–92 trains per day ¹ 79 mph maximum	6 trains per peak hour per direction 54–114 trains per day ¹ 79 mph maximum	6 trains per peak hour per direction 54–114 trains per day ¹ 79 mph maximum	6 trains per peak hour per direction 52–114 trains per day ¹ 110 mph maximum
HSR (project)	Not applicable	Not applicable	2 trains per peak hour per direction 48 to 59 trains per day ² 79 mph maximum 4th and King Street Interim Station	4 trains per peak hour per direction north of Diridon; up to 7 trains per peak hour per direction south of Diridon 134–176 trains per day ² 110 mph maximum Downtown station at Salesforce Transit Center
Freight	2 to 4 trains per day north of Santa Clara Up to 9 trains per day south of Santa Clara	3 to 7 trains per day north of Santa Clara Up to 15 trains per day south of Santa Clara	3 to 7 trains per day north of Santa Clara Up to 15 trains per day south of Santa Clara	5 to 10 trains per day north of Santa Clara Up to 23 trains per day south of Santa Clara
ACE/ Capitol Corridor ³	Up to 22 trains per day	Up to 42 trains per day	Up to 42 trains per day	Up to 50 trains per day
Coast Starlight ⁴	2 trains per day	2 trains per day	2 trains per day	2 trains per day
Coast Daylight ⁵	Not applicable	2 trains per day	2 trains per day	4 trains per day
TAMC Salinas Rail Extension ⁶	Not applicable	8 trains per day	8 trains per day	12 trains per day

ACE = Altamont Corridor Express

HSR = high-speed rail

LMF = light maintenance facility

mph = miles per hour

TAMC = Transportation Agency for Monterey County

¹ The range depends on location; the lower number is for trains south of the San Jose Diridon Station and the higher number is for trains north of the San Jose Diridon Station.

² The range depends on location. Includes nonrevenue trains. For 2029, there would be 48 trains south of Diridon and from Diridon to Brisbane LMF and 59 trains from Brisbane LMF to San Francisco. For 2040, there would be 176 trains south of Diridon, 134 from Diridon to Brisbane LMF, and 144 from Brisbane LMF to San Francisco.

³ ACE/Amtrak Capitol Corridor operates south of the Santa Clara Station.

⁴ Coast Starlight operates south of the Santa Clara Station.

⁵ Coast Daylight operates south of the San Jose Diridon Station.

⁶ TAMC Salinas Rail Extension will operate south of the San Jose Diridon Station.

Roadways and Intersection Analysis (Vehicle Circulation)

This section describes transportation operating conditions in terms of LOS and delay. LOS is the primary unit of measure for stating the operational quality of a roadway or intersection and is qualitative, with a ranking system of A through F, where LOS A signifies the least congested and LOS F the most congested operating conditions. LOS calculations followed the *Highway Capacity Manual* (Transportation Research Board 2010) procedures. LOS criteria for identifying effects at signalized and unsignalized intersections under NEPA are shown in Table 3.2-8 and Table 3.2-9.

As discussed in Section 3.2.2.2, California is no longer using automobile delay as a measure of transportation impacts under CEQA. The LOS consequences caused by the project may nevertheless be relevant for consideration of other transportation-related environmental effects under CEQA, including impacts on transit and nonmotorized travel, emergency vehicle access, air quality and GHG, and noise. Furthermore, traffic delay, as measured by LOS, is considered an effect of concern under NEPA in this document. The LOS consequences are therefore presented in the transportation section and referenced in other parts of the Draft EIR/EIS where appropriate.

The operation of signalized intersections is based on various intersection characteristics (e.g., traffic volumes, lane geometry, and signal phasing) to estimate the average control delay experienced by motorists traveling through an intersection. Control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. Table 3.2-8 shows the relationship between average delay per vehicle and LOS for signalized intersections.

Table 3.2-8 Signalized Intersection Level of Service Definitions

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1–20
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures ¹ begin to appear.	20.1–35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1–55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	55.1–80
F	Operations with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	> 80

Source: *Transportation Research Board 2010*

V/C = volume to capacity

¹ Cycle failures refer to a situation in which a vehicle queue at a signalized intersection fails to clear (i.e., fully proceed through the intersection) during a single green phase.

The Authority evaluated traffic conditions at unsignalized intersections using the method from Chapter 19 of the *Highway Capacity Manual* (Transportation Research Board 2010). With this method, operations are defined by the average control delay per vehicle (measured in seconds) for each movement that must yield to the right-of-way. For all-way stop-controlled intersections, this is reported as the average delay (and LOS) for the overall intersection. For two-way or side-street stop-controlled intersections, this is reported as the average delay (and LOS) for the overall intersection with the average delay for the worst-case approach in parentheses. Table 3.2-9 shows the relationship between delay and LOS for unsignalized intersections.

Table 3.2-9 Unsignalized Intersection Level of Service Definitions

Level of Service	Description	Average Control Delay Per Vehicle on Most Delayed Approach (seconds)
A	Little or no delays	≤ 10.0
B	Short traffic delays	> 10.0 to 15.0
C	Average traffic delays	> 15.0 to 25.0
D	Long traffic delays	> 25.0 to 35.0
E	Very long traffic delays	> 35.0 to 50.0
F	Extreme traffic, delays where intersection capacity exceeded	> 50.0

Sources: Transportation Research Board 2010

LOS values for the study intersections were based on *Highway Capacity Manual* (Transportation Research Board 2010) procedures using Synchro, SimTraffic, or VISSIM software packages depending on the individual intersection configuration and operating characteristics. Intersections with standard configurations and operating characteristics that are not close to other major intersections were evaluated using Synchro. The SimTraffic microsimulation package was generally used to evaluate intersections at freeway interchanges. The VISSIM microsimulation package was applied at intersections where high levels of congestion, frequent transit service, adjacent rail crossings, high pedestrian or bicycle volumes, or special traffic signal systems (such as transit signal priority) warranted a more sophisticated analytical approach.

Parking Analysis

The parking analysis focuses on project construction and operations impacts on station parking at and adjacent to the 4th and King Street Station, the Millbrae Station, and the San Jose Diridon Station, as such impacts relate to the potential for secondary physical impacts on the environment and socioeconomic conditions. Existing parking was identified by review of prior environmental review documents, aerial photography and public websites.

Transit Analysis

To assess impacts on transit facilities and operations, including bus and rail transit services, the Authority reviewed the potential for physical disruption of existing services from project footprint plans, changes in passenger trip generation, and impacts on intersection LOS that would affect transit in the project footprint. Data for existing and future transit services was collected from on-site reviews of existing facilities, from publicly available information and plans, and by contacting the various service providers (e.g., MUNI, SamTrans, VTA, BART, Caltrain).

Project construction impacts on passenger rail service considered the temporary closures of passenger rail track and stations that would likely disrupt service. The analysis used the *California Statewide Travel Demand Model* (Authority 2016c) to assess potential changes in Caltrain and other transit ridership from the operation of project alternatives (Authority 2016a, 2017a).

Nonmotorized Travel Analysis

Nonmotorized transportation, including bicycle and pedestrian facilities, were analyzed by reviewing engineering plans, project footprints, and passenger trip generation estimates. The analysis focused on project impacts on nonmotorized transportation within the project footprint and the impact of project-related trips on nonmotorized transportation within the RSA. Data for existing and future nonmotorized facilities was obtained from on-site reviews of existing facilities, review of publicly available information and plans, and contacting the various jurisdictions (e.g., City of San Francisco, City of Millbrae, City of Brisbane, Caltrans).

Freight Rail Service

A qualitative evaluation of construction impacts on freight rail service considered the locations where construction of the project alternatives would disrupt freight service and the duration of such disruptions. The Authority evaluated the potential impacts on freight service operations where the project would share passenger and freight rails based on potential changes in freight service access, routing, operating hours, and overhead clearance.

Aviation

The analysis of aviation presented in this section focuses on the changes in demand for air travel on a statewide or regional basis as a result of project operation. Estimated changes in air travel demand were based on HSR ridership forecasts from the Authority's 2016 Business Plan (Authority 2016a). Refer to Section 3.11 for an analysis of the project impacts on aviation safety.

3.2.4.4 Method for Evaluating Impacts under NEPA

CEQ NEPA regulations (40 Code of Federal Regulations [C.F.R.] Parts 1500–1508) provide the basis for evaluating project effects (as described in Section 3.1.5.4). As described in Section 1508.27 of these regulations, the criteria of context and intensity are considered together when determining the severity of the change introduced by the project.

- **Context**—The affected environment in which a proposed project occurs. Depending on the resource, the consideration of *context* could include the type, quality, and sensitivity of the resource involved, the location, or the geographical extent of the effect (national, regional, or local). For the transportation analysis, the context would include adopted local plans, policies, and regulations; existing and planned transportation systems; and the relative sensitivity of transportation conditions to construction or operational changes.
- **Intensity**—The severity of the effect, considering the type (direct/indirect), extent (local, regional), and duration of the effect (short or long term), and other considerations specific to particular resources, as set forth in the CEQ regulations. For the analysis of transportation effects, *intensity* is determined by assessing the degree to which the proposed project would result in changes to transportation conditions; and inconsistency with regional and local transportation plans.

In addition, the Authority identified criteria to be used to identify adverse NEPA effects in evaluating construction-related and operations-related effects on the roadway network as follows:

- For signalized intersections, if the Existing Plus Project, 2029 Plus Project, or 2040 Plus Project conditions would have an LOS E or F and the project would result in an increase in average traffic delay of 4 seconds or more over the baseline condition
- For unsignalized intersections, if the Existing Plus Project, 2029 Plus Project, or 2040 Plus Project conditions would have an LOS E or F and the project would result in an increase in traffic delay of 5 seconds or more (measured as average delay for all-way stop or worst-movement delay for side-street stop intersection), and if the intersection satisfies one or more traffic signal warrants for at least 1 hour of the day. Five seconds of delay is the criteria increase for unsignalized intersections (rather than the 4 seconds used for signalized intersections) because it only applies to a single movement.

3.2.4.5 Method for Determining Significance under CEQA

The following subsections list the significance thresholds for roadways and intersections (vehicle circulation), parking, transit, nonmotorized transportation, and freight rail service.

Roadways and Intersections (Vehicle Circulation)

Under CEQA Guidelines Section 15064.3, automobile delay no longer constitutes a significant environmental impact. Accordingly, this analysis does not characterize a particular level of automobile delay on roadways and intersections as a significant environmental impact. Operations effects on the roadway network would be significant if they would result in a net increase in VMT over baseline conditions, or otherwise conflict with CEQA Guidelines Section 15064.3(b).

Parking

Parking conditions evolve over time as people alter their modes and patterns of travel in response to changing land uses and transportation options. The availability of parking spaces is not part of the permanent physical environment subject to environmental review. Pursuant to SB 743, the adequacy of parking for a project shall not support a finding of significance. However, parking losses caused by a project or parking demand generated by a project in excess of the parking supply provided by the project could result in a significant indirect (secondary) impact on the environment if the insufficiency of parking results in secondary impacts such as on VMT, air quality, noise, safety, or land use.³ The criteria for the evaluation of these potential secondary impacts are the same as those used for direct (primary) impacts. The VMT criterion is the same as for vehicle circulation. For other relevant criteria, see Section 3.3, Section 3.4, Section 3.11, and Section 3.13.

Transit

The project would have a significant impact if it would:

- Conflict with a program, plan, ordinance, or policy regarding public transit, or otherwise materially decrease the performance of such facilities or services.

Nonmotorized Transportation

The project would have a significant impact if it would:

- Conflict with a program, plan, ordinance, or policy regarding bicycle or pedestrian facilities, or otherwise materially decrease the performance of such facilities.

Freight Rail Service

The project would have a significant impact if it would:

- Substantially disrupt or interfere with freight operations or require greater temporal separation that would change freight rail service such that resultant diversions to truck or other freight modes would result in significant secondary impacts related to air quality, noise, GHG emissions, or traffic operations (as defined by the other applicable significance criteria in this Draft EIR/EIS).

3.2.5 Affected Environment

Existing and planned transportation conditions in the transportation RSA are described in this section from north to south by subsection and, where applicable, by facility. This information provides the context for the environmental analysis and evaluation of impacts.

3.2.5.1 Vehicle Miles Traveled

The Authority used the statewide travel demand model to estimate VMT (2016) in the RSA for medium and high ridership scenarios. Under existing conditions, the annual total VMT is 2.395 billion miles in San Francisco County, 4.177 billion miles in San Mateo County, and 10.312 billion miles in Santa Clara County.

3.2.5.2 Roadways and Intersections (Vehicle Circulation)

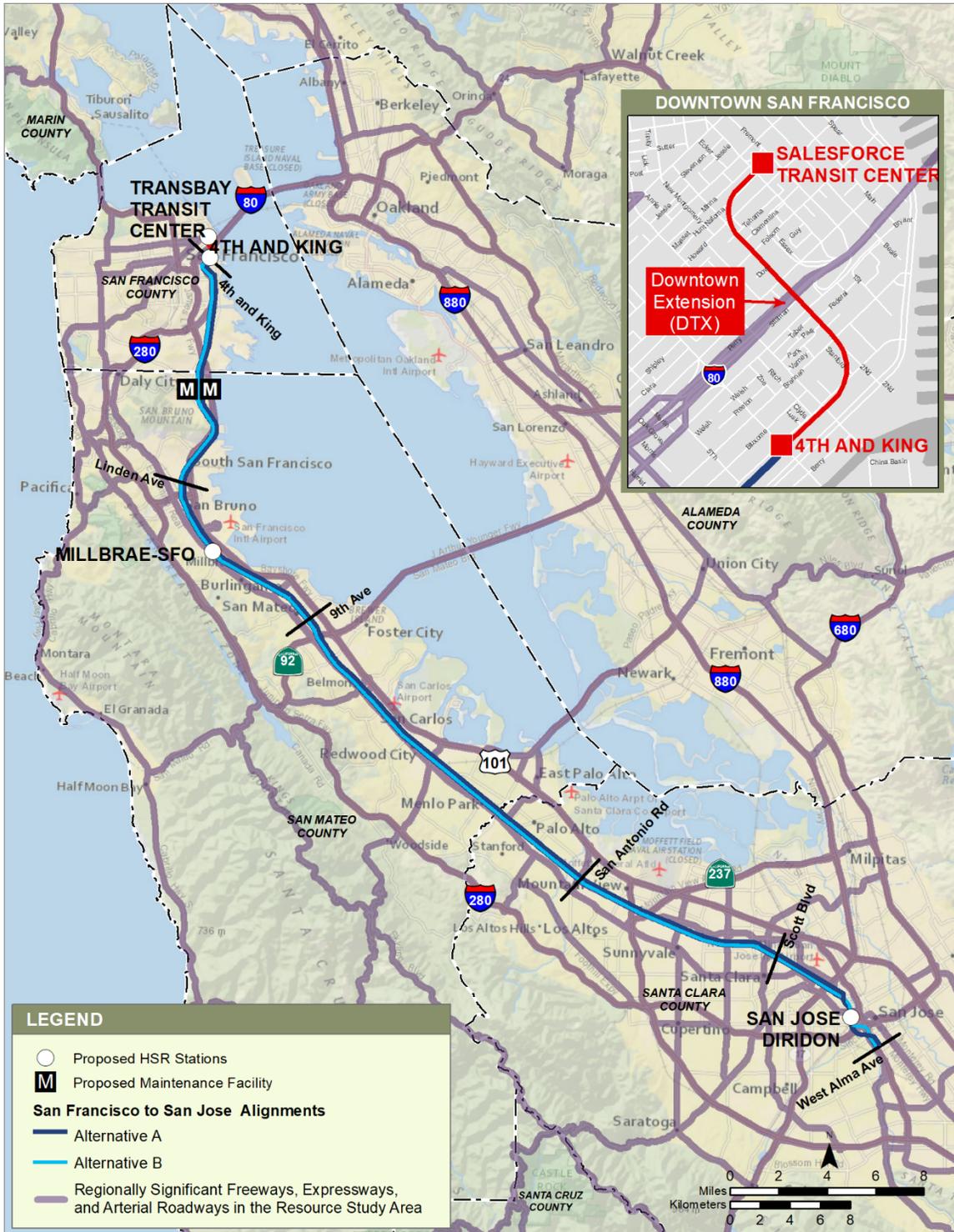
The RSA contains several regionally significant routes that serve as connections between population centers and transit hubs along the corridor. The communities along the RSA between San Francisco and San Jose are served by a network of freeways, expressways, and arterial streets. San Francisco is served by Interstate (I-) 80, I-280, U.S. Highway (US) 101, State Routes (SR) 1 and 35, and numerous arterial streets. Communities in San Mateo County are served primarily by US 101, I-280, I-380, SR 35, SR 84, SR 92, El Camino Real (SR 82), and arterial streets. Communities in Santa Clara County along the RSA are served by US 101, I-280, I-880,

³ Socioeconomic effects of insufficient parking supply are not considered impacts under CEQA. However, potential socioeconomic effects due to insufficient parking supply are analyzed as NEPA effects in this section.

SR 84, SR 85, SR 87, SR 237, expressways, and arterial streets. These routes each serve trucks, including freight service vehicles, which experience the same levels of service and congestion as the general traveling public. Figure 3.2-1 illustrates regionally significant routes.

The RSA contains 41 at-grade rail crossings and 70 grade-separated rail crossings of roadways along the track that would be shared by HSR and Caltrain services between the 4th and King Street Station in San Francisco and West Alma Avenue in San Jose. There are an additional 20 grade-separated pedestrian crossings and 15 at-grade pedestrian crossings of the rail line. During the weekday peak commute periods, gates at at-grade rail crossings of roadways and pedestrian paths in the corridor are currently down approximately 10 times per hour for Caltrain passenger rail service. The average gate-down time is just under 1 minute. The Authority also studied intersections adjacent to the at-grade crossings as part of this analysis.

A total of 207 intersections were evaluated as part of this analysis. Information on the existing signal control, delay, and LOS for the intersections in each subsection is provided in Volume 2, Appendix 3.2-A. A discussion of the affected intersections in the project subsections is provided in Section 3.2.6.2, Roadways and Intersections (Vehicle Circulation).



Source: Authority 2019a

MAY 2019

Figure 3.2-1 Regionally Significant Freeways, Expressways, and Arterial Roadways

San Francisco to South San Francisco Subsection

The 4th and King Street Station at 700 Fourth Street is approximately 0.9 mile south of Market Street. It is the northern terminus of the Caltrain commuter rail line, which operates between Santa Clara County and San Francisco. The 4th and King Street Station would serve as the interim terminal station for the Project Section until the DTX provides HSR access to the SFTC. Vehicle access directly around the 4th and King Street Station is provided primarily via Fourth Street, Townsend Street, and King Street. Townsend Street and Fourth Street provide access to the primary passenger loading locations and bus stop locations for the station. No off-street parking is provided at the station. No parking or passenger loading is available along the King Street or Seventh Street sides of the station.

Freeway access to the 4th and King Street Station is provided via the King Street ramps to and from I-280 as well as the following nearby I-80 ramps—eastbound off-ramp to Seventh Street/Bryant Street, eastbound off-ramp to Fourth Street/Bryant Street, eastbound on-ramp from Fifth Street/Bryant Street, westbound off-ramp to Fifth Street/Harrison Street, westbound on-ramp from Fourth Street/Harrison Street, and westbound on-ramp from Seventh Street/Harrison Street. The primary local streets used by vehicles to directly access the station area are Embarcadero, Third Street, Fourth Street, Fifth Street, Seventh Street, King Street, Townsend Street, Bryant Street, and Harrison Street.

Passenger loading occurs primarily on the Fourth Street and Townsend Street frontage of the station block. The curb space (as of October 2017) along the Townsend Street frontage, from Fourth Street to Fifth Street, includes a 120-foot bus stop, a short keep-clear zone, a 120-foot taxi loading zone, a 100-foot passenger loading zone, a 70-foot motorcycle parking zone, a 220-foot shuttle bus loading zone, and 120 feet of on-street parking. The opposite side of Townsend Street, from Fourth Street to Fifth Street, includes a 100-foot no-stopping zone, a 220-foot bus stop, an 80-foot commercial loading zone, 260 feet of on-street parking, and a 100-foot bus stop. Taxis wait throughout the day to pick up passengers in the designated taxi zone on Townsend Street. Transportation network companies, such as Uber and Lyft, use the passenger loading zone immediately behind the taxi loading zone. In addition, commuters may call taxis and transportation network company services along any of the streets surrounding the station.

The analysis included 19 intersections around the 4th and King Street Station. The study intersections are generally adjacent to the station, as well as strategic intersections near the station. They include all locations where the project would result in an increase of 50 or more vehicle trips in either the AM or PM peak hour. Under existing conditions, 9 of the 19 intersections operate worse than LOS D:

- Fourth Street/Townsend Street (during PM peak hour)
- Fifth Street/King Street
- Fifth Street/King Street/I-280 ramps
- Fourth Street/Brannan Street (during the PM peak hour)
- Fourth Street/Berry Street (during PM peak hour)
- Fourth Street/Bluxome Street
- Fifth Street/Bryant Street (during PM peak hour)
- Seventh Street/Bryant Street/I-80 ramp (during PM peak hour)
- Third Street/King Street (during PM peak hour)

The analysis also included 14 intersections around the LMF sites at Brisbane Baylands, where 50 or more peak hour vehicle trips would be added. Under existing conditions, all study intersections operate at LOS D or better with the following exception:

- Bayshore Boulevard/US 101 southbound off-ramp

At-grade crossings of the Caltrain corridor in the San Francisco to South San Francisco Subsection are located at Mission Bay Drive and 16th Street in San Francisco and at South Linden Avenue in South San Francisco. Seven intersections, immediately adjacent or close to

these at-grade crossings were evaluated. Under existing conditions, all study intersections operate at LOS D or better with the following exception:

- Seventh Street/Mississippi Street/16th Street (during AM peak hour)

San Bruno to San Mateo Subsection

The Millbrae Station is located at 200 Rollins Road, approximately 0.5 mile from downtown Millbrae and 1 mile from San Francisco International Airport (SFO). The station has three at-grade BART train platforms on its eastern side and two at-grade Caltrain commuter rail platforms on its western side, providing an intermodal connection between the two systems. The station serves as the southern terminus of the Richmond-Millbrae BART line on weekdays.

There are entrances to the station on both the east and the west sides of the tracks. Above the station platforms is a covered concourse that houses BART fare gates, a passenger waiting area, bathrooms, a station agent booth, and service rooms dedicated for BART staff and services. This concourse level also contains a Caltrain ticket and information booth. Add-fare machines, BART schedules, restrooms, and employee support facilities are in the BART fare gate area. Caltrain ticket machines and additional BART fare gates are at ground level between the northbound Caltrain platform and BART platforms. The station is wheelchair accessible and has bicycle lockers and public telephones.

The Millbrae Station is bounded by Aviator Avenue to the north, Millbrae Avenue to the south, US 101 to the east, and El Camino Real to the west. US 101 and El Camino Real provide the primary regional automobile access to the station.

The analysis studied 16 intersections around the Millbrae Station. The study intersections are generally adjacent to the station or along primary routes to or from the station. They include locations where 50 or more peak hour vehicle trips would be added. Under existing conditions, 5 of the 16 intersections operate worse than LOS D:

- El Camino Real/Linden Avenue (during PM peak hour)
- El Camino Real/Millbrae Avenue
- El Camino Real/Murchison Drive (during AM peak hour)
- El Camino Real/Trousdale Drive (during AM peak hour)
- Rollins Road/Millbrae Avenue

In this subsection, 16 at-grade crossings are located in San Bruno (1), Millbrae (1), Burlingame (6), and San Mateo (8). The analysis studied 40 intersections immediately adjacent or close to these at-grade crossings. Under existing conditions, all study intersections operate at LOS D or better with the following exceptions:

- California Drive/Broadway (Burlingame)
- Carolan Drive/Oak Grove Avenue (Burlingame)
- Arundel Road/Woodside Way/Peninsula Avenue (San Mateo, during PM peak hour)

San Mateo to Palo Alto Subsection

In this subsection, 16 at-grade crossings are located in Redwood City (6), Atherton (2), Menlo Park (4), and Palo Alto (4). The analysis studied 49 intersections immediately adjacent or close to these at-grade crossings. Under existing conditions, 13 of the 49 intersections operate worse than LOS D:

- Palm Avenue/East 25th Avenue (San Mateo, during PM peak hour)
- El Camino Real/East 25th Avenue (San Mateo, during PM peak hour)
- El Camino Real/Fair Oaks Lane/Atherton Avenue (Atherton, during AM peak hour)
- El Camino Real/Watkins Avenue (Atherton)
- El Camino Real/Glenwood Avenue/Valparaiso Avenue (Menlo Park)
- Merrill Street/Oak Grove Avenue (Menlo Park)
- Alma Street/Oak Grove Avenue (Menlo Park)
- Merrill Street/Ravenswood Avenue (Menlo Park, during PM peak hour)

- Alma Street/Ravenswood Avenue (Menlo Park, during AM peak hour)
- Alma Street/Meadow Drive (Palo Alto)
- Park Boulevard/Meadow Drive (Palo Alto)
- Alma Street/Charleston Road (Palo Alto)
- Park Boulevard/Charleston Road (Palo Alto, during AM peak hour)

Mountain View to Santa Clara Subsection

In this subsection, at-grade crossings are located in Mountain View (2) and Sunnyvale (2). The analysis studied 11 intersections immediately adjacent or close to these four at-grade crossings. Under existing conditions, 7 of the 11 study intersections operate worse than LOS D:

- Central Expressway/Rengstorff Avenue (Mountain View, during PM peak hour)
- Leland Avenue/Crisanto Avenue/Rengstorff Avenue (Mountain View)
- Central Expressway/Moffett Boulevard-Castro Street (Mountain View, during PM peak hour)
- Evelyn Avenue/Castro Street (Mountain View)
- Evelyn Avenue/Mary Avenue (Mountain View)
- Evelyn Avenue/Sunnyvale Avenue (Mountain View, during PM peak hour)
- Hope Street/Transit Street/Evelyn Avenue (Mountain View)

San Jose Diridon Station Approach Subsection

San Jose Diridon Station is located at 66 Cahill Street, approximately 0.5 mile west of downtown San Jose. Vehicle access directly around San Jose Diridon Station is provided primarily via Cahill Street, Montgomery Street, and Stover/Crandall Street. Cahill Street provides access to the surface parking lots north of the station. The primary passenger loading location is directly east of the station and accommodates buses entering the bus terminal. Montgomery Street provides access to the surface parking lots, and vehicles using Montgomery Street to access the passenger loading area use the Stover Street approach. Limited parking and passenger loading is available on the west side of the station on Laurel Grove Lane.

Freeway access to San Jose Diridon Station is provided via six nearby interchanges: I-280/Bird Avenue, SR 87 (Guadalupe Parkway)/West Julian Street-East St. James Street, SR 87 (Guadalupe Parkway)/West Santa Clara Street, SR 87 (Guadalupe Parkway)/Park Avenue, I-880/The Alameda, and I-880/Coleman Avenue. The local streets used by vehicles to access the station area are West Santa Clara Street from the north; Park Avenue, South Montgomery Street, and Autumn Street from the south; and from the east West San Fernando Street provides access to parking and loading areas. Vehicles primarily access Cahill Street and South Montgomery Street via West Santa Clara Street.

Passenger loading occurs at a loop driveway immediately east of the station entrance. Access to this loading area is via Cahill Street or Stover Street. This drive provides approximately 180 feet of loading space, including one 20-foot dedicated Americans with Disabilities Act-compliant loading space. This area can accommodate around eight vehicles, with overflow loading often occurring on Stover Street or Crandall Street.

The Authority studied 50 intersections around the San Jose Diridon Station. All study intersections in the station vicinity operate at LOS D or better under existing conditions during weekday AM and PM peak hours.

3.2.5.3 Existing Parking at Proposed HSR Stations

4th and King Street Station

Parking availability around the 4th and King Street Station is limited. Caltrain does not own or provide parking at this station location. Adjacent to the station, metered on-street parking is available along Townsend Street only. Additional metered parking can be found along Fourth Street north of Brannan Street, on Brannan Street and Berry Street. Off-street parking can be found at Fourth Street/Brannan Street and on Townsend Street between Second Street and Fourth Street.

Millbrae Station

Parking at the Millbrae Station serves both Caltrain and BART. There are 170 dedicated spaces for Caltrain and 2,980 spaces shared between Caltrain and BART for a total of 3,150 spaces (PCJPB 2015).

San Jose Diridon Station

According to the *Diridon Station Area Plan*, the City of San Jose is responsible for providing and maintaining the City's public parking facilities and on-street parking (City of San Jose 2014). The City of San Jose is responsible for developing and implementing parking policies within the station area and citywide. The *Diridon Station Area Plan* vision for the Diridon Station area is to develop a plan "around the transit station that anticipates maximum possible build-out of new transit-related development, supports transit ridership and economic development, and creates a world-class cultural destination." Regarding parking, the *Diridon Station Area Plan* seeks to "ensure the continued vitality of the San Jose Arena as a major anchor for both the Downtown and the station area, and that sufficient parking and access for Arena customers is critical to the Arena's on-going success." To that end, the plan has a specific goal to "disperse parking in different locations in the planning area and beyond to ensure easy walking access to destinations." Per the *Diridon Station Area Plan*, for event parking during weekday evenings, from 5:00 p.m. to 8:00 p.m., the average utilization of on-street parking is 85 percent and off-street parking is 87 percent.

VTA conducted a San Jose Diridon Station area parking survey in 2017 to validate the number of available parking spaces in the station vicinity (VTA 2018). The parking survey concluded that currently there are approximately 14,450 publicly available parking spaces within 0.5 mile of San Jose Diridon Station—2,605 on-street and 11,845 off-street spaces on both private and public property. Within 0.33 mile of the station there are a total of approximately 4,145 parking spaces available to the public—1,045 on-street and 3,100 off-street spaces. Figure 3.2-2 through Figure 3.2-5 show these parking space locations. By 2025, the BART Phase II extension would permanently displace 715 of these parking spaces, leaving a total of 3,430 spaces within 0.33 mile and 13,695 spaces within 0.5 mile of San Jose Diridon Station (VTA 2018).

There are also 4,798 public parking spaces (in nine lots, each open 24 hours per day) and private parking lots between 0.5 mile and 1 mile from San Jose Diridon Station in downtown San Jose, as well as additional public parking lots between 1 mile and 1.5 mile from the station (Park San Jose 2019a, 2019b).

According to the BestParking website, which provides real-time parking availability and pricing for the downtown San Jose area (including the San Jose Diridon Station area), 39 garages were counted within 1 mile east of the station, with weekday parking costs ranging from \$6 to \$45/day and an average parking cost of \$17.50. Norman Y. Mineta San Jose International Airport (SJC) parking costs \$22 per day for daily parking or \$15 per day for the economy lot, with approximately 4,407 spaces in two garages and four lots. The *2018 Business Plan: Connecting California, Expanding Economy, Transforming Travel* (2018 Business Plan) (Authority 2018) assumes market-provided parking up to \$32 per day for San Jose Diridon Station and within an average 10-minute walking distance of the station, more than the average daily cost in downtown San Jose or at SJC.

According to the Arena Management Agreement between the City of San Jose and San Jose Arena Management, the City of San Jose is contractually obligated to provide at least 6,350 off-site parking spaces within 0.5 mile of the SAP Center. Of the 6,350 off-site parking spaces, 3,175 must be within 0.33 mile of the SAP Center.

There is a separate Cooperative Parking Agreement between the San Jose Arena Management, PCJPB, and VTA that permits shared use of parking at the San Jose Diridon Caltrain Station during arena events. This agreement includes the 180 parking spaces on VTA property south of West Santa Clara Street and between Cahill and Montgomery Streets for the period before, during, and after arena events. PCJPB's commitment is for 400 parking spaces during arena events. Vehicles occupying these parking spaces prior to an event can remain according to the Cooperative Parking Agreement.

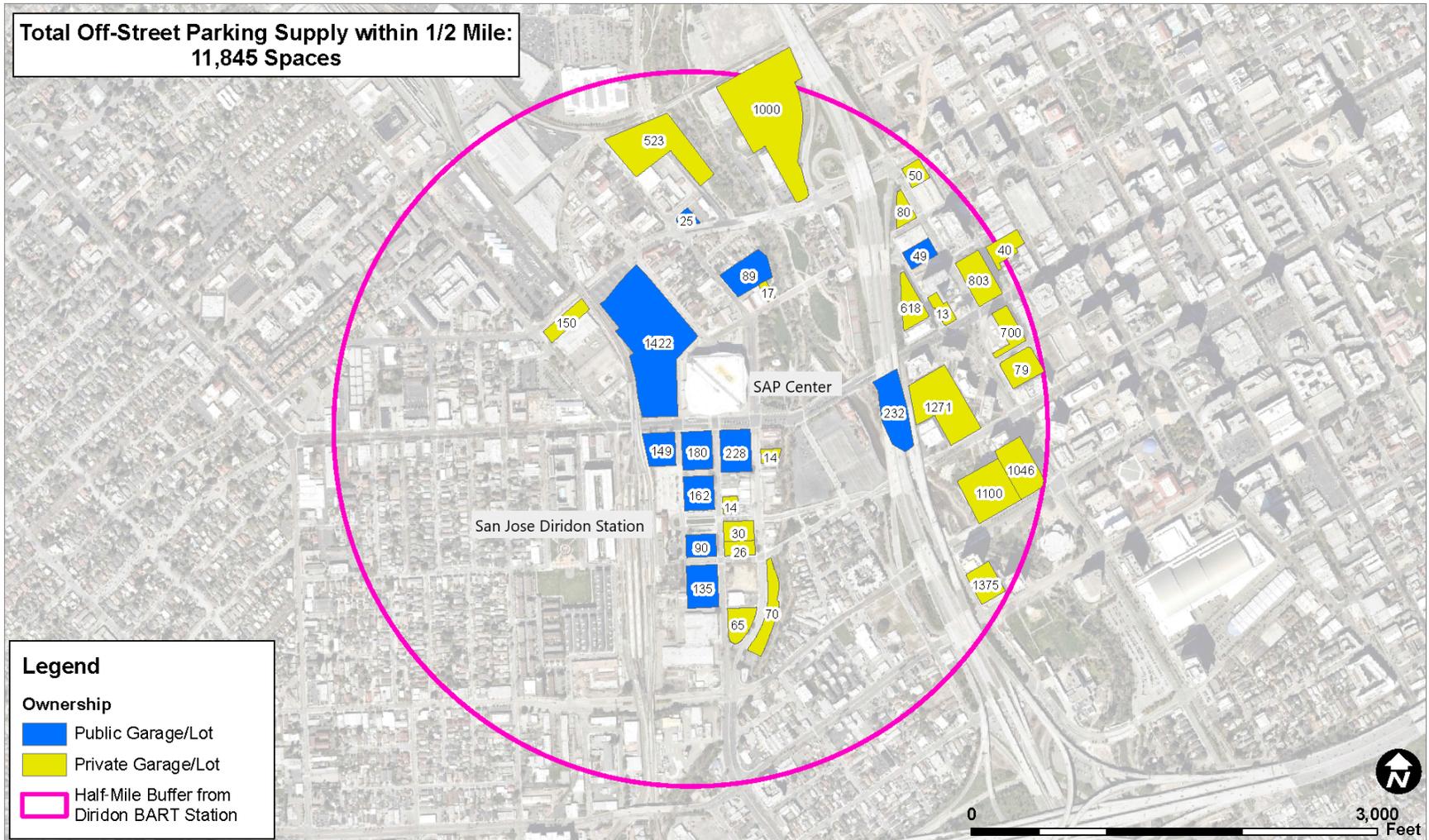
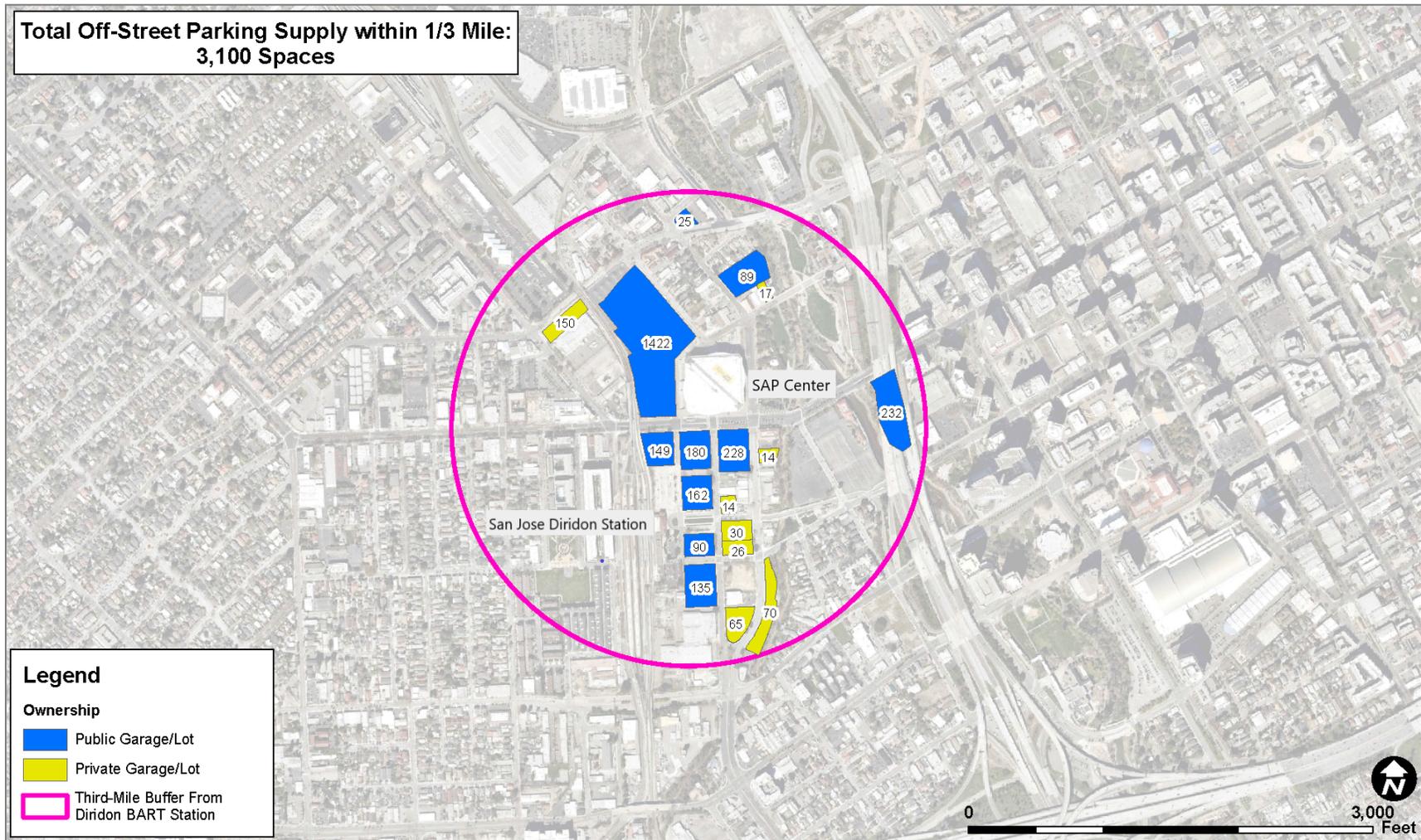
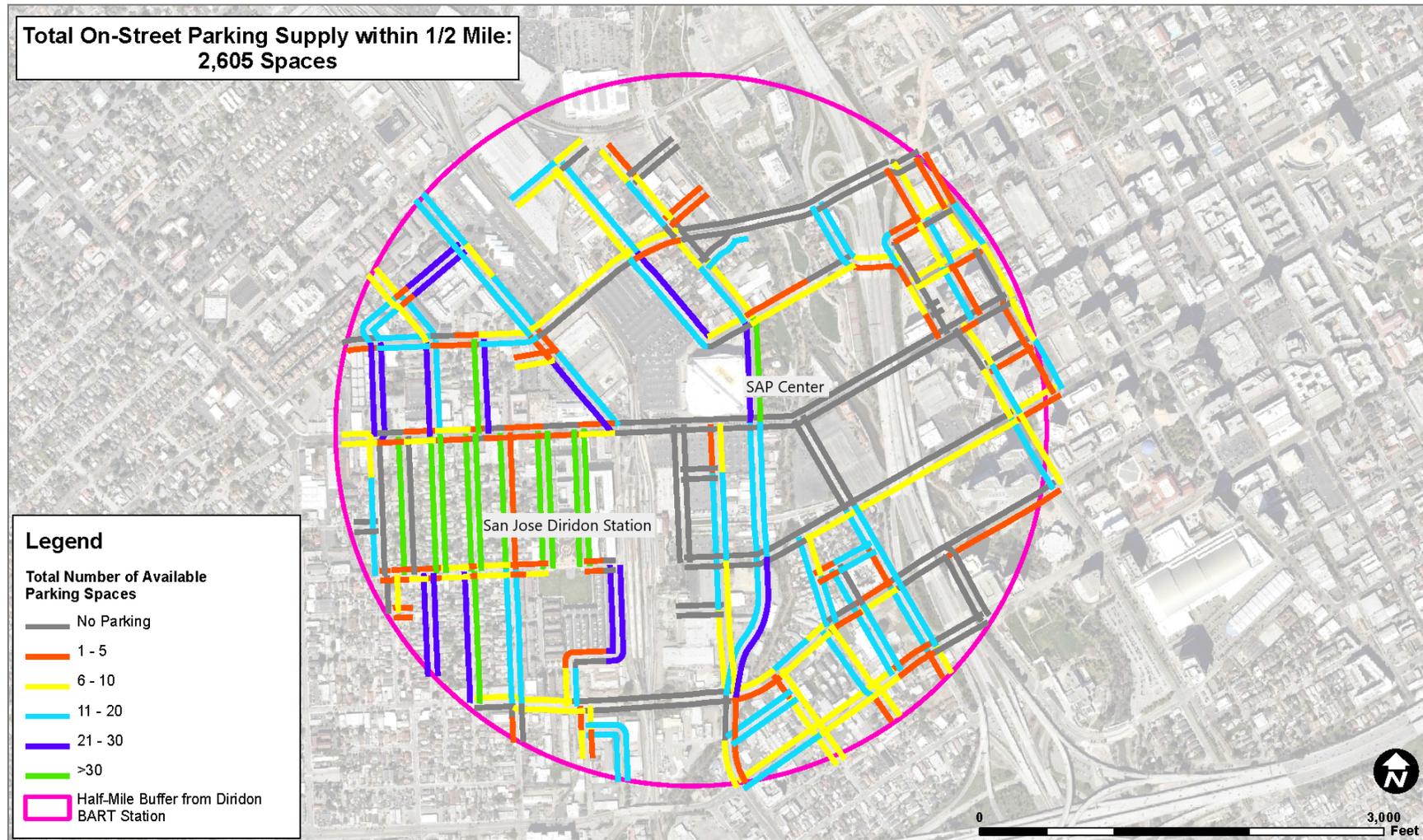


Figure 3.2-2 Parking near San Jose Diridon Station and SAP Center (Off-Street within 1/2 Mile)



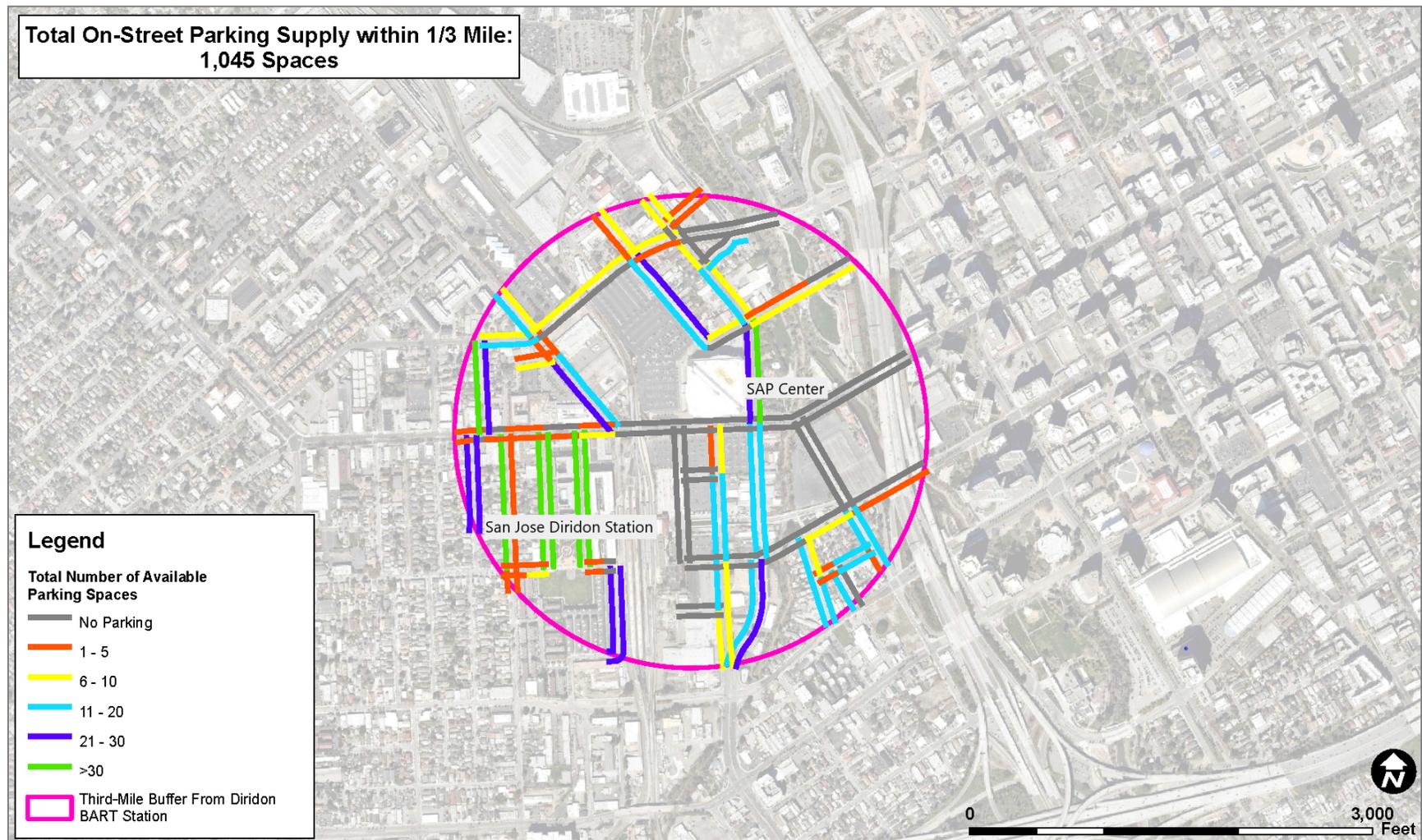
Source: VTA 2018

Figure 3.2-3 Parking near San Jose Diridon Station and SAP Center (Off-Street within 1/3 Mile)



Source: VTA 2018

Figure 3.2-4 Parking near San Jose Diridon Station and SAP Center (On-Street within 1/2 Mile)



Source: VTA 2018

Figure 3.2-5 Parking near San Jose Diridon Station and SAP Center (On-Street within 1/3 Mile)

3.2.5.4 Transit

There are several passenger rail providers along the project, including Caltrain and BART. PCJPB owns the corridor between San Francisco and San Jose and operates the Caltrain commuter rail service south to San Jose. Table 3.2-10 shows existing ridership at the 4th and King Street, Millbrae, and San Jose Diridon Stations for existing passenger rail operators.

Table 3.2-10 Existing Rail Ridership at Stations

Station	Operator	Weekday Trains	Weekday Boardings
4th and King Street	Caltrain	92	15,430 (2018)
Millbrae	BART	75	6,530 (2018)
	Caltrain	83	3,340 (2018)
San Jose Diridon	Caltrain	92	4,710 (2016)
	Capitol Corridor	14	260 (2015)
	ACE	8	380 (2016)
	Amtrak (Coast Starlight)	2	NA
	VTA light rail	108	710 (2016)

Sources: Caltrain 2018; BART 2018; CCJPA 2015; VTA 2016

ACE = Altamont Corridor Express

BART = Bay Area Rapid Transit

NA = not available

VTA = Santa Clara Valley Transportation Authority

Caltrain provides passenger rail service on 77 miles of track in the San Francisco Peninsula between San Francisco and downtown San Jose with stops in San Mateo County and Santa Clara County. Caltrain is operated under the jurisdiction of the PCJPB and is managed by SamTrans. As of 2018, Caltrain operates 92 weekday trains, including Baby Bullets (express), limited, and local services. The average weekday Caltrain ridership in 2018 was approximately 65,100; of this, approximately 97 percent (63,170 riders) occurred between San Francisco and San Jose, including approximately 15,430 riders at the 4th and King Street Station, 3,340 riders at the Millbrae Station, and 4,710 riders at the San Jose Diridon Station (Caltrain 2018).

Caltrain runs only limited-stop and Baby Bullet trains in the AM peak period (6:30 a.m. to 9:30 a.m.) and PM peak period (4:00 p.m. to 7:00 p.m.). Limited-stop services only operate on weekdays. Baby Bullet trains operate every day, with a reduced number of services on weekends and holidays. Local services operate every day, including holidays.

In January 2015, PCJPB certified and adopted the PCEP EIR (PCJPB 2015) as part of the program to modernize operation of the Caltrain rail corridor between San Jose and San Francisco to electric multiple unit (EMU) trains. The approximately 51-mile project will include the installation of electrification infrastructure including traction power facilities, poles and overhead contact system (OCS), and EMU trains. Upgraded signal systems will be installed to increase operational safety and establish a communications-based overlay signal system, known as positive train control. The existing diesel locomotive-hauled fleet will be replaced with EMU trains to facilitate the blended Caltrain and HSR system. The project is anticipated to start phased revenue service in fall 2021 and be completed in 2022.

BART provides passenger rail transit service to downtown San Francisco to and from cities in the northern portion of the San Francisco Peninsula, Oakland, Berkeley, Fremont, Walnut Creek, Antioch, Dublin/Pleasanton, and other cities in the East Bay. The BART system comprises five lines and 48 stations. The average weekday system ridership is approximately 431,000 (BART 2018). The only HSR station that currently has a direct connection to BART is the Millbrae

Station, which serves the Richmond and the Antioch BART lines. The Antioch Line includes a connection to SFO. The Richmond Line operates from Millbrae on weekdays before 9:00 p.m., and the Pittsburg/Bay Point Line provides service after 9:00 p.m. and on weekends. BART passengers can also connect to the 4th and King Street Station via MUNI Metro and bus (N-Judah, T-3rd, Routes 30 or 45). BART and VTA are also planning the Silicon Valley Phase II Extension from Berryessa/North San Jose through downtown San Jose to Santa Clara, with a planned underground station at the San Jose Diridon Station and a planned station in Santa Clara (VTA 2018).

MUNI, which is operated by the San Francisco Municipal Transportation Agency, provides various transit services within San Francisco. The MUNI Metro system, a mixture of above- and below-ground light rail service, consists of nine routes serving residential areas and the financial district. The MUNI bus system consists of 65 local and express routes. In addition to light rail and buses, MUNI operates three cable car routes and one historic streetcar route (F-Market and Wharves). MUNI operates 24 hours per day; actual hours and headways (the time between services) vary by route and type of service (e.g., OWL service only runs during late-night hours and express routes run during peak hours only). MUNI's hours of operation for light rail service are from approximately 4:00 a.m. to 2:00 a.m. daily, with slight variations by route. The average weekday ridership for fiscal year (FY) 2015 was approximately 700,000.

SamTrans operates 73 bus routes and paratransit service throughout San Mateo County and parts of San Francisco and Palo Alto. In addition, Caltrain and the San Mateo County Transportation Authority are contracted with SamTrans to serve as their managing agency, under the direction of the PCJPB and San Mateo County Transportation Authority Board of Directors, respectively. SamTrans buses, including the KX Express and Route ECR along El Camino Real between Palo Alto and Daly City, connect to the SFTC and Millbrae Stations. SamTrans also connects to a number of Caltrain stations throughout the RSA as well as a Caltrain/BART station and SFO. Buses generally operate between 5:00 a.m. and 12:00 a.m. daily, with several late-night service routes, including Routes 297 and 397. The average weekday ridership for FY 2015 was approximately 42,000.

Capitol Corridor provides intercity passenger rail service between San Jose, Oakland, and Sacramento. Capitol Corridor Joint Powers Authority, a partnership of six local transit agencies in the eight-county service area, manages the Capitol Corridor service, which Amtrak operates. The service operates seven daily round trips from Sacramento to San Jose, and an additional seven daily round trips from Sacramento to Oakland. Trains depart about every 1 to 2 hours during the weekdays. Capitol Corridor serves approximately 260 daily riders at San Jose Diridon Station (Capitol Corridor Joint Powers Authority 2015).

Altamont Corridor Express (ACE) provides passenger rail service across the Altamont corridor, between San Joaquin, Alameda, and Santa Clara Counties. The service operates four round trips between Stockton and San Jose daily, with trains connecting Stockton to San Jose in the AM peak period and providing reverse service from San Jose to Stockton in the PM peak period. ACE serves approximately 380 daily boardings at San Jose Diridon Station (VTA 2016).

VTA provides light rail, bus, and paratransit service to Santa Clara County. VTA buses include local, community, limited stop, express and rapid bus services. VTA light rail has two main lines and a spur line totaling approximately 42 miles and 62 stations. The average weekday ridership for VTA in FY 2016 was approximately 130,500 for both bus and light rail services. VTA light rail serves approximately 710 daily boardings at San Jose Diridon Station (VTA 2016).

Amtrak, VTA, and Santa Cruz Metro operate the Highway 17 Express that provides service between Santa Cruz and downtown San Jose with a stop at San Jose Diridon Station. It travels along SR 17 between San Jose and Santa Cruz with weekday services extending to San Jose State University.

Megabus provides intercity bus service between the 4th and King Street Station and Los Angeles, Sacramento, Anaheim, and Burbank. Megabus provides five to six daily round trips to these destinations from the 4th and King Street Station (Megabus 2017). Amtrak Thruway Buses and Greyhound provide intercity bus service at the SFTC. Greyhound provides service from San Jose Diridon Station and Gilroy to Oakland, San Francisco, Fresno, and Southern California. Megabus, BoltBus, and California Shuttle provide service from San Jose Diridon Station to Southern California.

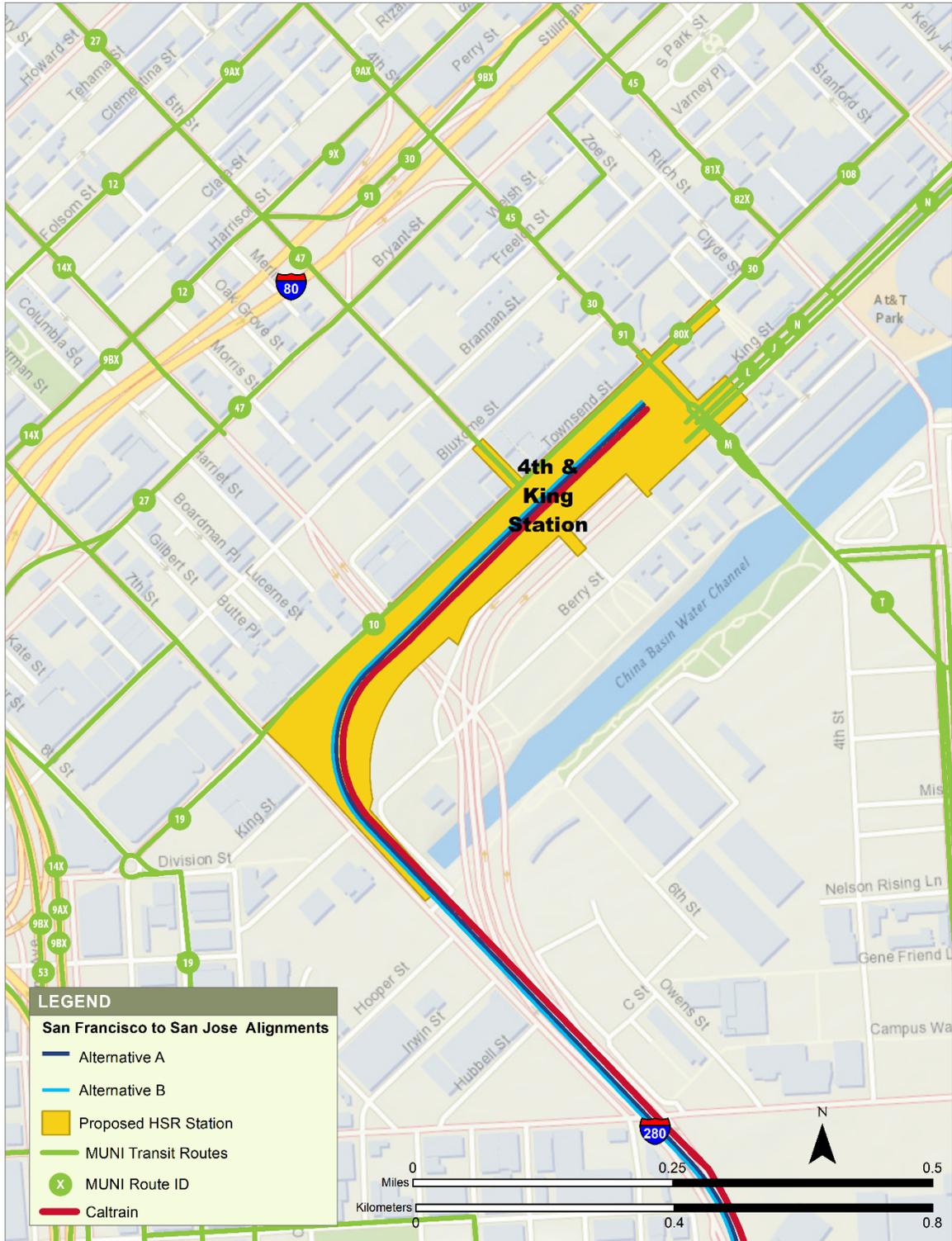
Shuttles providing connections to the 4th and King Street Station, Millbrae Station, and San Jose Diridon Station include a broad range of transportation services both publicly and privately provided by transit agencies, community organizations, employers, and academic and cultural organizations. Shuttle vehicles range from minivans to full-sized motor coaches. Most public shuttles operate fixed routes between passenger rail stations (e.g., BART and Caltrain) and employment sites. Many of these shuttles are funded by the Bay Area Air Quality Management District Transportation Fund for Cleaner Air, PCJPB, San Mateo County Transportation Authority, and participating employers. Some shuttles charge a fare, while others are free. There has been substantial growth of shuttle operations in the Bay Area, especially private employer-provided regional shuttles that provide direct service to employment sites, either from residential neighborhood stops or from major transit hubs. Major employers offering such services include a number of technology industry companies based throughout the Bay Area. Employers provide shuttles for a range of purposes, including retaining employees, filling transit service gaps, reducing commute times, providing environmental stewardship, discouraging driving, and limiting on-site parking.

San Francisco to South San Francisco Subsection

The 4th and King Street Station has 12 tracks and six platforms that serve Caltrain. The station is served by local, limited, and Baby Bullet trains. Passengers at the 4th and King Street Station can transfer to various MUNI buses and light rail lines. The E-Embarcadero, N-Judah, and T-Third light rail lines serve the station. Construction of the Central Subway Project is scheduled to be completed by 2020 with the start of revenue service anticipated in 2021 and will allow the T-Third Line to extend from Fourth and Brannan Street to Chinatown (City and County of San Francisco 2019). Figure 3.2-6 illustrates existing transit routes at the 4th and King Street Station.

Caltrain also serves the 22nd Street Station, the Bayshore Station, and the South San Francisco Station in the San Francisco to South San Francisco Subsection. Caltrain serves about 2,700 daily passengers at these three stations including 1,980 at the 22nd Street Station, 250 at the Bayshore Station, and 470 at the South San Francisco Station.

SamTrans operates several bus routes along Bayshore Boulevard and adjacent to the Brisbane LMF sites, including Routes 24, 29, 292, and 397. Also near the Brisbane LMF sites is the Bayshore Caltrain Station, as well as the southern terminus of the MUNI T-Third light rail, which is located at the Sunnydale Station, a light rail station near the intersection of Bayshore Boulevard and Sunnydale Avenue.



Source: MUNI 2017

SEPTEMBER 2019

Figure 3.2-6 4th and King Street Station Existing Transit Routes

San Bruno to San Mateo Subsection

The Millbrae Station is located at 200 Rollins Road approximately 0.5 mile from downtown Millbrae and 1 mile from SFO. The station has three at-grade BART train platforms on its eastern side and two at-grade Caltrain commuter rail platforms on its western side, providing an intermodal connection between the two systems.

There are entrances to the station on the east and west sides of the tracks. Above the station platforms is a covered concourse that includes BART fare gates, a passenger waiting area, bathrooms, a station agent booth, and service rooms dedicated for BART staff and services. This concourse level also contains a Caltrain ticket and information booth. Add-fare machines, BART schedules, restrooms, and employee support facilities are within the BART fare gate area. Caltrain ticket machines and additional BART fare gates are at ground level between the northbound Caltrain platform and BART platforms. In addition, the station is wheelchair accessible and has bicycle lockers and public telephones.

The Millbrae Station is bounded by Aviator Avenue to the north, Millbrae Avenue to the south, US 101 to the east, and El Camino Real to the west. US 101 and El Camino Real provide the primary regional auto access to the station. The Millbrae Station currently provides connections between BART, Caltrain, and SamTrans buses. Figure 3.2-7 illustrates existing transit routes at the Millbrae Station.

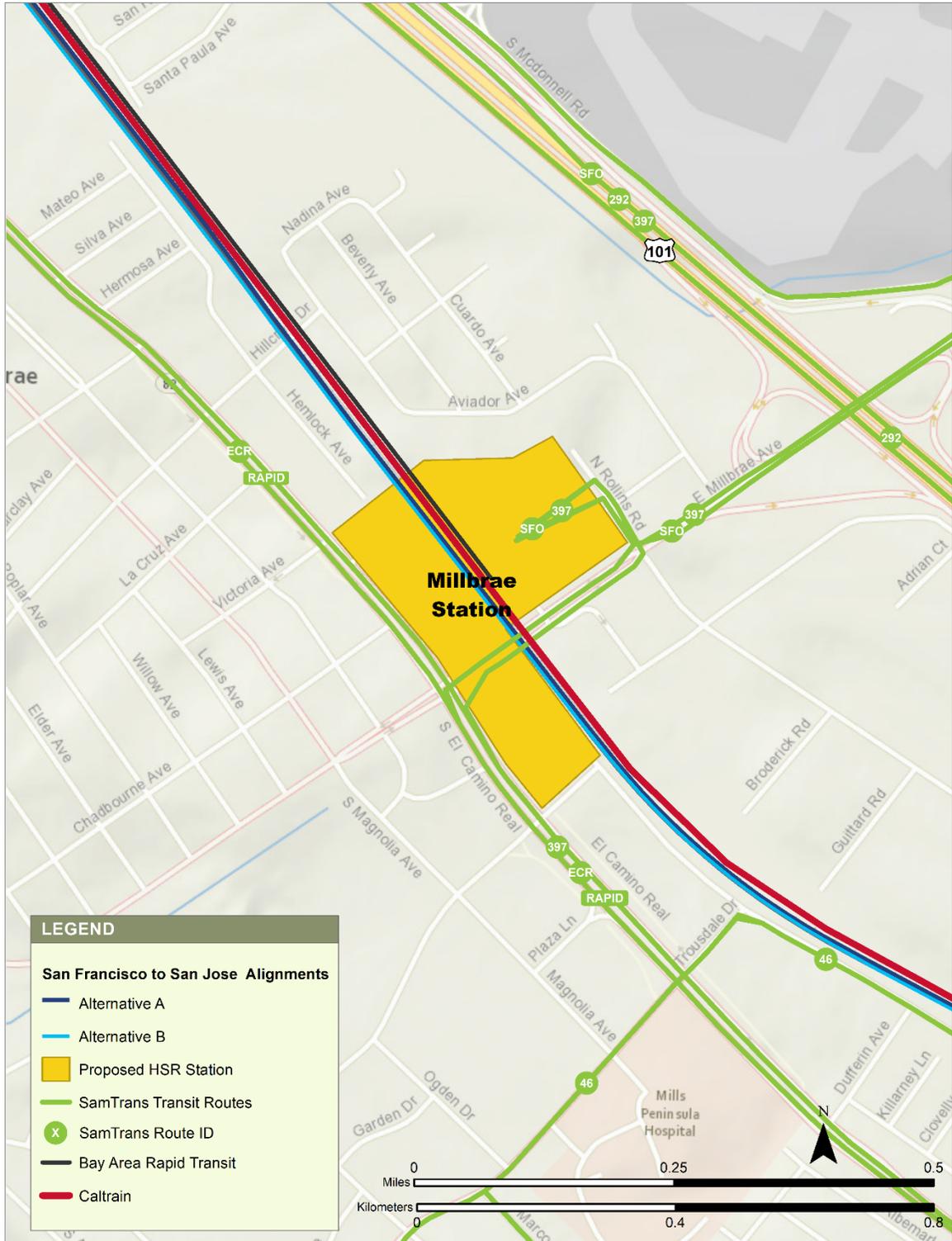
Caltrain currently serves the Millbrae Station with a combination of local, limited stop and Baby Bullet express trains. In the weekday AM and PM peak periods, the station is served by four trains per hour in both directions, which are a mix of limited trains and Baby Bullet trains.

The Antioch-SFO-Millbrae and Richmond-Millbrae BART lines serve Millbrae Station every 15 minutes. The Richmond-Millbrae line only runs on weekdays before 8:00 p.m. On evenings and weekends, the Pittsburg/Bay Point-SFO-Millbrae line operates every 15 to 20 minutes.

SamTrans runs two bus services at or near the Millbrae Station. Route ECR is a north-south bus line that provides regional transit service between Daly City and Palo Alto via El Camino Real. The route operates from 4:00 a.m. to 2:00 a.m. on weekdays with headways of 15 minutes during the peak commute and midday periods. The nearest stop for Route ECR is 400 feet from Millbrae Station. Route 397 is a north-south bus line that provides late-night regional transit service between downtown San Francisco and Palo Alto primarily via El Camino Real. The route operates every night from 1:00 a.m. to 6:00 a.m. with 1-hour headways. This route stops in the eastern bus loop next to the Millbrae Station.

Commuter shuttles, also known as first/last mile shuttles, include the Sierra Point shuttle, the Broadway-Millbrae Caltrain shuttle and three shuttles operated by the Peninsula Traffic Congestion Relief Alliance (Commute.org)—Burlingame-Bayside, North Foster City, and North Burlingame. Private shuttles serving the Millbrae Station are provided by Genentech, Google, Cisco, and Mercy High School.

Caltrain also serves the San Bruno Station, the Burlingame Station, and the San Mateo Station in the San Bruno to San Mateo Subsection. Caltrain serves about 4,090 daily passengers at these three stations, including 700 at the San Bruno Station, 1,100 at the Burlingame Station, and 2,290 at the San Mateo Station. The Broadway Station, between the Millbrae Station and the Burlingame Station, has weekend service only.



Source: SamTrans 2018

SEPTEMBER 2019

Figure 3.2-7 Millbrae Station Existing Transit Routes

San Mateo to Palo Alto Subsection

Caltrain serves the Hayward Park Station, Hillsdale Station, Belmont Station, San Carlos Station, Redwood City Station, Menlo Park Station, Palo Alto Station, and California Avenue Station in the San Mateo to Palo Alto Subsection. Caltrain serves about 21,380 daily passengers at these stations, including 580 at the Hayward Park Station, 3,300 at the Hillsdale Station, 780 at the Belmont Station, 1,330 at the San Carlos Station, 4,210 at the Redwood City Station, 1,730 at the Menlo Park Station, 7,760 at the Palo Alto Station, and 1,690 at the California Avenue Station. The Atherton Station, between the Redwood City and Menlo Park Stations, has weekend service only. SamTrans, VTA, and Alameda-Contra Costa Transit District provide local and express bus service along this subsection, while Commute.org and private operators run first/last mile shuttles.

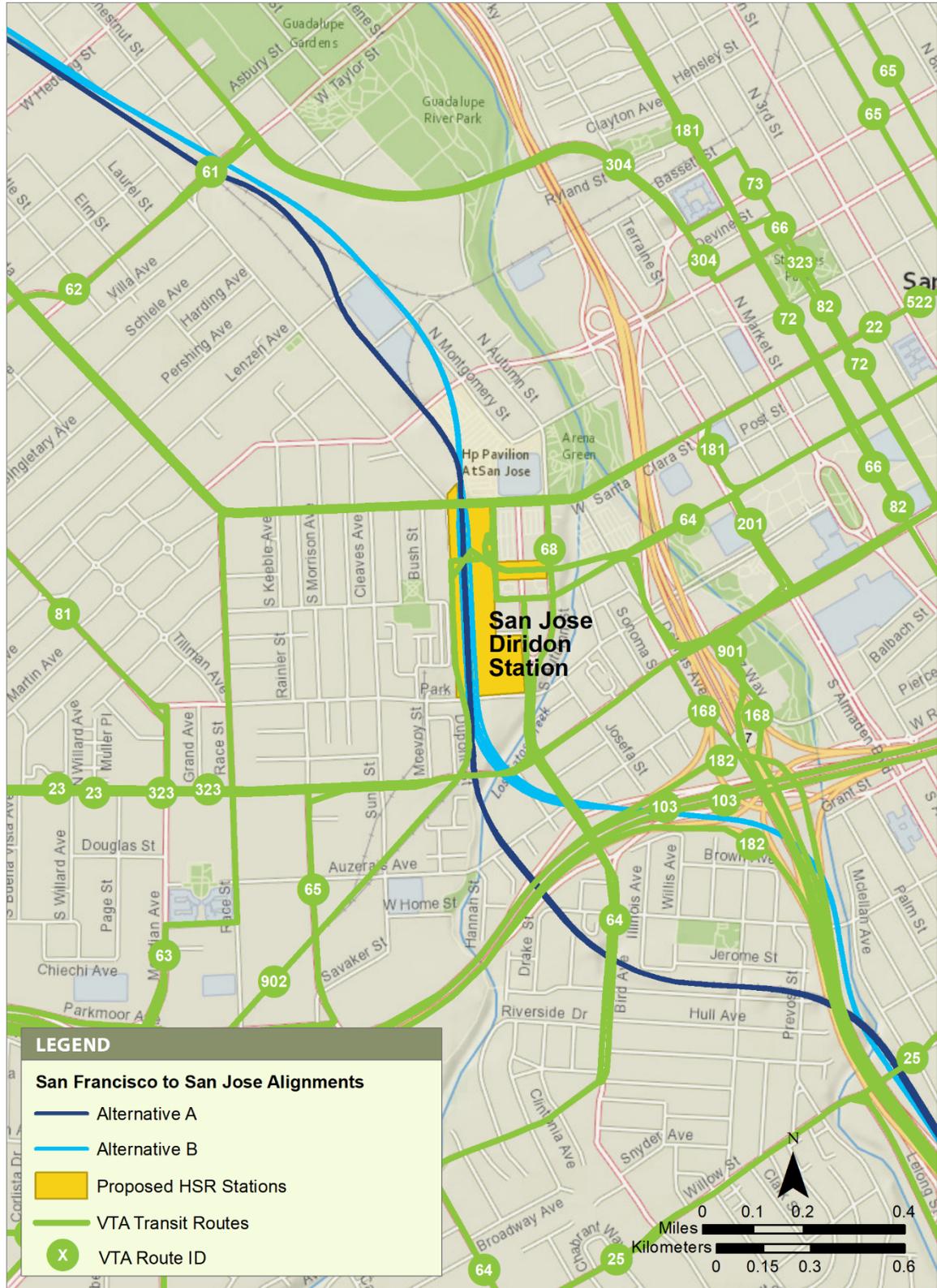
Mountain View to Santa Clara Subsection

Caltrain serves the San Antonio Station, Mountain View Station, Sunnyvale Station, and Lawrence Station in the Mountain View to Santa Clara Subsection. Caltrain serves about 10,060 daily passengers at these stations, including 940 at the San Antonio Station, 4,810 at the Mountain View Station, 3,360 at the Sunnyvale Station, and 950 at the Lawrence Station. ACE and Amtrak also operate commuter and intercity rail service at Santa Clara Station. VTA provides local and express bus service as well as light rail service along this subsection (VTA 2019).

San Jose Diridon Station Approach Subsection

San Jose Diridon Station has 11 tracks and seven platforms; nine tracks and five at-grade platforms serve Amtrak, Capitol Corridor, Caltrain, and ACE, while VTA light rail uses two tracks and platforms. The station has nine bus bays on a surface drop-off area on Cahill Street between Stover Street and West Santa Clara Street, two bus shelters on Cahill Street and curbside bus stops on the roadway network around the station area.

San Jose Diridon Station acts as a key transit hub connecting San Jose and Santa Clara County to the Bay Area and the Central Valley. Riders can transfer between five transit operators and 18 transit routes. Approximately 64 buses and 12 trains arrive and depart from San Jose Diridon Station in the peak hour. San Jose Diridon Station also serves intercity bus services by Amtrak, Greyhound, Megabus, BoltBus, and California Shuttle. Figure 3.2-8 illustrates existing transit routes at San Jose Diridon Station.



Source: VTA 2019

FEBRUARY 2020

Figure 3.2-8 San Jose Diridon Station Existing Transit Routes

3.2.5.5 Nonmotorized Travel

The affected environment for nonmotorized travel is described for areas that could experience changes from the project, including the 4th and King Street, Millbrae, and San Jose Diridon Stations, and the Brisbane LMF sites. These areas are within reasonable walking and biking distance of the alignment, which is typically a half mile. There are also several bicycle and pedestrian crossings of the rail corridor as well as a short section of trail parallel to the rail line that is partially within the rail right-of-way.

Bicycle facilities consist of separated bikeways, bicycle lanes, routes, trails, and paths, as well as bike parking, bike lockers, and showers for cyclists. Pedestrian facilities include sidewalks, crosswalks, trails, and pedestrian signals.

San Francisco to South San Francisco Subsection

Several streets within the 4th and King Street Station area include bicycle facilities (e.g., bicycle paths, lanes, parking, signage and signals, and cycle tracks⁴). Townsend Street has Class II bicycle lanes in both directions, as does King Street between Third Street and The Embarcadero. Fifth Street and a section of Third Street are Class III bike routes. The existing bicycle facilities in the 4th and King Street Station area are illustrated on Figure 3.2-9.

The Caltrain BikeHub bike station at the station provides free valet bike parking, bike repairs, bike parts and commuter gear, and bike rentals. The BikeHub has a capacity of 230 bikes and is open from 6:30 a.m. to 7:45 p.m. on weekdays. A 33-space Ford GoBike station is located at 311 Townsend Street between the bus stop and taxi loading zone. Ford GoBike is the Bay Area's bike share system with bikes in San Francisco, San Jose, and the East Bay.

The existing Caltrain station can be accessed on foot from Fourth Street, Townsend Street, and King Street. Pedestrian facilities (e.g., sidewalks, curb ramps, marked crosswalks, sidewalk furniture such as benches or trashcans, pedestrian signals) in the 4th and King Street Station area include sidewalks on both sides of Fourth Street, Fifth Street, Townsend Street, and King Street.

Most intersections in the station area provide marked pedestrian crossings on all approaches of the intersection. Intersections adjacent to the station, namely Fourth Street/King Street and Fourth Street/Townsend are signalized with crosswalks on all sides. The signalized intersection of Fifth Street/King Street has a crosswalk across Fifth Street and across the east side of the intersection.

Near the Brisbane LMF sites and the adjacent Bayshore Caltrain Station, Class II bicycle lanes are provided on Geneva Avenue and much of Bayshore Boulevard. A Class III bike route is striped on Tunnel Avenue from Blanken Avenue to Beatty Avenue. Sidewalks are located on Geneva Avenue and portions of the west side of Bayshore Boulevard. Only portions of Tunnel Avenue have sidewalks, notably along the frontage of the Bayshore Caltrain Station and along the east side of the street in the Little Hollywood residential neighborhood. A pedestrian overpass, over the Caltrain right-of-way, is located at the Bayshore Caltrain Station.

Bicycle facility categories:

Class I—Provides a completely separated right-of-way for the exclusive use of cyclists and pedestrians with cross-flow minimized (e.g., off-street bicycle paths).

Class II—Provides a striped lane for one-way travel on a street or highway.

Class III—Provides for shared use with motor vehicle traffic; however, routes are often signed or may include a striped bicycle lane.

Class IV—Provides a right-of-way designated exclusively for bicycle travel adjacent to a roadway and protected from vehicular traffic. Types of separation include, but are not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

⁴ A cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk (National Association of City Transportation Officials 2014).



Source: Authority 2019a

DECEMBER 2018

Figure 3.2-9 4th and King Street Station Existing Bicycle Facilities

San Bruno to San Mateo Subsection

As illustrated on Figure 3.2-10, there are limited existing bicycle facilities near the Millbrae Station (City of Millbrae 2016a). El Camino Real is a Class III facility north of Millbrae Avenue, with shared lane markings (“sharrows”) in its outside lanes. California Drive is also a Class III facility marked with sharrows where it extends south from the Millbrae Station. Despite the markings on El Camino Real, the wide, high-volume, and high-speed roadway is a challenging environment for bicyclists. El Camino Real has no bicycle facilities south of Millbrae Avenue, where California Drive serves as a preferred alternate route. Bike racks are provided and keyed bicycle lockers are available at the station.

The Millbrae Station area is surrounded by residential neighborhoods, commercial areas, schools, local parks, and the nearby Bay Trail. Pedestrians are well served in the station area, with sidewalks connecting the parking facilities to the station area. However, the lack of direct pedestrian connections, presence of high-volume and high-speed roadways, and poor quality of sidewalks and crossing facilities in and around the station area present challenges to walking as a mode of access from external locations. Sidewalks are provided on both sides of El Camino Real, Millbrae Avenue, and Rollins Avenue. Adjacent to the station, signalized crosswalks are available at the intersections of Millbrae Avenue/El Camino Real and Millbrae Avenue/Rollins Avenue. Signalized crosswalks are also available at other intersections along El Camino Real.

At the San Bruno Caltrain Station, where the project would provide track straightening, platform extensions, and relocation of existing stairs and ramps, sidewalks connect the platform area at the station to adjacent parking facilities with 178 spaces. The San Bruno Caltrain Station has seven bike racks and 40 bike lockers.

At the Broadway Caltrain Station, where the project would provide platform upgrades to eliminate the hold-out rule,⁵ a paved path connects the platform area to an adjacent parking lot with 119 spaces. The station has 18 bike racks and 12 bike lockers.

A pedestrian underpass or overpass, separated from the Caltrain right-of-way, is located at the San Bruno, Millbrae, and San Mateo Caltrain Stations. A pedestrian underpass of the Caltrain right-of-way is located at Sylvan Avenue in San Bruno. At-grade pedestrian crossings of the Caltrain right-of-way are located at Santa Paul Avenue in Millbrae and Morrell Avenue in Burlingame.

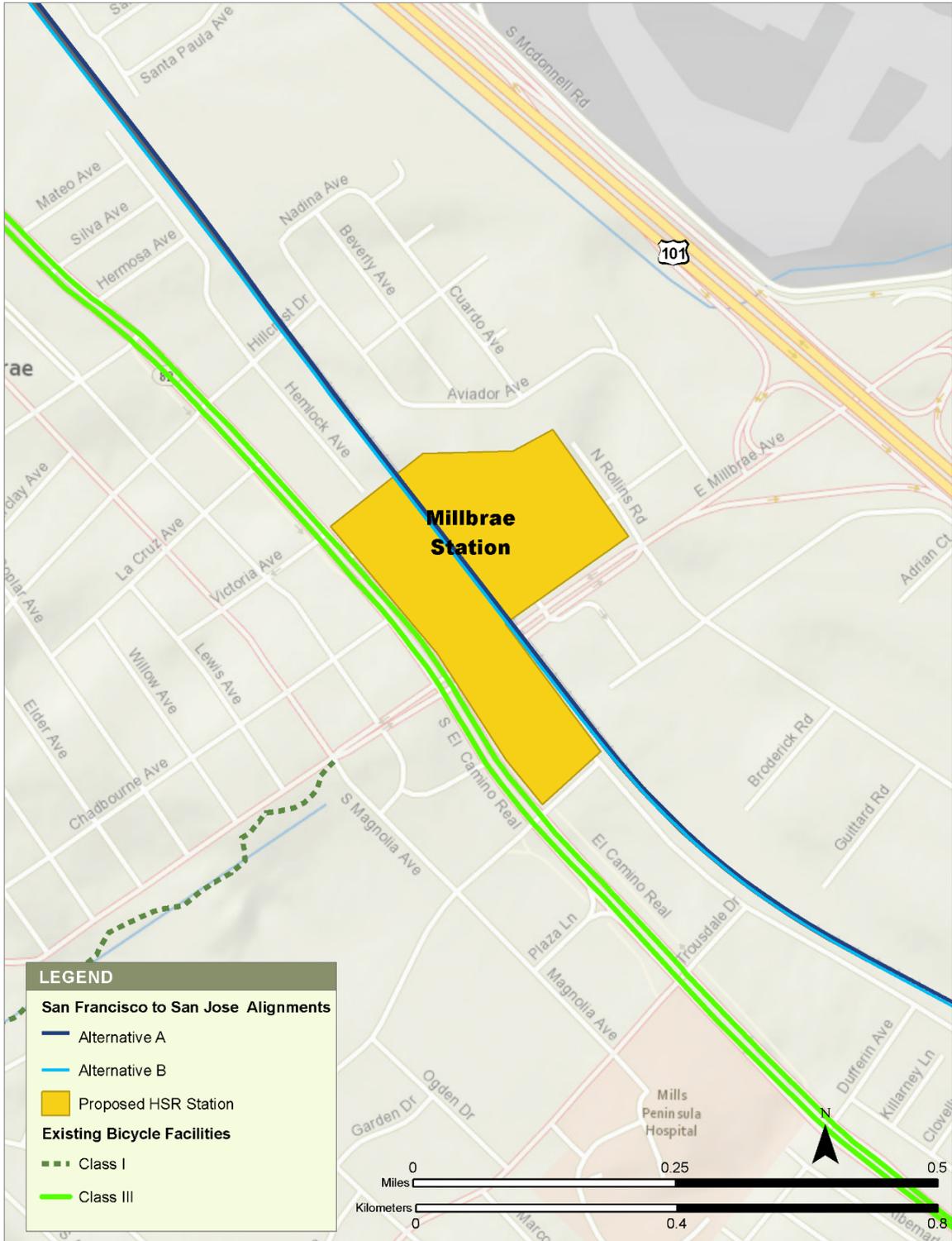
San Mateo to Palo Alto Subsection

Existing conditions for nonmotorized travel at the Hillsdale, Belmont, and San Carlos Caltrain Stations, which Alternative B would modify to provide passing tracks, are as follows:

- At the Hillsdale Caltrain Station, sidewalks connect the platform area to an adjacent parking facility with 518 spaces. The station has 18 bike racks and 12 City-run on-demand electronic bike lockers.
- At the Belmont Caltrain Station, sidewalks connect the platform area to an adjacent parking facility with 375 spaces. The station has 18 bike racks and 24 bike lockers.
- At the San Carlos Caltrain Station, there are 36 bike racks and 48 City-run on-demand electronic bike lockers. A multimodal transit center is currently under construction that includes a parking facility with 256 spaces and new bicycle and pedestrian access to San Carlos Avenue.

At the Atherton Station, where the HSR project would upgrade platforms to eliminate the hold-out rule, a sidewalk and plaza connects the platform area to an adjacent parking lot with 96 spaces. The station has 26 bike lockers.

⁵ The hold-out rule is the rule enforced at Caltrain stations that requires passengers to board and alight the train from between the active tracks. An oncoming train is forced to stop outside of the station zone until the passengers are safely clear.



Source: Authority 2019a

Figure 3.2-10 Millbrae Station Existing Bicycle Facilities

A pedestrian underpass or overpass, separated from the Caltrain right-of-way, is located at the Hayward Park, Hillsdale, Belmont, San Carlos, Redwood City, Menlo Park, Palo Alto, and California Avenue Caltrain Stations. A pedestrian underpass of the Caltrain right-of-way is located at F Street and Arroyo Avenue in San Carlos. The Embarcadero Bike Path is an approximately 0.9-mile trail located on the west side of the Caltrain right-of-way that connects the Palo Alto Caltrain Station to Churchill Avenue in Palo Alto.

Mountain View to Santa Clara Subsection

A pedestrian underpass or overpass, separated from the Caltrain right-of-way, is located at the San Antonio, Mountain View, Evelyn, Sunnyvale, and Lawrence Caltrain Stations. The Stevens Creek Trail overpass over the Caltrain right-of-way is just north of SR 85. An at-grade pedestrian crossing of the Caltrain right-of-way is located near North Frances Street in Sunnyvale.

San Jose Diridon Station Approach Subsection

Several streets in the San Jose Diridon Station project footprint include bicycle facilities (e.g., bicycle paths, lanes, parking, signage and signals, and cycle tracks). Santa Clara Street has Class II bicycle lanes in both directions, as does Park Avenue south of Montgomery Street. South of Crandall Street, Cahill Street provides green-painted Class II bicycle lanes in both directions; these lanes connect to buffered green-painted Class II bicycle lanes on West San Fernando Street. The existing bicycle facilities in the San Jose Diridon Station area are illustrated on Figure 3.2-11.

The station provides 16 bicycle parking spaces at outdoor bicycle racks, and 48 bicycle parking spaces in reserved lockers, for a total of 64 bicycle parking spaces. A 27-space Bay Area Bike Share station is located on the south side of Crandall Street.

Pedestrian facilities (e.g., sidewalks, curb ramps, marked crosswalks, sidewalk furniture such as benches or trash cans, and pedestrian signals) in the San Jose Diridon Station Approach Subsection include sidewalks throughout the station footprint, on both sides of Cahill Street, West San Fernando Street, Crandall Street, Stover Street, South Montgomery Street, West Santa Clara Street, and Park Avenue. Sidewalks are provided on all sides of the bus facility, and along the driveway between two parking facilities between Cahill Street and South Montgomery Street.

Most intersections in the station area provide marked pedestrian crossings on all approaches of the intersection. At the intersection of Santa Clara Street and Cahill Street, the north side of the intersection has a marked pedestrian crosswalk, and the east and south sides of the intersection have marked continental-style crosswalks.⁶ There is no crosswalk on the west side of the intersection. At the intersection of The Alameda, Stockton Avenue, and White Street, there are marked crosswalks on the north, west, and south sides of the intersection. There is no crosswalk on the east side of the intersection. Pedestrians and cyclists in the station area primarily travel in an east-west direction between San Jose Diridon Station and downtown San Jose. Pedestrian volumes increase substantially for short time periods before and after events at the SAP Center on Santa Clara Street.

⁶ Continental-style crosswalks use a high-visibility crosswalk pattern composed of thick, solid lines that cross the street perpendicular to the direction of pedestrian traffic.



Source: Authority 2019b

FEBRUARY 2020

Figure 3.2-11 San Jose Diridon Station Existing Bicycle Facilities

3.2.5.6 Freight Rail Service

Freight rail service in the Project Section is provided (as of December 2018) by the Union Pacific Railroad (UPRR) in accordance with the terms of a 1991 Trackage Rights Agreement (TRA) between UPRR and PCJPB (PCJPB 2015). Freight operation is restricted during the AM and PM peak periods and largely occurs during evening and night hours. The review of PCJPB dispatch data for freight operations in the project area in December 2012,⁷ indicated an average of three round trips per day that traverse portions of the RSA as follows (PCJPB 2015):

- **South City Switcher**—The South City Switcher operates early in the morning and serves industries located between South San Francisco and Pier 96 in San Francisco. Shippers include Granite Rock, Central Concrete and Pacific AgriProducts in South San Francisco; Sierra Point Lumber near the Bayshore Station; Dean’s Refrigerated Trucking off Carroll Avenue in San Francisco; Darling International, a rendering plant near Pier 96; and the Waste Solutions Group at Pier 96.
- **Broadway Local**—The Broadway Local starts operating around 5:30 p.m. and serves industries between South San Francisco and San Jose, such as the Port of Redwood City and the Unilever plant in Sunnyvale.
- **Mission Bay Hauler**—The Mission Bay Hauler starts operating around 6:30 p.m. and gathers up the outbound train cars brought in by the other two local train services and hauls them to the UPRR yard in Milpitas, then returns with the inbound cars for distribution by local services.

Railroad subdivisions⁸ and control points (CP)⁹ within the transportation RSA are illustrated on Figure 3.2-12 through Figure 3.2-14. Figure 3.2-15 illustrates the routes of daily freight service. North of CP Coast at Caltrain milepost (MP) 43.9 in Santa Clara, freight trains and Caltrain passenger trains both use the same tracks in the PCJPB-owned Caltrain corridor, although there are areas where freight has exclusive spur tracks and sidings that lead to customer locations outside the PCJPB right-of-way. Caltrain dispatches all tracks in the Caltrain corridor north of CP Lick, which is located in the Communication Hill area in San Jose, approximately 5 miles south of the San Jose Diridon Station.

Freight service varies in response to freight customer needs and activity. For example, there was a notable decline in freight operations during the 2008–2009 recession and slow recovery afterwards, but freight service has been increasing in recent years with the acceleration of the economic recovery. In addition to the routine daily traffic, freight operators also run periodic trains to serve nonroutine episodic freight needs. The Peninsula Freight Rail User’s Group estimates that the number of rail cars between San Jose and San Francisco over the past decade has averaged about 60 to 80 cars per day in each direction (once loaded, once empty). This translates to 20,000 to 30,000 loaded rail cars carrying 2 to 3 million tons of cargo between San Jose and the San Francisco Peninsula each year, the equivalent of at least 100,000 truck trips annually). During peak years in the past decade, the numbers were substantially higher (Peninsula Freight Rail Users’ Group 2014).

Where freight and HSR would share corridors, adequate clearance would need to be provided by the overhead passenger service wires to accommodate freight rail service. The review of dispatch data identified the highest freight car (or “load”) that PCJPB authorized on different portions of Caltrain corridor in the RSA.

⁷ This was the only data made available to HSR by Caltrain.

⁸ A railroad subdivision refers to a particular portion of a railroad line, similar to the way road names identify distinct roadway segments.

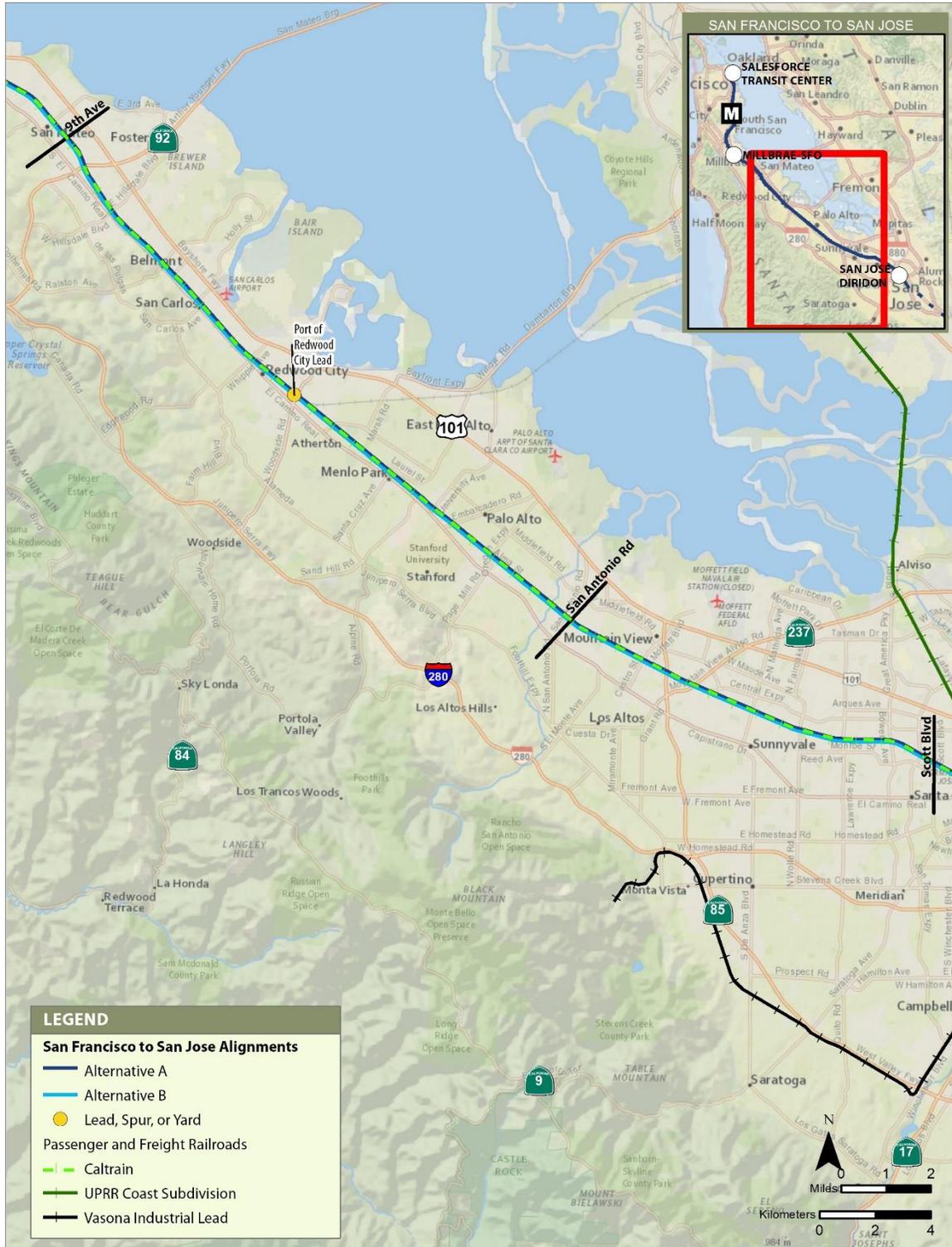
⁹ A control point is a location with signals where the dispatcher controls track access. Control points are commonly associated with track junctions.



Source: Authority 2019a

DECEMBER 2019

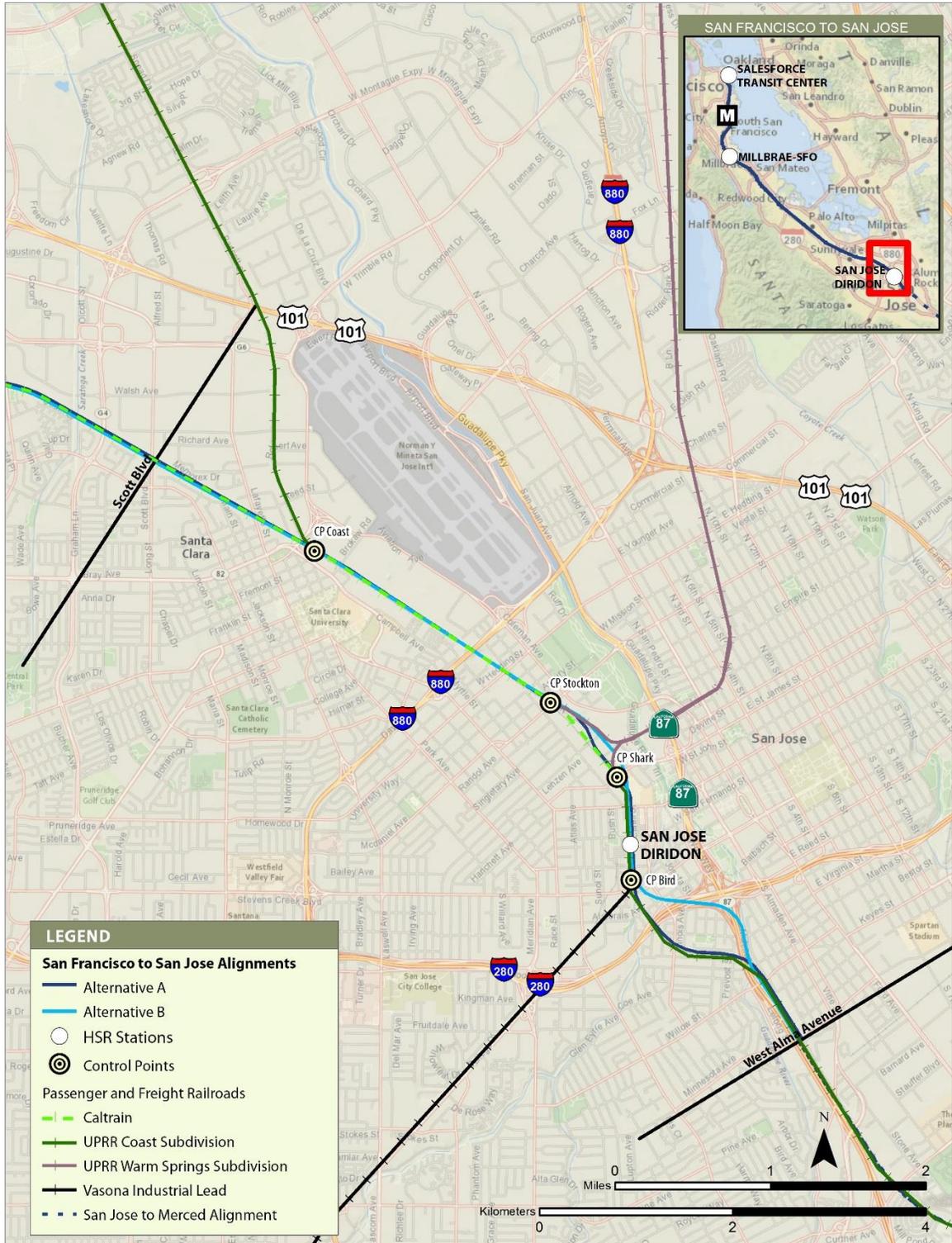
Figure 3.2-12 Railroad Control Points and Subdivisions in the RSA—Part 1 of 3



Source: Authority 2019a

DECEMBER 2019

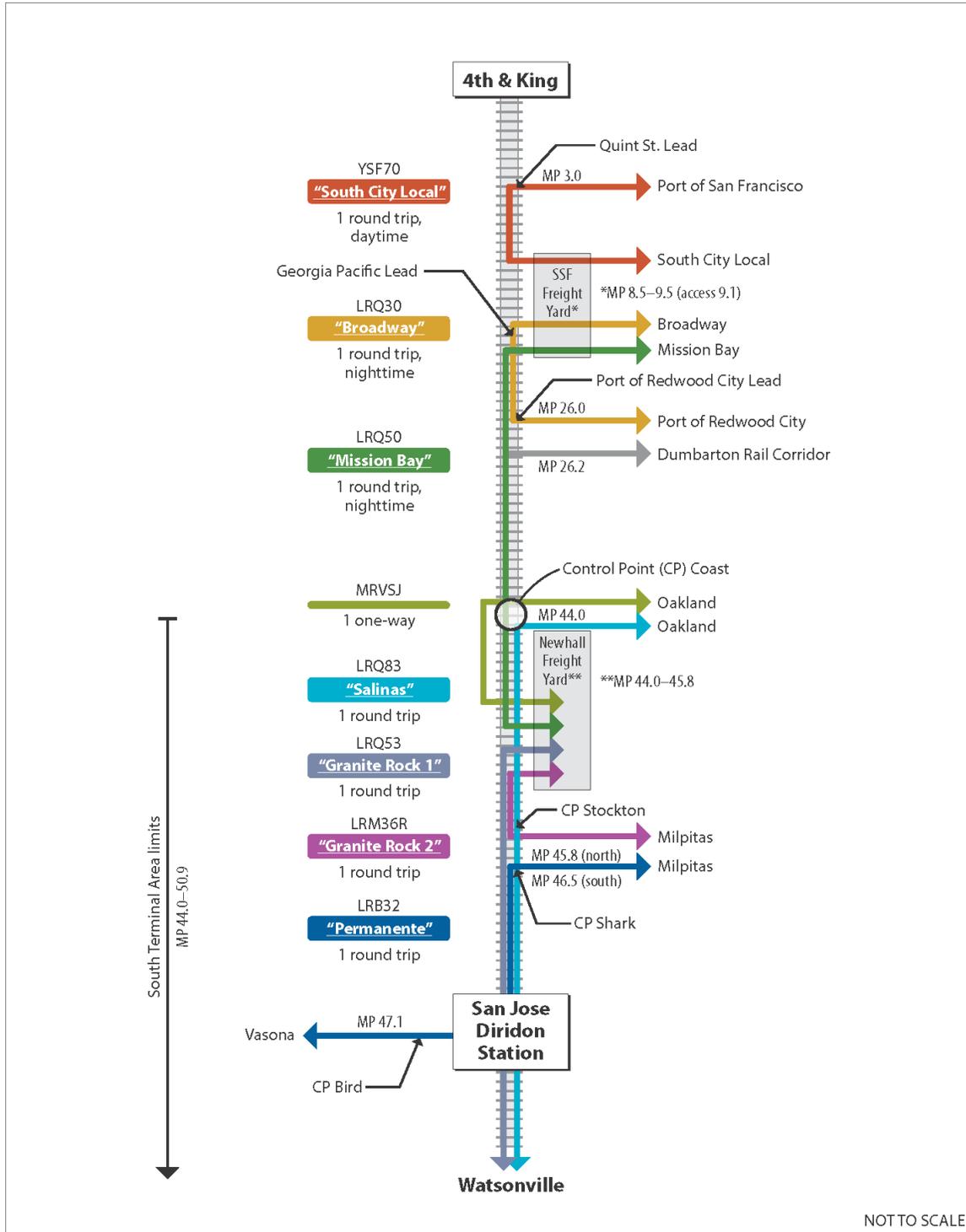
Figure 3.2-13 Railroad Control Points and Subdivisions in the RSA—Part 2 of 3



Source: Authority 2019b

DECEMBER 2019

Figure 3.2-14 Railroad Control Points and Subdivisions in the RSA—Part 3 of 3



Source: Authority 2019a

DECEMBER 2019

Figure 3.2-15 Daily Freight Service Routes

Trackage Rights Agreement between the Peninsula Corridor Joint Powers Board and Union Pacific Railroad

When the PCJPB acquired the Caltrain corridor, the PCJPB and the predecessor to UPRR, the Southern Pacific Transportation Company, entered into a TRA that established the rights of each of the parties relative to the corridor. The parties negotiated the TRA in 1991, with the understanding and expectation that passenger service would increase over time. This increase could ultimately affect the available times for freight operations in the corridor.

In December 2016, UPRR and the PCJPB agreed to a series of agreements related to the implementation of PCJPB's project to electrify the line that included a proposed transfer of the freight rights and intercity passenger rights from UPRR to the PCJPB for the portion of the Caltrain corridor from CP Coast north to San Francisco. The agreement established a three-phase process by which the PCJPB and UPRR would initiate a selection process to identify a third-party short-line railroad operator, select an operator and obtain Surface Transportation Board approvals, and then PCJPB would obtain the freight and intercity passenger rights for this portion of the Caltrain corridor, among other requirements. As of September 2019, the existing TRA is still in force for the Caltrain corridor until the transfer is implemented north of CP Coast and a new TRA is established for the area between CP Coast and CP Lick.

The following key requirements regard freight or passenger rights pursuant to the existing TRA and December 2016 agreement:

- The PCJPB owns the right-of-way, known as the Peninsula Main Line, associated tracks between San Francisco and CP Lick, and controls the commuter passenger rail rights.
- UPRR owns certain tracks along the corridor including the track referred to as MT1 from Santa Clara (CP Coast) southward.
- UPRR owns the freight rights and intercity passenger rail rights of the Caltrain corridor and has agreed conditionally to transfer the freight rights and intercity passenger rail rights north of CP Coast per the December 2016 agreement.
- The TRA does not limit freight service hours on the UPRR-owned MT1 track between CP Coast and CP Lick.
- The existing TRA, as amended by subsequent agreements with UPRR regarding the PCEP, establishes required vertical clearance heights at specific constrained locations along the corridor.¹⁰
- The existing TRA requires the PCJPB to allow for one daytime 30-minute freight window between 10 a.m. and 3 p.m. but the freight trains must be capable of operating at *commuter service train speeds* (up to 79 mph) and must do so if directed by the PCJPB. Once the PCJPB obtains the freight rights, it can amend this requirement north of CP Coast pursuant to the terms of a TRA to be entered into with the new freight operator selected pursuant to a competitive procurement process.
- The existing TRA requires the PCJPB to provide one track for exclusive freight use between midnight and 5 a.m. Once the PCJPB obtains the freight rights, it may be possible to modify this requirement north of CP Coast pursuant to the terms of a TRA to be entered into with the new freight operator selected pursuant to a competitive procurement process.
- Section 8.3(c) of the existing TRA recognizes that if PCJPB has a need to construct a transportation system that is a significant change in the method of delivery of commuter service and that system is inconsistent with freight service, the PCJPB can file for permission from the Surface Transportation Board to abandon freight service over the affected area and UPRR may not object to or oppose such a filing.

¹⁰ Within the Caltrain corridor from CP Lick to Scott Boulevard, the effective overhead clearance height in the TRA allows for Plate H equipment (20.25 feet).

3.2.5.7 Aviation

As described in greater detail in Section 3.11 and illustrated on Figure 3.2-1, there are four public airports within 2 miles of the project: SFO (0.22 mile from the track centerlines), San Carlos Airport (0.46 mile from the track centerlines), Moffett Federal Airfield (1.16 miles from the track centerlines), and SJC (0.30 mile from the track centerlines). SFO and SJC are large- and medium-hub commercial service airports that serve the cities and counties near the Project Section. Additionally, the Metropolitan Oakland International Airport (OAK) is a medium-hub commercial service airport that serves the Bay Area, although it is more than 2 miles from the project. A summary of the intercity service provided at SFO, SJC, and OAK is shown in Table 3.2-11. Moffett Federal Airfield is a joint civil-military airport located off US 101 in Mountain View, while the San Carlos Airport is a general aviation airport also located near the corridor.

Table 3.2-11 Commercial Air Travel in the San Francisco to San Jose Project Section Region

Airport	Total 2014 Enplanements	Number of Carriers Providing In State Service	In State Airports Served
San Francisco International (SFO)	22,770,783	8	Bakersfield, Burbank, Eureka, Fresno, Long Beach, Los Angeles, Monterey, Ontario, Orange County, Palm Springs, Redding, Sacramento, San Diego, San Luis Obispo, Santa Barbara
Norman Y. Mineta San Jose International (SJC)	5,069,257	5	Burbank, Long Beach, Los Angeles, Ontario, Orange County, San Diego
Metropolitan Oakland International Airport (OAK)	4,621,003	4	Crescent City, Santa Barbara, Orange County, Burbank, Long Beach, Los Angeles, Ontario, San Diego

Sources: FAA 2015; SJC 2017; SFO 2016; San Francisco International Airport Commission 2014

3.2.6 Environmental Consequences

3.2.6.1 Overview

This section discusses the potential transportation impacts that would result from construction and operation of the project alternatives as well as from the No Project Alternative. It is organized according to topic—intersections, parking, transit, nonmotorized travel, freight rail service, and aviation. Impacts on transportation would include intersection LOS effects, construction period impacts on adjacent properties, displacement of parking, impacts on feeder transit services, impacts on nonmotorized modes of travel such as bicycle and pedestrian facilities, impacts on freight service, and changes in air travel demand.

The project includes project features (IAMFs) that would minimize impacts on transportation during construction by requiring the contractor to develop and implement plans and actions to minimize or avoid potential construction disruptions (Volume 2, Appendix 2-E). These IAMFs include implementing construction hours and parking for construction vehicles, maintaining truck routes and construction for special events during construction of the project, maintaining bicycle and pedestrian access, protecting freight and passenger rail services, maintaining transit access and meeting design standards and guidance for transportation facilities.

However, temporary road closures and construction traffic, including traffic from truck deliveries and construction employee trips, would result in localized temporary impacts in a number of areas in the RSA. Permanent transportation impacts would result from the long-term presence of HSR track and systems, HSR operations, as well as an increase in localized trips near the stations. Localized impacts on intersection operations, transit service, and bicycle and pedestrian facilities are identified in the subsections that follow.

While the project alternatives may result in temporary traffic congestion during construction and operations at isolated areas around stations and within the project footprint, the overall effect of the project on transportation resources in the region and state would be beneficial through substantial reductions in VMT, increased transit connectivity, and reduction in the need to expand freeways and airports.

3.2.6.2 Roadways and Intersections (Vehicle Circulation)

Construction and operations of either project alternative would result in temporary and permanent changes to intersections to accommodate the new HSR infrastructure. Construction would affect intersections through temporary road closures and relocations causing temporary diversion of traffic onto other roadways and freeways. Project-related construction traffic would affect vehicle circulation and access in areas where construction activities occur, either through the temporary closure of traffic lanes or through heavy truck traffic, as materials are brought to the construction site and demolished or excavated materials are hauled away. Operations would affect intersections through traffic generated by passengers traveling to and from the station areas and employees and visitors traveling to and from the LMF. Project trips would affect intersection LOS by increasing the amount of traffic traveling to and from the station, contributing to longer delays. The addition of HSR trains would increase the number of times gates are down for passing trains at the at-grade crossings, which would affect vehicle circulation and access because of increased delays at adjacent intersections.

No Project Conditions

No Project conditions are studied for two future years—2029 and 2040. The 2029 No Project condition evaluates intersections around the 4th and King Street Station, serving as the interim HSR terminal station at this time. The 2040 No Project condition evaluates intersections at all locations other than the 4th and King Street Station between San Francisco to San Jose, including the Millbrae Station, the San Jose Diridon Station, the Brisbane LMF sites, and areas adjacent to at-grade crossings.

The population in the Bay Area is expected to see continued growth through 2040 (Section 2.6.1.1, Projections Used in Planning). Development in the Bay Area to accommodate the population increase would continue under the No Project conditions and result in associated direct and indirect impacts on transportation. Planned and other reasonably foreseeable projects anticipated to be built by 2029 and 2040 including shopping centers, industrial parks, transportation projects, and residential developments. A full list of anticipated future development projects is provided in Volume 2 in Appendix 3.18-A, Cumulative Nontransportation Plans and Projects List, and Appendix 3.18-B, Cumulative Transportation Plans and Projects Lists. The forecasts for the intersection evaluation were prepared using an updated version of the travel model developed for the Caltrain PCEP EIR (PCJPB 2015). The land use data in the updated model was taken from socioeconomic data forecasts developed by ABAG.

Although future transportation improvement projects as identified in RTPs (Volume 2, Appendix 3.18-B) would provide transportation benefits such as expanded capacity, improving safety, and reducing traffic volumes in the short term, the programmed transportation network capacity improvements would not be enough to meet long-term future demand and population growth. Under the No Project conditions, traffic volumes on regional roadways would continue to increase because of anticipated development activity through 2040, thereby affecting existing intersections and resulting in increased delays and a degradation of LOS.

To accommodate continued growth in the Bay Area, programmed transportation improvements would expand existing capacity. Without the additional capacity provided by the project, additional improvements to highways, airports, and other transportation facilities beyond those currently programmed would be required to meet the growing demand regionally and statewide. The Authority estimates that additional highway and airport projects (up to 4,300 highway lane miles, 115 airport gates, and 4 airport runways) would be needed to achieve equivalent capacity and relieve the increased pressure (Authority 2012). Table 3.2-12 shows the improvements programmed for implementation by 2029 and 2040. The improvements consist primarily of

individual interchange improvements and roadway widening projects on segments of the existing transportation network.

Table 3.2-12 2029 and 2040 No Project Conditions Roadway Improvements

Transportation Change	Source	2029 ¹	2040
All Subsections			
Caltrain PCEP	PCEP EIR	X	X
San Francisco to South San Francisco Subsection			
Central Subway Project	San Francisco Municipal Transportation Agency Short Range Transit Plan	X	X
16th Street Improvement Project—Center transit-only lanes	San Francisco Municipal Transportation Agency Short Range Transit Plan	X	X
Van Ness BRT Project	San Francisco Municipal Transportation Agency Short Range Transit Plan	X	X
Geary BRT Project	San Francisco Municipal Transportation Agency Short Range Transit Plan	X	X
Fourth Street and King Street Intersection—Prohibit all left turn movements	Central Subway SEIS/SEIR Addendum No. 2	X	X
Fourth Street—Reduce to one southbound travel lane from Bryant Street to Bluxome Street	Central Subway SEIS/SEIR Addendum No. 2	X	X
Caltrain/HSR Downtown San Francisco Extension Project	Plan Bay Area 2040		X
Caltrain Bayshore Station Multimodal Transit Center	Plan Bay Area 2040		X
SamTrans El Camino Real Express Rapid Bus Project—Route ECR (Redwood City Transit Center to Daly City BART)	El Camino Real Bus Rapid Transit Phasing Study		X
Caltrain PCEP mitigation—Seventh Street/16th Street intersection	PCEP EIR		X
Caltrain PCEP mitigation—Tunnel Avenue/Blanken Avenue intersection	PCEP EIR		X
US 101/Candlestick Point Interchange Project	Plan Bay Area 2040		X
Geneva Avenue Extension—Bayshore Boulevard to US 101	Plan Bay Area 2040		X
US 101/Sierra Point Parkway Interchange Project	Plan Bay Area 2040		X
Harney Way widening	Plan Bay Area 2040		X
San Bruno to San Mateo Subsection			
SamTrans El Camino Real Express Rapid Bus Project—Route ECR (Redwood City Transit Center to Daly City BART)	El Camino Real Bus Rapid Transit Phasing Study		X
California Drive extension	Millbrae Station Area Specific Plan		X
Millbrae Avenue widening	Millbrae Station Area Specific Plan		X

Transportation Change	Source	2029 ¹	2040
Skyline Boulevard (SR 35) widening	Plan Bay Area 2040		X
US 101/Broadway Interchange Reconstruction Project	C/CAG San Mateo Countywide Transportation Plan 2040		X
Caltrain PCEP mitigation—Carolan Avenue/Broadway Avenue intersection	PCEP EIR		X
Caltrain PCEP mitigation—Oak Grove Avenue/Carolan Avenue intersection	PCEP EIR		X
Caltrain PCEP mitigation—El Camino Real/Hillsdale intersection	PCEP EIR		X
Caltrain PCEP mitigation—South B Street/Ninth Avenue intersection	PCEP EIR		X
San Mateo to Palo Alto Subsection			
25th Avenue Grade-Separation Project	C/CAG San Mateo Countywide Transportation Plan 2040	X	X
Redwood City Streetcar Project	Redwood City General Plan		X
Redwood City Ferry Service to San Francisco	C/CAG San Mateo Countywide Transportation Plan 2040		X
Caltrain PCEP mitigation—El Camino Real/Watkins intersection	PCEP EIR		X
Caltrain PCEP mitigation—El Camino Real/Glenwood intersection	PCEP EIR		X
El Camino Real/Ravenswood intersection project	City of Menlo Park 5-Year Capital Improvement Plan		X
Caltrain PCEP mitigation—El Camino Real/Alma Street/Sand Hill Road intersection	PCEP EIR		X
Charleston Road/Arastradero corridor project	Charleston-Arastradero Corridor Plan Addendum to the Final Initial Study/Mitigated Negative Declaration		X
Charleston Road/Wilkie intersection project	Charleston-Arastradero Corridor Plan Addendum to the Final Initial Study/Mitigated Negative Declaration		X
Mountain View to Santa Clara Subsection			
BART Extension to Santa Clara	Plan Bay Area 2040		X
Caltrain PCEP mitigation—Villa St/Castro St intersection	PCEP EIR		X
San Jose Diridon Station Approach Subsection			
Hedding Street road diet ²	Envision: San José 2040 General Plan		X
Signal modifications	Diridon Station Area Plan		X
Montgomery Street conversion to two-way traffic	Diridon Station Area Plan		X
Montgomery Street closure south of West San Fernando	Diridon Station Area Plan		X

Transportation Change	Source	2029 ¹	2040
Autumn Street conversion to two-way traffic	Diridon Station Area Plan		X
New facility: Autumn Street extension	Envision: San José 2040 General Plan		X
Park Avenue road diet ²	Envision: San José 2040 General Plan		X
Bird Avenue road diet ²	Envision: San José 2040 General Plan		X
Delmas Avenue and West Santa Clara Street new traffic signal	San Jose City Council Resolution No. 7746		X
Coleman Avenue widening	Envision: San José 2040 General Plan		X

Sources: ABAG and MTC 2017; San Francisco Municipal Transportation Agency 2019; City and County of San Francisco 2018b; SamTrans 2014; City of Millbrae 2016b; C/CAG San Mateo County 2017; Redwood City 2010; City of Menlo Park 2015; City of Palo Alto 2015; PCJPB 2015; City of San Jose 2014, 2016, 2018

BART = Bay Area Rapid Transit

C/CAG = City/County Association of Governments

EIR = environmental impact report

HSR = high-speed rail

PCEP = Peninsula Corridor Electrification Project

SamTrans = San Mateo County Transit District

SEIS/SEIR = supplemental environmental impact statement/supplemental environmental impact report

SR = State Route

US = U.S. Highway

¹ The 2029 scenario analysis is conducted for the 4th and King Street Station area only. Projects outside the 4th and King Street Station area are evaluated for the 2040 scenarios.

² A road diet is a reduction in roadway capacity, usually achieved by removing lanes.

The number of intersections forecast to operate at LOS E or F in the 2029 and 2040 No Project conditions are shown by subsection in Table 3.2-13 (Volume 2, Appendix 3.2-A provides the LOS for all intersections). The traffic generated by projected jobs and population throughout each of the subsections will create high demand volumes and congested roadways. The high level of congestion is attributed to the projected volumes and constrained roadway choices, particularly at the rail crossings.

Table 3.2-13 2029 and 2040 No Project Intersection Operations

Subsection	Number of Study Intersections	Intersections Operating at LOS E or F		
		Existing	2029 No Project	2040 No Project
San Francisco to South San Francisco Subsection				
4th and King Street Station (2029 only)	19	9	14	N/A
At-grade crossings along track alignment	7	1	N/A	7
Brisbane LMF	15	1	N/A	4
San Bruno to San Mateo Subsection				
Millbrae Station	16	5	N/A	11
At-grade crossings along track alignment	40	3	N/A	34
San Mateo to Palo Alto Subsection				
At-grade crossings along track alignment	49	13	N/A	43
Mountain View to Santa Clara Subsection				
At-grade crossings along track alignment	11	7	N/A	11

Subsection	Number of Study Intersections	Intersections Operating at LOS E or F		
		Existing	2029 No Project	2040 No Project
San Jose Diridon Station Approach Subsection				
San Jose Diridon Station	50	0	N/A	26
Totals	207	39	14	136

Sources: Authority 2019a, 2019b
 LMF = light maintenance facility
 LOS = level of service
 N/A = not applicable

Project Impacts

Impact TR#1: Continuous Permanent Impacts on Vehicle Miles Traveled

When operational, the HSR system would divert vehicle trips from airports and other intercity travel hubs, and shift vehicle trips to train trips. This diversion of trips, even with the addition of new trips at the stations and the LMF, would change regional and statewide travel patterns. Overall, the impacts of these shifts and changes would be a reduction in VMT. Table 3.2-14 presents VMT under 2029 and 2040 No Project and Plus Project conditions.

Table 3.2-14 2029 and 2040 No Project and Plus Project Vehicle Miles Traveled

County	2029 Conditions		2040 Conditions	
	No Project	Plus Project	No Project	Plus Project
San Francisco County	2,530,115,205	2,512,386,260	2,720,965,133	2,696,558,412
San Mateo County	4,735,476,352	4,669,242,422	4,963,026,084	4,872,739,813
Santa Clara County	12,185,576,908	12,026,726,990	13,201,830,628	12,971,953,362

Source: Authority 2017b

Under 2029 and 2040 Plus Project conditions, annual total VMT in San Francisco County, San Mateo County, and Santa Clara County would be reduced compared to 2029 and 2040 No Project conditions. This reduction in VMT would be the same for both project alternatives because ridership and trip diversion associated with the project alternatives would be the same.

For the 2029 and 2040 Plus Project conditions, vehicle trips around the stations would increase because of the addition of passengers and HSR workers traveling to station areas. The impacts at the stations would be offset by the overall decrease in VMT throughout the region and the state.

CEQA Conclusion

The impact under CEQA would be less than significant for both project alternatives because the 2029 and 2040 Plus Project conditions would not result in a net increase of VMT over the baseline condition. The project would result in an overall decrease in VMT throughout the region and the state, resulting in a beneficial impact on VMT. The project would also be fully consistent with CEQA Guidelines Section 15064.3. Therefore, CEQA does not require any mitigation.

Construction Impacts

Construction of the project alternatives would consist predominantly of track modifications, relocation of OCS poles, and installation of communication radio towers, four-quadrant gates at at-grade crossings, and perimeter fencing along the right-of-way. At certain locations along the corridor the project would temporarily or permanently relocate or close roadways, modify and expand existing stations, expand or build new structures, and build a new LMF and additional passing tracks and viaduct (under Alternative B). Activities associated with building this

infrastructure include establishing equipment and materials storage areas close to construction sites, demolition of existing structures to expand the existing Millbrae Station; clearing and grubbing; handling, storing, hauling, excavating, and placing fill; possible pile driving; construction and modifications of bridges and roadways; and utility relocations. Chapter 2, Alternatives, describes construction activities.

Impact TR#2: Temporary Congestion/Delay Consequences on Intersections from Temporary Road Closures, Relocations, and Modifications

Construction activities associated with the stations, LMF, platform modifications, installation of four-quadrant gates at at-grade crossings, and track modifications would require temporary roadway closures or modifications, lane closures and underground utility work that would lead to changes in vehicle circulation, temporary disruption of transportation systems operations, and possible damage to the roadway system such as pavement and bridges. Changes related to major roadways and intersections would include:

- Temporary full or partial roadway closures, with associated detours.
- Temporary lane closures with associated detours.
- Temporary damage to pavement conditions from construction traffic and rerouting.
- Temporary changes to traffic signal operations, timing, or phasing to accommodate project construction.
- Temporary lane width reductions and reduced speed limits.
- Temporary loss of or modifications to parking, bicycle facilities, or pedestrian facilities.

Exact locations of temporary closures, changes, and disruptions would be determined and minimized during the development of a construction transportation plan (CTP).

Construction of stations, Brisbane LMF, platform modifications, installation of four-quadrant gates at at-grade crossings, track modifications, and passing track and associated structure modifications would require temporary construction easements (TCE), which would require the temporary closures of parking areas or roadway travel lanes, and the construction of overcrossings and interchanges. These activities would result in increased traffic congestion on roadways and intersections from lane or street closures, diversions in traffic from temporary detours, and other temporary disruptions to traffic.

In the San Francisco to South San Francisco Subsection, Alternatives A and B would have similar construction effects. Temporary lane closures would occur where four-quadrant gates would be installed at three existing at-grade crossings for both project alternatives. Modifications to the existing 4th and King Street Station and Bayshore Station for both project alternatives would also require temporary lane closures. Construction of the East Brisbane LMF under Alternative A would require the realignment of Tunnel Avenue to the east to allow for construction of the LMF, and a temporary street closure to reconnect both ends of the realigned segment. Construction of either the East or West Brisbane LMF would require a realignment of the Tunnel Avenue overpass and extension of Lagoon Road in Brisbane, which would require temporary street closures to reconnect these realigned streets. The realignment of the Tunnel Avenue overpass would also include relocating the southern terminus of Tunnel Avenue from the Bayshore Boulevard/Old County Road intersection to the Bayshore Boulevard/Valley Drive intersection, which may require temporary lane closures at these intersections.

In the San Bruno to San Mateo Subsection, Alternatives A and B would have the same construction effects. Temporary road or lane closures would occur as a result of construction of improved access roads on the west side of Millbrae Station including the extension of California Drive and closure of Serra Avenue. The Hillcrest Boulevard underpass north of the Millbrae Station would be widened and may require a potential road or lane closure under both project alternatives. Temporary lane closures may occur where four-quadrant gates would be installed at 16 existing at-grade crossings for both project alternatives.

In the San Mateo to Palo Alto Subsection, Alternative B would have greater construction effects given the additional track and station modifications associated with construction of the passing track that would extend through San Mateo, Belmont, San Carlos, and into the northern portion of Redwood City. Alternative B would replace the Ralston Avenue underpass in Belmont and the Holly Street underpass in Redwood City. Alternative B would also extend existing underpasses at 25th Avenue, 28th Avenue, 31st Avenue, and 42nd Avenue in San Mateo; Harbor Boulevard in Belmont; and Brittan Avenue and Howard Avenue in San Carlos. Temporary lane closures may occur where four-quadrant gates would be installed at 15 existing at-grade crossings for both alternatives. These construction activities would cause temporary delays, with the construction duration of the individual grade-separation modifications associated with the passing track for Alternative B lasting 6 to 9 months each and installation of four-quadrant gates for both project alternatives typically lasting 2 to 4 weeks. However, actual roadway closures would not be required for these construction activities, which would be short in duration and would occur mostly at night.

In the Mountain View to Santa Clara Subsection, Alternatives A and B would have the same construction effects. Temporary lane closures may occur where four-quadrant gates would be installed at four existing at-grade crossings for both project alternatives.

In the San Jose Diridon Station Approach Subsection, Alternative A would have fewer construction effects than Alternative B (both viaduct options) because construction would primarily occur in the existing UPRR right-of-way, although substantial widening of the existing overcrossings would be required. These activities would result in temporary highway lane closures and width reductions, reduced speed limits, temporary on- and off-ramp closures, detours, and temporary freeway closures. The duration of these effects would range from several hours in the case of a short-term freeway lane closure to months in the case of substantial roadway modifications. Alternative B would have greater construction activities to construct viaduct structures, which would include a new HSR overcrossing of I-280 and construction of foundations for bridge pier footings, placement of structural elements, and removal of falsework, and relocation of utilities. Alternative B (Viaduct to I-880) would have fewer construction effects than Alternative B (Viaduct to Scott Boulevard) because the northern terminus of dedicated HSR track on viaduct would be at I-880 rather than Scott Boulevard. Viaduct construction in this subsection would extend approximately 2.4 miles further north under Alternative B (Viaduct to Scott Boulevard), thereby affecting properties and transportation facilities in those areas for up to a year. This includes construction of a new Lafayette Street bridge and conversion of West Hedding Street and De La Cruz Boulevard from overpasses to underpasses. Under both alternatives, a limited number of weekend full closures of I-280 would be required to construct the overcrossing of the freeway. These closures would be done in close coordination with Caltrans.

To reduce traffic conflicts caused by construction, the contractor would prepare a CTP (TR-IAMF#2). The CTP, which would be reviewed and approved by the Authority, would address, in detail, the activities to be carried out in each construction phase. The CTP would provide a traffic control plan that would identify when and where temporary closures and detours would occur, with the goal of maintaining traffic flow, especially during peak travel periods. The traffic control plan would be developed for each affected location and would include, at a minimum, signage to alert drivers to the construction zone, traffic control methods, traffic speed limitations, and alternative access and detour provisions during road closures. Any temporary closure or removal of parking areas or roadways during construction would be restored upon completion of construction. Efforts would be made to minimize their removal or shorten the length of time these facilities are inoperable to the extent possible.

CEQA Conclusion

Construction of both project alternatives would require temporary roadway or lane closures that would result in an increase in congestion and intersection delay. Under CEQA, automobile delay is not a significant environmental impact.

Impact TR#3: Temporary Congestion/Delay Consequences on Major Roadways and Intersections from Construction Vehicles

Construction of stations and the Brisbane LMF, platform modifications, installation of four-quadrant gates at at-grade crossings, track modifications, and passing track and viaduct (Alternative B) would result in construction traffic, including heavy truck traffic entering and exiting construction sites to deliver materials, transport demolished or excavated materials, and move heavy construction equipment onto the construction site. Use of heavy equipment and delivery or removal of materials by trucks has the potential to add traffic, especially if movements occur during morning or evening peak periods. Construction traffic would also result from construction worker trips. Worker vehicles entering and leaving the job sites at the beginning and end of shifts have the potential to increase delays on roadways and at intersections. Construction traffic could lead to interference with local vehicle circulation and operational hazards.

The construction traffic effects would be similar for the two project alternatives for the San Francisco to South San Francisco, San Bruno to San Mateo, and Mountain View to Santa Clara. In the San Mateo to Palo Alto Subsection, the differences would be pronounced because of a higher level of construction vehicle traffic related to the passing tracks through San Mateo, Belmont, San Carlos, and into the northern portion of Redwood City under Alternative B. As noted earlier, construction of the passing track under Alternative B would require replacement of the Ralston Avenue underpass in Belmont and the Holly Street underpass in Redwood City, as well as extension of the existing underpasses at 25th Avenue, 28th Avenue, 31st Avenue, and 42nd Avenue in San Mateo; Harbor Boulevard in Belmont; and Brittan Avenue and Howard Avenue in San Carlos. In the San Jose Diridon Station Approach Subsection, construction vehicle traffic related to the San Jose Diridon Station under both alternatives as well as construction of the viaduct under Alternative B would affect local vehicle circulation.

Standard construction procedures related to traffic management would be used, including development of a CTP (TR-IAMF#2), which would be reviewed and approved by the Authority and would include details on the activities to be carried out during each construction phase, including construction vehicle operations. The CTP would include a detailed traffic control plan for each affected location, which would be implemented prior to any construction activities. The traffic control plan would identify when and where temporary closures and detours would occur, with the goal of maintaining traffic flow, especially during peak travel periods. At a minimum, the traffic control plan would include temporary signage to alert drivers to the construction zone, personnel operating flags or other methods of traffic control, traffic speed limitations, identified construction traffic routes, and provisions to allow safe access to residences and business to reduce effects on major roadways from construction vehicle traffic.

All truck traffic, either for transporting excavated materials from the site or for transporting construction materials to the site, would use the designated truck routes in each city (TR-IAMF#7) to the extent feasible. As part of the CTP, truck routes would be established away from schools, childcare centers, and residences, or along the routes with the least effect to minimize operational hazards. A detailed construction access plan would be developed and implemented for the project prior to any construction activities. The construction access plan would be reviewed by local city, county, and transit agencies. The movement of heavy construction equipment such as cranes, bulldozers, and dump trucks to and from the site would generally occur during off-peak hours on designated truck routes. Once on-site, heavy construction equipment would remain until its use for that job is completed so that equipment is not moved repeatedly to and from the construction site over public streets.

Trips for construction workers would generally occur outside of peak hours for roadway and freeway traffic. The contractor would limit the number of construction employees arriving or departing the site between the hours of 7:00 a.m. and 8:30 a.m. and 4:30 p.m. and 6:00 p.m. (TR-IAMF#6). The contractor would also limit construction material deliveries between 7:00 a.m. and 9:00 a.m. and 4:00 p.m. and 6:00 p.m. on weekdays to reduce traffic conflicts generated by construction traffic.

CEQA Conclusion

Construction of the two project alternatives would involve temporary construction vehicle operations that would interfere with local vehicle circulation resulting in delays or reductions in peak hour LOS operations. Under CEQA, automobile delay is not a significant environmental impact. Project features include actions to control and manage construction vehicle traffic through implementation of traffic control plans for each affected location prior to beginning construction activities, which would include efforts to minimize effects on major roadways from construction vehicle traffic through signage to alert drivers, traffic control methods, construction traffic routes, and alternative access and detour provisions. In addition, construction worker trips and material deliveries would be limited to off-peak hours for roadway traffic.

Impact TR#4: Permanent Congestion/Delay Consequences on Intersections from Permanent Road Closures and Relocations

Permanent roadway closures and roadway modifications associated with the construction of the project would cause shifts in travel patterns. Construction of either project alternative would require changes to be made to the roadway network to accommodate the stations, track modifications, the Brisbane LMF, and passing track and viaduct (Alternative B only). Table 3.2-15 shows the permanent roadway closures and changes proposed by each project alternative. In addition to these permanent roadway closures and changes, the project alternatives would install four-quadrant gates at 38 to 40 at-grade crossings at the locations listed in Table 2-14 of Chapter 2.

Table 3.2-15 Permanent Roadway Closures and Changes by Subsection and Alternative

Roadway	Type of Change	Description of Change	Alternative	
			A	B
San Francisco to South San Francisco Subsection				
Tunnel Avenue	Road realignment	Realign Tunnel Avenue to east	X	
Tunnel Avenue overpass	Grade-separation modification	Relocate Tunnel Avenue overpass and southern terminus connection to Valley Drive at Bayshore Boulevard	X	X
Lagoon Road	Road extension	Extend Lagoon Road to west to new Tunnel Avenue overpass	X	X
San Bruno to San Mateo Subsection				
Hillcrest Boulevard	Grade-separation modification	Widen existing underpass	X	X
California Drive	Road extension	Extend California Drive north to Victoria Avenue, to replace Serra Avenue	X	X
Serra Avenue	Road closure	Road closure	X	X
San Mateo to Palo Alto Subsection				
Ralston Avenue	Grade-separation modification	Replace underpass		X
Holly Street	Grade-separation modification	Replace underpass		X
25th Avenue	Grade-separation modification	Extend underpass		X
28th Avenue	Grade-separation modification	Extend underpass		X
31st Avenue	Grade-separation modification	Extend underpass		X
42nd Avenue	Grade-separation modification	Extend underpass		X

Roadway	Type of Change	Description of Change	Alternative	
			A	B
Harbor Boulevard	Grade-separation modification	Extend underpass		X
Brittan Avenue	Grade-separation modification	Extend underpass		X
Howard Avenue	Grade-separation modification	Extend underpass		X
Mountain View to Santa Clara Subsection				
None				
San Jose Diridon Station Approach Subsection				
Grant Street	Other roadway modification	Shorten road		X ²
De la Cruz Boulevard	Grade separation	Changes from overcrossing to undercrossing		X ²
West Hedding Street	Other roadway change	Rebuild existing overcrossing		X ¹
West Hedding Street	Grade separation	Change from overcrossing to undercrossing		X ²
Stockton Avenue	Road closure	Convert to a cul-de-sac		X ^{1,2}
University Avenue	Road closure	Convert to a cul-de-sac		X ^{1,2}
Emory Street	Road closure	Convert to a cul-de-sac		X ^{1,2}
Chestnut Street	Road closure	Realign; close from Asbury Street to West Taylor Street		X ^{1,2}
West Taylor Street	Grade separation	Build new HSR overcrossing alongside existing Caltrain overcrossing		X ¹
West Taylor Street	Grade separation	Build new HSR overcrossing alongside existing Caltrain overcrossing	X	
West Taylor Street	Alignment change	Realign westbound Taylor Street to northbound Chestnut Street		X ²
North Montgomery Street	Other roadway change	Extend to maintain property access		X ^{1,2}
Stover Street	Other roadway change	Extend Stover Street from South Montgomery Street to Autumn Street		X ^{1,2}
Crandall Street	Other roadway change	Extend from South Montgomery Street to Autumn Street		X ^{1,2}
Cahill Street	Other roadway change	Extend to Park Avenue and convert lanes to transit-only		X ^{1,2}
Cahill Street	Other roadway change	Extend to Otterson; convert to transit-only lanes	X	
Bird Avenue	Other roadway change	Rebuild existing underpasses	X	
Delmas Avenue	Other roadway change	Rebuild existing underpasses	X	

Roadway	Type of Change	Description of Change	Alternative	
			A	B
SR 87 On-Ramp	Alignment change	Realign ramp		X ^{1,2}
Fuller Avenue	Alignment change	Realign Fuller Avenue cul-de-sac	X	

Sources: Authority 2019a, 2019b

I = Interstate

SR = State Route

¹ Alternative B (Viaduct to I-880)

² Alternative B (Viaduct to Scott Boulevard)

The only substantive permanent roadway changes would be the realignment of Tunnel Avenue for the East Brisbane LMF under Alternative A; the realignment of the Tunnel Avenue overpass, extension of Lagoon Road, and new southern connection of Tunnel Avenue to the intersection of Bayshore Boulevard and Valley Drive associated with the East or West Brisbane LMF under both project alternatives; the closure of Serra Avenue, widening of the Hillcrest Boulevard underpass, and extension of California Drive to Victoria Avenue on the west side of the Millbrae Station for both project alternatives; and the closure of Stockton Avenue and University Avenue to through traffic for Alternative B (Viaduct to I-880). The remaining roadway modifications would involve widening, extending, or replacing existing grade separations.

The permanent road changes would not affect roadway operations with two exceptions. Realignment of the Tunnel Avenue overpass for both alternatives would relocate the southern terminus of Tunnel Avenue from the Bayshore Boulevard/Old County Road intersection to the Bayshore Boulevard/Valley Drive intersection. This would affect operations at both intersections. An evaluation of Existing Plus Project conditions at these two intersections indicated that the intersections would operate at LOS D or better with the realignment of the Tunnel Avenue overpass. Additionally, the permanent closures and modifications to the roadway network in the San Jose Diridon Station Approach Subsection would result in some shifting of traffic, but there would be no changes to the capacity of modified roadways. Within the San Jose Diridon Station Approach Subsection, all 50 intersections would continue to operate at LOS D or better.

At the Millbrae Station, both project alternatives would widen the Hillcrest Boulevard underpass, extend California Drive to Victoria Avenue to replace Serra Avenue, and close Serra Avenue. Alternative A would also realign Tunnel Avenue to the east to allow for construction of the East Brisbane LMF. Alternative B would replace two underpasses and extend seven underpasses to allow construction of the passing tracks. These roadway modifications would not change the capacity of the roadway network.

Prior to construction, the contractor would provide a photographic survey documenting the condition of the public roadways along truck routes providing access to the project site. The contractor would be responsible for the repair of any structural damage to public roadways caused by HSR construction or construction access, returning any damaged sections to the equivalent of their original pre-HSR construction access condition or better (TR-IAMF#1).

CEQA Conclusion

The changes to the geometry and capacity of intersections would realign and replace roadways and modify intersections but would not cause a degradation in operations of the roadway network. The project alternatives would not result in delays or reductions in peak-hour traffic operations from permanent road closures and relocations. Under CEQA, automobile delay is not a significant environmental impact.

Operations Impacts

HSR service between San Francisco and San Jose would become operational in 2029 with Silicon Valley to Central Valley service to 4th and King Street Station initially. HSR service would become fully operational by 2033 and would service the SFTC, Millbrae, and San Jose Diridon Stations. Trains would be maintained at the Brisbane LMF. Passengers traveling to the station

areas and maintenance workers traveling to the LMF in vehicles would add vehicle trips to the roadway network. Operations and maintenance (O&M) activities are described in Section 2.8, Operations and Service Plan.

Once the project is operational, vehicle trips around the stations would increase as passengers and HSR workers travel to station areas. Many of these trips would occur during peak hours. In 2029, the project would generate approximately 360 peak hour vehicle trips at the 4th and King Street Station. In 2040, the project would generate approximately 280 peak hour vehicle trips at the Millbrae Station. In 2040, the project would generate approximately 1,100 peak hour vehicle trips at San Jose Diridon Station. The addition of HSR trains would increase the number of gate-down events at at-grade crossings by up to an additional eight times per hour with four new HSR trains in service (i.e., two added gate-down events per hour per train round trip). This added traffic combined with an increase in gate-down events at at-grade crossings from added HSR trains would increase traffic volume, congestion, and delays at intersections.

Impact TR#5: Continuous Permanent Congestion/Delay Consequences on Intersection Operations

Intersection LOS effects (AM and PM peak hours) for 2029 and 2040 No Project and Plus Project conditions are presented in Volume 2, Appendix 3.2-A. Alternative A and Alternative B would result in the same intersection LOS effects in all subsections except for the San Jose Diridon Station Approach Subsection, where Alternative B would have more adverse effects on intersection LOS.

San Francisco to South San Francisco Subsection 4th and King Street Station Area

Under 2029 Plus Project conditions in the 4th and King Street Station area, 15 out of 19 intersections would operate at LOS E or F, and 9 of these intersections would be affected by the project under both project alternatives. Five affected intersections would experience adverse effects in the AM peak hour, while eight intersections would experience adverse effects in the PM peak hour.

Brisbane Light Maintenance Facility

In 2040 Plus Project conditions in the proposed Brisbane LMF area, four out of 16 intersections would operate at LOS E or F, and two of these intersections would be affected by the project under both alternatives. No intersections would experience adverse effects in the AM peak hour, while two intersections would experience adverse effects in the PM peak hour. LOS conditions would improve at the intersection of Bayshore Boulevard/Old County Road because of the relocation of the Tunnel Avenue overpass, which connects to this intersection, north to the intersection of Bayshore Boulevard/Valley Drive.

Intersections Near At-Grade Crossings Along Track Alignment

In 2040 Plus Project conditions for intersections near at-grade crossings in the San Francisco to South San Francisco Subsection, all seven intersections would operate at LOS E or F, and six of these intersections would be affected by the project under both project alternatives. Five affected intersections would experience adverse effects in the AM peak hour, while four intersections would experience adverse effects in the PM peak hour. When comparing 2040 Plus Project to 2040 No Project conditions in this subsection, delay increases at affected intersections would range from 3 seconds to 72 seconds (less than 2 minutes) because of added gate-down time at the at-grade crossings. The greatest increase in delays would occur at intersections adjacent to the 16th Street at-grade crossing in San Francisco (72-second increase in the PM peak hour at the Seventh Street/16th Street intersection) and the Linden Avenue at-grade crossing in South San Francisco (22-second increase in the PM peak hour at the Linden Avenue/Dollar Avenue intersection).

San Bruno to San Mateo Subsection Millbrae Station Area

Project circulation improvements for the Millbrae Station area on the west side of the existing Caltrain corridor, including extension of California Drive to Victoria Avenue and a new pedestrian signal at the El Camino Real/Chadbourne Avenue intersection, would improve access to the

Millbrae Station for all modes. Existing access to the west side of the Millbrae Station is provided via side street stop-controlled intersections at El Camino Real/Linden Avenue and El Camino Real/Serra Avenue, as well as via California Drive to and from the south. The extension of California Drive to a signalized intersection at El Camino Real/Victoria Avenue, combined with a new pedestrian signal at Chadbourne Avenue, would improve accessibility to the west side of the Millbrae Station from El Camino Real.

In 2040 Plus Project conditions in the Millbrae Station area, 11 out of 16 intersections would operate at LOS E or F, and 10 of these intersections would be affected by the project under both project alternatives. Three affected intersections would experience adverse effects in the AM peak hour, while 10 intersections would experience adverse effects in the PM peak hour.

Intersections Near At-Grade Crossings Along Track Alignment

In 2040 Plus Project conditions for at-grade crossings in the San Bruno to San Mateo Subsection, 34 out of 40 intersections would operate at LOS E or F, and 22 of these intersections would be affected by the project during the AM and/or PM peak hours. Seventeen affected intersections would experience adverse effects in the AM peak hour, while 16 intersections would experience adverse effects in the PM peak hour.

When comparing 2040 Plus Project to 2040 No Project conditions in this subsection, delay increases at affected intersections would range from 1 second to 169 seconds (less than 3 minutes) because of added gate-down time at the at-grade crossings. The greatest percent increase in delays would occur at intersections adjacent to the Oak Grove Avenue at-grade crossing in Burlingame (169-second increase in the AM peak hour at the California Drive/Oak Grove Avenue intersection), the Bayswater Avenue at-grade crossing in Burlingame (145-second increase in the PM peak hour at the Myrtle Road/Bayswater Avenue intersection), and the Peninsula Avenue at-grade crossing in San Mateo (107-second increase in the AM peak hour at the Peninsula Avenue/Arundel Road/Woodside Way intersection).

San Mateo to Palo Alto Subsection

Intersections Near At-Grade Crossings Along Track Alignment

In 2040 Plus Project conditions for at-grade crossings, 41 out of 49 intersections would operate at LOS E or F, and 27 of these intersections would be affected by the project during the AM and/or PM peak hours. Eighteen affected intersections would experience adverse effects in the AM peak hour, while 22 intersections would experience adverse effects in the PM peak hour. When comparing 2040 Plus Project to 2040 No Project conditions in this subsection, delay increases at affected intersections would range from 1 second to 387 seconds (less than 7 minutes) because of added gate-down time at the at-grade crossings. The greatest percent increase in delays would occur at intersections adjacent to the Meadow Drive at-grade crossing in Palo Alto (187-second increase in the AM peak hour at the Park Boulevard/Meadow Drive intersection), the Churchill Avenue at-grade crossing in Palo Alto (334-second increase in the AM peak hour at the Castilleja Avenue/Churchill Avenue intersection), and the Brewster Avenue at-grade crossing in Redwood City (387-second increase in the AM peak hour at the Perry Street/Brewster Avenue intersection).

Although the passing track would be built in this subsection under Alternative B, the passing track would be entirely grade-separated. As a result, there would be no additional impacts due to changes in gate-down time under Alternative B.

Mountain View to Santa Clara Subsection

Intersections Near At-Grade Crossings Along Track Alignment

In 2040 Plus Project conditions for at-grade crossings, all 11 intersections would operate at LOS E or F, and 8 of these intersections would be affected by the project during the AM and/or PM peak hours. Eight affected intersections would experience adverse effects in the AM peak hour, while six intersections would experience adverse effects in the PM peak hour. When comparing 2040 Plus Project to 2040 No Project conditions in this subsection, delay increases at affected intersections would range from 6 seconds to 175 seconds (less than 3 minutes) as a result of added gate-down time at at-grade crossings. The greatest percent increase in delays would occur at intersections adjacent to the Moffett Boulevard/Castro Street at-grade crossing in Mountain

View (175-second increase in the AM peak hour at the Central Expressway/Moffett Boulevard/Castro Street intersection) and the Rengstorff Avenue at-grade crossing in Mountain View (114-second increase in the PM peak hour at the Leland Avenue/Crisanto Avenue/Rengstorff Avenue intersection).

San Jose Diridon Station Approach Subsection

In 2040 No Project conditions, 26 out of 50 intersections would operate at LOS E or F. In 2040 Plus Project conditions in the San Jose Diridon Station Approach Subsection, 26 intersections would operate at LOS E or F and 16 of these intersections would be affected by the project under Alternative B (Viaduct to I-880) and Alternative B (Viaduct to Scott Boulevard). Under Alternative A, 25 intersections would operate at LOS E or F and 11 of these intersections would be adversely affected by the project.

CEQA Conclusion

The increases in traffic around the stations and the Brisbane LMF, as well as the increased gate-down time at at-grade crossings from the operation of HSR trains, would result in a degradation to LOS E or F and an increase in delay over the baseline condition for both project alternatives. Automobile delay is not a significant impact under CEQA.

3.2.6.3 Parking

Construction and operations of either project alternative would result in temporary and permanent effects on parking. This section evaluates the project effects on parking and the potential for secondary physical environmental and socioeconomic impacts related to parking.

No Project Conditions

The No Project conditions would be the same as those described in Section 3.2.6.2. Population in San Francisco, San Mateo, and Santa Clara Counties is projected to increase through 2029 and 2040 (Section 2.6.1.1). Development projects to accommodate projected population growth, including shopping centers, industrial parks, transportation projects, and residential developments, would continue under the No Project conditions. Planned transit projects, such as the BART Phase II Extension and PCEP, would provide additional transit options to San Jose Diridon Station. The BART Phase II Extension project would displace 755 parking spaces near the San Jose Diridon Station and the SAP Center in San Jose during construction by 2025 and 715 parking spaces permanently during operations from 2025 onward. It is anticipated that parking conditions would evolve as people alter their modes and patterns of travel in response to changing land uses and transportation options under the No Project conditions.

Project Impacts

Construction Impacts

Impact TR#6: Temporary Construction-Related Effects on Parking

Temporary Effects during Construction (in areas other than Diridon Station and SAP Center)

Construction activities associated with station and platform improvements, track shifts, and other improvements would require temporary removal of public parking and Caltrain station parking, at certain locations. These activities would result in decreased parking availability and increased vehicle congestion and queuing around areas with decreased parking supply. Construction of the LMF is not expected to remove or disrupt existing parking.

Any closure or removal of parking areas or roadways during construction would be temporary. However, under Alternative B only, portions of the Caltrain station parking areas at the San Carlos, Belmont, Hillsdale, and Hayward Park Stations also could be closed intermittently at times over 2 to 3 years for Alternative B passing track construction, which would result in inconvenience to Caltrain riders, who currently access these stations via parked vehicle. Some of Caltrain riders would need to access affected stations via another mode or park at alternative locations farther from the stations. Every attempt would be made to minimize parking space removal, shorten the length of time that these facilities are inoperable, and provide signage directing users to alternate facilities. Upon completion of construction, all parking areas would be restored.

To minimize effects on public on-street parking, the contractor would identify temporary locations to accommodate off-street parking for all construction-related vehicles (TR-IAMF#3). If adequate parking cannot be provided on the construction sites, the contractor would designate existing off-site remote parking areas in the CTP and, if the remote parking areas are distant from the construction site, provide shuttles to carry construction workers to and from the construction area.

Temporary Effects during Construction (adjacent to Diridon Station and SAP Center)

Construction of the project would temporarily displace parking adjacent to the San Jose Diridon Station and the SAP Center, affecting users of both facilities. As shown in Table 3.2-16, Alternative A would affect up to 397 publicly available parking spaces (approximately 15 percent of the total spaces), while Alternative B would temporarily affect up to 2,083 publicly available parking spaces (approximately 80 percent of the total spaces). These totals include parking within the temporary project footprint. At any one time, some of this parking may be available for station or special event users, but this analysis conservatively assumes that temporary loss of these spaces may occur at the same time. Construction of the San Jose Diridon Station and related parking displacement could take 2 years for an at-grade station under Alternative A and 3 to 4 years for an aerial station under Alternative B.

Table 3.2-16 Temporary Displacement of Parking Adjacent to Diridon Station

Location	Total Spaces	Displaced Spaces under Alternative A	Displaced Spaces under Alternative B
SAP Center Lot ABC	1,422	81	1,422
SAP Center Lot D	228	0	0
Cahill Lot 1, 2 (northeast of station)	180	0	0
Cahill Lot 3 (northeast of station)	162	0	162
Cahill Lot 4 (north of station)	148	148	148
Cahill Center Lot (east of station)	90	90	90
Cahill Lots (south of station)	78	78	78
Stephen's Meat Loaf	135	0	68
Navlets	65	0	65
Palermo and adjacent	70	0	0
On-street parking	95	0	50
TOTAL	2,578	397	2,083

Source: Authority 2019b

The temporary loss of up to 397 (Alternative A) or 2,083 (Alternative B) parking spaces adjacent to San Jose Diridon Station during construction would affect 3 percent (Alternative A) or 15 percent (Alternative B) of the approximately 13,695 total publicly available parking spaces within 0.5 mile of Diridon Station and 12 percent (Alternative A) or 61 percent (Alternative B) of 3,390 total publicly available parking spaces within 0.33 mile of the Diridon Station.¹¹

The amount of parking still available for use under Alternative A within 0.33 mile of the Diridon Station (2,993 spaces) or under Alternative B (1,307 spaces) would not meet the parking obligations specified in the Arena Management Agreement between the SAP Center and the City of San Jose (3,175 spaces). However, both alternatives would leave sufficient parking outside

¹¹ The total available spaces takes into account the temporary loss of 755 spaces during BART Phase II construction.

construction areas (13,298 spaces under Alternative A and 11,612 spaces under Alternative B) to meet agreement requirements relative to the 0.5-mile radius requirements (6,175 spaces).¹²

In accordance with TR-IAMF#8, the Authority's contractors would identify adequate off-street parking using existing remote parking areas or vacant land to replace any temporary displacement of parking utilized for special events at the SAP Center on a 1:1 basis during construction. Contractors would arrange for shuttle vehicles between the remote parking areas and the SAP Center for any remote parking areas that are more than 0.5 mile from the SAP Center. Contractors would also work with the SAP Center to provide advance and real-time information about parking availability for special events during times in which construction displaces existing available special event parking.

The feasibility of providing replacement off-street parking spaces during construction per TR-IAMF#8 is supported by the *San Jose Diridon Station Area Parking Study* (as described in VTA 2018) and additional research by the Authority (Authority 2019c). The parking study was prepared by the City of San Jose in collaboration with VTA, Caltrain, the Authority, and Sharks Sports and Entertainment to identify interim parking solutions to help address effects during construction of various improvements. Available land in the area was evaluated for use for interim parking during 2018–2025. The study identified four possible sites that could accommodate more than 1,400 total parking spaces that met the goals and needs of interim parking for stakeholders. These sites are all within 0.5 mile from San Jose Diridon Station, at the intersections of Montgomery Street and West St. John Street, Montgomery Street and San Fernando Street, and Montgomery Street and Park Avenue (two lots). Of these parking spaces, 525 are within 0.33 mile of the station. In addition to the lots identified in the parking study, as described in Section 3.2.5.3, Existing Parking at Proposed HSR Stations, there are additional parking areas within 0.5 mile that would not be affected by construction that could also provide additional special event parking opportunities. Also, as noted in Section 3.2.5.3, an additional 4,798 public parking spaces (open 24 hours) as well as private parking areas between 0.5 mile and 1 mile of the Diridon Station would be available in downtown San Jose as well as additional parking areas more than 1 mile from the station that could be used with remote parking shuttles. Based on this evidence, there are sufficient opportunities for off-street parking in the San Jose Diridon Station and SAP Center area to offset temporarily displaced parking spaces for special events.

In addition, San Jose Diridon Station is an existing multimodal transportation center in San Jose's downtown urban core. San Jose Diridon Station is served by several transit modes including VTA's light rail and express and local bus service, ACE, Amtrak, Capitol Corridor, and regional bus lines to Alameda and Santa Cruz Counties. This station is well connected to the regional bicycle network and is well served with pedestrian facilities. Consequently, many multimodal options are available for SAP Center customers and transit riders to access the station during construction.

CEQA Conclusion

Project features include the temporary replacement of any displaced parking for special events at the SAP Center (TR-IAMF#8), and as a result, parking demand would continue to be met during the construction period. Construction of the project would not require the construction of remote parking facilities (beyond those included and evaluated as part of the project), the construction of which would result in significant secondary environmental impacts. The impact would be less than significant under CEQA for both project alternatives because it would not result in secondary environmental impacts on VMT, air quality, noise, safety, or land use associated with the temporary displacement of parking. Therefore, CEQA does not require any mitigation.

¹² The total available spaces takes into account the loss of 715 spaces permanently displaced by BART Phase II Extension.

Operations Impacts

Impact TR#7: Permanent Effects Related to Parking

Permanent Effects during Operations (Light Maintenance Facility, 4th and King Street Station, Millbrae Station)

The Brisbane LMF is not expected to induce parking demand because, unlike a station, the public would not use this facility. The parking provided at the LMF would be sized to accommodate employee and visitor parking demand.

The Authority has a strategy for long-term coordination with local transit agencies and cities to develop transit connectivity plans for HSR station areas and for connectivity to neighboring communities where high HSR ridership is projected. This strategy, as outlined in LU-IAMF#2, is expected to minimize the overall demand for parking at stations by facilitating alternative methods of station access (refer to *HST Station Area Development: General Principles and Guidelines* [Authority 2011]). This strategy includes the following components:

- Stations would be designed and built to enhance pedestrian, bicycle, and other shared ride access. Mobility features such as walking paths, bicycle lockers, and drop-off zones would be encouraged to enhance access.
- The Authority would work with local transit agencies around stations to provide easy transfer and fare payment options, and would install wayfinding signs, maps, and other techniques to identify local connections within HSR stations.
- In coordination with station cities, the Authority would promote street enhancements for pedestrian and bicycle access such as improved sidewalks, multi-use pathways, trails, bike lanes, and shared parking sites.
- Station space would be allocated for taxis, private buses, and shared rides.

Implementation of LU-IAMF#2 would improve connections to HSR stations, minimizing the need for additional parking. Therefore, parking included in the project footprint, in combination with other access modes, would be sufficient to meet projected 2040 demand, avoiding the need to convert adjacent land uses to parking. Any removal of parking supply during construction would be supported by local plans and policies (see Volume 2, Appendix 2-I) and would not permanently alter land use patterns.

At the 4th and King Street Station, the project design includes no long-term parking. Because the site is an existing major transportation hub in a densely developed urban center, riders would be expected to use other modes of transport to arrive at or depart from the station, such as taxi, drop-off, transit, walking, and biking. This approach to parking is supported by the policies in the San Francisco General Plan, which emphasize programs to manage the supply of parking and to encourage transit, ridesharing, or other alternatives to single-occupant vehicles (City and County of San Francisco 2010).

At the Millbrae Station, station modifications would entail displacement of 288 existing parking spaces on both the east and west sides of the station. The project design includes construction of a total of 325 parking spaces, the majority of which would be in surface lots on the west side of the station. The removed spaces and the new spaces would result in a net change of 37 additional parking spaces. The design also includes pick-up and drop-off facilities west of the track alignment along the newly built California Drive and east of the alignment in the BART parking structure. These parking modifications would be consistent with the *Millbrae Station Area Specific Plan* (MSASP) (City of Millbrae 2016b) approach to parking because the modifications would encourage riders to use alternative modes of transportation to arrive at and depart from the station, such as taxi, drop-off, transit, walking, and biking. The MSASP seeks to balance parking demand and supply. Providing appropriate parking supply, given alternative transit modes, would help lessen reliance on automobiles, and reduce potential conflicts with other modes. The changes to access and the replacement parking would not change adjacent land use patterns because the existing land uses in this area are a parking garage and vacant areas. The addition

of new surface parking lots would not ultimately change existing conditions for adjacent land uses.

The 4th and King Street Station would not generate new parking demand and the station design and facilities provided at the Millbrae Station (including new parking facilities) would meet access demands through a combination of existing and future parking, pickup and drop off facilities, transit connections, and linkages for bicycles and pedestrian access. As a result, there would be no need for construction of additional off-site parking facilities and there would be no secondary environmental effects from construction or operation of such facilities and no secondary effects (e.g., traffic, VMT, air quality, noise, safety, land use, socioeconomic effects) caused by insufficient parking supply.

Permanent Effects during Operations (Diridon Station and SAP Center)

Permanent Loss of Existing Parking

As shown in Table 3.2-17, Alternative A would permanently displace up to 52 and Alternative B would permanently displace up to 247 parking spaces in SAP Center Lots A, B, and C. For Alternative B, the estimated number of displaced parking spaces is conservative, as it includes all parking spaces within the viaduct footprint. However, there would be opportunity for some parking beneath the viaduct between the viaduct columns; consequently, fewer than 247 spaces would actually be displaced under Alternative B. Replacement parking (on a 1:1 basis for both alternatives) would be provided in a new parking structure on the north side of SAP Center Lots A, B, and C. Additionally, both alternatives would permanently displace up to 226 publicly available parking spaces in and around San Jose Diridon Station (Table 3.2-17). Replacement parking (on a 1:1 basis) would be provided in new parking facilities on the northwest side of the intersection of Stockton Avenue and The Alameda (both alternatives), near the intersection of Cahill Street and Crandall Avenue (Alternative B), and near the intersection of Cahill Street and Park Street (Alternative A). Under either alternative, there would be no permanent loss of parking caused by the project compared to No Project conditions.

Table 3.2-17 Permanent Displacement of Parking Adjacent to Diridon Station

Location	Total Spaces	Displaced Spaces under Alternative A	Displaced Spaces under Alternative B
SAP Center Lot ABC	1,422	52 ¹	247 ^{1,2}
SAP Center Lot D	228	0	0
Cahill Lot 1, 2 (northeast of station)	180	0	0
Cahill Lot 3 (northeast of station)	162	0	0
Cahill Lot 4 (north of station)	148	148 ³	148 ³
Cahill Center Lot (east of station)	90	0	0
Cahill Lots (south of station)	78	78	78
Stephen's Meat Loaf	135	0	0
Navlets	65	0	0
Palermo and adjacent	70	0	0
On-Street Parking	95	0	0
TOTAL	2,578	278	473

Source: Authority 2019b

¹ Displaced spaces at the SAP Center Lot ABC would be replaced with a new parking structure on the northern part of the existing lot.

² The estimated number of displaced spaces for Alternative B at the SAP Center Lot ABC are conservative because the alignment would be on aerial structure over the parking lot, but this analysis assumed all parking spaces within the project footprint of the viaduct would be displaced.

³ Displaced spaces would be replaced by new parking structures northwest and east of the station.

Increased Parking Demand

As shown in Table 3.2-3, the total number of trips related to parked vehicles in 2040 would be 2,340 at the San Jose Diridon Station. Each parking space is associated with 1.66 trips (as some vehicles are parked for multiple days). As shown in Table 3.2-4, the average number of passengers per parked car for the San Jose Diridon Station is 1.33. Consequently, the daily access/egress trips associated with the San Jose Diridon Station would create an additional demand for 1,060 parking spaces (beyond current existing demand).

The increased demand of 1,060 parking spaces would affect 31 percent of the approximately 3,430 publicly available parking spaces within 0.33 mile of Diridon Station and 8 percent of the approximately 13,735 parking spaces within 0.5 mile. As noted in Section 3.2.5.3, there are 4,798 public parking spaces between 0.5 and 1 mile from the San Jose Diridon Station as well as private parking lots, and additional parking opportunities more than 1 mile from the station, including at SJC. The Authority would rely on commercially available parking to meet HSR parking demand, provided and priced in accordance to local conditions.

The SAP Center (with capacity of approximately 17,500) is similar in terms of capacity, number of events, and proximity to public transit to the Oakland Coliseum/Oracle Arena (with capacity of approximately 19,600) that is adjacent to the Coliseum BART Station. There are approximately 170 events at the SAP Center each year and 200 events at the Oakland Coliseum/Oracle Arena. In 2016, of tickets sold for Oakland Coliseum/Oracle Arena events, 20 to 30 percent of patrons accessed the event from the Coliseum BART station.

A 20 to 30 percent mode shift from vehicles to transit is anticipated at the SAP Center due to the planned BART extension and electrification of Caltrain, as well as the existing VTA light rail, rapid bus, and intercity bus service.¹³ This would reduce parking demand by 1,400 to 2,100 cars per event (assuming 2.5 persons per vehicle).¹⁴ Assuming a 20 percent increase in transit share, the transit increase would offset demand for 1,400 parking spaces, leaving a net increased demand of 375 parking spaces (increase demand due to permanent loss of 715 parking spaces due to BART and 1,060 spaces of demand due to HSR riders minus the offset of 1,400 parking spaces). This net demand of 375 parking spaces would affect 11 percent of the approximately 3,430 remaining publicly available parking spaces within 0.33 mile of Diridon Station and 3 percent of the approximately 13,735 parking spaces within 0.5 mile.¹⁵ As noted in Section 3.2.5.3, there are an additional 4,798 public parking spaces between 0.5 and 1 mile from the San Jose Diridon Station as well as private parking lots, and additional parking opportunities more than 1 mile from the station, including at SJC. Assuming a 30 percent increase in transit share, the transit increase would offset demand for 2,100 parking spaces, which would more than offset the loss of 715 spaces due to BART and the 1,060-parking-space demand for HSR riders. There would be adequate remaining parking in general proximity to the SAP Center for SAP Center patrons, regardless of whether the ultimate transit share is 10 percent or 30 percent.

The decision to not provide park-and-ride facilities for HSR service at San Jose Diridon Station is consistent with the *Envision: San José 2040 General Plan*, Commercial Downtown Land Use Plan Policies and Transportation Policies, which state that development within this designation should “enhance the ‘complete community’ in downtown, support pedestrian and bicycle circulation, and increase transit ridership”, and that “uses that serve the automobile should be

¹³ The Final Supplemental EIS/EIR for the BART Phase II Extension (VTA 2018) assumed conservatively that 10 percent of patrons (1,750) would access SAP Center events by BART. Assuming a vehicle occupancy of 2.5 persons per vehicle for SAP patrons, a 10 percent BART mode share would reduce parking demand by 700 spaces, which would nearly offset the loss of 715 spaces caused by the BART Phase II Extension. In addition to new BART service, the PCEP will also increase peak hour capacity of the San Jose Diridon Station by 20 percent over existing conditions, increasing transit rider access to the SAP Center and resulting in additional offset of parking demand. With the SAP Center served in the future by BART, electrified Caltrain, VTA light rail, rapid bus, and intercity bus service, a 10 percent transit mode share is considered highly conservative.

¹⁴ The assumption of 2.5 passengers/vehicle for SAP patrons is based on a factor of 2.41 passengers/vehicle from a study of passengers/vehicle for the Oakland Coliseum (Fehr & Peers 2019) that was rounded up to 2.5. No data was located for passengers/vehicle for the SAP Center.

¹⁵ These calculations take into account the permanent loss of 715 spaces due to the BART extension.

carefully controlled in accordance with the Downtown Land Use Policies” (City of San Jose 2018). Additionally, San Jose’s Transportation Goals, Policies, and Actions aim to establish circulation policies that increase bicycle, pedestrian, and transit travel, while reducing motor vehicle trips, to increase the city’s share of travel by alternative transportation modes. The policy of Goal TR-1.3, Balanced Transportation System, is to “increase substantially the proportion of commute travel using modes other than the single-occupant vehicle.” The policy clarifies that the 2040 commute mode split target for San Jose residents and workers is for drive alone to be no more than 40 percent and transit at least 20 percent of the mode share. The Authority’s design for the San Jose Diridon Station is intended to be in alignment with the City of San Jose’s mode shift goal.

The Authority initiated the San Jose Diridon Station Intermodal Working Group in 2018 to coordinate the planning, design, and delivery of concurrent and interrelated transportation infrastructure projects: HSR, BART Phase II, and PCEP. The Authority has funded two grants to prepare the station area for HSR operations. The grant to the City of San Jose funded an evaluation of short-term and long-term parking needs during construction and operation of both HSR and BART Phase II and is supporting several site-specific parking studies in the San Jose Diridon Station area to develop a Parking Program for the Diridon Station Area Plan. The grant to VTA is to prepare a San Jose Diridon Station Facilities Master Plan to address both station and station area facilities, criteria for replacing any parking displaced for new station facilities, and a program to manage the evolution of parking demand and supply over time to reflect changes in ridership and park-and-ride mode share. The City of San Jose and VTA studies would inform a multimodal access plan, which would be developed prior to design and construction of the station. This plan would be developed in coordination with local agencies and would include a parking strategy that would inform the final location, amount, and phasing of parking.

The San Jose Diridon Station is well served by existing multimodal options, which are planned to improve with the Caltrain electrification and BART extension projects, increasing transit options for SAP customers and transit riders to access the station. HSR service would only add to the many multimodal options available to travelers with San Jose Diridon Station as their intended destination. In view of these characteristics, the project’s increased parking demand is not expected to result in insufficient parking for either the San Jose Diridon Station or the SAP Center or to result in the construction of additional remote parking facilities.

Indirect Environmental Effects Related to the Diridon Station and SAP Center

The project would replace all permanently displaced parking with nearby replacement parking facilities on a 1:1 basis. The project’s demand for additional parking could be met by existing parking facilities, especially in light of the increased transit service planned for San Jose Diridon Station. The SAP Center’s parking demand could similarly be met through the combination of existing parking facilities, the replacement parking facilities provided by the project, and the offsetting effect on parking demand caused by planned increases in transit services. Thus, no new additional remote parking facilities would be required to meet these demands.

While parking demands could be met, because of the BART Phase II Extension permanent displacement of 715 spaces near the San Jose Diridon Station and the potential for some HSR riders to use spaces near the station, it is possible that some station users and SAP Center patrons would need to use more distant parking spaces. The extensive information on available parking provided by Caltrain, City of San Jose, the SAP Center, and private vendors and the increasing use of web-based and mobile applications (including real-time applications) means that most station users and SAP Center patrons would be able to locate parking without extensive circling. Furthermore, parking information would be advanced through the integrated planning by the City of San Jose, VTA, the Authority, and other partners as development in the station area advances, such that information available by the time HSR is operational would be superior to the information currently available. While there may be some minor increases in local travel due to the use of slightly more remote lots, this local travel is expected to be more than offset by the overall reduction in parking demand resulting from increased transit service.

Potential secondary environmental effects of the use of slightly more remote parking facilities are:

- **Transportation**—Minor increases in circling could contribute to traffic congestion on streets near the San Jose Diridon Station and SAP Center as well as minor increases in VMT. However, the net demand for parking is expected to decrease due to transit service expansion (including planned Caltrain service increases as well as the additions of new BART and HSR service) which would more than offset any effects caused by the use of more remote parking facilities. In addition, the HSR project would substantially reduce overall VMT, also reducing traffic on major roadways accessing downtown San Jose.
- **Air quality**—Overall parking demand is expected to decrease, even taking into account the loss of parking caused by the BART Phase II project and the increased parking demand of HSR, such that vehicle emissions caused by localized use of more remote parking lots would be more than offset. Furthermore, as described in Section 3.3, local intersections most affected by project-related traffic do not have sufficient traffic volumes to trigger local carbon monoxide hot spots. Finally, the project overall would substantially reduce regional criteria pollutants.
- **Noise**—With an overall net reduction in parking demand resulting from increased transit service, the increased use of more remote parking lots is not expected to substantially change traffic volumes or traffic noise. Furthermore, as described in Section 3.4, project-related traffic noise near stations would not result in an increase in noise levels above the project-related train noise.
- **Safety**—As described in this section and in Section 3.11, the area around the San Jose Diridon Station and the SAP Center is well served by existing roadway, transit, bicycle, and pedestrian facilities. Existing pedestrian facilities connect remote lots to the station and the SAP Center. Increased use of remote parking lots would not increase safety risks for people accessing the station or the SAP Center.
- **Land use**—Parking at the San Jose Diridon Station would be accommodated in existing lots, with the additional construction of two small new lots. The construction of the proposed new parking lots near the San Jose Diridon Station to accommodate demand would not create land use conflicts because they would be consistent with applicable plans, would be compatible with adjacent land uses under existing zoning and would not ultimately change existing conditions for adjacent land uses outside the project area or change land use patterns. Since the project would not result in the construction of new remote parking lots (other than those included in the project description), the project would not displace any additional land uses or disrupt existing land use patterns through construction of any such additional remote parking lots.

Socioeconomic Effects

Demand for all modes of access to the San Jose Diridon Station and the SAP Center, including parking, could be accommodated through existing parking facilities, project parking facilities, and the offsetting reduction of parking demand through the increase in transit service. Consequently, the SAP Center is not expected to experience a reduction in patronage for special events. The experience of other downtown sports and event-serving arenas in transit-accessible locations further supports a conclusion that the economic vitality of the SAP Center would not be adversely affected and may actually receive a benefit (Authority 2019c):

- Over the last 20 years 18 new arenas have been built for National Basketball Association (NBA) and National Hockey League (NHL) franchise teams in the United States. Fifteen arenas are located in downtown, transit-accessible locations, adjacent to central business districts, to maximize access and competitiveness to attract regional market demand for sports and entertainment events. A downtown arena location, adjacent to a central business district, offers the opportunity to benefit from regional transit and highway access created for commuters, the sharing of off-peak employment parking, and direct walking access for the downtown employment base to events.

- Several new arenas, such as the Golden 1 Center for the Sacramento Kings, the Chase Center for the Golden State Warriors, and the Little Caesar's Arena for the Detroit Pistons and the Red Wings, are part of an American trend where cities—not the suburbs—have returned as the primary generators of the nation's economic growth according to the Federal Reserve. In the effort to reduce GHG emissions and fight climate change, U.S. cities are transitioning away from auto-dependence by investing in transit and TOD. Arenas are contributing to and benefiting from this urban downtown renaissance, with billion-dollar public and private investments in transit and mixed-use TOD comprised of office, retail, and housing. This resurgence of downtowns is attracting millennials as well as baby boomers to the vibrancy of urban living without needing a car.
- Research on event day parking at the 18 NBA and NHL arenas constructed over the last 20 years demonstrates that downtown arenas are benefiting from regional transit service and the use of shared parking to meet event travel demand. Parking is priced based on proximity and convenience to the venue, with highest-cost premium convenience parking adjacent to the arena and lower-cost options a 5- to 10-minute walk (or more) from the arena. Transit service is adjacent to or within a short walk of most of these facilities, and in some cases, additional event day transit service is offered. Websites such as StadiumParkingGuide.com provide maps with the location, availability, and pricing of event parking so attendees can make choices on how to most conveniently and affordably access the event in advance or at the time of the event.
- All of the 18 venues mentioned above, as well as the SAP Center, ranked in the top 100 venues worldwide in ticket sales in 2018 by Pollstar Magazine, indicating that a transit-accessible downtown location supports economic success.

CEQA Conclusion

Permanently displaced parking spaces at the Millbrae Station and at the San Jose Diridon Station and SAP Center area would be replaced on a 1:1 basis to preclude permanent loss of parking spaces for station users or SAP Center patrons. The increase in parking demand caused by HSR riders at the San Jose Diridon Station would be accommodated through existing parking facilities, project parking facilities, and the offsetting effect of increased transit service to the San Jose Diridon Station such that no non-project remote parking facilities would need to be constructed. The project would not result in significant secondary environmental effects on transportation, air quality, noise, safety, or land use related to parking demands or non-project remote parking facilities. The impact would be less than significant under CEQA for both alternatives associated with secondary environmental impacts related to parking using the thresholds for evaluation of these subjects. Therefore, CEQA does not require any mitigation.

3.2.6.4 Transit

Construction and operations of either project alternative would result in temporary and permanent impacts on bus transit and passenger rail operations. Construction of either project alternative would disrupt roadway and rail transit services. Project operations would increase the number of station passengers and would change the demand for transit services at the shared 4th and King Street, Millbrae, and San Jose Diridon Stations. Project operations would also include use of rail lines used by Caltrain between the 4th and King Street Station and West Alma Avenue for either project alternative.

No Project Conditions

The No Project conditions would be the same as those described in Section 3.2.6.2. Population in San Francisco, San Mateo, and Santa Clara Counties is projected to increase through 2029 and 2040 (Section 2.6.1.1). Development projects to accommodate projected population growth, including shopping centers, industrial parks, transportation projects, and residential developments, would continue under the No Project conditions and could result in increased demands on transit services and the resulting need to continue expanding transit services.

The No Project conditions include the implementation of transit projects identified and funded in Plan Bay Area 2040 and other plans identified in Section 3.2.2.3, Regional and Local (ABAG and

MTC 2017). These projects include new or enhanced rail and bus facilities to expand transit capacity and performance in the RSA. All of the improvements are expected to be operational by 2029. The 2029 and 2040 No Project transit improvements, which are shown in Table 3.2-18, would primarily affect the 4th and King Street Station and San Jose Diridon Station.

After implementation of the PCEP, rail service would increase along the Project Section. Twenty-two trains would be added between the 4th and King Street Station and San Jose Diridon Station, totaling 114 passenger trains per day. Between the San Jose Diridon Station and Tamien Station, the corridor would serve 46 passenger trains per day.

Table 3.2-18 2029 and 2040 No Project Transit Improvements

Project Name	Description
Peninsula Corridor Electrification Project	The PCEP will include the installation of electrification infrastructure including traction power facilities, poles and OCS, and EMUs along 51 miles of the Caltrain corridor between San Francisco and San Jose. Positive train control will be implemented to increase operational safety and the existing diesel locomotive-hauled fleet will be replaced with EMUs to facilitate the blended Caltrain and HSR system. PCEP is planned for completion by 2022.
Central Subway Project	The Central Subway Project in San Francisco will extend the MUNI Metro T-Third Line through the South of Market neighborhood, Union Square, and Chinatown. It will provide a direct, rapid transit link between downtown and the existing T-Third Line route on Third Street. When the Central Subway is completed, T-Third Line trains will travel mostly underground along a 1.7-mile alignment from the 4th and King Street Station to Chinatown. This project is planned for completion by 2021.
Sixteenth Street Improvement Project	The Sixteenth Street Improvement Project in San Francisco will improve transit reliability and travel time along 2.3 miles of 16th Street by providing transit-only median lanes, transit bulbs, new traffic and pedestrian signals, and streetscape amenities. The project will allow for zero-emission transit service into Mission Bay by extending the OCS that powers trolley buses from Kansas Street to Third Street. Phase 1 construction will be implemented on 16th Street from Potrero to Third Street and is scheduled to be complete by 2020. Phase 2 construction on 16th Street between Church and Potrero is scheduled to begin in spring 2020. As of March 2020, a completion date for Phase 2 work has not been established.
Van Ness BRT Project	The Van Ness BRT Project in San Francisco will provide dedicated bus lanes along 2 miles of Van Ness and South Van Ness Avenues, from Lombard to Mission Streets. The project will also provide for low-floor boarding, high-quality shelters, pedestrian safety enhancements, and transit signal priority. This project is planned for completion by 2021.
Geary BRT Project	The Geary BRT Project in San Francisco will provide dedicated transit lanes, utility upgrades, and streetscape improvements on Geary Street from 34th Avenue to Market Street. Phase 1 (Geary Street from Market to Stanyan Streets) is scheduled to be complete by 2021. A schedule for Phase 2 (Stanyan Street to 34th Avenue) has not been established.
SamTrans El Camino Real Express Rapid Bus Project	This project was substantially completed in 2018. Route ECR Rapid complements El Camino Real bus service by providing additional rapid bus service during commute periods between the Daly City BART station and the Redwood City Transit Center. Interim stops are located at the Colma, South San Francisco, San Bruno, and Millbrae BART Stations as well as the Hillsdale, Belmont, and San Carlos Caltrain Stations.
BART to Silicon Valley Project	The BART to Silicon Valley Project will implement a 16-mile extension from Warm Springs Station in Fremont to Santa Clara in two phases. Phase I, the Berryessa Extension Project, would connect Warm Springs to new stations in Milpitas and Berryessa, while Phase II would connect Berryessa Station to new stations in Alum Rock, downtown San Jose, San Jose Diridon Station, and Santa Clara. This project is planned for completion by 2025.

Project Name	Description
VTA BRT projects	<p>The Santa Clara/Alum Rock BRT Project was substantially completed in 2017. It enhanced service for 7.2 miles at 11 planned stations, from the Eastridge Transit Center to the Arena Station in downtown San Jose using Capitol Expressway, Alum Rock Avenue, and Santa Clara Street. The project included enhanced bus stops along Santa Clara Street near San Jose Diridon Station and dedicated bus lanes along a portion of Alum Rock Avenue.</p> <p>The Stevens Creek BRT Project will upgrade the current VTA Limited 323 bus route that travels along Stevens Creek Boulevard and San Carlos Street between De Anza College in Cupertino and the Downtown San Jose Transit Mall in San Jose. BRT service will also extend east to the Eastridge Transit Center along the Santa Clara-Alum Rock corridor. A stop is planned at the intersection of Bird Avenue and San Carlos Street approximately 2,000 feet from San Jose Diridon Station. The new service (Rapid 523) started at the end of 2019.</p>
VTA light rail extensions	<p>The Capitol Expressway light rail extension will extend light rail service approximately 2.5 miles from Alum Rock Station to the Eastridge Transit Center, adding two new stations at Storey Road and Eastridge. This project is planned for completion for 2025. The Vasona light rail extension Phase II would extend light rail service approximately 1.6 miles from Winchester Station to SR 85 in Los Gatos. The schedule for completion has not been established.</p>

Sources: Caltrain 2017; ABAG and MTC 2017; VTA 2016

BART = Bay Area Rapid Transit

BRT = bus rapid transit

ECR = El Camino Real

EMU = electric multiple unit

HSR = high-speed rail

MUNI = San Francisco Municipal Railway

OCS = overhead contact system

PCEP = Peninsula Corridor Electrification Project

VTA = Santa Clara Valley Transportation Authority

The Dumbarton Rail Corridor Project would extend commuter rail service across the southern portion of the San Francisco Bay between the San Francisco Peninsula and the East Bay. The rail corridor would link Caltrain, ACE, Amtrak's Capitol Corridor, and BART, as well as East Bay bus systems, at a multimodal transit center in Union City (San Mateo County Transportation Authority 2018). In 2017, the SamTrans Board of Directors approved the *Final Dumbarton Transportation Corridor Study* and authorized additional planning and conceptual design activities (SamTrans 2017). The Dumbarton Rail Corridor Project is not yet fully funded and thus is not addressed as part of the No Project conditions.

Project Impacts

Construction Impacts

Impact TR#8: Temporary Impacts on Bus Transit

Project-related construction staging and traffic would interfere with bus transit along roadways and at the existing 4th and King Street, Millbrae, and San Jose Diridon Stations. The construction of the HSR stations, Brisbane LMF, Caltrain station improvements, at-grade crossing gate improvements, platforms, and track modifications would require TCEs. The TCEs would require the temporary closure of parking areas, bus stops, or roadway travel lanes. Roadway closures would only occur periodically at night or on weekends, as necessary, which would reduce the potential effect on transit service when it is heaviest during the day on weekdays. Bus stops would be temporarily relocated to nearby locations so that service would not be disrupted. Portions of the Caltrain station parking areas at the San Carlos, Belmont, Hillsdale, and Hayward Park stations could be closed at times over 2 to 3 years for Alternative B passing track construction. Any closure of roadways, sections of platforms, or transit lines during construction would be temporary.

The impact of roadway, bus stop, or bus line routing changes would depend on the location and duration of these changes. The following impacts on bus facilities would occur:

- Temporary closure and relocation of bus stops.
- Temporary rerouting of bus lines because of temporary roadway closures.
- Temporary closure of parking to accommodate relocated bus facilities.
- Temporary closure and relocation of sidewalks, crosswalks, and curb ramps used to access bus stops.

The construction-related activities would lead to temporary delays of buses because of changes in vehicle circulation and increased travel time, particularly at designated at-grade rail crossings where four-quadrant gates would be installed over a 2- to 4-week period. High-frequency bus routes currently travel across three of the at-grade rail crossings: 16th Street in San Francisco, Ravenswood Avenue in Menlo Park, and Sunnyvale Avenue in Sunnyvale.

Delays to buses and bus stop relocations may also occur because of modifications to rail undercrossings required for construction of the passing track for Alternative B through San Mateo, Belmont, San Carlos, and Redwood City. Bus stops may be temporarily relocated during construction of improvements at the 4th and King Street, Millbrae, and San Jose Diridon Stations.

In accordance with a specific construction management plan (CMP) (TR-IAMF#11) and CTP (TR-IAMF#2), the contractor would attempt to provide temporary bus stops, parking areas, and access with the same features and amenities of the relocated facility, such as lighting, seating, shelters, and signage. However, some riders would experience changes in convenience and access. Rerouting and detours of bus lines would cause an increase in travel time for passengers. Increased travel times and modified access along affected bus routes could cause bus patrons to shift to another bus route or cause a temporary reduction in bus ridership for the duration of construction.

The contractor would attempt to minimize disruption or shorten the length of time that transit facilities are inoperable and would provide signage to alternate facilities. Upon completion of construction, the contractor would restore parking areas, bus stops, and roadway travel lanes. To minimize conflicts with transit during construction, the contractor would prepare a specific CMP (TR-IAMF#11) to maintain safe and adequate access for transit users during construction. In addition, the CTP would include methods to minimize construction traffic. A CTP traffic control plan would include provisions to maintain transit flows and access, minimize operations hazards through alternative access and bus route detour provisions, minimize transit schedule disruptions, identify temporary bus stops away from construction locations, and separate transit users from construction locations. Implementation of standard construction practices would establish construction truck routes, restrictions on construction hours, and construction vehicle parking.

CEQA Conclusion

The impact would be significant under CEQA for either project alternative because construction vehicles or temporary roadway closures would materially decrease the performance of certain bus routes. Implementation of a CMP and CTP would include methods to maintain bus transit operations and access, thereby reducing impacts on the performance of bus transit facilities; however, material decreases in the performance of certain bus routes would still occur. No mitigation measures are available to address this impact.

Impact TR#9: Permanent Impacts on Bus Transit

Construction of either project alternative would require modifications and closures throughout the roadway network to accommodate the modifications to stations, platforms, track alignment, at-grade crossing gate improvements, and Brisbane LMF. The permanent road closures and relocations are described under Impact TR#4 and in Volume 2, Appendix 2-A. Permanent closures and relocations would not occur on any roadways that serve high-frequency bus routes (routes with service every 15 minutes or less) for MUNI, SamTrans, or VTA under either alternative.

CEQA Conclusion

There would be no impact under CEQA under either project alternative because the project would not result in permanent impacts on any roadways that serve high-frequency bus routes and, as a result, would not conflict with these public transit services or otherwise materially decrease the performance of such services. Therefore, CEQA does not require any mitigation.

Impact TR#10: Temporary Impacts on Passenger Rail Operations

Project-related construction, staging, and traffic could contribute to temporary interference with passenger rail transit under either project alternative. The construction of the HSR stations, platforms, and track alignment would require TCEs. The TCE may require the temporary closure of transit stations, passenger rail platforms, and passenger rail track for other operators where the systems interface. Any closure of passenger rail stations, platforms, and track during construction would be temporary (as in a matter of hours or a few days) except as related to the College Park Caltrain Station. Where passenger rail stations would be closed, temporary stations would be established to avoid cessation of service at that station.

Both project alternatives would include some utility relocation work at discrete locations, but this is not expected to result in delay or closure of passenger rail service or Caltrain stations. Both alternatives would include installation of four-quadrant gates at all existing at-grade crossings that currently lack them, but this is not expected to result in delay or closure of passenger rail service. Both project alternatives would include safety improvements at Caltrain stations, which may require temporary closure of portions of one platform at a time, but passenger service would continue using the remainder of the affected platform or the opposite platform at each station. Both project alternatives would include turnout replacement, relocation, or modification, which would occur at nights or on weekends.

Both project alternatives would include track realignments. Track realignments of less than 10 feet would be done at night or on weekends to allow continued passenger service, but speed restrictions would be imposed until the track realignment is completed. For realignments of more than 10 feet and when there is adequate space within the right-of-way or vacant adjacent land identified within the project footprint without resulting in substantial displacement of adjacent development, a parallel track would be built first and then connected to the existing track. Temporary track closure for reconnecting tracks would occur at night or on weekends and would take 1 to 2 days each. The track realignment works would be carried out according to track possession work windows and work segments as follows:

- Work windows
 - Weekday days, each day (Monday through Friday): Midday during the week between morning and afternoon rush hours. Single tracking between 9:00 a.m. and 5:00 p.m.
 - Weekday nights (Monday and Thursday only): Single tracking between 8:00 p.m. and 4:00 a.m., Monday night and Thursday nights, with both tracks out of service after completion of revenue operations, between 1:00 a.m. and 4:00 a.m.
 - Weekends (Friday night to Monday morning): Weekend, single-tracking, 56-hour continuous work window from 8:00 p.m. Friday night to 4:00 a.m. Monday morning, with both tracks out of service after completion of revenue operations between 1:00 a.m. and 4:00 a.m. Friday, Saturday, and Sunday nights.
- Work segments along the Caltrain corridor
 - Work Segment 1: 7.8 miles (MP 0.2 to MP 8.0)
 - Work Segment 2: 21.1 miles (MP 8.0 to MP 29.1)
 - Work Segment 3: 15.4 miles (MP 29.1 to MP 44.5)
 - Work Segment 4: 6.6 miles (MP 44.5 to MP 50.4)

- Other work requirements
 - Work may be performed concurrently in only two work segments. Work would not be allowed to occur concurrently in two adjacent work segments.
 - Station platforms would be closed occasionally.
 - Speed restrictions would be limited to the minimum required duration.
 - Track crossovers could be temporarily closed during relocation works.

Alternative A would include the following locations of potential disruption to passenger rail operations by subsection:

- **San Francisco to South San Francisco Subsection**—Alternative A would include realignment of tracks and lengthening of two platforms at the 4th and King Street Station, relocation of the Bayshore Caltrain Station, construction of the East Brisbane LMF with connections from the yard lead tracks to the mainline tracks, realignment of the Sierra Lumber Spur, realignment of tracks in the South San Francisco Yard area and the Georgia Pacific Lead, as well as several other track realignments. In Brisbane, the Bayshore Station would stay in operation until the relocated station is operational, and realignment of mainline tracks would occur at nights and on weekends with three tracks available at nearly all times.
- **San Bruno to San Mateo Subsection**—Alternative A would include modification of the San Bruno, Millbrae, and Broadway Caltrain Stations for realignment of tracks at the San Bruno Station, realignment of tracks and platform work to remove the hold-out rule at the Broadway Station, and construction of the additional track at and north and south of the Millbrae Station. Alternative A would also require realignment of tracks at several other locations. At the Broadway Station, parallel tracks would be built at their future location and then the new track would be cut over to the existing track. There would be some platform closure when relocating the center platform and modifying or building the side platforms, but the station could be maintained open by using another platform during construction.
- **San Mateo to Palo Alto Subsection**—Alternative A would include modification of the Hayward Park Station for realignment of tracks and modification of the Atherton Station for realignment of tracks and platform modifications (to remove the hold-out rule). At the Atherton Station, parallel tracks would be built at their future location and then the new track would be cut over to the existing track. There would be some platform closure when relocating the center platform and modifying or building the side platforms, but the station could be maintained open by using another platform during construction. Alternative A would require a realignment of tracks in Belmont and in other areas of this subsection.
- **Mountain View to Santa Clara Subsection**—Alternative A would require realignment of tracks near Bowers Road in Santa Clara and in other areas of this subsection.
- **San Jose Diridon Station Approach Subsection**—North of San Jose Diridon Station (De La Cruz Boulevard to Santa Clara Street), Alternative A would include a new dedicated freight track between CP Coast and CP Shark, the construction of which may result in periodic disruption to passenger service on adjacent tracks. The College Park Station would be rebuilt and San Jose Diridon Station would be modified. South of San Jose Diridon Station (Park Avenue to West Alma Avenue), Alternative A would convert the current double-track corridor to three tracks with a single dedicated track for freight, ACE, Amtrak, and Capital Corridor, and two electrified tracks under a cantilevered OCS for Caltrain and HSR. This track configuration would maintain current capacity for UPRR, ACE, Amtrak, and Capitol Corridor and the planned increases for Caltrain with the PCEP and the proposed HSR service. Rail bridges over Bird Avenue and Delmas Avenue would be modified to accommodate three tracks.

Alternative B would include the following locations of potential disruption to passenger rail operations by subsection:

- **San Francisco to South San Francisco Subsection**—Alternative B features in this subsection would be the same as Alternative A except that Alternative B would include relocation of the Bayshore Caltrain Station and construction of the West Brisbane LMF with connections from the yard lead tracks to the mainline tracks.
- **San Bruno to San Mateo Subsection**—There are no differences between Alternative B and Alternative A in this subsection.
- **San Mateo to Palo Alto Subsection**—Alternative B would include construction of passing tracks from south of Ninth Street in San Mateo to north of Whipple Avenue in Redwood City, which would require reconstruction of the Hayward Park, Hillsdale, Belmont, and San Carlos Stations as well as realignment of tracks. This construction would result in disruption to passenger rail options when making connections between tracks and modifying stations. Extensive single-tracking would occur along the passing track segment from southern San Mateo to northern Redwood City for up to 2 years. While single-tracking would only be in one portion of the passing track segment at any one time, it would be highly disruptive to Caltrain passenger service, particularly at peak hours, and would likely result in service delays. A shoofly track (i.e., temporary bypass track) is not proposed in the passing track segment because the residential and commercial development adjacent to the Caltrain right-of-way would have to be demolished to accommodate a shoofly track. Alternative B would also include modification of the Atherton Station and other realignments in this subsection (outside the passing track segment) similar to Alternative A.
- **Mountain View to Santa Clara Subsection**—There are no differences between Alternative B and Alternative A in this subsection.
- **San Jose Diridon Station Approach Subsection**—Alternative B (Viaduct to I-880) would require relocation of three existing tracks, MT1, MT2, and MT3 from north of I-880 to Julian Street. During connection of the existing tracks to the new tracks, the existing track may shut down for 1 to 2 days (on weekends if feasible), which would affect Caltrain, ACE, Amtrak, and Capitol Corridor service. Alternative B (Viaduct to I-880) also would require a rebuild of the College Park Caltrain Station and the tracks leading into the station. This station would be shut down 1 to 2 years. Alternative B (Viaduct to Scott Boulevard) would require relocation of two tracks, MT1 and MT2, from just south of Scott Boulevard to CP Coast and relocation of three tracks, MT1, MT2, and MT3, from CP Coast to just south of I-880. During connection of the existing tracks to the new tracks, there may be a shutdown of the existing track for 1 to 2 days (on weekends if feasible), which would affect Caltrain, ACE, Amtrak, and Capitol Corridor service. At San Jose Diridon Station, construction of the aerial HSR station under Alternative B would require closure of one platform (two tracks) at a time; the station would continue to operate for Caltrain, ACE, and Capitol Corridor, but during peak times there would be more congestion with the closure of two tracks and one platform. Alternative B would cross over the Caltrain corridor just east of the SR 87 crossing. Construction of the crossovers has the potential for several-day closures (on weekends if feasible).

The contractor would attempt to minimize disruption to passenger rail facilities or shorten the length of time that these facilities would be inoperable (TR-IAMF#2). To minimize conflicts caused by construction with passenger rail transit, the contractor would repair any accidental damage associated with construction and would implement scheduling and the use of existing alternative tracks where available. The temporary disruption would occur over several hours to several days. Where feasible, the contractor would schedule cessation of passenger rail service during the night or on weekends to minimize disruption of passenger rail service. Upon completion, HSR contractors would open and repair tracks or built new a mainline track and remove the shoofly track.

The contractor would identify specific measures in the CMP (TR-IAMF#11) to maintain passenger rail access and provide safe and adequate access for passenger rail users during construction

activities. In addition, the CTP would include methods to minimize construction traffic. A traffic control plan developed as part of the CTP would include provisions for maintaining traffic flow and access and minimizing operations hazards through alternative access and detour provisions, routes for construction traffic, and scheduled transit access. The contractor would establish construction truck routes, restrictions on construction hours, and construction parking as part of the CTP. While the implementation of the CMP would minimize disruption, there would still be residual disruptions to passenger rail operation at times.

CEQA Conclusion

The impact related to temporary disruption would be significant under CEQA for either project alternative due to track relocations, bridge modifications, station modifications, and track crossovers because the anticipated disruptions would materially decrease the performance of existing passenger rail operations. In addition, Alternative B would cause significant disruptions during construction of the passing tracks between San Mateo and Redwood City. The contractor would minimize disruption to passenger rail transit through construction of shoofly tracks (where feasible), maintenance of transit access and implementation of traffic control measures; however, construction would still materially decrease the performance of passenger rail operations. The mitigation measure to address this impact is identified in Section 3.2.9, CEQA Significance Conclusions, and Section 3.2.7, Mitigation Measures, describes the measure in detail.

Operations Impacts

Impact TR#11: Continuous Permanent Impacts on Bus Services

Operation of the project would have a beneficial effect on long-distance travel in California by providing increased transit system connectivity through the establishment of a statewide transit network that connects state, regional, and local transit service. However, project operations would have localized impacts on bus service. For the 2029 Plus Project conditions, two HSR round trips would serve the 4th and King Street Station. For 2040 Plus Project conditions, HSR would be fully operational and would also serve the SFTC, Millbrae, and San Jose Diridon Stations. Vehicle trips around the stations would increase because of the addition of HSR passengers and workers traveling to and from station areas. Many of these trips would occur during peak hours. While overall traffic volumes would decline with initiation of service, the added traffic at stations would lead to increased volume, congestion, and delays around the 4th and King Street, Millbrae, and San Jose Diridon Stations. Population and employment would continue to increase between 2029 and 2040, as would traffic volumes and delays in the No Project conditions. The increase in gate-down events at at-grade crossings from added HSR trains would result in increased delays at adjacent intersections. The increased congestion and delays would occur along high-frequency bus routes (routes with service every 15 minutes or less) operated by MUNI and SamTrans, contributing to bus performance delay. The addition of project-related vehicle trips at stations and added gate-down time at at-grade rail crossings would affect bus on-time performance and operating speeds.

Both project alternatives would result in an increase in intersection delays and significant LOS operational impacts from added gate-down time at at-grade rail crossings and added vehicle traffic in station areas that would affect nine high-frequency bus routes. Table 3.2-19 shows Plus Project bus performance delay impacts from vehicle trips.

Table 3.2-19 Bus Performance Delays from Vehicle Trips and Increased Gate-Down Time at At-Grade Crossings

Subsection	Affected High-Frequency Bus Routes	Alternatives
San Francisco to South San Francisco	MUNI Routes 30 and 45 (4th and King Street Station area) MUNI Route 55 (16th Street crossing)	A and B
San Bruno to San Mateo	SamTrans ECR (Millbrae Station area)	A and B
San Mateo to Palo Alto	SamTrans Route 296 (Ravenswood Avenue crossing)	A and B
San Jose Diridon Station Approach	VTA Routes 181, 22, 64, DASH	A and B

Sources: Authority 2019a, 2019b

ECR = El Camino Real

MUNI = San Francisco Municipal Railway

SamTrans = San Mateo County Transit District

VTA = Santa Clara Valley Transportation Authority

MUNI Routes 30 Stockton and 45 Union/Stockton would be affected by increased delays at intersections in the 4th and King Street Station area. Near the station area, these two MUNI routes travel southbound along Fifth Street, eastbound along Townsend Street, and northbound along Third Street. Three intersections along these two MUNI routes would operate at LOS F under 2029 Plus Project conditions, most notably the intersection of Fourth Street and Townsend Street. When comparing 2029 Plus Project to 2029 No Project conditions, delays at the adjacent intersection of Fourth Street and Townsend Street would increase by 20 seconds in the AM peak hour.

MUNI Route 55 16th Street would be affected by increased delays at the 16th Street at-grade crossing in San Francisco because of increased gate-down time from added HSR trains. When comparing 2040 Plus Project to 2040 No Project conditions at the 16th Street at-grade crossing, delays at the intersection of 16th Street and Seventh Street would increase by 72 seconds in the PM peak hour.

SamTrans Route ECR travels primarily along El Camino Real between the Daly City BART Station and the Palo Alto Transit Center and would be affected by increased delays at intersections along El Camino Real because of added vehicle trips generated by HSR passengers traveling to and from the Millbrae Station. The project would adversely affect six of seven study intersections along El Camino Real between Hillcrest Boulevard and Trousdale Drive in Millbrae. When comparing 2040 Plus Project to 2040 No Project conditions, delays at the intersection of El Camino Real and Millbrae Avenue would increase by 7 seconds in the PM peak hour.

SamTrans Route 296 connects the Redwood City Transit Center, the Menlo Park Caltrain Station, and the Palo Alto Transit Center. Route 296 would be affected by increased delays at the Ravenswood Avenue at-grade crossing in Menlo Park because of increased gate-down time from added HSR trains. When comparing 2040 Plus Project to 2040 No Project conditions at the Ravenswood at-grade crossing, delays at the adjacent intersection of Ravenswood Avenue and Merrill Street would increase by 14 seconds in the AM peak hour.

VTA routes 181, 22, 64, and DASH are high-frequency routes that would be affected by added vehicle traffic and resulting delays around the San Jose Diridon Station. VTA Route 181 connects the Fremont BART Station with the San Jose Diridon Transit Center. VTA Route 22 connects the Palo Alto Transit Center with the Eastridge Transit Center. VTA DASH Route connects the Downtown San Jose area. Route 181, 22, and DASH would be affected by increased delays associated with added HSR station trips in the San Jose Diridon Station area along Cahill Street, Montgomery Street, and Autumn Street between West Santa Clara Street and Park Avenue. VTA Route 64 connects the Almaden Station to the McKee Station via downtown San Jose. Route 64 would be affected by increased delays associated with added HSR station trips in the San Jose

Diridon Station area along Montgomery Street and Autumn Street between West Santa Clara Street and Park Avenue.

CEQA Conclusion

The impact on local bus service would be significant under CEQA under either project alternative based on bus performance delays for 9 high-frequency bus routes. Increased delays from added gate-down time at at-grade crossings would contribute to increased delay on two high-frequency bus routes. Increased delays from added vehicle traffic at the three HSR stations would contribute to increased delay on seven high-frequency bus routes. Nevertheless, project operations would make long-distance travel in California more efficient by providing increased transit system connectivity through the establishment of a statewide transit network that connects state, regional, and local transit service. The mitigation measure to address this impact is identified in Section 3.2.9, and Section 3.2.7 describes the measure in detail.

Impact TR#12: Continuous Permanent Impacts on Passenger Rail and Bus Access

For the 2029 Plus Project conditions, two HSR round trips would serve the 4th and King Street Station. For 2040 Plus Project conditions, HSR would be fully operational serving the SFTC, Millbrae, and San Jose Diridon Stations and increasing transit connectivity to the statewide system. Transit, nonmotorized, and vehicle trips around the stations would increase because of the addition of HSR passengers and workers traveling to station areas. Many of these trips would occur during peak hours. The project would generate approximately 570 peak hour transit trips at the 4th and King Street Station in 2029. In 2040, the project would generate approximately 520 peak hour transit trips at Millbrae Station. At the San Jose Diridon Station, the project would add 1,200 peak hour transit trips in 2040. These project-generated transit trips, in addition to the nonmotorized and vehicle trips around the station areas and transit riders not accessing HSR, would create additional demand for station facilities.

Station design would take into account the changes in demand and would provide access for passengers using HSR as well as other bus and passenger rail services (TR-IAMF#11). The Authority would work with Caltrain, MUNI, SamTrans, VTA, and shuttle operators during station design to provide adequate access to all passenger rail and bus services. At the 4th and King Street Station, two existing Caltrain platforms would be raised and lengthened to serve four northbound and southbound HSR tracks. Four existing Caltrain platforms would remain on either side of the HSR platforms to serve eight Caltrain tracks. At the Millbrae Station, the project would have dedicated HSR platforms and the existing Caltrain and BART tracks and platforms would remain unchanged, so project operations would have no impact on platform access for other passenger rail services. The project would have dedicated HSR platforms at San Jose Diridon Station and thus would have no impact during operations on platform access for other passenger rail services. Project design plans would sufficiently accommodate the operational needs of all modes of affected transportation facilities in the project footprint. By designing for all modes of transportation, including bus and rail transit, these project features would provide permanent adequate access for all passengers in the station area.

The project would relocate Bayshore Station to accommodate the realignment of the mainline tracks for the Brisbane LMF. The station would be rebuilt approximately 1,000 feet south of the existing station near the proposed Geneva Avenue extension under either project alternative. This station relocation is consistent with the *Draft Brisbane Baylands Specific Plan* (City of Brisbane 2011).

Alternative B would relocate San Carlos Station approximately 2,260 feet south of its current location to accommodate the passing tracks. This relocation would reduce Caltrain's accessibility to downtown San Carlos, putting most of downtown beyond a quarter-mile walk from the station. The station relocation would also lengthen SamTrans Route 260 (which currently terminates at San Carlos Station) and increase bus travel times to Redwood Shores.

CEQA Conclusion

The impact would be less than significant under CEQA for Alternative A. Passengers for other passenger rail and bus services would be able to access these services unimpeded, and

Alternative A would not materially decrease the performance of these services. Changes to Bayshore Station are consistent with plans by the City of Brisbane. Therefore, CEQA does not require any mitigation.

The impact would be significant under CEQA for Alternative B because HSR operations would materially decrease the performance of transit services at the San Carlos Station. Caltrain passengers using the San Carlos Station would experience longer travel times to reach downtown San Carlos. SamTrans Route 260 would experience longer travel times. The mitigation measure to address this impact is identified in Section 3.2.9, and Section 3.2.7 describes the measure in detail.

Impact TR#13: Continuous Permanent Impacts on Transit Ridership

For the 2029 Plus Project conditions, two HSR round trips would serve the 4th and King Street Station. For 2040 Plus Project conditions, HSR would be fully operational and would also serve the SFTC, Millbrae, and San Jose Diridon Stations. Because HSR ridership and service would be greater in 2040 than in 2029, the 2040 analysis serves as a more conservative analysis of impacts. HSR riders at HSR stations would create new demands for Caltrain and other transit systems as they transfer from HSR to reach destinations served by other transit systems. In addition, HSR would compete with Caltrain for riders from San Jose northward. This analysis focuses on the impacts on systemwide transit ridership and potential secondary physical impacts from transit system improvements to address changes in ridership.

The Authority modeled transit access and egress for HSR passengers from the 4th and King Street Station for the 2029 Plus Project conditions and for the SFTC, Millbrae, and San Jose Diridon Stations for 2040 Plus Project conditions using the *California Statewide Travel Demand Model* (Authority 2016c). As shown in Table 3.2-3, the increase in HSR service over time would result in increased use of connecting transit systems by HSR passengers.

The Authority also modeled 2040 Caltrain system ridership using the *California Statewide Travel Demand Model* (Authority 2016c). The Authority modeled both the increase in demand for transfers between Caltrain and HSR and the competitive effect of parallel Caltrain and HSR service to Gilroy, San Jose, Millbrae, and San Francisco. As shown in Table 3.2-20, in 2040, HSR service would result in a net increase in Caltrain ridership by 6.5 percent compared to the 2040 No Project conditions.

Table 3.2-20 Changes in Caltrain System Average Weekday Ridership with the Project, 2040

Transit System	Existing	2040 No Project	2040 Plus Project	Percent Change Between 2040 No Project and Plus Project
Caltrain ^{1,2}	65,095	114,500	121,900	6.5%

Sources: Caltrain 2018; Authority 2017a; PCJPB 2015

BART = Bay Area Rapid Transit

EIR = environmental impact report

HSR = high-speed rail

LOS = level of service

¹ Existing results from Caltrain 2018 ridership report (Caltrain 2018).

² 2040 estimates from the *California Statewide Travel Demand Model* (Authority 2016c) results for a HSR medium-ridership scenario (Authority 2017a), using Caltrain Peninsula Corridor Electrification Project EIR assumptions for Caltrain and BART fares and LOS (PCJPB 2015). The statewide model produces results in average daily ridership of 89,000 for 2040 No Project conditions and 94,800 for 2040 Plus Project conditions, which the Authority then converted to average weekday ridership based on comparison of 2016 ratio between average daily and average weekday ridership.

The primary source of increase to Caltrain ridership would be the increase in HSR riders at San Jose Diridon Station and Millbrae Station, where Caltrain would serve as a feeder service to and from HSR. HSR would have fewer stops than Caltrain service between Gilroy, San Jose, Millbrae, and San Francisco and thus shorter service times, which may result in some Caltrain commuters shifting to HSR when traveling to these limited destinations. However, Caltrain would continue to

provide service to the five non-HSR stations between Gilroy and San Jose and 24 stations between San Jose and San Francisco.

The increase in HSR riders at the SFTC would also result in an increase to MUNI light rail service, MUNI bus, and BART system ridership. The increase in HSR riders at the Millbrae station would also result in an increase to SamTrans and BART system ridership using the existing connections. The increase in HSR riders at the San Jose Diridon Station would result in an increase to VTA and BART system ridership using the existing VTA connections (light rail and bus) and the presumed future BART extension to San Jose Diridon Station. HSR fares would be higher than competing transit services but would provide time savings for some regional commutes. HSR would be competitive with other transit services in time, but not price.

HSR would have limited competitive impact on transit bus services (MUNI, SamTrans, and VTA) and transit light rail (MUNI light rail service and VTA), because HSR would not serve local geographies served by local bus and light rail connections. HSR would pose some competition with BART by providing a more direct connection from San Jose to San Francisco, whereas BART service to San Francisco would be via the East Bay and from Millbrae to San Francisco. At the same time, HSR would likely increase BART riders who would use BART to get to and from HSR stations and locations in the Bay Area not served by HSR. HSR would have a limited competitive impact on other transit services in the RSA because the markets and geography served by these services are different from those served by HSR. The overall effect of HSR is expected to be an increase in the use of other transit services as a complement to HSR service by providing transit connections to local geographies to and from the HSR stations.

Growth in the region by 2040 would increase demand for transit service. HSR is one of many projects in the planning phase to address that increased demand. HSR service would result in increased ridership for other transit feeder systems. If excess capacity is available for other transit service providers, the introduction of new riders could have the net benefit of increasing farebox revenue and thus the financial viability of the system. Systems that operate at capacity may require changes in service levels and additional transit vehicles. Transit providers must plan for their future needs and build the facilities to meet their system rider demands as feasible given funding availability. Thus, HSR operations may increase ridership on other transit systems but would not materially harm the ability of other transit providers to serve their customers. The increase in ridership would not conflict with adopted policies, plans, or programs regarding public transit. The increase in ridership would not materially decrease the performance of such facilities.

Another concern is whether physical improvements on other transit systems would be needed to accommodate HSR-induced transit ridership and whether such improvements would result in physical impacts on the environment. Caltrain facilities already contain multimodal access and thus the 6.5 percent increase in system ridership should not result in substantial new capital improvements for Caltrain stations beyond what is planned without HSR service. A similar conclusion applies for VTA and BART.

It is not anticipated that the relatively modest increases in HSR-induced ridership for other transit services would require the construction of substantial additional transit infrastructure. Secondary impacts from construction of limited amounts of additional facilities (such as bus stops/shelters) at existing rail, light rail, and bus facilities are not expected to result in secondary environmental impacts; however, improvements by other transit agencies would be the subject to independent environmental analysis.

CEQA Conclusion

The impact would be less than significant under CEQA for both project alternatives. HSR operations would increase the demand for Caltrain and other transit services, which would enhance the financial viability of these public transit services where excess capacity is available. HSR operations would not materially harm the ability of other transit services to serve their customers and would not conflict with adopted policies, plans, or programs regarding public transit, or otherwise materially decrease the performance of such facilities. Transit service expansions would result in limited physical improvements not likely to result in secondary environmental impacts. Therefore, CEQA does not require any mitigation.

Impact TR#14: Continuous Permanent Impacts on Passenger Rail System Capacity

For the 2029 Plus Project conditions, two HSR round trips would serve the 4th and King Street Station. For 2040 Plus Project conditions, HSR would be fully operational and serve the SFTC, Millbrae, and San Jose Diridon Stations.

The Authority evaluated blended service with Caltrain between the San Francisco 4th and King Street Station and the San Jose Diridon Station using operational modeling (Authority 2017c). The Authority modeling shows that average Caltrain operational service times between San Francisco and San Jose would be nearly the same with blended service as without any HSR trains for Alternative A, which has no passing tracks. Caltrain operational service times from San Jose to San Francisco would be approximately 2.5 minutes slower for Alternative B, which would have the passing track. The addition of HSR trains would result in some supplemental time (from 4.8 minutes under Alternative A to 7.6 minutes under Alternative B) for Caltrain trains because operation of the passing tracks with blended service would require Caltrain trains to be held in order to allow for HSR trains to pass. This supplemental time may be negatively perceived by Caltrain riders. However, the operations results show that blended service would not result in a substantial increase of Caltrain average operational service times.

The operations analysis also examined whether blended service would allow Caltrain to operate a “clock-face” regular interval service and avoid scheduling of trains close together. Regular interval service allows commuters to reliably use the service. Scheduling of trains with more time separation can better spread passenger load over several trains and can maintain a more regular schedule if one train is delayed. Caltrain would be able to operate northbound and southbound trains at regular hourly times. With the no passing track configuration under Alternative A, there would be no substantial bunching¹⁶ of Caltrain service. With the passing track configuration under Alternative B, there would be slightly more bunching than under the No Project conditions or Alternative A (Table 3.2-21).

Between CP Coast in Santa Clara and West Alma Avenue in San Jose, the project alternatives would have no impact on capacity for passenger rail operations other than Caltrain (ACE, Capitol Corridor, Amtrak). All other passenger rail operations would use a separate track (MT1) that HSR would not use.

Under Alternative A, HSR and Caltrain would have blended operations between 4th and King Street Station in San Francisco and West Alma Avenue in San Jose. The blending of Caltrain and HSR operations between San Francisco and San Jose Diridon Station is included in the analysis presented in Table 3.2-21. South of San Jose Diridon Station, Alternative A includes two tracks for blended service (HSR and Caltrain) and a separate dedicated track (MT1) for freight and other passenger rail services. Based on analysis of blended operations between San Jose and Gilroy by the Authority, the two tracks for HSR and Caltrain blended service would accommodate up to 12 trains per direction per peak hour, which would provide adequate capacity for planned HSR and Caltrain service. Thus, there would be adequate capacity to match current levels of passenger train service.

Terminology

Supplemental time refers to the time when Caltrain is waiting at a station or operating at less than optimal speed to provide time for passing HSR trains.

A **“clock-face” schedule** is one in which the train arrives at regular intervals each hour. For example, a train may arrive at a station at 17 minutes past and 47 minutes past each hour (8:17, 8:47, 9:17; 9:47, etc.)

¹⁶ *Bunching* occurs where trains are forced to be scheduled very close together.

Table 3.2-21 Average Operational Service Times for Caltrain (4th and King Street Station to San Jose Diridon Station) during Peak Hour

San Francisco to San Jose Operating Scenario	Train Service in Peak Hour	Caltrain Average Operational Service Time (minutes per train)	Caltrain Average Supplemental Time per Train ¹ (minutes)	Hourly Schedule Interval (minutes between Caltrain service)
No Project Alternative	6 Caltrain per direction	62.2	None	SB San Jose: 11 - 9 - 10 - 11 - 8 - 11 NB Palo Alto: 9 - 7 - 13 - 10 - 9 - 12
Alternative A (no passing tracks)	6 Caltrain + 4 HSR per direction	62.5	4.8	SB San Jose: 10 - 14 - 8 - 9 - 13 - 6 NB Palo Alto: 10 - 9 - 11 - 10 - 10 - 10
Alternative B (passing track)	6 Caltrain + 4 HSR per direction	65.0	7.4	SB San Jose: 17 - 6 - 8 - 16 - 6 - 7 NB Palo Alto: 12 - 3 - 15 - 12 - 3 - 15

Source: Authority 2017c

HSR = high-speed rail

NB = northbound

SB = southbound

¹ Supplemental is included in the calculation of average service times (i.e., is not in addition to the average service times shown in the table).

Under Alternative B, HSR and Caltrain would have blended operations between 4th and King Street Station in San Francisco and either I-880 or Scott Boulevard (depending on the viaduct option) in Santa Clara. Under Alternative B (Viaduct to I-880), HSR would transition from shared to dedicated HSR tracks at I-880. Under Alternative B (Viaduct to Scott Boulevard), HSR would transition from shared to dedicated tracks at Scott Boulevard and would not affect Caltrain service on MT2 and MT3. The analysis presented in Table 3.2-21 takes into account the sharing of tracks with Caltrain between San Francisco and San Jose Diridon Station including between either I-880 or Scott Boulevard.

CEQA Conclusion

The impact would be less than significant under CEQA for both project alternatives. The project would not result in a substantial increase in Caltrain average operational service times and would not affect capacity for any other passenger rail services. Caltrain would be able to operate a regular interval schedule without substantial bunching. The project would not conflict with adopted policies, plans, or programs regarding public transit, or otherwise materially decrease the performance of passenger rail. Therefore, CEQA does not require any mitigation.

3.2.6.5 Nonmotorized Travel

Construction and operations of either project alternative would result in temporary and permanent impacts on nonmotorized travel. Construction would disrupt bicycle and pedestrian facilities within the project footprint. Project operations would increase the number of station passengers and would change the demand for bicycle and pedestrian facilities that serve the shared stations.

No Project Conditions

The population under the No Project conditions is projected to increase through 2029 and 2040. Development projects to accommodate projected population growth, including shopping centers, industrial parks, transportation projects, and residential developments, would continue under the No Project Alternative and could result in impacts on bicyclist and pedestrian transportation, including changes to bicycle and pedestrian access. Pedestrian and bicycle volumes near Caltrain stations would increase because of increased Caltrain service and ridership.

The No Project conditions include pedestrian and bicycle improvements at the 4th and King Street, Millbrae, and San Jose Diridon Stations. At the 4th and King Street Station, pedestrian and bicycle improvements would occur along Townsend Street, and pedestrian signal timing improvements would occur at Fourth Street and Townsend Street and Fourth Street and King Streets. At Millbrae Station, pedestrian improvements to sidewalks and crosswalks would occur within the MSASP boundaries. At the San Jose Diridon Station, pedestrian improvements would include enhanced underpass connections along SR 87 and Caltrain underpasses, a pedestrian scramble at the intersection of Santa Clara Street and Montgomery Avenue, and sidewalk and crosswalk enhancements around station area; bicycle improvements would include extensions of the Class I bike trails of Los Gatos Creek Trail and North Railroad Trail and Class II bike lanes on Autumn Street, Montgomery Street, The Alameda, Race Street, Julian Street, and Auzerais Avenue.

The No Project conditions include the implementation of bicycle and pedestrian projects from plans identified in Section 3.2.2, Laws, Regulations, and Orders. These projects include the implementation of bike lanes or trails, and pedestrian sidewalk, crosswalk, and signal timing enhancements. All active transportation improvement projects in the transportation RSA are assumed to be built by 2029 and are shown in Table 3.2-22.

Table 3.2-22 2029 and 2040 No Project Conditions Bicycle and Pedestrian Improvements

Subsection	Pedestrian Projects	Bicycle Projects
San Francisco to South San Francisco Subsection		
4th and King Street Station	Townsend Corridor Improvement Project—new and repaved pedestrian walkways between Fifth and Seventh Streets, new sidewalk island between Fourth and Fifth Streets, more visible intersections and upgraded crosswalks	Townsend Corridor Improvement Project—new and repaved protected bikeways between Fourth and Eighth Streets
4th and King Street Station: Caltrain PCEP mitigations	Pedestrian scramble at the 4th and Townsend Street intersection and pedestrian all-red phase at 4th and King Street Station	No changes
Brisbane LMF	No changes	No changes
San Bruno to San Mateo Subsection		
Millbrae Station	Millbrae Station Area Specific Plan—widen sidewalks on periphery of and internal to plan area, enhance crosswalks, wayfinding	No changes
San Jose Diridon Station Approach Subsection		
San Jose Diridon Station	Enhanced underpass connections along SR 87 and Caltrain underpasses Pedestrian scramble ¹ at the intersection of Santa Clara Street and Montgomery Avenue Sidewalk and crosswalk enhancements around station area	Class I bike trail extensions of Los Gatos Creek Trail and North Railroad Trail, including grade-separated trail crossings along Los Gatos Creek Trail Class II bike lanes on Autumn Street, Montgomery Street, The Alameda, Race Street, Julian Street, and Auzerais Avenue

Sources: City and County of San Francisco 2018b; City of Millbrae 2016b; PCJPB 2015; City of San Jose 2009, 2014

LMF = light maintenance facility

PCEP = Peninsula Corridor Electrification Project

SR = state route

¹ A pedestrian scramble is a type of traffic signal phasing that temporarily stops all vehicular traffic and allows pedestrians to cross an intersection in every direction, including diagonally, at the same time.

Project Impacts

Construction Impacts

Impact TR#15: Temporary Impacts on Pedestrian and Bicycle Access

Construction activities associated with the stations, LMF, platforms, installation of four-quadrant gates at at-grade crossings, track modifications, viaduct and modifications to underpasses to accommodate the passing track (Alternative B) would result in temporary roadway lane or road closures, underground utility work, and disruption of transportation systems operations in urban areas. Construction activities associated with the stations, platforms, and track alignment would require TCEs, which would result in the temporary closure of pedestrian or bicycle facilities. Any closure or removal of pedestrian facilities, bicycle lanes, and paths during construction would be temporary.

The relocation or extension of platforms or track realignment, or both, at the Bayshore, San Bruno, Broadway, Atherton, and College Park Caltrain Stations may require temporary pedestrian and bicycle access modifications for both project alternatives. The relocation or extension of platforms or track realignment at the Hillsdale, Belmont, and San Carlos Caltrain Stations that would be required for construction of passing tracks for Alternative B may require temporary pedestrian and bicycle access modifications. Through the CTP, pedestrian and bicycle access to the stations would be maintained throughout construction.

Temporary closure of bicycle and pedestrian facilities would result in a reduction in access for cyclists and pedestrians in the area of the closure. Every attempt would be made to minimize the removal of pedestrian and bicycle facilities, and shorten the length of time that these facilities are inoperable. Upon completion of construction, all pedestrian facilities and bicycle lanes would be restored. To minimize construction impacts on bicycles and pedestrians, the contractor would prepare specific CMPs (TR-IAMF#4, TR-IAMF#5) to address maintenance of pedestrian and bicycle access during construction activities. To maintain pedestrian and bicycle access, the contractor would provide a technical memorandum (TR-IAMF#12), which would describe how pedestrian and bicycle accessibility would be provided and maintained across the HSR corridor, to and from stations, and on station property. Local access programs, such as Safe Routes to Schools, would be maintained or enhanced. Access to community facilities for vulnerable populations would be maintained or enhanced.

To minimize access conflicts caused by construction, the contractor would prepare a CTP (TR-IAMF#2). The CTP, which would be reviewed and approved by the Authority, would address, in detail, the activities to be carried out in each construction phase. The CTP would provide a traffic control plan that would identify when and where temporary closures and detours would occur, with the goal of maintaining traffic flow, especially during peak travel periods. The traffic control plan would be developed for each affected location and would include, at a minimum, signage to alert pedestrians to the construction zone, traffic control methods, traffic speed limitations, provisions for safe pedestrian and bicycle passage or convenient detours, and safe pedestrian access to local businesses and residences.

CEQA Conclusion

The impact would be less than significant under CEQA for both project alternatives because the project would not conflict with adopted policies, plans, or programs regarding bicycle or pedestrian facilities, or otherwise materially decrease the performance of such facilities. The contractor would prepare CMPs, which would maintain safe and adequate access for pedestrians and cyclists during construction. A CTP would be developed containing standard construction procedures related to traffic management, including development of a detailed traffic control plan for each affected location prior to beginning any construction activities. Pedestrian and bicycle accessibility would be maintained and would be prioritized over motor vehicle access. The traffic control plan would include efforts to maintain safe and adequate pedestrian and bicycle access through signage to alert pedestrians to the construction zone, traffic control methods, traffic speed limitations, provisions for safe pedestrian and bicycle passage or convenient detours, and

safe pedestrian access to local businesses and residences. Therefore, CEQA does not require any mitigation.

Impact TR#16: Permanent Impacts on Pedestrian and Bicycle Access

Construction of either project alternative would not require changes to the pedestrian and bicycle facilities in the HSR station areas that would have permanent effects. There would be no significant permanent road closures and existing pedestrian and bicycle facilities affected by road realignments and underpass modifications would be replaced. The permanent road closures and relocations are described under Impact TR#4 and in Volume 2, Appendix 2-A.

Changes to the pedestrian and bicycle facilities in HSR station areas and on roadways changed or rebuilt by the project would provide safe and accessible connections. In the 4th and King Street Station area, the project would make no permanent changes to pedestrian or bicycle facilities outside the station. In the Millbrae Station area, new HSR station facilities would be built on the west side of the existing station with pedestrian access to the new HSR platforms. A new dedicated cycle track would be provided on the west side of the station to enhance bicycle access to the station. In the San Jose Diridon Station area, new bicycle facilities to access the station would be provided on Cahill Street between Santa Clara Street and Park Avenue and on various local streets between The Alameda and Park Avenue. Designated bicycle parking areas are currently provided at all three station areas.

The relocation or extension of platforms and/or track realignment at the Bayshore, San Bruno, Broadway, Atherton, and College Park Caltrain Stations include permanent modifications to pedestrian and bicycle access and circulation for both alternatives. The relocation or extension of platforms and/or track realignment at the Hillsdale, Belmont, and San Carlos Caltrain Stations required for construction of passing tracks include permanent modifications to pedestrian and bicycle access and circulation under Alternative B. These modifications would not result in a substantial change to current levels of pedestrian or bicycle access.

To maintain pedestrian and bicycle access, project design plans include specifications for vehicle lanes, passenger loading zones, sidewalks, crosswalks, bike lanes, trails, bus stops, parking, and intersection controls (TR-IAMF#12). These features address how pedestrian and bicycle accessibility would be provided and maintained across the HSR corridor, to and from stations, and on station property. Local access programs, such as Safe Routes to Schools, would be maintained or enhanced. Access to community facilities for vulnerable populations would be maintained or enhanced. All reconstructed roadways would replace all bicycle and pedestrian facilities upon completion of construction. All new and replaced facilities would be designed with specifications for passenger loading zones, sidewalks, crosswalks, bike lanes, trails, bus stops, parking, and intersection controls. Project designs would incorporate best practice multimodal design standards and guidance from the American Association of State Highway and Transportation Officials, the National Association of City Transportation Officials, and the Institute of Transportation Engineers.

CEQA Conclusion

The impact would be less than significant under CEQA for both project alternatives because the project would not conflict with adopted policies, plans, or programs regarding bicycle or pedestrian facilities, or otherwise materially decrease the performance of such facilities. The project would provide safe and accessible bike and pedestrian facilities. For all reconstructed roadways, all bicycle and pedestrian facilities would be replaced upon completion of construction to maintain nonmotorized access. Pedestrian and bicycle accessibility would be provided and maintained and would be prioritized over motor vehicle access. Thus, the project would not materially decrease the performance of pedestrian and bicycle facilities. Therefore, CEQA does not require any mitigation.

Operations Impacts

Impact TR#17: Continuous Permanent Impacts on Pedestrian and Bicycle Access

The 2029 Plus Project conditions would entail two trains per hour in each direction to San Francisco's 4th and King Street Station. The addition of HSR service to 4th and King Street Station would result in increased pedestrian volumes in an already congested pedestrian environment. The project would add about 170 peak hour nonmotorized trips at the 4th and King Street Station in 2029, and increase peak hour pedestrian crossings by approximately 50 pedestrians per hour at both the Fourth Street and King Street and Fourth Street and Townsend Street intersections—an increase of approximately 15 percent over the 2029 No Project conditions. Along the north side of the 4th and King Street Station, the City of San Francisco is building the Townsend Corridor Improvement Project that will provide a protected bikeway between Fourth and Eighth Streets, an upgraded pedestrian walkway between Fourth Street and Seventh Street where no sidewalk exists, a raised island between Fourth and Fifth Streets for passenger boarding, relocated and expanded commercial and passenger loading zones, high-visibility crosswalks and curb zones at intersections, and a modified bus route (MUNI 47 Van Ness) and bus stop changes for various bus routes throughout the corridor. The project would make no changes to pedestrian facilities at the station. The increase in pedestrian traffic caused by the project would exacerbate pedestrian crowding concerns around limited sidewalk capacity along the Fourth Street station frontage between Townsend Street and King Street.

For the 2040 Plus Project conditions, HSR would be fully operational with service to the SFTC, Millbrae, and San Jose Diridon Stations. Transit, nonmotorized, and vehicle trips around the stations would increase because of the addition of passengers and HSR workers traveling to station areas. The project would generate approximately 50 peak hour nonmotorized trips at the Millbrae Station in 2040. The planned station area facilities would be designed to adequately serve forecast volumes of nonmotorized traffic. The project would generate approximately 450 peak hour nonmotorized trips at the San Jose Diridon Station. The planned station area facilities would be designed to adequately serve forecast volumes of nonmotorized traffic.

The project features described under Impact TR#15 would maintain pedestrian and bicycle access across the HSR corridor, to and from stations, and on station property. Project design would incorporate best practice multimodal design standards and guidance from the American Association of State Highway and Transportation Officials, the National Association of City Transportation Officials, and the Institute of Transportation Engineers.

The relocation or extension of platforms and/or track realignment at the Bayshore, San Bruno, Broadway, Atherton, and College Park Caltrain Stations would include modifications to pedestrian and bicycle access and circulation for both project alternatives. The relocation or extension of platforms and/or track realignment at the Hillsdale, Belmont, and San Carlos Caltrain Stations required for construction of passing tracks include modifications to pedestrian and bicycle access and circulation under Alternative B. These modifications would not result in a substantial change to levels of pedestrian or bicycle access during project operation.

CEQA Conclusion

The impact would be significant under CEQA under either project alternative at the 4th and King Street Station because the project would exacerbate pedestrian crowding due to limited sidewalk capacity along the Fourth Street frontage between Townsend Street and King Street. At all other locations, the impact would be less than significant under CEQA because the project would not conflict with adopted policies, plans, or programs regarding bicycle or pedestrian facilities, or otherwise materially decrease the performance of such facilities. All roadways that are reconstructed would replace all bicycle and pedestrian facilities upon completion of construction. This would maintain or enhance nonmotorized access. Facilities would be designed to latest standards and guidance and would provide adequate access. Pedestrian and bicycle accessibility would be provided and maintained and would be prioritized over motor vehicle access. Thus, at all locations other than the 4th and King Street Station, the project would not materially decrease the performance of pedestrian and bicycle facilities. The mitigation measure to address the

impact at the 4th and King Street Station is identified in Section 3.2.9, and Section 3.2.7 describes the measure in detail.

3.2.6.6 Freight Rail Service

Construction and operations of either project alternative would result in temporary and permanent impacts on freight service. Freight rail operations would be temporarily affected by temporary closure or relocation of tracks during construction, and would be permanently affected by constraints associated with the sharing of tracks along certain portions of the alignment. Diversion of freight from rail to other modes is not anticipated.

No Project Conditions

Population, employment, and economic activity in San Francisco, San Mateo, and Santa Clara Counties will increase through 2040. Development projects to accommodate projected population growth and economic growth, including shopping centers, industrial parks, transportation projects, and residential developments, would continue under the No Project conditions and could result in increased demands for transport of freight by rail and the resulting need to expand freight services.

The exact amount of future freight rail transport is difficult to predict. Freight levels depend on not only the overall level of economic activity but also the specific demand for bulk and oversize commodities that dominate freight carried by rail. As a conservative assessment, the Authority assumed that freight would increase in the future at a rate of 3.5 percent per annum (Caltrans 2014). This rate is an informal rate that freight operators, such as UPRR, often cite. Table 3.2-23 shows existing and estimated future freight levels along different parts of the Project Section corridor. As shown, freight service levels are forecast to increase under 2040 No Project conditions.

Table 3.2-23 Existing and Estimated Future Freight Train Operations

Year	Time Period	Total Daily Number of Trains (Both Directions) Per Segment				
		San Francisco to South San Francisco	South San Francisco to Redwood City	Redwood City to Santa Clara	Santa Clara to Diridon	Diridon to Tamien
2016 ¹	Total	2	4	2	9	4
2040 ²	Total	5	10	5	23	10

Sources: Authority 2019a, 2019b

¹ Caltrain Corridor—from PCEP EIR (PCJPB 2015)

² Growth factor of 3.5 percent from Caltrans 2014 rounded up conservatively to 4 percent per annum change every year starting in 2017.

The section from San Jose Diridon Station to CP Coast (just north of the Santa Clara Caltrain Station) is a pinch point for rail services, including freight rail, as freight from the south (via the Coast Subdivision), the southwest (via the Vasona Industrial Lead), the north (via the Caltrain corridor), and the northeast (Coast Subdivision and Warm Springs Subdivision) all traverse the Caltrain corridor in a 3.1-mile segment, which Caltrain refers to as the south terminal area. This area is a key focus of the impact analysis concerning freight rail capacity.

Under 2040 No Project conditions, freight service levels are forecast to increase compared to existing conditions. UPRR owns the MT1 track in the Caltrain corridor from CP Coast to CP Lick and the tracks southward from CP Lick to Gilroy and this track is sufficient to accommodate the potential increases in freight service shown in Table 3.2-23.¹⁷ Caltrain service levels would increase with PCEP implementation between Santa Clara and Tamien, and ACE and Capitol Corridor may also increase service levels to San Jose (depending on funding, permitting, and

¹⁷ The nominal capacity of a single-track line for freight is 30 daily trains, as indicated in the *Alameda County Goods Movement Plan* (Alameda County Transportation Commission 2016).

UPRR consent) in the future, which would result in more train activity between Santa Clara and Tamien. Given UPRR's rights to control the use of MT1, it can assure that there is adequate capacity for the potential freight increases. As such, under 2040 No Project conditions, adequate capacity would be available to support potential freight service increases.

Project Impacts

Construction Impacts

Impact TR#18: Temporary Impacts on Freight Rail Operations

The construction of the HSR stations, platforms, and track modifications would require construction in certain areas presently used for freight service. Construction would require the temporary closure of tracks presently used by freight in certain areas for limited durations. Any closure or removal of freight track during construction would be temporary (ranging from a few hours to a few days), but would disrupt freight rail operations. This would result in inconvenience to freight operators and customers and could result in additional truck traffic if necessary to meet freight delivery requirements.

In accordance with TR-IAMF#9, the project contractor would repair any structural damage to freight or public railways that may occur during the construction period and return any damaged sections to their original structural condition. If there is room within the existing Caltrain right-of-way and necessary during construction, a shoofly track may be built to allow existing train lines to bypass areas closed for construction activities where feasible. Upon completion, tracks would be opened and repaired; or new mainline track would be built, and the shoofly would be removed. Shoofly tracks are only feasible in areas with unconstrained right-of-way with adequate space and may not be feasible in constrained areas. Much of the Caltrain corridor is constrained in terms of available space; therefore, shoofly tracks would not be feasible in many locations. Shoofly tracks would not be used where they would require acquisition of temporary construction easement beyond that otherwise already required for other purposes (e.g. where a shoofly alignment would increase temporary construction easement widths outside the right-of-way beyond that which would be required without a shoofly track).

Construction of either project alternative would require turnout replacement, relocation, or modification, which would occur at nights or on weekends, as well as track realignments. Track realignments of less than 10 feet would be done at night or on weekends and speed restrictions would be imposed until the track realignment is completed. For realignments more than 10 feet, a parallel track would be built first and then connected to the existing track. Temporary track closure for reconnecting tracks would occur at night or on weekends and would have a duration of 1 to 2 days each. The track realignment would be carried out according to track possession work windows and work segments described under Impact TR#9.

Alternative A would include the following locations of potential disruption to freight service:

- **San Francisco to South San Francisco Subsection**—Alternative A would include construction of the East Brisbane LMF with connections from the yard lead tracks to the mainline tracks, realignment of the Sierra Lumber Spur, realignment of tracks in the South San Francisco Yard area and the Georgia Pacific Lead, as well as several other track realignments that would temporarily affect freight service when connecting to existing tracks or doing single-tracking at nights and weekends.
- **San Bruno to San Mateo Subsection**—Alternative A would include realignment of tracks at the San Bruno, Broadway, and Millbrae Stations, and realignment of tracks at several other locations, which would result in some temporary closures during track reconnections and single-tracking.
- **San Mateo to Palo Alto Subsection**—Alternative A would include realignment of tracks near the Hayward Park and Atherton Stations, in Belmont, and in other areas of this subsection, all of which would result in some temporary closures during track connections as well as single-tracking.

- **Mountain View to Santa Clara Subsection**—Alternative A would require a realignment of tracks near Bowers Road in Santa Clara and in other areas of this subsection.
- **San Jose Diridon Station Approach Subsection**—North of San Jose Diridon Station (De La Cruz Boulevard to Santa Clara Street), Alternative A would include a new dedicated freight track between CP Coast and CP Shark. South of San Jose Diridon Station (Park Avenue to West Alma Avenue), Alternative A would convert the current double-track corridor to three tracks with a single dedicated track for freight, ACE, Amtrak, and Capital Corridor, and two electrified tracks under a cantilevered OCS for Caltrain and HSR. This track configuration would maintain current capacity for freight and all existing passenger rail services while providing additional capacity for the planned increases with Caltrain PCEP and the proposed HSR service. Rail bridges over Bird Avenue and Delmas Avenue would be modified to accommodate three tracks. Existing spurs, siding connections, at-grade crossings, and grade separations would be retained. The Michael Yard would be reconfigured to retain storage capacity with additional connection to the storage tracks at the southern end.

Alternative B would include the following locations of potential disruption to freight service:

- **San Francisco to South San Francisco Subsection**—Construction of Alternative B would result in disruption to freight service similar to Alternative A except that Alternative B would include relocation of the Bayshore Caltrain Station and construction of the West Brisbane LMF with connections from the yard lead tracks to the mainline tracks.
- **San Bruno to San Mateo Subsection**—There are no differences between Alternative B and Alternative A in this subsection.
- **San Mateo to Palo Alto Subsection**—Alternative B would include construction of passing tracks from south of Ninth Street in San Mateo to north of Whipple Avenue in Redwood City. This would require realignment of tracks that would result in disruption to freight rail operations because of extensive single-tracking along the passing track segment for up to 2 years. Single-tracking would only occur in one portion of the passing track segment at any time. Given limited freight service levels, it is expected that freight service can be accommodated at night when Caltrain is not operating. However, freight trains would not likely be able to operate during the day through single-tracked areas because of train congestion when Caltrain service is running without exacerbating Caltrain service delays. A shoofly track is not feasible in the passing track segment because the residential and commercial development adjacent to the Caltrain right-of-way would have to be demolished to accommodate a shoofly track. Alternative B would also include realignments for the Atherton Station and in other areas in this subsection (outside the passing track segment) similar to Alternative A.
- **Mountain View to Santa Clara Subsection**—There are no differences between Alternative B and Alternative A in this subsection.
- **San Jose Diridon Station Approach Subsection**—Alternative B (Viaduct to I-880) would relocate MT1 and other UPRR tracks from north of I-880 to Julian Street and would rebuild or relocate the Lenzen Wye leading to the UPRR Warm Springs Subdivision. During connection of the existing tracks to the new tracks, there may be a shutdown of the existing track for several days (on weekends if feasible), which would affect freight service. Alternative B (Viaduct to Scott Boulevard) would relocate MT1 and MT2 from south of Scott Boulevard to CP Coast, relocate MT1 and other freight tracks from CP Coast to just south of I-880, and rebuild or relocate the Lenzen Wye leading to the UPRR Warm Springs Subdivision. Connection of the existing tracks to the new tracks may shut down the existing track for 1 to 2 days (on weekends if feasible), which would affect freight service. At San Jose Diridon Station, construction of the aerial HSR station would close one platform (two tracks) at a time, so that the station would continue to operate but during peak times there would be more congestion with the loss of two tracks and one platform. During closure of MT1, freight would be rerouted to one of the open tracks around the closure. Alternative B would cross over the

Caltrain corridor just east of where it crosses SR 87. Crossovers have the potential for several-day closures (on weekends if feasible).

To avoid affecting freight railroad operations during construction, the contractor would be responsible for reaching an agreement on the timing and duration of activities prior to implementing a TCE on any railroad property outside the Caltrain right-of-way or exclusive UPRR tracks within the Caltrain right-of-way. Under both project alternatives, the design-build contractor would finalize specific TCEs during final project design in coordination with the affected railroads in areas where access is required. In areas where TCEs would cross railroad property, the Authority would avoid affecting railroad operations to the extent possible.

Because construction conditions may vary, there is a possibility for temporary disruption or delay of freight railroad operations. However, the Authority and the freight railroads would work together to build the project in a manner consistent with the agreements negotiated by the Authority's contractor during the final design process. This would enable each entity to conduct its relevant activities in a manner that would reduce impacts on freight railroad operations. The Authority would coordinate with the freight railroads to prevent disruption to freight operations during construction of the project.

During construction of the project, the contractor would minimize disruption of freight rail service with scheduling, and use of existing alternative tracks where available (TR-IAMF#9). There would be temporary periods of service disruption when connecting existing tracks to new tracks. Where feasible, the contractor would schedule any necessary cessation of freight rail service during the weekend to minimize disruption of freight rail operations. Service disruptions, when they occur, would last several hours to several days except in the case of the passing track segment, wherein freight operations may be limited to overnight hours for up to 2 years.

CEQA Conclusion

The impact would be significant under CEQA for both project alternatives because project construction would substantially disrupt or interfere with freight rail operations. Both alternatives would disrupt freight overnight operations on Monday and Thursday nights when two-track closures would occur between 1:00 a.m. and 4:00 a.m. Alternative B would have slightly greater levels of substantial disruption related to relocation of tracks between Scott Boulevard and the San Jose Diridon Station and to the construction of passing tracks between San Mateo and Redwood City. Disruption would result in delays and rescheduling of freight service and could result in the temporary diversion of freight to trucks, which would result in additional noise, air quality, GHG emissions compared to transport by rail. The mitigation measure to address this impact is identified in Section 3.2.9, and Section 3.2.7 describes the measure in detail.

Operations Impacts

Impact TR#19: Continuous Permanent Impacts on Freight Rail Capacity

This impact concerns the potential for project operations to limit freight rail service because tracks would be shared north of CP Coast for Alternative A and Alternative B (Viaduct to I-880) and north of Scott Boulevard under Alternative B (Viaduct to Scott Boulevard). In these areas, HSR, Caltrain and freight would share MT1 and MT2 (as well as other mainline tracks), with potential freight timing and capacity conflicts. South of CP Coast, HSR service would be separate from freight traffic and the project would have no operational impacts on freight.

Based on Caltrain dispatch data, on average, one daily round-trip freight train (Mission Bay Hauler) operates in the Caltrain corridor during the daytime between the Port of San Francisco (via the Quint Street Lead in San Francisco) and the South San Francisco Yard. One daily round-trip train (Broadway Local) runs from the South San Francisco Yard to the Port of Redwood City and other local deliveries at night. One daily round-trip train (Mission Bay Hauler) runs from the South San Francisco Yard to points south of CP Coast at night.

FRA regulations concerning trainset safety standards for Tier III HSR trains that operate on dedicated rights-of-way up to 220 mph also allow for operations in a shared right-of-way with freight trains and other tiers of passenger equipment at speeds up to 125 mph (49 C.F.R. Part

238). For safety purposes, there would be mandatory temporal separation between HSR and Caltrain trains and freight trains, which would allow for both freight and passenger rail services to operate on the system during the day and at night.

Given the limited amount and relatively short distance of daytime freight traffic on the Caltrain corridor (approximately 7 miles from the South San Francisco Yard to the Quint Street Lead), daytime freight could be accommodated. The existing TRA allows freight one 30-minute window for daytime operations that could be continued, unless Caltrain were to obtain the freight rights and decides to change this allowance.

Between midnight and 5:00 a.m., regular HSR and Caltrain service would not be operating, but some HSR and Caltrain trains would still use the Caltrain corridor to reach maintenance facilities and start locations for the next-day service.

With increased HSR and Caltrain service, early evening access for the Broadway Local and the Mission Bay Hauler freight trains would likely be difficult to provide because of passenger train congestion during the evening peak hour. As passenger train service declines further into the evening, freight access should be able to be provided. Based on dispatch data, the Broadway Local and Mission Bay Hauler freight service should be able to complete normal round-trip service in approximately 5 hours most of the time. At times, freight operators may not be able to be complete round-trip service in a single night using a single train. In this case, trips may need to be staggered over several nights, as is currently done on the South City Local between South San Francisco and San Francisco. Alternatively, freight operators could employ additional trains operating in each direction (one-way transit per night) or longer trains in order to maintain the same level of service as a round trip that they could otherwise complete in a single night.

Constraining freight in the early evening period would require changes in freight operations practices north of the city of Santa Clara. However, through use of longer trainsets or staggering over several nights, the compression of freight service hours would not result in a diversion of freight hauling from freight trains to trucks or other modes and, thus, would not result in any potential secondary impacts related to air quality, GHG emissions, noise, or traffic congestion.¹⁸

CEQA Conclusion

The impact would be less than significant under CEQA for both project alternatives because the project would not create a change in freight rail service such that diversions to truck or other freight modes would occur. Freight operation hours would be partially constrained, which would cause inconvenience to operators, but freight operations overall could be maintained. Diversion of freight from rail to other modes is not likely to occur. No significant secondary impacts related to air quality, noise, GHG emissions, or traffic operations are expected. Therefore, CEQA does not require any mitigation.

Impact TR#20: Continuous Permanent Impacts on Freight Rail Operations

This impact concerns the potential for project operations to affect height clearances for freight because of the installation of the OCS under existing constrained overhead structures such as bridges and roadway overcrossings. Installation of the OCS could lower the existing vertical clearance at bridges, other crossings and structures, and tunnels along the Caltrain corridor but not to a degree that would require a change in the existing freight equipment used to service this corridor. The PCEP EIR (PCJPB 2015) evaluated the existing overhead clearances for freight as well as the overhead clearances with installation of the OCS along the Caltrain corridor and concluded that overhead heights could be maintained that would accommodate the existing height of freight trains and carriages used on the Caltrain corridor. The PCEP EIR includes the specific existing and proposed overhead clearances along each portion of the Caltrain corridor (height clearances vary). PCJPB committed in its design of the OCS to maintain the ability to use existing freight equipment through the Caltrain corridor. Although poles would be realigned in some locations of track realignments for either project alternative, the HSR project would not alter

¹⁸ This is a common practice on other light-density freight lines shared with transit such as the River Line in New Jersey and some of the San Diego Trolley system.

the overhead clearance provided by the OCS system installed for the PCEP. Thus, the HSR project would not lower overhead clearances compared to that proposed for the PCEP and would not constrain the use of existing freight equipment due to height.

CEQA Conclusion

The impact would be less than significant under CEQA for both project alternatives because the OCS would not disrupt or interfere with existing freight operations. The project would involve some OCS pole relocations but the residual height clearance would still be greater than the highest freight equipment using the Caltrain corridor under existing conditions. The project would not disrupt or interfere with freight operations and would not require a diversion of freight from rail to trucks (or other modes) and no secondary impacts related to air quality, noise, GHG emissions, or traffic operations would occur. Therefore, CEQA does not require any mitigation.

3.2.6.7 Aviation

This section evaluates changes in air travel demand on a statewide and regional basis under the No Project Alternative and the project alternatives.

No Project Conditions

The No Project conditions would be the same as those described in Section 3.2.6.2. Population in San Francisco, San Mateo, and Santa Clara Counties is projected to increase through 2029 and 2040. RTPs forecast continued growth in air travel over the coming decades to accommodate projected population growth (Caltrans 2018b). Without the additional capacity provided by the project, additional improvements to airports beyond those currently programmed would be required to meet the growing demand regionally and statewide. The Authority estimates that 4 additional airport runways would be needed to achieve equivalent capacity and relieve the increased pressure (Authority 2012).

Both SFO and Los Angeles International Airport (LAX) are among the most capacity-constrained airports in the nation. SFO is an example of a capacity-constrained airport where new runway construction may not be a feasible solution.¹⁹ There are also physical constraints to adding new runways at OAK (which is adjacent to San Francisco Bay) and SJC (which is surrounded by existing development). A Federal Aviation Administration (FAA) study concluded that other solutions, including regional sharing of air travel among local airports, market mechanisms, and consideration of high-speed ground travel modes, would be needed to alleviate the demand and capacity constraints (FAA 2015).

Project Impacts

Operations Impacts

Impact TR#21: Continuous Permanent Changes in Air Travel Demand

Implementation of the HSR system would be expected to result in changes in the demand for air travel on a statewide and regional basis. SFO, SJC, and OAK are the only large- and medium-hub airports near the project providing regular commercial aviation service. SFO is approximately 2 miles (by road) from the Millbrae Station. SJC is approximately 4 miles (by road) from the San Jose Diridon Station. OAK is approximately 18 miles (by road) from the 4th and King Street Station. All three airports serve the Bay Area, and would be expected to experience a reduction in demand as a result of the project, because demand for some trips otherwise expected to be made by air would be made using HSR instead.

¹⁹ As early as 1998, SFO undertook studies to address capacity constraints associated with the airport's existing runway configuration. These studies included plans for new runways to be constructed on fill placed in San Francisco Bay, since expansion of the airport inland is not feasible. Because of environmental concerns and public opposition, SFO withdrew the expansion plans, and in 2008 the San Francisco Board of Supervisors passed a resolution that no additional fill should be placed in San Francisco Bay for new or reconfigured runways at SFO (City and County of San Francisco 2008).

While the HSR system would provide more convenient access to airports for some travelers, the HSR system overall is expected to reduce airline flights by 29 percent statewide and 35 percent in the Bay Area compared to the No Project condition based on the Authority's modeling for the 2040 period for the medium ridership scenario (Authority 2017b). The reduction in air travel demand would allow for better management of the limited capacity of existing airports and reduce the demand for construction of additional runways and terminals. This would have a beneficial long-term effect on air quality and GHG emissions.

CEQA Conclusion

No determination under CEQA is required for this topic, and CEQA does not require mitigation.

3.2.7 Mitigation Measures

The transportation-specific mitigation measures TR-MM#2 through TR-MM#5 (Table 3.2-24) would be implemented to address effects near stations, and impacts on transit schedules and passenger and freight rail service as a result of project construction and operations. As part of the Record of Decision, the Authority will determine whether to implement mitigation strategies identified in TR-MM#1, which are available to address NEPA effects related to vehicle congestion or delay. These mitigation measures would be the same under both project alternatives except for TR-MM#4, which would apply only to Alternative B.

Table 3.2-24 Transportation-Specific Mitigation Measures

Mitigation Measure	Alternative A	Alternative B
TR-MM#1: Potential Mitigation Measures Available to Address Traffic Delays (NEPA Effect Only)	X	X
TR-MM#2: Install Transit Priority Treatments	X	X
TR-MM#3: Implement Railway Disruption Control Plan	X	X
TR-MM#4: Install San Carlos Caltrain Station Pedestrian Improvements		X
TR-MM#5: Contribute to 4th and King Street Station Pedestrian Improvements	X	X

TR-MM#1: Potential Mitigation Measures Available to Address Traffic Delays (NEPA effect only)

Mitigation measures to address permanent congestion/LOS effects on intersection operations under both project alternatives from permanent road closures and relocations, increased gate-down time at at-grade crossings, and vehicle flow to/from HSR stations could include one or more of a combination of: various standard vehicle capacity enhancements such as signal retiming or additions, lane restriping, road/intersection widening and turn pocket additions/increases (including right-of-way acquisitions as needed), and contribution to regional/joint solutions to implement such enhancements; and measures (to the extent not already addressed by TR-IAMF#12) to encourage diversion of HSR station access trips from single-occupancy vehicles to other modes.

Depending on location and design, traffic mitigation measures can have substantial secondary environmental impacts, including construction disruption to roadways and rail operations as well as construction noise, air pollutant emissions, visual aesthetic changes, right-of-way acquisition, displacement of residential and commercial development, encouragement of sprawl growth and associated VMT and air pollutant/GHG emissions, discouragement of compact walkable TOD, encroachment on public parks and open space, removal of trees and vegetation, and impacts on groundwater. However, it is speculative to ascribe specific impacts absent detailed location and designs.

TR-MM#2: Install Transit Priority Treatments

Prior to operations, the Authority's contractor would install bus transit priority treatments at all traffic signals on the following roads to reduce the impact of permanent delays to MUNI Routes 30 and 45 due to added HSR station traffic, to SamTrans Route ECR along El Camino Real due to added HSR station traffic, to SamTrans Route 296 at the Ravenswood at-grade crossing caused by increased gate-down time from added HSR trains, and to VTA routes 181, 22, 64, and DASH due to added HSR station traffic near the San Jose Diridon Station:

- Fifth Street and Townsend Street along MUNI Routes 30 and 45 (City of San Francisco)
- El Camino Real along SamTrans Route ECR between Hillcrest Boulevard and Trousdale Drive (City of Millbrae)
- Ravenswood Avenue along SamTrans Route 296 between El Camino Real and Middlefield Road (City of Menlo Park)
- Middlefield Road along SamTrans Route 296 between Marsh Road and Willow Road (City of Menlo Park)
- Cahill Street along VTA Route 181, 22, and DASH from West Santa Clara Street to Park Avenue (City of San Jose)
- Montgomery Street VTA Route 181, 22, 64, and DASH from West Santa Clara Street to Park Avenue (City of San Jose)
- Autumn Street VTA Route 181, 22, 64, and DASH from West Santa Clara Street to Park Avenue (City of San Jose)

The contractor would prepare all materials necessary for and seek the approval of MUNI, the City and County of San Francisco, SamTrans, the City of Millbrae, the City of Menlo Park, Town of Atherton, and City of San Jose for the implementation of these improvements.

MUNI Routes 30 and 45 would be affected by added station traffic at the 4th and King Street Station. These routes travel on Fifth Street, Townsend Street, and Third Street in the station vicinity. Transit priority treatments are already in place on Third Street. The City and County of San Francisco is in the process of adding a protected bike lane on Townsend Street and bicycle facilities are already in place on Fifth Street. While HSR can provide funding for construction of transit priority treatments, implementation of any such treatments would be undertaken by the City and County of San Francisco.

MUNI Route 55 would be affected by increased gate-down time at the 16th Street at-grade-crossing, but MUNI already plans to implement bus transit signal priority for 16th Street, and no other feasible mitigations are available to address impacts on MUNI Route 55. As such, this impact on MUNI Route 55 is considered significant and unavoidable. Implementing TR-MM#3 would not result in secondary impacts, because operation improvements would be coordinated with local authorities and would benefit users of bus transit services.

This mitigation measure would be effective in improving the speed and reliability of SamTrans Route ECR, which would be affected by increased delays at intersections along El Camino Real due to added vehicle trips at the Millbrae Station, by identifying targeted improvements to enhance operations. This mitigation measure would also be effective in improving the speed and reliability of SamTrans Route 296, which would be affected by increased gate-down time at the Ravenswood Avenue at-grade crossing, by identifying targeted improvements to enhance operations along Ravenswood Avenue between El Camino Real and Middlefield Road and along Middlefield Road between Marsh Road and Willow Road. While HSR can provide funding for construction of transit priority treatments, it cannot compel the City of Menlo Park to construct the improvements.

VTA Routes 181, 22, 64, and DASH would be affected by added station traffic at the San Jose Diridon Station. These routes travel on Cahill Street, Montgomery Street, and Autumn Street in the station vicinity. This mitigation measure would be effective in improving the speed and

reliability of the four affected VTA bus routes by identifying targeted improvements to enhance operations.

TR-MM#3: Implement Railway Disruption Control Plan

Prior to construction, the Authority would require the construction contractor to prepare a railway disruption control plan for Authority approval and would implement the plan during construction. The goal of the plan would be to minimize the duration of disruption of passenger and freight operations and maintain reasonable LOS while allowing for an expeditious completion of construction. The Authority would require the construction contractor to coordinate with Caltrain and UPRR in advance and during any potential disruption to passenger or freight operations or Caltrain or UPRR facilities. The construction contractor would maintain emergency access to and from Caltrain and UPRR throughout construction.

With Alternative B (Viaduct to I-880), the Authority would provide a bus bridge from the College Park Station to the Santa Clara Station and San Jose Diridon Station. This would maintain passenger access to Caltrain service during the 1 to 2 years that the station would be closed because of track work.

This mitigation measure would be effective in minimizing the disruption of passenger and freight rail services during project construction. Implementing this mitigation measure would not result in secondary impacts because it is anticipated that all identified improvements would occur within existing rights-of-way or within the project footprint.

TR-MM#4: Install San Carlos Station Pedestrian Improvements

Prior to construction of Alternative B, the Authority's contractor would construct sidewalks and related streetscape improvements to El Camino Real to accommodate diverted pedestrian trips from land uses in the current station location area to the new station location. The contractor would prepare all materials necessary for and seek the approval of the City of San Carlos for the implementation of this improvement.

This mitigation measure would be effective in reducing pedestrian impacts associated with relocation of the San Carlos Station and make pedestrian access safer, but would not fully mitigate the impact of increasing walking distance to the station. Implementing this mitigation measure would not result in secondary impacts, because the pedestrian improvements would be located within existing right-of-way.

TR-MM#5: Contribute to 4th and King Street Station Pedestrian Improvements

Prior to construction, the Authority's contractor would work with Caltrain and the City and County of San Francisco to develop an improvement plan to increase sidewalk capacity on Fourth Street along the station frontage between Townsend Street and King Street. These improvements would build off of the ongoing construction of the Townsend Corridor Improvement Project by the City and County of San Francisco that will provide a protected bikeway between Fourth and Eighth Streets, an upgraded pedestrian walkway between Fourth Street and Seventh Street where no sidewalk exists, a raised islands between Fourth and Fifth Streets for passenger boarding, relocated and expanded commercial and passenger loading zones, high-visibility crosswalks and curb zones at intersections, and a modified bus routes (MUNI 47 Van Ness) and bus stop changes for various bus routes throughout the corridor. The PCEP EIR identified a pedestrian impact at the 4th and King Street Station. The contractor would construct pedestrian improvements based on the approved pedestrian improvement plan. The contractor would prepare all materials necessary for and seek the approval of the City and County of San Francisco for the implementation of this improvement.

This mitigation measure would be effective in reducing pedestrian impacts associated with new pedestrian trips generated by HSR at the 4th and King Street Station. Implementing this mitigation measure would not result in secondary impacts, because the pedestrian improvements would be located within existing right-of-way.

3.2.8 Impact Summary for NEPA Comparison of Alternatives

As described in Section 3.1.5.4, NEPA requires the comparison of the effects of project actions to the No Project conditions when evaluating the effect of the project on the resource. The context and intensity of the changes caused by construction and operations of the project determine the level of effect. Figure 3.2-16 and Table 3.2-25 compare the project effects by alternative, and are followed by a summary of the effects.



2040 Project Summary of Transportation Effects by Subsection

SAN FRANCISCO TO SOUTH SAN FRANCISCO	SAN BRUNO TO SAN MATEO	SAN MATEO TO PALO ALTO	MOUNTAIN VIEW TO SANTA CLARA	SAN JOSE DIRIDON STATION APPROACH
Affected Intersections 17	Affected Intersections 32	Affected Intersections 27	Affected Intersections 8	Affected Intersections 11
17	32	27	8	16

Colors represent Alternatives A & B

Effects identified are NEPA effects.

JUNE 2019

Figure 3.2-16 Summary of Transportation Effects by Subsection

Table 3.2-25 Comparison of Project Alternative Impacts for Transportation

Impacts	Alternative A	Alternative B
Intersections		
Impact TR#1: Continuous Permanent Impacts on Vehicle Miles Traveled	By 2040, the project would reduce overall VMT from 2.720 to 2.697 billion miles in San Francisco County, from 4.963 to 4.873 billion miles in San Mateo County, and from 13.202 to 12.972 billion miles in Santa Clara County.	Same as Alternative A
Impact TR#2: Temporary Congestion/Delay Consequences on Intersections from Temporary Road Closures, Relocations, and Modifications	Temporary road closures and realignments would result in increases in travel times, delays, and inconvenience to the traveling public in all subsections. The CTP would maintain traffic flow on major roadways and intersections.	Increases in travel time, delays, and inconvenience to the traveling public associated with temporary road closures and realignments would be greater under Alternative B. Although there would be fewer effects in the San Francisco to South San Francisco Subsection, effects would be greater in the San Mateo to Palo Alto Subsection due to construction of the passing track and in the San Jose Diridon Station Approach Subsection due to construction of aerial viaducts and the San Jose Diridon Station. The CTP would maintain traffic flow on major roadways and intersections.
Impact TR#3: Temporary Congestion/Delay Consequences on Major Roadways and Intersections from Construction Vehicles	Temporary construction vehicle trips would result in increases in travel times and delays in all subsections. Project features such as the CTP and establishment of designated construction truck routes would control and manage construction vehicle traffic to minimize effects on local vehicle circulation, operations hazards, or loss of access to residences and community facilities.	Temporary construction vehicle trip effects would be greater under Alternative B, particularly in the San Mateo to Palo Alto Subsection where construction or modification of nine underpasses would occur to accommodate the passing track. Project features such as the CTP and establishment of designated construction truck routes would control and manage construction vehicle traffic to minimize effects on local vehicle circulation, operations hazards, or loss of access to residences and community facilities.
Impact TR#4: Permanent Congestion/Delay Consequences on Intersections from Permanent Road Closures and Relocations	One permanent road closure, two road extensions, one road realignment, one overpass relocation, and two overpass reconstructions would not change the capacity of the roadway network or result in a permanent construction effect on vehicle traffic or LOS.	Three permanent road closures, three road extensions, nine underpass modifications, one overpass relocation, three grade-separation changes from an overcrossing to undercrossing configuration, one reconstruction of an overcrossing, and one road extension and lane conversion to transit-only lanes would not change the capacity of the roadway network or result in a permanent construction effect on vehicle traffic or LOS.

Impacts	Alternative A	Alternative B
<p>Impact TR#5: Continuous Permanent Congestion/Delay Consequences on Intersection Operations</p>	<p>Project circulation improvements for the Millbrae Station on the west side of the existing Caltrain corridor would improve access to the Millbrae Station by all modes and intersection LOS on this portion of El Camino Real. LOS conditions would improve at the intersection of Bayshore Boulevard/Old County Road due to the relocation of the Tunnel Avenue overpass. Increased traffic in the Project Section and increased gate-down events at at-grade crossings would affect 9 intersections operating at LOS E or F in 2029 (relative to the 4th and King Street Station) and 86 intersections in 2040 in the five subsections.</p>	<p>Similar to Alternative A, except that increased traffic in the Project Section and increased gate-down events at at-grade crossings would affect an additional five intersections (total of 91 affected intersections) in 2040 in the five subsections.</p>
Parking		
<p>Impact TR#6: Temporary Construction-Related Effects on Parking</p>	<p>Some parking space displacement would occur along the Caltrain corridor and at Caltrain stations during construction. An estimated 379 parking spaces at the San Jose Diridon Station and SAP Center would be temporarily displaced during construction. Project features would limit effects on public parking by providing parking for construction vehicles, minimizing the time parking facilities are inoperable, and providing temporary replacement of displaced special event parking for the SAP Center on a 1:1 basis.</p>	<p>Alternative B would result in displacement of some additional parking beyond Alternative A at the San Carlos, Belmont, Hillsdale and Hayward Park Caltrain Stations during passing track construction. Alternative B would also result in greater number of parking spaces (2,083 spaces) at the San Jose Diridon Station and SAP Center being displaced during construction. The same project features described under Alternative A would apply to Alternative B.</p>
<p>Impact TR#7: Permanent Effects Related to Parking</p>	<p>At the Millbrae Station, station modifications would entail displacement of 288 existing parking spaces on both the east and west sides of the station. The project design includes construction of a total of 325 parking spaces, the majority of which would be in surface lots on the west side of the station. The removed spaces and the new spaces would result in a net change of 37 additional parking spaces. An estimated 278 parking spaces near the San Jose Diridon Station and SAP Center would be permanently displaced and would be replaced on a 1:1 basis. Parking demands related to the San Jose Diridon Station and SAP Center can be met by existing facilities, project facilities, and the offsetting effects of increased transit service.</p>	<p>Same as Alternative A relative to the Millbrae Station. A greater number of parking spaces (473 spaces) near the San Jose Diridon Station and SAP Center would be permanently displaced and would be replaced on a 1:1 basis. Parking demands related to the San Jose Diridon Station and SAP Center can be met by existing facilities, project facilities, and the offsetting effects of increased transit service.</p>

Impacts	Alternative A	Alternative B
Transit		
Impact TR#8: Temporary Impacts on Bus Transit	Construction vehicles or temporary roadway closures would result in interference with bus routes and bus stops.	Similar to Alternative A
Impact TR#9: Permanent Impacts on Bus Transit	No high-frequency bus routes would experience delays from permanent changes in the road network.	Same as Alternative A
Impact TR#10: Temporary Impacts on Passenger Rail Operations	Station construction in San Francisco, Millbrae, and San Jose Diridon, construction of LMF, station modifications at other stations, and track relocations would result in temporary disruptions to Caltrain service.	Alternative B would result in all of the effects identified for Alternative A except along the passing track and viaduct. Alternative B would result in substantial disruption to Caltrain operations greater than Alternative A for up to 2 years because of single-tracking near the passing track, construction of the viaduct, and Caltrain station modifications.
Impact TR#11: Continuous Permanent Impacts on Bus Services	Nine high-frequency bus routes would be delayed by added vehicle trips at HSR stations or increased gate-down events resulting from added HSR trains.	Same as Alternative A
Impact TR#12: Continuous Permanent Impacts on Passenger Rail and Bus Access	Passenger rail and bus access would be accommodated by project design and features and would not affect the performance of these services.	Same as Alternative A
Impact TR#13: Continuous Permanent Impacts on Transit Ridership	Transit ridership would increase but would not hinder service by other transit providers. The project would not be inconsistent with transit plans and policies.	Same as Alternative A
Impact TR#14: Continuous Permanent Impacts on Passenger Rail System Capacity	Caltrain average service times would increase slightly because of the blending of service, but a regular interval schedule could be maintained. The project would not materially decrease the performance of passenger rail services.	Caltrain average service times would increase slightly (and more than Alternative A) because of the blending of service, but a regular interval schedule could be maintained. The project would not materially decrease the performance of passenger rail services.
Nonmotorized Travel		
Impact TR#15: Temporary Impacts on Pedestrian and Bicycle Access	Pedestrian and bicycle access would be temporarily impeded, but safe and adequate access would be maintained during construction.	Similar to Alternative A
Impact TR#16: Permanent Impacts on Pedestrian and Bicycle Access	At train stations or on streets where existing pedestrian or bicycle facilities are modified as a result of the project, they would be replaced with new safe and accessible facilities.	Same as Alternative A

Impacts	Alternative A	Alternative B
Impact TR#17: Continuous Permanent Impacts on Pedestrian and Bicycle Access	Operations would introduce nonmotorized trips around station areas, exacerbating pedestrian access concerns at the 4th and King Street Station due to limited sidewalk capacity along the 4th Street frontage between Townsend Street and King Street.	Same as Alternative A
Freight Rail Service		
Impact TR#18: Temporary Impacts on Freight Rail Operations	Station construction and modification, construction of new tracks, and realignment of tracks would result in temporary disruptions of freight rail service.	Alternative B would result in all of the effects identified for Alternative A except along the passing track. Alternative B would result in substantial disruption to freight operations greater than Alternative A for up to 2 years because of single-tracking in the passing track vicinity.
Impact TR#19: Continuous Permanent Impacts on Freight Rail Capacity	Shared track could result in some inconveniences to freight service during the early evening but would not likely divert freight rail service to other modes.	Same as Alternative A
Impact TR#20: Continuous Permanent Impacts on Freight Rail Operations	The project design and the HSR OCS installation would accommodate required freight height clearances where tracks are shared.	Same as Alternative A
Aviation		
Impact TR#21: Continuous Permanent Changes in Air Travel Demand	The HSR system is expected to reduce airline flights by 29 percent statewide and 35 percent in the Bay Area.	Same as Alternative A

CTP = construction transportation plan
 HSR = high-speed rail
 LMF = light maintenance facility
 LOS = level of service
 OCS = overhead contact system
 VMT = vehicle miles traveled

3.2.8.1 Roadways and Intersections (Vehicle Circulation)

Operation of the project would change regional and statewide travel patterns and result in a reduction in the VMT in the RSA. Though localized congestion would result from the project, VMT would be reduced regionally in the Project Section through decreases in long-range vehicle trips and increases in HSR ridership, resulting in less overall congestion. By 2040, the project would reduce overall VMT from 2.720 billion miles to 2.697 billion miles in San Francisco County, from 4.963 billion miles to 4.873 billion miles in San Mateo County, and from 13.202 billion miles to 12.972 billion miles in Santa Clara County. Project circulation improvements for the Millbrae Station on the west side of the existing Caltrain corridor would improve access to the Millbrae Station by all modes and intersection LOS on this portion of El Camino Real. LOS conditions would improve at the intersection of Bayshore Boulevard/Old County Road from the relocation of the Tunnel Avenue overpass.

Temporary effects at intersections from temporary road closures and relocations during construction would be minimized through project features such as standard construction procedures, dedicated traffic control plans, and a CTP (TR-IAMF#2). The CTP, which would be

reviewed and approved by the Authority, would provide a traffic control plan that would identify when and where temporary closures and detours would occur, with the goal of maintaining traffic flow, especially during peak travel periods.

Temporary effects on parking and intersections from construction vehicle operations would occur for both alternatives in the San Jose Diridon Station Approach Subsection and for Alternative B in the 6-mile-long passing track section through San Mateo, Belmont, San Carlos, and Redwood City. Effects under both alternatives would be minimized but not avoided through the implementation of a CTP and providing off-street parking for construction vehicles (TR-IAMF#3). All truck traffic, either for excavation or for transporting construction materials to the site, would use the designated truck routes in each city (TR-IAMF#7) to the extent feasible. Any temporary closure or removal of parking areas or roadways during construction would be restored upon completion of construction.

Construction of the project would result in permanent road closures and realignments that would have permanent effects on intersection operations because of congestion. These are delineated in Volume 2, Appendix 2-A. Construction would require changes and closures to be made throughout the roadway network to accommodate the stations, platforms, track alignment and LMFs. The types of roadway modifications would be similar under both project alternatives, with one exception. Construction of the passing track for Alternative B would require modifications to nine roadway undercrossings.

Operation of the project would result in 95 permanent adverse effects on intersection operations under Alternative A and 100 permanent adverse effects on intersection operations under Alternative B. Under both project alternatives, increased traffic and increased gate-down events at at-grade crossings from added HSR trains would affect intersections because of congestion. Mitigation measures are available to address permanent effects on intersection operations from permanent road closures and relocations and other intersection delay causes, as described in TR-MM#1. Project operations would change regional and statewide travel patterns and result in a reduction of VMT in the RSA, region, and state. Though there would be localized congestion resulting from the project, VMT would be reduced regionally in the project area through decreases in long-range vehicle trips and increases in HSR ridership, resulting in less overall congestion.

3.2.8.2 Parking

Project construction would temporarily displace parking in certain areas within the construction footprint including at and adjacent to the San Jose Diridon Station (both alternatives), including parking used for special events at the SAP Center. Project features would minimize temporary effects on parking through identification of employee parking locations (TR-IAMF#2), off-street parking for construction-related vehicles (TR-IAMF#3), and replacement on a 1:1 basis for temporary displacement of special event parking at the SAP Center (TR-IAMF#8).

Project operations would permanently displace parking at and adjacent to the Millbrae Station and the San Jose Diridon Station and SAP Center (both alternatives), but the project includes construction of replacement parking on a 1:1 basis, so there would be no permanent reduction of available parking at these locations. Increased parking demands caused by HSR riders at the San Jose Diridon Station (both alternatives) would be accommodated through existing parking facilities, project parking facilities, and the offsetting effects of increased transit service to the station so that station user and SAP Center parking demands can be met without secondary environmental or socioeconomic effects.

3.2.8.3 Transit

Construction of the project would involve the temporary closure of bus stops, parking areas, transit stations, and roadway travel lanes. Project features would minimize temporary effects on bus operations through the implementation of the CTP and CMP (TR-IAMF#11). Permanent effects on bus operations would result from permanent road closures and roadway modifications that would reduce capacity and shift traffic. Available mitigation would include installing transit

priority treatments (TR-MM#2). Construction of the project would result in temporary effects on passenger rail operations because of construction at passenger rail stations and platforms and track realignments, as well as constructing passing tracks and viaduct in Alternative B. To minimize conflicts and disruption, project features include implementation of CMPs, CTP, and construction of temporary tracks (TR-IAMF#9). Available mitigation would include a railway disruption control plan (TR-MM#3).

Operation of the project would have continuous permanent effects on transit ridership by increasing overall passenger rail ridership. Increased gate-down events at at-grade crossings would result in continuous permanent effects on bus services, with delays from increased congestion along two bus routes. Added vehicle traffic at the three HSR stations would result in continuous permanent effects on bus services, with delays from increased congestion along seven bus routes. Available mitigation would include installing transit priority treatments (TR-MM#2). Operation of the project would not result in continuous permanent effects on passenger rail and bus access at stations, because passengers would be able to access these services unimpeded. Project features such as station design would take into account the changes in demand and would provide access for passengers using HSR as well as bus and other passenger rail services. HSR riders would create new demands for Caltrain and other transit systems as they would transfer from HSR to reach destinations served by these other systems. Additionally, HSR would compete with Caltrain for riders from San Jose northward. Operation of the project would have continuous permanent effects on passenger rail system capacity.

3.2.8.4 Nonmotorized Travel

Construction of the project would result in temporary effects on pedestrian and bicycle access from the temporary closure or removal of pedestrian facilities, bicycle lanes, and paths. Maintenance of pedestrian and bicycle access would minimize conflicts (TR-IAMF#4, TR-IAMF#5, TR-IAMF#12). Construction of the project would result in permanent effects on pedestrian and bicycle access from construction and changes to pedestrian and bicycle facilities in HSR station areas or on roadways. Project features would provide and maintain pedestrian and bicycle accessibility across the HSR corridor, to and from stations, and on station property (TR-IAMF#12).

Operation of the project would have continuous permanent effects on pedestrian and bicycle access because of the potential for increased numbers of passengers at stations. Project features would maintain access across the HSR corridor and prioritize safety (TR-IAMF#11). Relocation of the San Carlos Station would result in a permanent pedestrian effect. Mitigation measures available include San Carlos Station pedestrian improvements (TR-MM#4). Added pedestrian trips at the 4th and King Street Station would result in a permanent pedestrian effect. Mitigation measures available include 4th and King Street Station pedestrian improvements (TR-MM#5).

3.2.8.5 Freight Rail Service

Construction of the project would result in temporary effects on freight rail operations from temporary closure or relocation of tracks, which would vary by project alternative and subsection, and disruption and delay could last hours or days. Effects would be minimized with scheduling and the use of existing alternative tracks where available. Mitigation measures available include a railway disruption control plan (TR-MM#3). Installation of the project OCS would not affect height clearances for freight where tracks are shared with HSR.

Operation of the project would result in continuous permanent effects on freight rail capacity because of limiting freight service from sharing of tracks in portions of different project alternatives. Freight operation hours would be partially constrained at peak hours, which would cause changes in freight operations and inconvenience to operators, but freight operations overall could be maintained. Diversion of freight from rail to other modes is not likely to occur.

3.2.8.6 Aviation

Operation of the HSR system would provide more convenient access to airports for some travelers, and would have the overall effect of reducing airline flights by 29 percent statewide and

35 percent in the Bay Area compared to the No Project condition. These findings are based on the Authority’s modeling for the 2040 period for the medium ridership scenario. The reduction in air travel demand would allow for better management of the limited capacity of existing airports and reduce the demand for construction of additional runways and terminals.

3.2.9 CEQA Significance Conclusions

As described in Section 3.1.5.4, the Authority evaluated the impact of project actions against thresholds to determine whether a project action would result in no impact, a less-than-significant impact, or a significant impact under CEQA. Table 3.2-26 shows the CEQA significance conclusions for each impact discussed in Section 3.2.6. A summary of the significant impacts, mitigation measures, and factors supporting the significance conclusion after mitigation follows the table.

Table 3.2-26 CEQA Significance Conclusions and Mitigation Measures for Transportation

Impacts	Impact Description and CEQA Level of Significance before Mitigation	Scenario	Mitigation Measure	CEQA Level of Significance after Mitigation
Intersections				
Impact TR#1: Continuous Permanent Impacts on Vehicle Miles Traveled	Less than significant for both alternatives: The project would result in an overall decrease in VMT throughout the region and the state.	2029 and 2040 Plus Project Conditions	No mitigation measures are required.	N/A
Impact TR#2: Temporary Congestion/Delay Effects on Intersections from Temporary Road Closures, Relocations, and Modifications	Temporary road and lane closures would result in an interference with local vehicle circulation compared to the baseline condition. This is not considered a significant impact under CEQA.	During Construction	No mitigation measures are required.	N/A
Impact TR#3: Temporary Congestion/Delay Effects on Major Roadways and Intersections from Construction Vehicles	Construction of the San Jose Diridon Station could result in interference with local vehicle circulation over the baseline condition. Construction of the passing track, the viaducts in San Jose, and the San Jose Diridon Station could result in interference with local vehicle circulation over the baseline condition. This is not considered a significant impact under CEQA.	During Construction	No mitigation measures are required.	N/A
Impact TR#4: Permanent Congestion/Delay Effects on Intersections from Permanent Road Closures and Relocations	Permanent road modifications would not cause a degradation in operations of the roadway network or degrade roadway LOS. This is not considered a significant impact under CEQA.	Existing Plus Project Conditions	No mitigation measures are required.	N/A

Impacts	Impact Description and CEQA Level of Significance before Mitigation	Scenario	Mitigation Measure	CEQA Level of Significance after Mitigation
Impact TR#5: Continuous Permanent Congestion/Delay Effects on Intersection Operations	Operation of the project in 2029 would result in increased congestion at 9 intersections under both alternatives from increased project-related traffic at the 4th and King Street Station. Operation of the project in 2040 would result in increased congestion at 86 intersections under Alternative A and 91 intersections under Alternative B from increased project-related traffic and increased gate-down time at at-grade crossings from added HSR trains. Increases in traffic associated with the project would result in a degradation of LOS E or F and an increase in delay over the baseline condition. This is not considered a significant impact under CEQA.	2029 and 2040 Plus Project Conditions	No mitigation measures are required.	N/A
Parking				
Impact TR#6: Temporary Construction-Related Effects on Parking	Less than significant for both alternatives: Temporary impacts on parking would be minimized through 1:1 replacement of SAP Center special event parking during construction. As a result, no secondary physical impacts related to parking would occur.	During Construction	No mitigation measures are required.	N/A
Impact TR#7: Permanent Effects Related to Parking	Less than significant for both alternatives: No permanent loss of parking would occur at or near stations. No increase in parking demand at the 4th and King Street Station. Parking demands at other stations can be met by a combination of existing and project facilities and offsetting effect of existing and increased transit service (Millbrae, San Jose Diridon and SAP Center). As a result, no secondary physical impacts related to parking would occur.	2029 and 2040 Plus Project Conditions	No mitigation measures are required.	N/A
Transit				
Impact TR#8: Temporary Impacts on Bus Transit	Significant for both alternatives: The project would minimize decreases to the performance of bus transit facilities because it would control and manage construction vehicle traffic, material decreases in performance of certain bus routes would still occur.	During Construction	No mitigation measures are available	Significant and unavoidable for both alternatives

Impacts	Impact Description and CEQA Level of Significance before Mitigation	Scenario	Mitigation Measure	CEQA Level of Significance after Mitigation
Impact TR#9: Permanent Impacts on Bus Transit	No impact for both alternatives: Construction of the project would not result in permanent impacts on any roadways that serve high- frequency bus routes.	Existing Plus Project Conditions	No mitigations measures are required	N/A
Impact TR#10: Temporary Impacts on Passenger Rail Operations	Significant for both alternatives: Construction of the project would cause temporary disruptions in passenger rail service and result in the decrease of passenger rail operation performance in all five subsections.	During Construction	TR-MM #3: Railway Disruption Control Plan	Less than Significant for both alternatives
Impact TR#11: Continuous Permanent Impacts on Bus Services	Significant for both alternatives: Operation of the project would lead to delays for nine high frequency bus routes from added traffic at the 4th and King Street Station, the Millbrae Station, the San Jose Diridon Station, and an increase in gate-down time at at-grade crossings resulting from added HSR trains, resulting in the decrease of bus operation performance.	2029 and 2040 Plus Project Conditions	TR-MM#2: Install Transit Priority Treatments	Significant and Unavoidable for both alternatives for MUNI Route 55 at the 16th Street at-grade crossing, and for MUNI Routes 30 and 45 near the 4th and King Street Station while the interim HSR station is in operation. Less than Significant for both alternatives for the SamTrans Route ECR along El Camino Real, SamTrans Route 296 at the Ravenswood Avenue at-grade crossing, and VTA Routes 181, 22, 64, and DASH.
Impact TR#12: Continuous Permanent Impacts on Passenger Rail and Bus Access	Significant for Alternative B: This alternative would relocate the San Carlos Station, reducing accessibility to Caltrain from downtown San Carlos due to the additional walking distance from the relocated station. Less than significant at other study locations for both alternatives: Operation of the project would not impede passenger access to other passenger rail and bus services and would therefore not decrease the performance of these services.	2029 and 2040 Plus Project Conditions	TR-MM#4: Install San Carlos Station Pedestrian Improvements	Less than Significant for Alternative A. Significant and Unavoidable for Alternative B.

Impacts	Impact Description and CEQA Level of Significance before Mitigation	Scenario	Mitigation Measure	CEQA Level of Significance after Mitigation
Impact TR#13: Continuous Permanent Impacts on Transit Ridership	Less than significant for both alternatives: Operation of the project would result in increased transit ridership. This increase in ridership is consistent with transit plans and policies. The increase in ridership would not hinder transit operations or planned expansions.	2029 and 2040 Plus Project Conditions	No mitigation measures are required	N/A
Impact TR#14: Continuous Permanent Impacts on Passenger Rail System Capacity	Less than significant for both alternatives: Caltrain average operational service times would increase slightly because of the blending of service, but a regular interval schedule could be maintained. The project would not materially decrease the performance of passenger rail services. Operation of the project would not conflict with adopted policies, plans, or programs regarding public transit or decrease the performance of transit systems.	2029 and 2040 Plus Project Conditions	No mitigation measures are required	N/A
Nonmotorized Travel				
Impact TR#15: Temporary Impacts on Pedestrian and Bicycle Access	Less than significant for both alternatives: Construction of the project would not decrease the performance of pedestrian and bicycle facilities, because it would maintain safe and adequate access.	During Construction	No mitigation measures are required	N/A
Impact TR#16: Permanent Impacts on Pedestrian and Bicycle Access	Less than significant for both alternatives: Construction of the project would not result in permanent changes to pedestrian or bicycle facilities.	Existing Plus Project Conditions	No mitigation measures are required	N/A
Impact TR#17: Continuous Permanent Impacts on Pedestrian and Bicycle Access	Significant at 4th and King Street Station for both alternatives. Less than significant at other study locations for both alternatives: Operation of the project would not decrease the performance of pedestrian and bicycle facilities, because it would provide safe and accessible bicycle and pedestrian facilities.	2029 and 2040 Plus Project Conditions	TR-MM#5: Contribute to 4th and King Street Station Pedestrian Improvement	Less than Significant for both alternatives

Impacts	Impact Description and CEQA Level of Significance before Mitigation	Scenario	Mitigation Measure	CEQA Level of Significance after Mitigation
Freight Rail Service				
Impact TR#18: Temporary Impacts on Freight Rail Operations	Significant for both alternatives: Construction of the project would cause temporary disruptions in freight rail service which would result in temporary diversion of freight service to other modes.	During Construction	TR-MM#3: Implement Railway Disruption Control Plan	Less than Significant for both alternatives
Impact TR#19: Continuous Permanent Impacts on Freight Rail Capacity	Less than significant for both alternatives: Shared track with freight could result in inconveniences to freight service during peak hours, but the project would not divert freight rail service to other modes.	2029 and 2040 Plus Project Conditions	No mitigation measures are required	N/A
Impact TR#20: Continuous Permanent Impacts on Freight Rail Operations	Less than significant for both alternatives: Project design and the HSR OCS installation would accommodate existing freight height clearances and the project would not divert freight rail service to other modes.	2029 and 2040 Plus Project Conditions	No mitigation measures are required	N/A
Aviation				
Impact TR#21: Continuous Permanent Changes in Air Travel Demand	No determination under CEQA is required for this topic, and CEQA does not require mitigation.	2029 and 2040 Plus Project Conditions	No mitigation measures are required	N/A

CEQA = California Environmental Quality Act
 CTP = Construction Transportation Plan
 ECR = El Camino Real
 DASH = Downtown Area Shuttle
 GHG = greenhouse gases
 HSR = high-speed rail
 LOS = level -of -service
 MUNI = San Francisco Municipal Railway
 N/A = not applicable
 OCS = overhead contact system
 US = U.S. Highway
 V/C = volume to capacity
 VTA = Santa Clara Valley Transportation Authority

Impact TR#8: Temporary Impacts on Bus Transit

There would be a significant impact under CEQA for either project alternative on bus transit operations during construction. Project-related construction staging and traffic would contribute to material decrease in bus transit service along roadways and at the existing 4th and King Street, Millbrae, and San Jose Diridon Stations, at the Brisbane LMF sites, and at affected Caltrain stations. The construction of the HSR stations, platforms, and track alignment would require TCEs. The TCE may require the temporary closure of parking areas, bus stops, transit stations, or roadway travel lanes. Changes to bus routes and bus stops would be managed through development and implementation of a CMP and CTP, but material decreases in certain bus

routes would still occur. No mitigation measures are available, and the impact would be significant and unavoidable under CEQA for both project alternatives.

Impact TR#10: Temporary Impacts on Passenger Rail Operations

There would be a significant impact under CEQA for either project alternative on passenger rail operation prior to mitigation. The construction of the HSR stations, platforms, and track alignment would require TCEs. The TCE may require the temporary closure of transit stations, passenger rail platforms, and passenger rail track. Any closure or removal of passenger rail stations, platforms, and track during construction would be temporary. These activities would disrupt passenger rail and result in commuter inconvenience and diversion from transit to other commute modes.

The Authority would implement TR-MM#3 to reduce the impacts on passenger rail. The railway disruption control plan would minimize the duration of construction in areas that would require temporary closures, limit construction hours, and plan for coordination between the construction contractor and passenger rail service providers. The implementation of the mitigation would reduce disruption to a matter of hours or a few days at most, which would result in a less-than-significant impact.

Impact TR#11: Continuous Permanent Impacts on Bus Services

There would be a significant impact under CEQA for either project alternative on bus transit operations. Vehicle trips around the stations would increase because of the addition of passengers and HSR workers traveling to station areas. Many of these trips would occur during peak hours. This added traffic would lead to increased volume, congestion, and delays around 4th and King Street, Millbrae, and San Jose Diridon Stations. In addition, the increased gate-down time at at-grade crossings from added HSR trains would result in increased congestion and delays at the at-grade rail crossings and adjacent intersections. The increased congestion and delay because of the project would occur along high-frequency MUNI, SamTrans, and VTA bus routes (routes with service every 15 minutes or less), contributing to bus performance delay. The addition of project-related vehicle trips would affect bus on-time performance and operating speeds. Both project alternatives would add project-related trips or result in added gate-down times at at-grade crossings that would affect nine high-frequency bus routes: in the 4th and King Street Station area (MUNI Routes 30 and 45), at the 16th Street at-grade crossing in San Francisco (MUNI 55), along El Camino Real adjacent to the Millbrae Station (SamTrans ECR), at the Ravenswood Avenue at-grade Crossing in Menlo Park (SamTrans 296), and in the San Jose Diridon Station area (VTA Routes 181, 22, 64, and DASH).

The Authority would implement TR-MM#2 to reduce the impacts on bus transit operations. This mitigation measure would improve bus transit operations for MUNI Routes 30 and 45 by installing transit signal priority improvements along segments of Fifth Street and Townsend Street in the station area. This mitigation measure would improve bus transit operations for SamTrans Route ECR, caused by the added trips generated by HSR service at the Millbrae Station, by installing transit signal priority improvements along El Camino Real. This mitigation measure would also improve bus transit operations for SamTrans Route 296, caused by delays at the Ravenswood Avenue at-grade crossing because of increased gate-down time caused by added HSR trains, by installing transit signal priority at key intersections. This mitigation measure would also improve bus transit operations for VTA Routes 181, 22, 64, and DASH by installing transit signal priority treatments along Cahill Street, Montgomery Street, and Autumn Street between West Santa Clara Street and Park Avenue. Because mitigation would support continued bus transit operations with improvements, the impact would be less than significant for SamTrans Route ECR, SamTrans Route 296, and VTA Routes 181, 22, 64, and DASH.

MUNI Routes 30 and 45 would be affected by increased congestion around the 4th and King Street Station, and while the transit priority treatments in TR-MM#2 would improve conditions, they would not reduce transit delays and no additional feasible mitigations are available. MUNI Route 55 would also be affected by increased gate-down time at the 16th Street at-grade-crossing, but MUNI already plans to implement bus transit signal priority for 16th Street, and no other feasible mitigations are available to address impacts on MUNI Route 55. As such, the

impact would be significant and unavoidable under CEQA for MUNI Routes 30, 45, and 55 for both project alternatives.

Impact TR#12: Continuous Permanent Impacts on Passenger Rail and Bus Access

There would be a significant impact under CEQA for Alternative B on passenger rail service as a result of the relocation of the San Carlos Station. The Authority would implement TR-MM#4 to reduce the impact on passenger rail service at San Carlos Station, but the measure would not fully mitigate impacts. As such, the impact would be significant and unavoidable under CEQA at the San Carlos Station for Alternative B.

Impact TR#17: Continuous Permanent Impacts on Pedestrian and Bicycle Access

There would be a significant impact under CEQA for both project alternatives on pedestrian access at the 4th and King Street Station from increased pedestrian trips resulting from the addition of HSR service. The Authority would implement TR-MM#5, which would increase sidewalk capacity along the Fourth Street station frontage between Townsend Street and King Street and would reduce pedestrian impacts associated with new pedestrian trips generated by HSR to a less-than-significant level under CEQA for pedestrian access at the 4th and King Street Station for both project alternatives.

Impact TR#18: Temporary Impacts on Freight Rail Operations

There would be a significant impact under CEQA for either project alternative on freight rail operations. Because freight rail operations occur within the rail rights-of-way used for portions of the construction, construction could disrupt freight rail operations. Construction would disrupt freight rail services, which would result in freight operator and customer inconvenience and potentially temporary diversion to other freight modes.

The Authority would implement TR-MM#3 to reduce the impacts on freight rail. The railway disruption control plan would minimize the duration of construction in areas that would require temporary closures, limit construction hours, and plan for coordination between the construction contractor and freight rail service providers. Implementation of the mitigation would reduce disruption to a matter of hours or a few days at most, which would result in a less-than-significant impact.