

California High-Speed Rail Authority

San Francisco to San Jose Project Section

Checkpoint C Summary Report

May 2020



The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the Federal Railroad Administration and the State of California.

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- Appendix B: Sequenced Evaluation of Less Environmentally Damaging Alternatives
- Appendix C: Preliminary Compensatory Mitigation Plan
- Appendix D: Factual Determinations Regarding the Impacts of the Proposed Discharge on the Aquatic Environment (40 C.F.R. Section 230.11 and Subparts C, D, E, AND F)
- Appendix E: Avoidance and Minimization Measures for Aquatic Resources and Measures to Address Impacts to Other Environmental Resources

ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
AB	(California) Assembly Bill
Authority	California High-Speed Rail Authority
BART	Bay Area Rapid Transit
Bay Area	San Francisco Bay Area
BCDC	San Francisco Bay Conservation and Development Commission
CARB	California Air Resources Board
C.F.R.	Code of Federal Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNDDDB	California Natural Diversity Database
CP	control point
CWA	Clean Water Act
CWG	community working group
DTX	Downtown Extension
EFH	essential fish habitat
EIR	environmental impact report
EIS	environmental impact statement
Fed. Reg.	<i>Federal Register</i>
FESA	federal Endangered Species Act
FRA	Federal Railroad Administration
GHG	greenhouse gas
GIS	geographic information systems
HSR	high-speed rail
HUC	hydrologic unit code
I-	Interstate
ILF	in-lieu fee
LEDPA	least environmentally damaging practicable alternative
LMF	light maintenance facility
LPMG	local policy maker group
MOU	Memorandum of Understanding
mph	miles per hour
MUNI	San Francisco Municipal Railway
NEPA	National Environmental Policy Act

NFWF	National Fish and Wildlife Foundation
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
O&M	operations and maintenance
PCJPB	Peninsula Corridor Joint Powers Board
pCMP	preliminary Compensatory Mitigation Plan
PFMC	Pacific Fishery Management Council
PRM	permittee-responsible mitigation
Project Section, project	San Francisco to San Jose Project Section
RHNA	Regional Housing Need Allocation
RSA	resource study area
SB	(California) Senate Bill
SFO	San Francisco International Airport
SFTC	Salesforce Transit Center
SR	State Route
Summary Report	Draft Checkpoint C Summary Report
US	U.S. Highway
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMT	vehicles miles traveled

1 AUTHORITY AND SCOPE OF ANALYSIS

1.1 Checkpoint C Purpose and Relationship to the Memorandum of Understanding

This Draft Checkpoint C Summary Report (Summary Report) for the San Francisco to San Jose Project Section (Project Section, or project) of the proposed California High-Speed Rail (HSR) System was prepared pursuant to the National Environmental Policy Act (NEPA)/Section 404/408 Integration Process Memorandum of Understanding (MOU) between the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), U.S. Army Corps of Engineers (USACE), and U.S. Environmental Protection Agency (USEPA) (FRA et al. 2010).

The following documents are included as appendices to this Summary Report and were used to support the analyses contained in this report:

- Appendix A, Watershed and Wetland Condition (CRAM) Evaluation Report
- Appendix B, Sequenced Evaluation of Less Environmentally Damaging Alternatives
- Appendix C, Preliminary Compensatory Mitigation Plan
- Appendix D, Factual Determinations Regarding the Effects of the Proposed Discharge on the Aquatic Environment (40 C.F.R. § 230.11 and Subparts C, D, E, and F)
- Appendix E, Avoidance and Minimization Measures for Aquatic Resources and Measures to Address Impacts to Other Environmental Resources

The alternatives evaluated in this Summary Report pursuant to Clean Water Act (CWA) Section 404(b)(1) were identified in the *San Francisco to San Jose Project Section Draft Checkpoint B Summary Report*, included in Appendix B. A draft environmental impact report (EIR)/environmental impact statement (EIS) is being prepared to address the project alternatives—the *Draft San Francisco to San Jose Project Section Environmental Impact Report/Environmental Impact Statement*. The Authority is the lead agency for NEPA and California Environmental Quality Act (CEQA) compliance. The evaluation of the alternatives in this Summary Report is based largely on the analyses conducted as part of the development of the Draft EIR/EIS and on technical studies supporting that document. This information is contained within the Draft EIR/EIS, appendices to the Draft EIR/EIS, and the *San Francisco to San Jose Project Section Biological and Aquatic Resources Technical Report* (Biological and Aquatic Resources Technical Report) (Authority 2020a).

The Authority has carried forward the following alternatives from the Checkpoint B Report for the purposes of the CWA Section 404(b)(1) alternatives analysis (Authority 2019a):

- Alternative A
- Alternative B

The Project Section would provide HSR service from the Salesforce Transit Center (SFTC) in San Francisco to Diridon Station in San Jose within the counties of San Francisco, San Mateo, and Santa Clara. The limits of analysis in this report are from the 4th and King Street Station¹ in San Francisco to Scott Boulevard in Santa Clara, just north of the San Jose Diridon Station.² The

¹ The 4th and King Street Station would serve as an interim station until completion of the proposed Downtown Extension Project (DTX). The DTX would extend the electrified peninsula rail corridor in San Francisco from the 4th and King Street Station to the Salesforce Transit Center (SFTC). HSR would utilize the track constructed for the DTX to reach the SFTC. The DTX and SFTC were evaluated in the Transbay Terminal/Caltrain Downtown Extension/Redevelopment Project Final EIS/EIR (USDOT et al. 2004). A Supplemental EIS/EIR—the Transbay Transit Center Program Final Supplemental EIS/EIR (USDOT et al. 2018)—was subsequently prepared to address adjustments to the DTX tunnel design.

² The *San Francisco to San Jose Project Section Draft EIR/EIS* incorporates an analysis of the HSR corridor extending to the San Jose Diridon Station, the San Jose Diridon Station Approach Subsection, which was also fully analyzed as part of the *San Jose to Merced Project Section Draft EIR/EIS* and corresponding technical reports. The analysis of this

area from Scott Boulevard to the San Jose Diridon Station is covered in the Checkpoint C Summary Report for the San Jose to Merced Project Section.

Operating on the two-track system primarily within the existing Caltrain right-of-way, the project would use existing infrastructure and in-progress improvements being implemented through the Caltrain Modernization Program, including electrification of the Caltrain corridor between San Francisco and San Jose as part of the Peninsula Corridor Electrification Project, and an upgraded signal system to meet positive train control requirements.

The blended system³ would accommodate operating speeds of up to 110 miles per hour (mph) for up to four HSR trains and six Caltrain trains per hour per direction in the peak period. Operation of the blended system would require additional infrastructure improvements and project elements beyond the Caltrain Modernization Program and positive train control to accommodate HSR service. Design elements common to both alternatives include track modifications to support higher speeds while maintaining passenger comfort; station and platform modifications to accommodate HSR trains passing through or stopping at existing stations; and modifications to the overhead contact system (a series of wires strung above the tracks by poles) and traction power facilities installed by Caltrain as part of the Peninsula Corridor Electrification Project. The project alternatives would implement safety improvements at existing at-grade roadway crossings and at Caltrain stations and platforms, as well as security modifications such as the installation of perimeter fencing along the right-of-way. The project would also include a light maintenance facility (LMF) to accommodate planned operational needs for high-capacity rail movement and communication radio towers located at approximately 2.5-mile intervals.

Both alternatives share common end points to allow for a meaningful comparison of engineering and environmental considerations between alternatives. Alternative A would entail modification of approximately 14.5 miles of existing Caltrain track, predominantly within the existing Caltrain right-of-way, construction of the East Brisbane LMF, modifications of existing stations or platforms to accommodate HSR, and installation of safety improvements and communication radio towers. No additional passing tracks would be built under Alternative A. Alternative B would include modification of approximately 17.4 miles of existing Caltrain track, predominantly within the existing Caltrain right-of-way; construction of the West Brisbane LMF; construction of passing track; modifications of existing stations or platforms to accommodate HSR; and installation of safety improvements and communication radio towers. Depending on the alternative selected, 7 or 10 of the 23 existing Caltrain stations between Fourth and King Street in San Francisco and Scott Boulevard in Santa Clara would require varying degrees of modifications to accommodate HSR trains passing through or stopping at the stations. HSR trains would stop at the 4th and King Street Station and Millbrae Station, requiring dedicated HSR platforms and associated passenger services be provided at these stations.

1.2 Scope of Alternatives Analysis under Clean Water Act Section 404(b)(1) (33 C.F.R. § 320.4, 40 C.F.R. § 230.10(a))

The CWA Section 404(b)(1) Guidelines establish the requirements for consideration of alternatives when a Section 404 permit is sought. The Guidelines state that no fill of waters of the U.S. is permitted if there is a “practicable alternative” to the proposed project that would have a less adverse effect on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences (40 C.F.R. § 230.10(a)). An alternative is *practicable* if it “is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purposes” (40 C.F.R. § 230.10(a)(2)). Accordingly, this Summary Report is based on an evaluation of impacts on the aquatic

subsection has been incorporated into the Draft EIR/EIS to support a station to station analysis with logical termini for the San Francisco to San Jose Project Section. However, the decision on selection of alternatives between Scott Boulevard in Santa Clara and West Alma Avenue in San Jose will occur as part of the environmental approvals process for the San Jose to Merced Project Section.

³ Blended refers to operating the HSR trains with existing intercity, commuter, and regional rail trains on common infrastructure.

ecosystem and on other environmental resources associated with the alternatives as well as the practicability of the alternatives.

1.3 Scope of Analysis of the Preliminary Compensatory Mitigation Plan

The preliminary Compensatory Mitigation Plan (pCMP) is included as Appendix C. The pCMP contains information sufficient for USACE to evaluate the general approach to compensatory mitigation proposed by the Authority and to provide early feedback regarding the adequacy of the approach. The pCMP will be subject to continued development and refinement and will provide the basis for a final mitigation plan that will be submitted to USACE for its approval.

1.4 Scope of Section 408 Analysis

Pursuant to the MOU and the Checkpoint C agency review process, this Summary Report documents that the project alternatives do not intersect any federal or nonfederal flood control facilities. Therefore, no USACE Section 408 review is required because there is no potential to affect such facilities.⁴

1.5 Compliance with U.S. Environmental Project Agency/U.S. Army Corps of Engineers Data Needs

The information required by the MOU is included in this Summary Report, the appendices to this Summary Report, the Draft EIR/EIS, appendices to the Draft EIR/EIS, and the Biological and Aquatic Resources Technical Report.

⁴ WRECO reviewed the USACE National Levee Database Interactive Map to identify potential conflicts between the project alignment and 408 facilities. Specifically, WRECO reviewed areas protected by levees and the locations of levees in the database to identify potential conflicts with the project alignment. In addition, WRECO confirmed the presence or absence of 408 facilities and locations of facilities with each local flood control agency along the alignment: San Francisco Public Utilities Commission, San Mateo County Flood Control District, and Santa Clara Valley Water District. On October 25, 2016, WRECO contacted by phone Jack Xu, Associate Civil Engineer, Hydraulics, Hydrology & Geomorphology, Watershed Stewardship & Planning Division Santa Clara Valley Water District, to request a list of 408 facilities potentially affected by the current alignment. The list of 408-affected facilities did not include any facilities along the project footprint. On October 26, 2016, WRECO contacted by phone Julie Casagrande, Resource Conservation Specialist, County of San Mateo Department of Public Works to request a list of 408 facilities potentially affected by the current alignment. Julie's response indicated that there are no 408-affected facilities along the alignment. On October 27, 2016, WRECO contacted by phone and email Bimayendra Shrestha, Associate Engineer, Hydraulic Section, San Francisco Department of Public Works to request a list of 408 facilities potentially affected by the current alignment. Bimayendra's response indicates that there are no 408-affected facilities along the alignment.

2 SECTION 404(b)(1) ALTERNATIVE ANALYSIS

2.1 Introduction

2.1.1 Purpose of the Analysis

The purpose of the Section 404(b)(1) alternatives analysis is to identify the least environmentally damaging practicable alternative (LEDPA). Specifically, this section of this Summary Report evaluates the project alternatives to determine their impacts on the aquatic ecosystem and on other environmental resources and assesses the practicability of the alternatives.

2.1.2 Section 404(b)(1) Guidelines Criteria for Consideration of Alternatives

CWA Section 404(b)(1) Guidelines (40 C.F.R. Part 230) establish the requirements for consideration of alternatives as part of the permitting process under Section 404. USACE's memorandum entitled "Appropriate Level of Analysis Required for Evaluating Compliance with the Section 404(b)(1) Guidelines Alternatives Requirements" (Wayland and Davis 1993) describes these requirements as follows:

The fundamental precept of the Guidelines is that discharges of dredged or fill material into waters of the U.S., including wetlands, should not occur unless it can be demonstrated that such discharges, either individually or cumulatively, will not result in unacceptable adverse effects on the aquatic ecosystem. The Guidelines specifically require that 'no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences' (40 C.F.R. § 230.10(a)). Based on this provision, the applicant is required in every case (irrespective of whether the discharge site is a special aquatic site or whether the activity associated with the discharge is water dependent) to evaluate opportunities for use of non-aquatic areas and other aquatic sites that would result in less adverse impact on the aquatic ecosystem. A permit cannot be issued, therefore, in circumstances where a less environmentally damaging practicable alternative for the proposed discharge exists (except as provided for under Section 404(b)(2)).

The term *practicable* means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes (40 C.F.R. § 230.2(q)). For further discussion of the practicability analysis, refer to Section 2.6.4, Practicability Analysis, of this Summary Report.

2.1.3 Selection of Alternatives

The *Final Program EIR/EIS for the Proposed California High-Speed Train System* (Statewide Program EIR/EIS) (Authority and FRA 2005) provided a first-tier analysis of the general effects of implementing the HSR system across two-thirds of the state. That document provided the environmental analysis necessary to evaluate the overall HSR system and to make broad decisions about general HSR alignments and station locations for further study in second-tier EIR/EIS documents. The conclusions of the Statewide Program EIR/EIS provided the basis for the initial range of alternatives to be considered in the project-level alternatives analysis process.

Pursuant to the provisions regarding Checkpoint A in the MOU, in April 2016 the Authority and FRA submitted a Purpose and Need statement to USEPA and USACE. USACE agreed with the Purpose and Need statement on May 3, 2016, and USEPA agreed with the Purpose and Need statement on May 5, 2016. The MOU also stipulates that a range of alternatives is to be identified in a Checkpoint B Summary Report for each project EIR/EIS that will be carried forward for project-level analysis and consideration under the Section 404(b)(1) Guidelines. The Authority prepared a Checkpoint B Summary Report which was submitted to USACE and USEPA for the Project Section on May 13, 2019 and then resubmitted to address comments on July 11, 2019. The Checkpoint B Summary Report identified two end-to-end alternatives that meet the Purpose

and Need and are potentially practicable. USACE and USEPA agreed with the two alternatives as an adequate range for the Draft EIR/EIS on August 14, 2019, and July 26, 2019, respectively. These two alternatives are also evaluated in this Section 404(b)(1) analysis. Appendix B to this document contains the Checkpoint B Summary Report.

2.1.4 Assessment of Environmental Impacts under the National Environmental Policy Act

2.1.4.1 California HSR System Programmatic Assessment: Tier 1

The Authority and FRA prepared several Tier 1 environmental documents for the HSR system pursuant to NEPA and CEQA requirements. The Tier 1 Statewide Program EIR/EIS (Authority and FRA 2005) provided a programmatic analysis of implementing the HSR system across the state, from Sacramento in the north to San Diego in the south and the San Francisco Bay Area (Bay Area) in the west. The Authority issued a Notice of Determination for the High-Speed Train System Program EIR/EIS on November 2, 2005 and the FRA issued its related Record of Decision on November 11, 2005.

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

The Authority and FRA prepared these Tier 1 documents in coordination with USEPA and USACE. USEPA and USACE concurred that the corridors selected by the Authority and FRA in Tier 1 were most likely to yield the LEDPA under Section 404 of the CWA. These Tier 1 decisions established the broad framework for the HSR system that serves as the foundation for the Tier 2 environmental review of individual projects.

2.1.4.2 Project-Level Assessment: Tier 2

Following completion of the Tier 1 documents, the Authority and FRA initiated a Tier 2 project-level planning and environmental review process. Between San Francisco and San Jose, an alignment following the existing Caltrain corridor was advanced for Tier 2 study. The station locations advanced for Tier 2 study included a station in downtown San Francisco, a San Francisco International Airport (SFO) Station at Millbrae, and a station at the site of the existing San Jose Diridon Station.

The Authority commenced the initial Tier 2 planning process in 2009, which evaluated a fully grade-separated four-track system between San Francisco and San Jose. That analysis was paused in 2011 in response to concerns about the impacts of a fully grade-separated system. In 2012, the Authority adopted the *California High-Speed Rail Program Revised 2012 Business Plan: Building California's Future*, which concluded that, as allowed by law, the HSR project to be studied north of Scott Boulevard in the Project Section would operate as a blended system (Authority 2012b). Other actions establishing the framework for blended operations along the Caltrain corridor included adoption of the *MTC Resolution No. 4056 Memorandum of Understanding: High-Speed Rail Early Investment Strategy for a Blended System on the Peninsula Corridor* (MOU)⁵ (Metropolitan Transportation Commission 2012) and passage of

⁵ A nine-party agreement adopted in March 2012 to establish a funding framework for a blended system on the Caltrain corridor. Signatories include the Authority, Metropolitan Transportation Commission, Peninsula Corridor Joint Powers Board, San Francisco County Transportation Authority, San Mateo County Transportation Authority, Santa Clara Valley Transportation Authority, City of San Jose, City and County of San Francisco, and Transbay Joint Powers Authority.

Senate Bills (SB) 1029⁶ and 557.⁷ In 2016, the Authority and FRA reinitiated the Tier 2 planning process with a focus on a predominantly two-track blended system between San Francisco and San Jose.

2.2 Project Purpose and Project Objectives

2.2.1 High Speed Rail Objectives Established by Enabling Legislation

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

Pursuant to Prop 1A, the HSR system must be powered by an electric propulsion system capable of sustained operating speeds of at least 200 mph where conditions permit those speeds (Streets & Highway Code §§ 2704.1(d), 2704.09(a)). The speed requirement of Section 2704.1(d), in turn, necessitates a design with limited flexibility to change the alignment of the project to avoid features such as jurisdictional waters because the curve radius for changes in the alignment is a minimum of 5 miles. Prop 1A also specifically mandated that HSR stations “be located in areas with good access to local mass transit or other modes of transportation. The HSR system also shall be planned and constructed in a manner that minimizes urban sprawl and impacts on the natural environment,” including wildlife corridors.

The HSR system is identified as an integral greenhouse gas (GHG) reduction measure in the Climate Change Scoping Plan prepared by the California Air Resources Board pursuant to AB 32, the California Global Warming Solutions Act of 2006, which requires a reduction in GHG emissions to 1990 levels by 2020 (CARB 2008, 2014). In 2014, the Legislature passed SB 862, which continuously appropriated 25 percent of specified cap-and-trade⁸ auction proceeds to Phase 1 (San Francisco to Anaheim) of the HSR system. The Legislature found that the HSR system, once completed and operational, “will contribute significantly toward the goal of reducing emissions of greenhouse gases and other air pollutants” and provides “the foundation for a large-scale transformation of California’s transportation infrastructure” by reducing millions of vehicle miles traveled (VMT) by automobiles and reducing the demand for air travel. In 2017, the Legislature extended the cap-and-trade program from 2020 to 2031.

⁶ SB 1029, approved July 2012, amended the Budget Act of 2012 to appropriate funds for HSR projects in the San Francisco to San Jose corridor, consistent with the blended system strategy identified in the Authority’s 2012 Business Plan, and the Metropolitan Transportation Commission MOU.

⁷ SB 557, passed by the Legislature and signed by the Governor in 2013, provided that any bond funds appropriated pursuant to SB 1029 would be used solely to implement a blended system approach.

⁸ Cap and trade refers to the market-based mechanism established by the California Air Resources Board for achieving the AB 32 GHG reduction requirements.

2.2.2 Purpose and Need and Overall Project Purpose

The project's purpose, and overall project purpose, is to implement the California HSR System to provide the public with electric-powered HSR service that offers predictable and consistent travel times between San Francisco and San Jose, facilitates connectivity to the San Francisco and San Jose international airports, mass transit, the Bay Area highway network, and the statewide HSR system to:

- Achieve HSR service that meets Prop 1A travel time using blended train operations in the Caltrain corridor
- Provide blended system infrastructure that supports commercially feasible HSR, while also minimizing environmental impacts and maximizing compatibility with communities along the rail corridor
- Establish an HSR connection to the economic center of Northern California

A further purpose of the San Francisco to San Jose Project Section is to construct, maintain, and operate an electrified HSR system, which includes the construction, improvement, upgrade, operation, and maintenance of new and existing facilities and infrastructure necessary to support the system connecting the SFTC in San Francisco to Diridon Station in San Jose. Consistent with state law and to minimize environmental impacts by providing a reduced HSR footprint, the system would "blend" with the existing Caltrain system through the primary use of a two-track configuration, incorporating "common level" boarding platforms at stations shared with Caltrain and using existing transportation corridors and rights-of-way. The system would be designed and operated to provide consistent and predictable travel, capable of achieving a nonstop service travel time of 30 minutes between San Francisco and San Jose.

2.3 Overview of Alternatives

2.3.1 No-Fill Alternative

The No-Fill Alternative is the alternative under which the project would be implemented without the discharge of dredged or fill material into waters of the U.S. Throughout the project development process, the Authority has sought to balance the regulatory need to minimize and avoid impacts on jurisdictional waters, taking into account the project's Purpose and Need, along with design, engineering, cost, and environmental criteria.

A No-Fill Alternative would include the following modifications to Alternative A to avoid discharge of fill in waters of the U.S. as follows:

- Modification of the East Brisbane LMF to avoid discharge of fill in Visitacion Creek by constructing the LMF on a bridge structure that spans over the creek, shifting the LMF approximately 130 feet east to avoid fill in associated wetlands, and raising the LMF base elevation by 12 feet to allow for the necessary inspection pits under the LMF tracks.
- Construction of bridges to span Guadalupe Valley Creek and Sanchez Creek to avoid discharge of fill in watercourses associated with the extension of existing culverts proposed under Alternative A.

The Authority also examined the potential for a No-Fill Alternative based on Alternative B by modifying the West Brisbane LMF (in addition to the clear span bridges over Guadalupe Valley Creek and Sanchez Creek described for Alternative A). However, waters of the U.S. within the footprint of the West Brisbane LMF are much more extensive than those at the East Brisbane LMF site. Consequently, any effort to elevate the LMF would require columns to be placed within the wetlands. Additionally, an elevated or reconfigured LMF would not meet the established design criteria for the facility related to the length of storage tracks and extent of inspection pits. As a result, the No-Fill Alternative is based on modifications to Alternative A.

2.3.2 San Francisco to San Jose Project Section Alternatives

2.3.2.1 Components of the Alternatives

This section generally describes the components the project alternatives evaluated in this Section 404(b)(1) analysis. The construction activities and project footprints for the project are described in Chapter 2, Alternatives, of the Draft EIR/EIS, and the footprints are shown in detail in Volume 3, Preliminary Engineering Plans, of the Draft EIR/EIS. The following list describes the key project components:

- **HSR stations**—HSR trains would stop at the existing 4th and King Street and Millbrae Stations, which would require construction of dedicated HSR platforms and the provision of associated passenger services at these stations. The stations associated with Alternative A and Alternative B are illustrated on Figure 2-1.
- **Track and station modifications**—The existing Caltrain tracks between 4th and King Street Station in San Francisco to Scott Boulevard in Santa Clara consists of predominantly two-track ballasted track. The blended system would require curve straightening, track center modifications, and superelevation⁹ of existing Caltrain tracks along approximately 33 percent of the project corridor to support higher speeds of up to 110 mph. These track modifications are described under Section 2.3.2.2, Alternative A, and Section 2.3.2.3, Alternative B, and the amount of horizontal track shift is illustrated on Figures 2-2, 2-4, 2-5, 2-6, 2-7, 2-8, and 2-10. Where horizontal track modifications would be greater than 1 foot, the OCS poles and wires would require relocation. Where track modifications would occur at existing Caltrain stations, adjustments to existing stations and platforms would be required.
- **LMF**—Both Alternatives A and B would include an approximately 100- to 110-acre LMF in Brisbane. Designed to accommodate projected system growth to the year 2040, it would provide storage capacity for trains and accommodate light maintenance activities, including daily inspections, pre-departure cleaning, testing, and servicing between runs; monthly inspections; quarterly inspections; train washing; and wheel truing. Two LMF site options for the Brisbane LMF, located east and west of the mainline Caltrain tracks, are evaluated in this document as part of the two project alternatives.
- **Passing tracks (Alternative B only)**—Alternative B would require construction of an approximately 6-mile-long, four-track passing track through San Mateo, Belmont, San Carlos, and into the northern portion of Redwood City.
- **Safety and security modifications**—Both Alternatives A and B would implement safety improvements at the at-grade crossings to create a “sealed corridor” that would reduce conflicts with automobiles and pedestrians. Safety improvements include installing four-quadrant gates extending across all lanes of travel, median separators to channelize and regulate paths of travel, and pedestrian crossing gates. The project would also complete gaps in the existing fencing along the perimeter of the Caltrain corridor.

⁹ *Superelevation* is the vertical distance between the height of the inner and outer rails at a curve. Superelevation is used to partially or fully counteract the centrifugal force acting radially outward on a train when it is traveling along the curve.



Source: Authority 2019b

MARCH 2020

Figure 2-1 Proposed San Francisco to San Jose Project Section

2.3.2.2 *Alternative A*

Alternative A would modify approximately 14.5 miles of existing Caltrain track, predominantly within the existing Caltrain right-of-way, build the East Brisbane LMF, modify seven existing stations or platforms to accommodate HSR, and install safety improvements and communication radio towers. Caltrain has several locations of four-track segments where trains can pass; no additional passing tracks would be constructed under Alternative A. Table 2-1 presents a summary of the alternative's design features, followed by a more detailed description by subsection.

Table 2-1 Summary of Design Features for Alternative A

Feature	Alternative A
Length of existing Caltrain track (miles) ¹	42.9
Length of modified track (miles) ¹	14.5
Length of track modification <1 ft (miles) ¹	5.1
Length of track modification >1 ft and <3 ft (miles) ¹	2.2
Length of track modification > 3 ft (miles) ¹	7.2
Length of OCS pole relocation (miles) ^{1, 2}	9.4
Includes additional passing tracks	No
LMF	East Brisbane
Modified stations	
Modifications to HSR stations	4th and King Street; Millbrae
Modifications to Caltrain stations due to the LMF	Bayshore (relocated)
Modifications to Caltrain stations due to track shifts	San Bruno; Hayward Park
Modifications to Caltrain stations to remove hold-out rule	Broadway; Atherton
Number of modified or new structures ³	14
New structures	2
Modified structures	7
Replaced structures	2
Affected retaining walls	3
Number of at-grade crossings with safety modifications (e.g., four-quadrant gates, median barriers)	38
Length of new perimeter fencing (miles) ¹	7.3
Communication radio towers	20

Source: Authority 2019b

LMF = light maintenance facility

OCS = overhead contact system

¹ Lengths shown are guideway mileages, rather than the length of the northbound and southbound track.

² OCS pole relocations are assumed for areas with track shifts greater than 1 foot.

³ Structures include bridges, grade separations such as pedestrian underpasses and overpasses, tunnels, retaining walls, and culverts.

San Francisco to South San Francisco Subsection

The San Francisco to South San Francisco Subsection would extend approximately 10 miles from the 4th and King Street Station in downtown San Francisco to Linden Avenue in South San Francisco, through the cities of San Francisco, Brisbane, and South San Francisco. The existing Caltrain track within this subsection is predominantly two-track at grade, with four two-track tunnel segments in San Francisco, and a four-track at-grade section through Brisbane. As illustrated on Figure 2-2, this alternative would modify the existing 4th and King Street and Bayshore Stations, construct the East Brisbane LMF and associated track modifications, reconfigure Tunnel Avenue, install four-quadrant gates at three existing at-grade crossings, and install six communication radio towers. Additional right-of-way would be required in San Francisco and in Brisbane to accommodate track modification, the East Brisbane LMF, Tunnel Avenue reconfiguration, four-quadrant gates, and communication radio towers.

4th and King Street Station

The existing 4th and King Street Station would serve as the interim terminal station for the Project Section until the Downtown Extension (DTX) provides HSR access to the Salesforce Transit Center (SFTC). Station improvements would include installing a booth for HSR ticketing and support services, adding HSR fare gates, and modifying existing tracks and platforms. Until the DTX can provide service to the SFTC, passengers would be required to use alternative methods of transportation to get there (e.g., San Francisco Municipal Railway [MUNI], ride-share program, or walk).

To support HSR operations, two existing Caltrain platforms in the center of the station yard would be raised and lengthened to serve four northbound and southbound HSR tracks. The HSR platforms would be approximately 4.25 feet high, with lengths of 1,000 feet for the platform on the east and 1,400 feet for the platform on the west. Ramps would be installed to provide pedestrian access from the station building to the raised platforms. Four existing Caltrain platforms, 600 feet or 800 feet long, would remain on either side of the HSR platforms to serve eight Caltrain tracks.



Figure 2-2 San Francisco to South San Francisco Subsection—Alternative A

East Brisbane Light Maintenance Facility

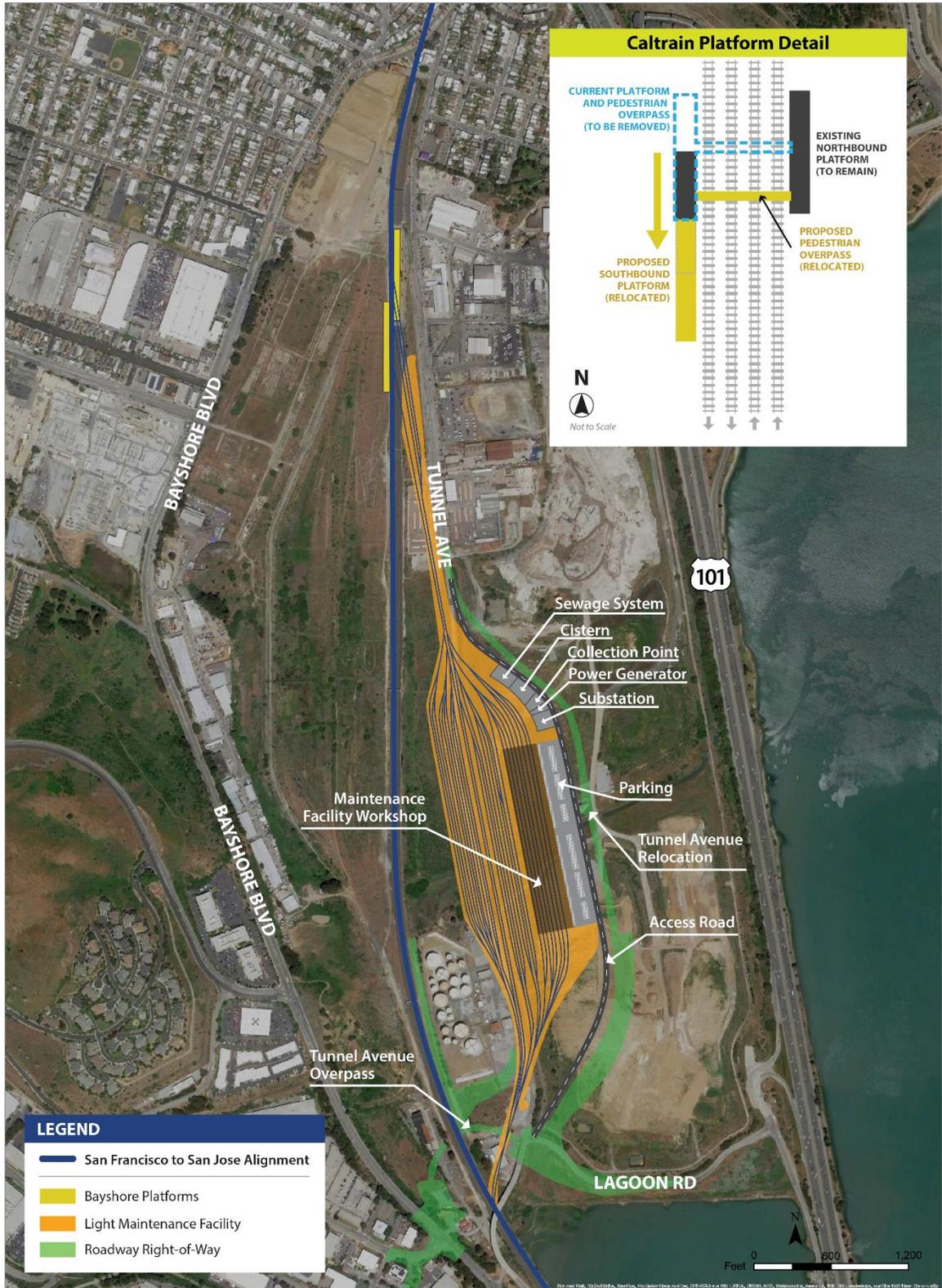
The East Brisbane LMF would be constructed south of the San Francisco tunnels on approximately 100 acres east of the Caltrain corridor (illustrated on Figure 2-3). Direct HSR mainline track access would be provided along double-ended yard leads that would cross over the mainline track on an aerial flyover at the north end, with an at-grade track entering the LMF from the south. Approximately 1,400-foot-long transition tracks would allow trains to reduce or increase speed when entering or exiting the East Brisbane LMF.

The East Brisbane LMF would include a maintenance yard with 17 yard tracks adjacent and parallel to a maintenance building containing eight shop tracks with interior access and inspection pits for underside and truck inspections. A 400-space surface parking lot would be provided east of the maintenance building with truck and vehicle access to the relocated Tunnel Avenue.

The track modifications associated with the East Brisbane LMF would require relocating the Bayshore Caltrain Station, relocating the Tunnel Avenue overpass, widening the bridge crossing Guadalupe Valley Creek in Brisbane, and relocating control point (CP) Geneva. The reconstructed Tunnel Avenue overpass would connect to Bayshore Boulevard north of its existing connection, at its intersection with Valley Drive, and would provide a roadway extension connecting Valley Drive to Old Country Road. The widened Guadalupe Valley Creek Bridge would support the East Brisbane LMF lead tracks as they cross Visitacion Creek. Track modification near CP Geneva could require relocating the overhead signal pole.

Track and Station Modifications

Track and station modifications within the San Francisco to South San Francisco Subsection (shown on Figure 2-2) are predominantly associated with the 4th and King Street Station modifications and the East Brisbane LMF. To accommodate the realignment of the mainline tracks for the East Brisbane LMF, the Bayshore Caltrain Station and associated surface parking lot, southbound platform, and a new pedestrian overpass would be reconstructed approximately 0.2 mile south of the existing station (illustrated in the inset on Figure 2-3). A new pedestrian overpass would access the reconstructed station by connecting to Tunnel Avenue on the east and the planned local roadway network envisioned in the Draft Brisbane Baylands Specific Plan on the west (City of Brisbane 2011). The relocated Caltrain Bayshore Station would be closer to the planned future Geneva Avenue extension, which would extend from Bayshore Boulevard to U.S. Highway (US) 101.



Source: Authority 2019b

MAY 2019

Figure 2-3 East Brisbane Light Maintenance Facility Layout—Alternative A

San Bruno to San Mateo Subsection

The San Bruno to San Mateo Subsection extends approximately 8 miles from Linden Avenue in South San Francisco to Ninth Avenue in San Mateo through South San Francisco, San Bruno, Millbrae, Burlingame, and San Mateo. The existing Caltrain track within this subsection is predominantly two-track at grade on retained fill with a three-track at-grade section south of the Millbrae Caltrain Station. As illustrated on Figure 2-4, this alternative would modify the existing San Bruno, Millbrae, and Broadway Stations, modify track, install four-quadrant gates at 16 existing at-grade crossings, and install three communication radio towers. Additional right-of-way would be required in Millbrae, Burlingame, and San Mateo associated with communication radio towers, the Millbrae Station modifications to accommodate HSR service, track modifications, roadway relocations, and four-quadrant gates.

Millbrae Station

New HSR infrastructure within the San Bruno to San Mateo Subsection would be constructed at the existing Millbrae Bay Area Rapid Transit (BART)/Caltrain Intermodal Station. New HSR station facilities on the west side of the existing Caltrain corridor would include a new station entrance hall along El Camino Real, with ticketing and support services. The station area design would provide intermodal connectivity with Caltrain and BART via an overhead pedestrian crossing that would extend from the new station entrance over the extension of California Drive, connecting to the existing station concourse with vertical circulation of stairs, escalators and elevators providing access to HSR, Caltrain, and BART platforms.

Track modifications extending approximately 1 mile north and south of the station would require additional right-of-way along the west side of the Caltrain corridor and modifying existing Caltrain tracks, station platforms, and structures. Constructing two new tracks would require widening the Hillcrest Boulevard underpass north of the Millbrae Station. At the station, the existing BART tracks and platforms and the easternmost Caltrain track (MT1) and platform would remain unchanged. The westernmost Caltrain track (MT2) would be shifted west by up to 40 feet for construction of two new tracks serving an 800-foot-long center HSR platform, and a new Caltrain MT2 outboard platform. The historic Southern Pacific Depot/Millbrae Station (previously relocated to accommodate station improvements) and associated surface parking along California Drive would be relocated to accommodate these track modifications.



Source: Authority 2019b

MAY 2019

Figure 2-4 San Bruno to San Mateo Subsection—Alternative A and B

Track and Station Modifications

Track and station modifications in this subsection include curve straightening near the San Bruno Station, platform modifications at the Broadway Station to eliminate the hold-out rule, and several other minor track shifts in San Bruno and San Mateo. The curve straightening at the San Bruno Station would require an extension of the existing platforms approximately 145 feet south, and relocation of the existing stairs/ramps from the northern to southern side of the northbound platform. The Euclid Avenue pedestrian underpass, just north of the San Bruno Station, would be widened to support the realigned tracks, and the concrete retaining wall along the east side would be modified to accommodate the realigned tracks. Safety-related modifications would be made to the Broadway Station, including platform upgrades that would eliminate the hold-out rule by adding a second outboard platform to serve the northbound track and extending the southbound platform. The southbound platform extension would affect the station's surface parking along California Drive, and minor track shifts south of the Broadway Station would require widening of the Sanchez Creek and Mills Creek Culverts.

San Mateo to Palo Alto Subsection

The San Mateo to Palo Alto Subsection extends approximately 16 miles from Ninth Avenue in San Mateo to San Antonio Road in Palo Alto through the cities of San Mateo, Belmont, San Carlos, Redwood City, Atherton, Menlo Park, and the northern portion of Palo Alto. The existing Caltrain track within this subsection is predominantly two-track at grade on retained fill. As illustrated on Figures 2-5 and 2-6, this alternative would modify platforms at the existing Atherton Station, modify tracks, install four-quadrant gates at 15 existing at-grade crossings, and install 7 communication radio towers. Minor amounts of additional right-of-way would be required in San Mateo, Belmont, San Carlos, Redwood City, Menlo Park, and Palo Alto for the siting of four-quadrant gates and communication radio towers.

Track and Station Modifications

Track and station modifications in this subsection (illustrated on Figures 2-5 and 2-6) consist of curve straightening predominantly located in San Mateo, Belmont, San Carlos, and Palo Alto, and station platform modifications at the existing Atherton Station to remove the hold-out rule. In several locations, these track modifications would result in modifications to existing Caltrain structures; track shifts south of Ralston Street in Belmont and north of Holly Street in San Carlos would require modifying the existing retaining walls along the west side of the Caltrain corridor to accommodate the shifted track. The HSR project would be compatible with Caltrain and the City of San Mateo's planned 25th Avenue Grade-Separation Project. This grade-separation project, expected to be constructed by 2020, would elevate the existing at-grade track between State Route (SR) 92 and Hillsdale Boulevard to provide a grade-separated undercrossing of 25th Avenue, construct new east-west crossings under the track corridor at 28th and 31st Avenues, and relocate Hillsdale Station. No design changes to the 25th Avenue Grade-Separation Project are expected to result from the blended system.

Mountain View to Santa Clara Subsection

The Mountain View to Santa Clara Subsection extends approximately 9 miles from San Antonio Road in Palo Alto to Scott Boulevard in Santa Clara through the cities of Palo Alto (the southern portion), Mountain View, Sunnyvale, and Santa Clara. The existing Caltrain track within this subsection is predominantly two-track at grade and there are no major project features within this subsection. As illustrated on Figure 2-7, this alternative would make minor track modifications, install four-quadrant gates at four at-grade crossings, and install four communication radio towers. Minor amounts of additional right-of-way would be required in Palo Alto, Mountain View, Sunnyvale, and Santa Clara for communication radio towers.



Source: Authority 2019b

MAY 2020

Figure 2-5 San Mateo to Palo Alto Subsection (Northern Portion)—Alternative A



Source: Authority 2019b

MAY 2019

Figure 2-6 San Mateo to Palo Alto Subsection (Southern Portion)—Alternative A and B



Source: Authority 2019b

MAY 2019

Figure 2-7 Mountain View to Santa Clara Subsection—Alternative A and B

Track and Station Modifications

Minor track shifts of less than 1 foot would be required in several locations in Mountain View, Sunnyvale, and Santa Clara. The largest track shift within this subsection would be a shift of 2.5 feet that occurs near Bowers Avenue in Santa Clara. None of these track shifts would require modifying existing Caltrain structures or stations.

2.3.2.3 Alternative B

Alternative B would modify approximately 17.4 miles of existing Caltrain track, predominantly within the existing Caltrain right-of-way, construct the West Brisbane LMF and the passing track, modify 10 existing stations or platforms to accommodate HSR, and install safety improvements and communication radio towers. Table 2-2 summarizes the alternative's design features, followed by a more detailed description by subsection.

Table 2-2 Summary of Design Features for Alternative B

Feature	Alternative B
Length of existing Caltrain track (miles) ¹	42.9
Length of modified track (miles) ¹	17.4
Length of track modification <1 ft (miles) ¹	4.3
Length of track modification >1 ft and <3 ft (miles) ¹	1.9
Length of track modification > 3 ft (miles) ¹	11.2
Length of OCS pole relocation (miles) ^{1, 2}	13.1
Includes additional passing tracks	Yes
LMF	West Brisbane
Modified stations	
Modifications to HSR stations	4th and King Street; Millbrae
Modifications to Caltrain stations due to the LMF	Bayshore (relocated)
Modifications to Caltrain stations due to the passing tracks	Hayward Park; Hillsdale; Belmont; San Carlos (relocated)
Modifications to Caltrain stations due to track shifts	San Bruno
Modifications to Caltrain stations to remove hold-out rule	Broadway; Atherton
Number of modified or new structures ³	35
New structures	3
Modified structures	18
Replaced structures	7
Affected retaining walls	7
Number of at-grade crossings with safety modifications (e.g., four-quadrant gates, median barriers)	38
Length of new perimeter fencing	8.7
Communication radio towers	20

Source: Authority 2019b

LMF = light maintenance facility

OCS = overhead contact system

¹ Lengths shown are guideway mileages.

² OCS pole relocations are assumed for areas with track shifts greater than 1 foot.

³ Structures include bridges, grade separations such as pedestrian underpasses and overpasses, tunnels, retaining walls, and culverts.

San Francisco to South San Francisco Subsection

The Alternative B characteristics in this subsection would be predominantly the same as those described for Alternative A in Section 2.3.2.2. Locating the LMF on the west side of the Caltrain corridor (West Brisbane LMF) would, however, require different track, roadway, and Bayshore Station modifications than described for Alternative A. Locations for the track modifications, safety and security improvements, and communication radio towers within this subsection are depicted on Figure 2-8.

West Brisbane Light Maintenance Facility

The West Brisbane LMF would be constructed south of the San Francisco Caltrain tunnels on approximately 110 acres west of the Caltrain corridor. Direct mainline track access would be along double-ended yard leads that would cross over the mainline track on aerial flyover and would enable north and south movements. The four existing mainline tracks would be shifted west by up to 16.5 feet, and new yard lead tracks connecting to the West Brisbane LMF would be constructed east and west of the existing tracks. The yard leads east of the existing tracks would cross over the realigned four-track alignment on an aerial flyover to avoid train operations on the mainline track, converging with the yard leads on the west side of the track alignment. Approximately 1,400-foot-long transition tracks would allow trains to reduce or increase speed when entering or exiting the LMF.

The West Brisbane LMF (as illustrated on Figure 2-9) would include a maintenance yard with 17 yard tracks parallel to a runaround track and a maintenance building with shop tracks. A 400-space surface parking lot would be provided west of the maintenance building with truck and vehicle access to Industrial Way, which parallels and connects to Bayshore Boulevard.

Track modifications associated with the West Brisbane LMF would require relocating the Tunnel Avenue overpass, widening the bridge crossing Guadalupe Valley Creek in Brisbane, relocating CP Geneva at its intersection with Valley Drive, and providing a roadway extension connecting Valley Drive to Old Country Road. The widened Guadalupe Valley Creek Bridge would support the West Brisbane LMF lead tracks as they cross the creek. Track modification near CP Geneva could require relocating the overhead signal pole.

Track and Station Modifications

Track and station modifications within the San Francisco to South San Francisco Subsection for Alternative B (illustrated on Figure 2-8) are predominantly associated with the West Brisbane LMF. The realignment of the mainline tracks for the West Brisbane LMF would require relocation of the Caltrain Bayshore Station and removal of the existing Bayshore Station pedestrian overpass. The Caltrain Bayshore Station and associated surface parking lot, southbound platform, and a new pedestrian overpass would be reconstructed approximately 0.2 mile south of the existing station (inset on Figure 2-9). The new pedestrian overpass would provide access to the reconstructed station by connecting to Tunnel Avenue on the east and the planned local roadway network envisioned in the *Draft Brisbane Baylands Specific Plan* on the west (City of Brisbane 2011). Caltrain Bayshore Station would be closer to the planned future Geneva Avenue extension, which would extend from Bayshore Boulevard to US 101.

San Bruno to San Mateo Subsection

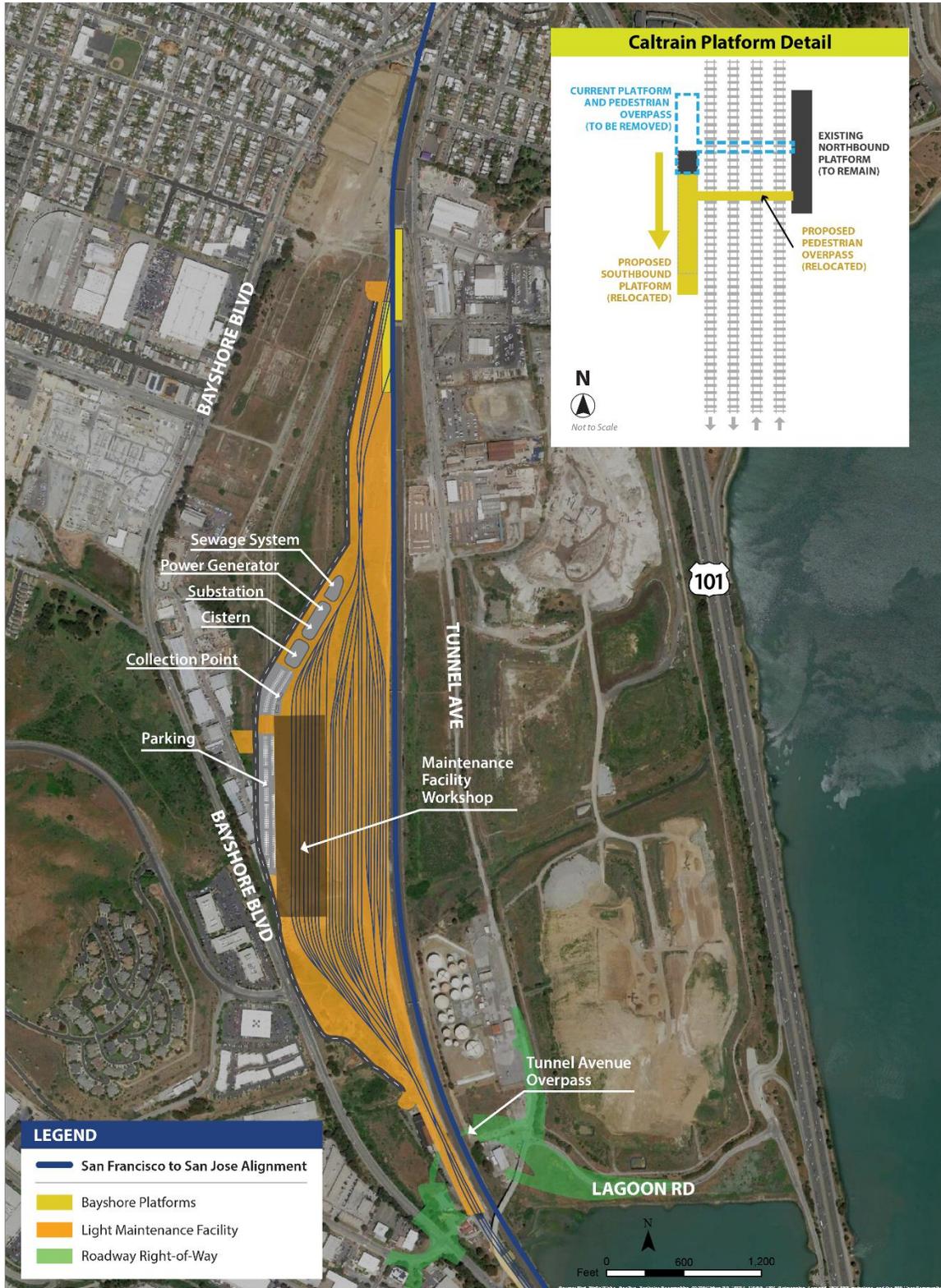
The characteristics of the San Bruno to San Mateo Subsection of Alternative B would be the same as those described for Alternative A in Section 2.3.2.2. The track and station modifications, safety and security improvements, Millbrae Station, and communication radio towers within this subsection are depicted on Figure 2-4.



Source: Authority 2019b

MAY 2019

Figure 2-8 San Francisco to South San Francisco Subsection—Alternative B



Source: Authority 2019b

APRIL 2019

Figure 2-9 West Brisbane Light Maintenance Facility Layout – Alternative B

San Mateo to Palo Alto Subsection

In the San Mateo to Palo Alto Subsection, Alternative B would construct passing tracks through San Mateo and San Carlos and modify the Hayward Park, Hillsdale, Belmont, and San Carlos Stations to accommodate the additional passing tracks. As illustrated on Figures 2-6 and 2-10, this alternative also would modify existing track, install four-quadrant gates at 15 existing at-grade crossings, and install 7 communication radio towers. The platforms at the existing Atherton Station would be modified to eliminate the hold-out rule. While the northern portion of this subsection (illustrated on Figure 2-10) differs from Alternative A because of the passing tracks and associated track and station modifications, the characteristics of the southern portion of the San Mateo to Palo Alto Subsection would be the same as those described for Alternative A (illustrated on Figure 2-6). Additional right-of-way would be required in San Mateo, Belmont, San Carlos, Redwood City, Menlo Park, and Palo Alto associated with four-quadrant gates, communication radio towers, passing tracks, and the reconfiguration or relocation of existing Caltrain stations.

Passing Tracks

The approximately 6-mile-long four-track passing track would extend through San Mateo, Belmont, San Carlos, and into the northern portion of Redwood City. South of Ninth Avenue in San Mateo, the two-track alignment would diverge to four tracks continuing at grade and on retained fill. The existing tracks would be realigned predominantly within the existing right-of-way to accommodate the new four-track configuration. Additional right-of-way would be required in some areas with particularly narrow existing rights-of-way or where curve straightening would be necessary to achieve higher speeds.

25th Avenue Grade-Separation Project

This grade-separation project, which is being undertaken by Caltrain in coordination with the City of San Mateo, would elevate the existing at-grade track between State Route 92 and Hillsdale Boulevard to provide a grade-separated undercrossing of 25th Avenue, construct new east-west crossings under the track corridor at 28th and 31st Avenues, and relocate the Hillsdale Station. Construction is expected to be completed in 2020.

Beginning in Hayward Park north of the SR 92 crossing, the tracks located on retained fill, would be shifted up to 46 feet, requiring acquisition of additional right-of-way. New outboard platforms and a pedestrian underpass at the Hayward Park Caltrain Station, and a new structure south of the SR 92 overpass to carry the reconfigured four-tracks over the Borel Creek Culvert would be constructed. South of the Hayward Park Station, the passing tracks would use the infrastructure installed by the planned 25th Avenue Grade-Separation Project (described in the inset box). A new retaining wall would be installed between SR 92 and Hillsdale Boulevard to match the elevation of the 25th Avenue

Grade-Separation Project, along with new bridge structures for the two new tracks at Borel Creek and 25th, 28th, and 31st Avenues. Additionally, a northbound Hillsdale Station platform would be constructed, eliminating some existing parking at the Hillsdale Station. At Hillsdale Boulevard, the existing underpass structure would be widened to accommodate the realigned tracks, along with widening of the existing Laurel Creek underpass to the south.

South of Hillsdale Boulevard, the passing tracks would ascend to a four-track aerial viaduct. Between Hillsdale Boulevard and Whipple Avenue, the following structures or facilities would be replaced or reconstructed: CP Ralston tie-in points, Belmont Station platforms, and San Carlos Station and platforms. The Belmont Station and platforms would be reconstructed to accommodate the new four-track configuration. The San Carlos Station and platforms would be relocated approximately 2,260 feet south of their currently location to Arroyo Avenue and a pedestrian underpass would be constructed. The following structures would be removed and replaced or modified: 42nd Avenue underpass, Caltrain Belmont Station pedestrian underpass, Ralston Avenue underpass, Harbor Boulevard underpass, F Street pedestrian underpass, Holly Street and San Carlos Station pedestrian underpass, Arroyo Avenue pedestrian underpass, Brittan Avenue, and Howard Avenue. South of Howard Avenue, Alternative B would descend to grade and converge back to a two-track configuration.



Figure 2-10 San Mateo to Palo Alto Subsection (Northern Portion)—Alternative B

Track and Station Modifications

The track and station modification characteristics of the San Mateo to Palo Alto Subsection of Alternative B would vary from those described for Alternative A in Section 2.3.2.2 in the northern portion of the subsection between Ninth Avenue in San Mateo and Whipple Avenue in Redwood City. In this portion of the subsection, the passing track would result in modifications to the existing Hayward Park, Hillsdale, Belmont, and San Carlos Stations. These station modifications consist of the modification and realignment of station platforms at Hayward Park, the construction of new platforms at the Hillsdale and Belmont Stations, and relocation of the San Carlos Station approximately 2,260 feet south of its existing location (Figure 2-11).

South of Whipple Avenue, the track and station modifications in the southern portion of this subsection would be the same as that described for Alternative A. Safety-related modifications would be made to the Atherton Station, including platform upgrades that would eliminate the hold-out rule by extending the southbound platform and adding a second outboard platform to serve the northbound track (see Figure 2-6).

Mountain View to Santa Clara Subsection

The characteristics of the Mountain View to Santa Clara Subsection of Alternative B would be the same as those described for Alternative A in Section 2.3.2.2. The locations for track modifications, safety and security improvements, and communication radio towers within this subsection are illustrated on Figure 2-7.



Source: Authority 2019b

APRIL 2019

Figure 2-11 San Carlos Station Relocation—Alternative B

2.4 Environmental Setting

2.4.1 Aquatic Resources

2.4.1.1 Definition of Aquatic Resource Study Area

Resource study areas (RSA) are the geographic boundaries within which the environmental investigations specific to each resource topic were conducted. The aquatic RSA is the project footprint plus a 250-foot buffer outside the project footprint. The project footprint includes all project elements (i.e., blended Caltrain/HSR right-of-way, station locations, LMF, passing track, and temporary construction easements) associated with the project alternatives. Direct impacts associated with the project occur within the project footprint.

2.4.1.2 Aquatic Resources Considered in the Alternatives Analysis

Analysts identified 73.86 acres of aquatic resources in the aquatic RSA. All these features were assumed to be waters of the U.S. under CWA Section 404.

Analysts also identified 41.25 acres of navigable waters under Section 10 of the Rivers and Harbors Act of 1899 (which occur within certain Section 404 waters) in the aquatic RSA.

Navigable waters are those waters of the U.S. that are subject to the ebb and flow of the tide shoreward to the mean high water mark and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce.

The types and extent of the wetlands and nonwetland waters delineated in the aquatic RSA are shown in Table 2-3. Brief discussions of the wetland and nonwetland water types follow the table.

Table 2-3 Summary of Potential Waters of the U.S. under Clean Water Act Section 404 and Navigable Waters Regulated under Rivers and Harbors Act Section 10 Jurisdiction in the Aquatic Resource Study Area

Feature Type and Map Symbol	CWA Section 404 nontidal (acres)	CWA Section 404 tidal (acres)	Total CWA Section 404 (acres) ²	RHA Section 10 Navigable Waters (acres) ¹
Wetlands				
Freshwater Emergent Wetland—FEM	16.20	0.06	16.26	0.00
Saline Emergent Wetland—SEW	0.56	10.39	10.95	8.69
Scrub/Shrub Wetland—SW	1.06	0.12	1.18	0.03
Seasonal Wetland—SW	0.04	0.00	0.04	0.00
<i>Wetlands Total</i>	<i>17.86</i>	<i>10.57</i>	<i>28.43</i>	<i>8.72</i>
Nonwetland Waters				
Constructed Basin—CB	1.25	0.00	1.25	0.00
Constructed Watercourse—CW	10.25	2.39	12.64	2.60
Natural Watercourse—NW	1.53	0.36	1.89	0.35
Open Water—OW	0.02	29.63	29.65	29.58
<i>Nonwetland Waters Total</i>	<i>13.05</i>	<i>32.38</i>	<i>45.43</i>	<i>32.53</i>
Waters of the U.S. Total	30.91	42.95	73.86	41.25

CWA = Clean Water Act

RHA = Rivers and Harbors Act

USACE = U.S. Army Corps of Engineers

¹ RHA Section 10 navigable waters occur with Section 404 tidal waters. The CWA Section 404 waters typically extend beyond the RHA Section 10 jurisdiction.

²Total includes only the CWA Section 404 nontidal acres and the CWA Section 404 tidal acres.

2.4.1.3 Wetlands

Four wetland types totaling 28.43 acres are jurisdictional waters under CWA 404, of which 8.72 acres are also considered navigable waters under Section 10 of the Rivers and Harbors Act (RHA), were mapped in the aquatic RSA—freshwater emergent wetland, saline emergent wetland, scrub/shrub wetland, and seasonal wetland. The general classifications of the wetland types were identified using the *Manual of California Vegetation* (Sawyer et al. 2009). Detailed descriptions of these communities are presented in the *San Francisco to San Jose Project Section Aquatic Resources Delineation Report* (Aquatic Resources Delineation Report) (Authority 2020b).

Freshwater Emergent Wetland

A total of 16.26 acres jurisdictional under CWA 404 were mapped as freshwater emergent wetland in the aquatic RSA. These wetlands are scattered throughout the RSA but are most common in the Brisbane wetlands area. Freshwater emergent wetland in the RSA is generally associated with perennial drainages and depressions in California annual grassland or ruderal habitat. The distribution of freshwater emergent wetlands varies from individual wetlands to small, scattered clumps. The dominant vegetation in freshwater emergent wetland consists of erect, herbaceous hydrophytes (i.e., water-adapted plants) that are rooted in saturated or inundated soils. Species that were observed in the RSA include broadleaved cattail, saltgrass, tall flatsedge, and bristly oxtongue. There are no freshwater emergent wetlands regulated under RHA 10 in the RSA.

Saline Emergent Wetland

A total of 10.95 acres jurisdictional under CWA 404 were mapped as saline emergent wetlands, of which 8.69 acres are considered navigable waters under RHA 10. These wetlands occur in a 1.7-mile stretch of the northern portion of the Project Section along Guadalupe Valley Creek near where it flows into Brisbane Lagoon, along the northeastern margin of Brisbane Lagoon, and along the edge of the Caltrain right-of-way near Oyster Point. More extensive saline emergent wetlands occur at the northern and southern ends of Brisbane Lagoon, just east of the RSA. The dominant plant species in the saline emergent wetlands at the time of the delineation field survey (Peninsula Corridor Joint Powers Board [PCJPB] 2015) were Pacific pickleweed and associated species such as strict gumplant, alkali sea heath, fat-hen, saltgrass, and alkali Russian thistle.

Scrub/Shrub Wetland

A total of 1.18 acres jurisdictional under CWA 404 were mapped as scrub/shrub wetlands at the LMF sites in Brisbane, of which 0.03 acre are considered navigable under RHA 10. The dominant species in this wetland type at the time of the delineation field survey was arroyo willow (PCJPB 2015).

Seasonal Wetland

A total of 0.04 acre jurisdictional under CWA 404 are mapped as seasonal wetlands in the RSA. Seasonal wetland habitat in the RSA is south of Santa Paula Avenue in Millbrae. Seasonal wetland is isolated and bounded by urban development and ruderal vegetation. Dominant vegetation in the seasonal wetlands in the RSA includes watercress, cocklebur, hyssop loosestrife, curly dock, mannagrass, seaside barley, and Harding grass. Seasonal wetland habitat in the RSA receives water from surface runoff and an adjacent constructed watercourse. There are no seasonal wetlands regulated under RHA 10 in the RSA.

Seasonal wetlands are typically associated with seasonal runoff from creeks and rivers. Seasonal wetlands were mapped based on ponding visible from road rights-of-way and on aerial imagery. Seasonal wetlands are a subclass of depressional wetlands.

2.4.1.4 Nonwetland Waters of the U.S.

Four nonwetland water types totaling 45.43 acres are jurisdictional waters under CWA 404, of which 32.53 acres are also considered navigable waters under RHA 10, were mapped in the aquatic RSA—constructed basin, constructed watercourse, natural watercourse, and open water. Detailed descriptions of these nonwetland water types are provided in the Aquatic Resources Delineation Report (Authority 2020b).

Constructed Basin

A total of 1.25 acres jurisdictional under CWA 404 are mapped as constructed basins in the aquatic RSA. The constructed basins consist of four stormwater basins at the LMF sites and one artificial pond. All constructed basins appear to have year-round, or nearly year-round, standing water. They generally have less than 5 percent cover by hydrophytic vegetation. There are no constructed basins under RHA 10 in the RSA.

Constructed Watercourse

A total of 12.64 acres jurisdictional under CWA 404 are mapped in the RSA as constructed watercourses, of which 2.60 acres are considered navigable under RHA 10. Constructed watercourses consist of channelized or engineered watercourses with concrete or sackcrete-lined channels that lack natural beds and banks on one or both sides. Constructed watercourses include highly modified stream channels and artificial drainage ditches (concrete or earthen surfaces). Constructed watercourses may occur as unvegetated features or as vegetated features that are regularly maintained (i.e., vegetation is periodically removed to maintain flow capacity). Constructed watercourses are distributed relatively evenly throughout the RSA. Only 3 of the 22 constructed watercourses (Easton Creek, Sanchez Creek, and Permanente Creek), contain both natural and engineered (e.g., concrete-lined) stream segments.

Natural Watercourse

A total of 1.89 acres jurisdictional under CWA 404 are mapped as natural watercourses in the RSA, of which 0.35 acre are considered navigable under RHA 10. These watercourses are distributed throughout the RSA and are comprised of named creeks—Guadalupe Valley Creek, Mills Creek, San Mateo Creek, Borel Creek, Belmont Creek, Cordilleras Creek, San Francisquito Creek, and Stevens Creek.

Open Water

A total of 29.65 acres jurisdictional under CWA 404 are mapped as open water in the RSA, of which 29.58 acres are considered navigable under RHA 10. Open water (i.e., the San Francisco Bay) habitat is unvegetated tidal areas located below the mean high water elevation. Brisbane Lagoon, which is an estuary that receives tidal action from the bay, parallels the project footprint south of the LMF sites and is the largest area of open water in the RSA. China Basin and the Islais Creek channel in San Francisco are the only other locations where the San Francisco Bay reaches the RSA. Open water can include features such as unvegetated depressions in wetlands, freshwater or tidal ponds, lagoons, the San Francisco Bay, or the Pacific Ocean.

2.4.2 Biological Resources

2.4.2.1 Definition of Resource Study Areas

The RSA for impacts on biological resources encompasses the project footprint for each of the project alternatives plus an additional distance from the project footprint where construction and operations could affect biological resources. Specific RSA boundaries vary by different biological resources, and are described in Table 2-4.

Table 2-4 Resource Study Area Definitions for Biological Resources

Resource Study Area	Area of Impact	General Description
Habitat Study Area		
Core Habitat Study Area		
Direct impacts	Project footprint (includes permanent and temporary impacts)	Area in which potential direct and indirect impacts on special-status fish and wildlife species and their habitat were evaluated. Ground-based site assessments or surveys were conducted in this area, if accessible.
Indirect impacts	Project footprint plus 250-foot buffer outside project footprint.	
Auxiliary Habitat Study Area		
Indirect impacts	250- to 1,000-foot buffer outside core habitat study area	Area in which indirect impacts on special-status fish and wildlife species and their habitat were evaluated. Habitat assessed through extrapolation of field observations made in the core habitat study area, aerial photograph interpretation, or windshield surveys.
Supplemental Habitat Study Area		
Indirect impacts	Extends up to 10 miles outward from the auxiliary habitat study area, depending on target species	Identifies species-specific habitat based on aerial photograph interpretation and documented occurrences of the species. The supplemental habitat study area includes lands within 3.1 miles of the project footprint for impacts on California tiger salamander (CDFG and USFWS 2003), and includes the 1-mile buffer required by the USFWS (2005) in formal site assessments for California red-legged frog. No other species-specific study areas were identified.
Special-Status Plant Study Area		
Direct impacts	Project footprint	Evaluate direct and indirect impacts on upland sensitive plant resources (including special-status plants, special-status plant communities, and protected trees).
Indirect impacts	Project footprint plus 100-foot buffer outside project footprint	
Wildlife Movement Study Area		
Direct and indirect impacts	20-mile buffer outside project footprint	Determined based on agency regulations and guidance, literature, and best professional judgment, and in consultation with appropriate regulatory agencies.

Sources: CDFG and USFWS 2003; USFWS 2005
 CDFG = California Department of Fish and Game
 USFWS = U.S. Fish and Wildlife Service

2.4.2.2 Land Cover Types

The project is located within the California Floristic Province, traversing the San Francisco Bay Area subregion of the Central Western California region. The San Francisco Bay Area subregion is physiographically defined by features such as Mount Tamalpais, the Santa Cruz Mountains, and the northern Diablo Range, including Mount Diablo and Mount Hamilton. The San Francisco Bay Area subregion encompasses a diversity of vegetation types, from very wet redwood forest to dry oak/pine woodland and chaparral. Table 2-5 shows the area of land cover associated with each of the project alternatives. Land cover maps for the habitat study area are provided in Appendix C, Land Cover Maps, of the Biological and Aquatic Resources Technical Report. The

Biological and Aquatic Resources Technical Report also describes the vegetation structure and composition of each land cover type in greater detail (Authority 2020a).

Table 2-5 Land Cover Types within the Project Footprint and Habitat Study Area (acres)

Land Cover Type	Alternative A			Alternative B		
	Project Footprint	Core Habitat Study Area ¹	Auxiliary Habitat Study Area ²	Project Footprint	Core Habitat Study Area ¹	Auxiliary Habitat Study Area ²
Tree-Dominated						
Oak woodland	0.7	4.6	34.1	0.9	4.6	34.3
Mixed riparian	1.8	5.2	15.7	1.9	5.4	16.3
Mixed woodland	0.0	0.0	2.4	0.0	0.0	2.4
<i>Subtotal</i>	2.5	9.8	52.2	2.8	10.0	53.0
Shrub-Dominated						
Coyote brush scrub	11.7	21.7	55.8	7.2	24.5	67.3
Scrub/shrub wetland	0.7	1.1	1.8	0.2	0.5	0.9
<i>Subtotal</i>	12.4	22.8	57.6	7.4	25.0	68.2
Herbaceous-Dominated						
California annual grassland	81.7	132.3	242.2	35.8	97.0	203.1
Freshwater emergent wetland	3.7	6.7	41.7	9.5	15.6	38.9
Saline emergent wetland	1.7	10.9	10.1	1.7	10.9	9.5
Seasonal wetland	0.0	0.0	18.2	0.0	0.0	18.2
<i>Subtotal</i>	87.1	149.9	312.2	47.0	123.5	269.7
Aquatic						
Constructed basin	0.4	1.2	3.3	0.0	0.5	3.0
Constructed watercourse	4.1	12.2	17.0	3.9	11.8	16.7
Natural watercourse	0.6	1.9	4.6	0.6	1.9	4.7
Open water	0.5	28.9	133.4	0.5	29.6	133.5
<i>Subtotal</i>	5.6	44.2	158.3	5.0	43.8	157.9
Developed						
Disturbed/barren	70.7	111.4	125.7	34.7	56.7	91.2
Ornamental woodland	8.2	32.1	57.7	9.2	36.0	53.3
Ruderal	26.6	81.5	111.5	89.6	130.3	143.2
Urban	607.5	3,115.6	7,982.4	634.1	3,184.3	8,074.0
<i>Subtotal</i>	713.0	3,340.6	8,277.3	767.6	3,407.3	8,361.7
Total	820.6	3,567.3	8,857.6	829.8	3,609.6	8,910.5

Source: Authority 2020a

¹ Acreage provided reflects the project footprint plus a 250-foot buffer.

² The auxiliary habitat study area extends 250 to 1,000 feet outside the core habitat study area.

2.4.2.3 *Special-Status Species*

This section addresses special-status plant and fish and wildlife species that have the potential to be affected by the project alternatives. Special-status species are defined as species meeting one or more of the following criteria: (1) plants or wildlife listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (FESA); (2) plants or wildlife listed or candidates for listing as threatened or endangered under the California Endangered Species Act (CESA); (3) California fully protected species or species of special concern; (4) plants listed as rare under the California Native Plant Protection Act; (5) plants included in the California Rare Plant Ranks 1A, 1B, 2A, 2B or 3 (California Native Plant Society 2018); or (6) species with a special status established by a federal or state agency with the authority to make such a designation. Information on the distribution, habitat requirements, threats, and occurrence of special-status species potentially affected by the project is described in the Biological and Aquatic Resources Technical Report (Authority 2020a). The Biological and Aquatic Resources Technical Report also identifies listed and nonlisted species that were considered but determined unlikely to be affected by the project.

The primary areas where special-status plant and wildlife species may occur within or adjacent to the project alternative footprints are those supporting remnant natural land cover or trees, shrubs, and structures that provide nesting and roosting habitat for birds and bats. Specific locations where special-status species are known or most likely to occur are as follows:

- Saline emergent wetland at the northern and southern ends of Brisbane Lagoon in South San Francisco provides limited habitat for several special-status plants and the following special-status wildlife species: California Ridgway's rail, California black rail, Alameda song sparrow, saltmarsh common yellowthroat, salt marsh harvest mouse, and salt marsh wandering shrew. Except for Alameda song sparrow and saltmarsh common yellowthroat, the occurrence of these species is not expected due to the small size of the wetland and adjacent disturbance.
- Icehouse Hill in Brisbane, which overlaps with the West Brisbane LMF footprint under Alternative B, contains California annual grassland known to support the host plants for three federally listed butterfly species: Bay checkerspot butterfly, callippe silverspot butterfly, and Mission blue butterfly.
- Scattered ground squirrel burrows and burrow surrogates (e.g., concrete debris or rock piles) in grassland, ruderal, and disturbed/barren land cover in Brisbane may occasionally support wintering burrowing owls (California Department of Fish and Wildlife [CDFW] species of special concern).
- The SFO West-of-Bayshore property, located east of the project footprint between Angus Avenue in San Bruno and the Millbrae Station, supports one of nine remaining populations of San Francisco garter snake (state- and federally listed as endangered) as well as California red-legged frog (federally listed as threatened and CDFW species of special concern). Wetlands and watercourses at this location may also support western pond turtle (CDFW species of special concern).
- Riparian habitat and ornamental landscaping provide nesting habitat for white-tailed kite, a California fully protected species, and roosting habitat for three special-status bat species—pallid bat, Townsend's big-eared bat, and western red bat.
- California annual grassland and coyote brush scrub provide marginal habitat for bent-flowered fiddleneck, Congdon's tarplant, and pappose tarplant. The latter two species may also occur in wetlands.
- Several streams that cross the habitat study area (Mills Creek, San Mateo Creek, San Francisquito Creek, and Stevens Creek) are seasonally used by central California coast steelhead as migratory habitat to upstream spawning areas and possibly juvenile rearing

habitat, but habitat conditions within the project footprint are degraded due to the urban nature of the areas.

- Streams with tidal influence in the San Francisco to South San Francisco Subsection are designated as green sturgeon critical habitat and are also considered estuarine rearing habitat for central California coast steelhead. They provide estuarine rearing habitat for juveniles, adults, and sub-adults that may occasionally enter from San Francisco Bay.

Table 2-6 identifies additional watercourses and open waters connected to San Francisco Bay that contain potential habitat¹⁰ for special-status fish and wildlife species.

Table 2-6 Biological Resource Summary for Watercourses or Open Waters in the Habitat Study Area

Name	Type ¹	Special-Status Species Habitat	Riparian Vegetation	Wildlife Corridor
San Francisco to South San Francisco Subsection				
China Basin Water Channel (aka Mission Creek) ²	Open Waters	Green sturgeon (designated critical habitat), central California coast steelhead (estuarine rearing habitat)	NP	NP
Islais Creek ²	Open Waters	Green sturgeon (designated critical habitat), Central California coast steelhead (estuarine rearing habitat)	NP	NP
Visitacion Creek	Constructed	Green sturgeon (designated critical habitat), central California coast steelhead (estuarine rearing habitat)	NP	NP
Brisbane Lagoon	Open Waters	Green sturgeon (designated critical habitat), central California coast steelhead (estuarine rearing habitat)	NP	NP
Guadalupe Valley Creek	Natural	Saltmarsh common yellowthroat, Alameda song sparrow, white-tailed kite, western red bat, pallid bat, Townsend's big-eared bat	P	P
Oyster Point Channel ³	Open Waters, Constructed	Green sturgeon (designated critical habitat), central California coast steelhead (estuarine rearing habitat), pallid bat, Townsend's big-eared bat	NP	NP
Colma Creek	Constructed	Green sturgeon (designated critical habitat), central California coast steelhead (estuarine rearing habitat), pallid bat, Townsend's big-eared bat	NP	P
San Bruno to San Mateo Subsection				
El Zanjon (aka Cupid Row Canal)	Constructed	California red-legged frog, San Francisco garter snake, western pond turtle	NP	NP
Highline Creek Tributary (aka South Lomita Canal)	Constructed	California red-legged frog, San Francisco garter snake, western pond turtle	NP	NP

¹⁰ Based on a spatial model that predicts where a species could occur using habitat requirements and locations of known occurrences.

Name	Type ¹	Special-Status Species Habitat	Riparian	Wildlife
Mills Creek	Natural	Central California coast steelhead (freshwater migration habitat), California red-legged frog, western pond turtle, white-tailed kite, western red bat	P	P
Easton Creek	Constructed	California red-legged frog, pallid bat, Townsend's big-eared bat, western pond turtle, western red bat, white-tailed kite	P	P
Sanchez Creek	Constructed	California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat	NP	NP
San Mateo Creek	Natural	Central California coast steelhead, California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat, western bat, white-tailed kite	P	P
San Mateo to Palo Alto Subsection				
Borel Creek	Natural	California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat, western red bat, white-tailed kite	P	P
Belmont Creek	Natural	California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat, western red bat, white-tailed kite	P	P
Pulgas Creek	Constructed	California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat, western red bat, white-tailed kite	P	P
Cordilleras Creek	Natural	California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat, western red bat, white-tailed kite	P	P
San Francisquito Creek	Natural	Central California coast steelhead (designated critical habitat), California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat, western red bat, white-tailed kite	P	P
Matadero Creek	Constructed	California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat	NP	P
Barron Creek	Constructed	California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat	NP	P
Adobe Creek	Constructed	California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat	NP	P
Mountain View to Santa Clara Subsection				
Permanente Creek	Constructed	California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat, western red bat, white-tailed kite	P	NP
Stevens Creek	Natural	Central California coast steelhead (designated critical habitat), California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat, western red bat, white-tailed kite	P	P

Name	Type ¹	Special-Status Species Habitat	Riparian Vegetation	Wildlife Corridor
Sunnyvale East Channel	Constructed	California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat	NP	P
Calabazas Creek	Constructed	California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat	NP	P
San Tomas Aquino Creek	Constructed	California red-legged frog, western pond turtle, pallid bat, Townsend's big-eared bat	NP	P

Source: Land cover generated using ESRI ArcGIS version 10.3 from data gathered during field surveys and aerial photo interpretation using NAIP aerial imagery dated 2010–2015

NP = Not Present

P = Present

¹ Some watercourses categorized as constructed are natural in part of the study area and concrete-lined in other parts (i.e., on one side of the tracks). Only portions of constructed watercourses that are natural were determined to support riparian vegetation.

² Open waters outside but within 1,000 feet of project footprint.

³ At this location the project footprint consists of the blended Caltrain/HSR right-of-way over an existing box culvert. The open waters of San Francisco Bay are located to the east and a concrete-lined (i.e., constructed watercourse) flood control channel is located to the west and southwest of this culvert.

Critical Habitat

Designated critical habitat for four federally listed species occurs within 0.5 mile of the project footprints for the alternatives, as shown in Table 2-7. Designated critical habitat for the Franciscan manzanita is located east of Caltrain's Tunnel 4 in the San Francisco to South San Francisco Subsection; designated critical habitat for the Bay checkerspot butterfly is located at San Bruno Mountain in South San Francisco; and designated critical habitat for central California coast steelhead is located at San Francisquito Creek (San Mateo to Palo Alto Subsection) and Stevens Creek (Mountain View to Santa Clara Subsection). The southern distinct population segment of green sturgeon has designated critical habitat in China Basin Channel, Islais Creek, and Colma Creek in the San Francisco to South San Francisco Subsection, Mills Creek and Highline Creek in the San Bruno to San Mateo Subsection, and Pulgas Creek in the San Mateo to Palo Alto Subsection. However, no critical habitat occurs within the project footprint. Additional information on critical habitat is provided in the Biological and Aquatic Resources Technical Report (Authority 2020a).

Table 2-7 Critical Habitat within 0.5 Mile of the Project Footprint¹

Species	San Francisco to South San Francisco	San Bruno to San Mateo	San Mateo to Palo Alto	Mountain View to Santa Clara
Franciscan manzanita	O	NP	NP	NP
Bay checkerspot butterfly	P	NP	NP	NP
Central California coast steelhead	NP	NP	P	P
Green sturgeon—southern DPS	P	P	P	NP

Sources: 78 Federal Register (Fed. Reg.) 77289; 50 Fed. Reg. 50406; 70 Fed. Reg. 52488

DPS = distinct population segment

¹ P = designated critical habitat present in or within 1,000 feet of project footprint; O = designated critical habitat present in vicinity (1,000 feet–0.5 mile from project footprint); NP = no designated critical habitat within 0.5 mile of project footprint

Essential Fish Habitat

The habitat study area contains designated essential fish habitat (EFH) for Pacific coast (Chinook and coho) salmon, coastal pelagic [fish] species, and Pacific Coast groundfish species (Table 2-8).

Appendix A to the Pacific Salmon Fishery Management Plan (Pacific Fishery Management Council [PFMC] 2014) identifies two kinds of EFH for Chinook and coho salmon—marine and freshwater. The important elements of Chinook and coho salmon marine EFH are: (1) estuarine rearing, (2) ocean rearing, and (3) juvenile and adult migration. Important features of this estuarine and marine habitat are: (1) good water quality, (2) cool water temperatures, (3) abundant prey species and forage base (food), (4) connectivity with terrestrial ecosystems, and (5) adequate depth and habitat complexity including marine vegetation and algae in estuarine and nearshore habitats (PFMC 2014: page A-21).

Marine EFH for Chinook and coho in the San Francisco Bay hydrologic unit (HUC-8 18050004) extends from nearshore and tidal submerged environments out to the full extent of the Exclusive Economic Zone (i.e., 200 nautical miles from the California coast). Marine EFH in the habitat study area is limited to the six locations in the San Francisco to South San Francisco Subsection identified in Table 2-8.

Freshwater EFH for Chinook and coho salmon includes “all those streams, lakes, ponds, wetlands, tributaries, and other waterbodies currently viable and most of the habitat historically accessible to Chinook and coho salmon within Washington, Oregon, Idaho and California” (PFMC 2014: page A-21). Freshwater EFH in the habitat study includes all of the streams in the remaining subsections listed in Table 2-8 because they were historically accessible to Chinook salmon, coho salmon, or both. All of these streams are located in the San Francisco Bay hydrologic unit (HUC-8 18050004).

The fishery management plan for Pacific Coast coastal pelagic species includes five species: northern anchovy, Pacific sardine, Pacific (chub) mackerel, jack mackerel and market squid. EFH for these coastal pelagic species is defined both by geographic boundaries and sea-surface temperature ranges (PSMFC n.d.). Pelagic species live in the water column as opposed to living near the sea floor. They can generally be found anywhere from the surface to 1,000 meters deep. Pacific sardine and Pacific mackerel are actively managed—they are assessed annually for stock status and fishery management. The three other species are either managed at the state level or are landed in low numbers and are therefore monitored for potential elevation to active management in the future (PFMC 2019a). The east-west geographic boundary of EFH for coastal pelagic species is defined to be all marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington offshore to 200 nautical miles and above the thermocline where sea surface temperatures range between 10 degrees Celsius (°C) to 26°C. The southern boundary is the United States-Mexico maritime boundary. The northern boundary is more dynamic and is defined as the position of the 10°C isotherm, which varies seasonally and annually (PFMC 2019b).

The Pacific Coast groundfish fishery management plan manages 90-plus species over a large and ecologically diverse area. Groundfish species are comprised of flatfish, rockfish, roundfish (e.g., lingcod, Pacific cod, cabezon), and elasmobranchs (sharks and skates). The overall extent of groundfish EFH is identified as all waters and substrate within the following areas:

- Depths less than or equal to 3,500 meters to mean higher high water level or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean derived salts measure less than 0.5 parts per thousand during the period of average annual low flow.
- Seamounts in depths greater than 3,500 meters.
- Areas designated as habitat areas of particular concern not already identified by the above criteria. The habitat area of particular concern in the habitat study area is estuarine.

Table 2-8 Designated Essential Fish Habitat in the Habitat Study Area¹

Name	Pacific Coast Salmon	Pacific Coast Groundfish	Coastal Pelagic
San Francisco to South San Francisco Subsection			
China Basin Water Channel (aka Mission Creek)	P	P	P
Islais Creek	P	P	P
Visitacion Creek	P	NP	NP
Brisbane Lagoon/Guadalupe Valley Creek	P	NP	NP
Oyster Point Channel	P	P	P
Colma Creek	P	NP	NP
San Bruno to San Mateo Subsection			
El Zanjon Creek (aka Cupid Row Canal)	P	NP	NP
Highline Creek Tributary (aka South Lomita Canal)	P	NP	NP
Mills Creek	P	NP	NP
Easton Creek	P	NP	NP
Sanchez Creek	P	P	NP
San Mateo Creek	P	NP	NP
San Mateo to Palo Alto Subsection			
Borel Creek	P	NP	NP
Belmont Creek	P	NP	NP
Pulgas Creek	P	NP	NP
Cordilleras Creek	P	NP	NP
San Francisquito Creek	P	NP	NP
Matadero Creek	P	NP	NP
Barron Creek	P	NP	NP
Adobe Creek	P	NP	NP
Mountain View to Santa Clara Subsection			
Permanente Creek	P	NP	NP
Stevens Creek	P	NP	NP
Sunnyvale East Channel	P	NP	NP
Calabazas Creek	P	NP	NP
San Tomas Aquino Creek	P	NP	NP

¹ P = designated essential fish habitat overlaps with project footprint; O = designated essential fish habitat present outside but within 1,000 feet of project footprint; NP = no designated essential habitat within 1,000 feet of project footprint

2.4.2.4 Special-Status Plant Communities

Special-status plant communities are named differently in the California Natural Diversity Database (CNDDDB) than in the CDFW Sensitive Natural Community List (CDFW 2018a) because Holland's (1986) vegetation classification system was used when the CNDDDB was first developed in the mid-1990s. The CDFW's Vegetation Classification and Mapping Program is currently focused on completing an updated statewide vegetation classification system. After this update to

the classification system is completed, the CDFW will review and update the existing Holland-based occurrences in the CNDDDB based on the current classification system. Until that time, both Holland-based CNDDDB natural community occurrences and the CDFW Sensitive Natural Community List are considered.

The CNDDDB (CDFW 2018b) identifies seven Holland-type special-status plant communities (Holland 1986) as occurring within 10 miles of the special-status plant study area:

- Northern maritime chaparral
- Coastal terrace prairie
- Valley needlegrass grassland
- Serpentine bunchgrass
- Northern coastal salt marsh
- Coastal brackish marsh
- Valley oak woodland

None of the CNDDDB-identified community occurrences overlap with the special-status plant study area. To date, project land cover mapping has identified only one of these communities (northern coastal salt marsh) in the special-status plant study area at Brisbane Lagoon. None of the remaining communities has been observed or is expected to occur because of the project’s urban setting; most vegetation within the special-status plant study area is composed of nonnative invasive weeds that thrive in disturbed environments.

Based on a review of the CDFW Sensitive Natural Community List (CDFW 2018a), biologists identified two special-status plant communities as occurring or potentially occurring in the special-status plant study area:

- Arroyo willow thickets (*Salix lasiolepis* Shrubland Alliance)
- Pickleweed mats (*Sarcocornia pacifica* Herbaceous Alliance)

Table 2-9 shows a cross-walk between the project’s land cover types and associated special-status plant communities that are synonymous with or could potentially occur in these land cover types. Saline emergent wetland potentially supporting pickleweed mats is limited to a small area at the northwestern corner of Brisbane Lagoon. Scrub-shrub wetlands supporting arroyo willow thickets occur in the East and West Brisbane LMF footprints and mixed riparian land cover at various stream crossings may support additional stands of this community.

Table 2-9 Special-Status Plant Communities Occurring or Potentially Occurring in the Special-Status Plant Study Area

Project Land Cover Type	Sensitive Natural Community ¹	Holland (1986) Community Type Listed in CNDDDB
Mixed Riparian Scrub/Shrub Wetland	Arroyo willow thickets (<i>Salix lasiolepis</i> Shrubland Alliance)	Central coast riparian scrub
Saline Emergent Wetland	Pickleweed mats (<i>Sarcocornia pacifica</i> Herbaceous Alliance)	Northern coastal salt marsh

Sources: CDFW 2018a, 2018b; Sawyer et al. 2009, Holland 1986

CDFW = California Department of Fish and Wildlife

CNDDDB = California Natural Diversity Database

¹ Special-status plant communities are named differently in the CNDDDB than in the CDFW Sensitive Natural Community List (CDFW 2018a) because Holland’s (1986) vegetation classification system was used when the CNDDDB was first developed in the mid-1990s. The CDFW indicates that both Holland-based CNDDDB natural community occurrences and the CDFW Sensitive Natural Community List should be considered during the California Environmental Quality Act review process.

2.4.2.5 Wildlife Corridors

The California Essential Habitat Connectivity Project (Caltrans and CDFG 2010) identifies two natural landscape blocks in the vicinity of the project: (1) San Bruno Mountain north of South San Francisco, and (2) an uninterrupted block of high-quality northern coastal salt marsh that fringes the southern end of San Francisco Bay. Neither of these landscape blocks overlap the project footprint. Additionally, 16 watercourses support wildlife movement in the project vicinity between the Santa Cruz Mountains and San Francisco Bay (Table 2-6). These corridors are discussed in greater detail in the Biological and Aquatic Resources Technical Report (Authority 2020a).

2.4.3 Cultural Resources

This section provides information on cultural resources. The full environmental setting for cultural resources is presented in the Draft EIR/EIS.

2.4.3.1 Definition of Resource Study Areas

The RSA for archaeological resources encompasses the areas directly affected by ground disturbance before, during, and after project construction as well as during operation. These areas include the project footprint for each of the project alternatives, extending vertically to the maximum depth of anticipated ground disturbance.

The RSA for historic built resources encompasses the areas directly or indirectly affected by construction and operation of the project. These areas include all parcels intersected by the project footprint for each of the project alternatives.

2.4.3.2 Archaeological Resources

The Project Section is in an area that is sensitive for archaeological deposits and known archaeological resources. Table 2-10 presents the 21 previously recorded archaeological resources within the archaeological resources RSA from north to south. All resources listed in Table 2-10 but CA-SMA-233 would be affected by the project; therefore, a total of 20 archaeological resources would be affected.

Table 2-10 Archaeological Resources in the Resource Study Area

Trinomial (Smithsonian)	Description	NRHP/CRHR
CA-SFR-171	Pre-contact midden buried below artificial fill; appears intact and has potential to be eligible	Assumed eligible
CA-SMA-378H	Refuse scatter	Assumed eligible
CA-SMA-418H	Refuse scatter	Assumed eligible
CA-SMA-47	Pre-contact shell midden; Nelson Shellmound #386	Assumed eligible
CA-SMA-422	Pre-contact midden with surface and buried component	Assumed eligible
CA-SMA-423H/HST-94H	Refuse scatter	Assumed eligible
CA-SMA-6	Midden; buried	Assumed eligible
CA-SMA-102	Midden	Assumed eligible
CA-SMA-316	Shell midden	Assumed eligible
CA-SMA-317	Shell midden; Hamilton Shellmound	Assumed eligible
CA-SMA-4	Shell midden with human burials; Nelson mound	Assumed eligible
CA-SMA-232	Shell midden; Hamilton Shellmound #9	Assumed eligible
CA-SMA-233	Shell midden; Hamilton Shellmound #12	Assumed eligible

Trinomial (Smithsonian number):	Description	NRHP/CRHR Eligibility
CA-SMA-419	Midden	Assumed eligible
CA-SMA-420	Midden	Assumed eligible
CA-SMA-421	Midden in disturbed context	Assumed eligible
CA-SMA-358/H	Pre-contact, protohistoric, and historic site on surface and buried	Assumed eligible
CA-SMA-424/CA-SCL-939	Buried midden along San Francisquito Creek	Assumed eligible
CA-SCL-600	Midden	Assumed eligible
CA-SCL-1	Shellmound	Assumed eligible
CA-SCL-22	Midden	Assumed eligible

NRHP = National Register of Historic Places
 CRHR = California Register of Historical Resources

2.4.3.3 Historic Built Resources

A total of 21 known built historic resources were identified within the RSA. Table 2-11 presents the record search findings for the 19 previously recorded built resources within the built historic resources RSA, as well as the 2 properties identified and documented as part of this project. None of the resources listed in Table 2-11 would be adversely affected by the project.

Table 2-11 Known Built Historic Resources in the Resource Study Area

Historic Name (NRHP Number)	City	Year Built	Status
San Francisco Fire Department Auxiliary Water Supply System	San Francisco	1908–1964	NRHP Eligible
Central Waterfront Historic District	San Francisco	1872–1958	NRHP Eligible
Southern Pacific Railroad Tunnel No. 3	San Francisco	1904	NRHP Eligible
Southern Pacific Railroad Tunnel No. 4	San Francisco	1904	NRHP Eligible
Southern Pacific Railroad Bayshore Roundhouse	San Mateo	1910	NRHP Listed
Airport Boulevard Underpass/South San Francisco Subway	South San Francisco	1927	NRHP Eligible
Southern Pacific Depot/Millbrae Station (78000770)	Millbrae	1907	NRHP Listed
Jules Francard Grove/Francard Tree Rows	Burlingame	ca. 1874–1880	NRHP Eligible
Southern Pacific Depot/Burlingame Railroad Station (78000769)	Burlingame	1894	NRHP Listed
Southern Pacific Depot/San Carlos Station (84001191)	San Carlos	1888	NRHP Listed
Southern Pacific Railroad Dumbarton Cutoff Linear Historic District	Redwood City	1907–1910	NRHP Eligible
Willie Mays Jr. House	Atherton	1964	NRHP Eligible
Southern Pacific Depot/Atherton Station	Atherton	1913	NRHP Eligible

Historic Name (NRHP Number)	City	Year	Status
Carriage House and Water Tower, Holbrook-Palmer Estate	Menlo Park	ca. 1883, 1897	NRHP Listed
Southern Pacific Depot/Menlo Park Railroad Station (74000556)	Menlo Park	1867, 1890s, 1917	NRHP Listed
Southern Pacific Railroad San Francisquito Creek Bridge	Palo Alto	1902	NRHP Eligible
El Palo Alto	Palo Alto	ca. 939	NRHP Eligible
Palo Alto Southern Pacific Railroad Depot	Palo Alto	1940	NRHP Listed
University Avenue Underpass	Palo Alto	1941	NRHP Eligible
Embarcadero Underpass	Palo Alto	1936	NRHP Eligible
Tract 795, Charleston Meadows	Palo Alto	1950–1951	NRHP Eligible

NRHP = National Register of Historic Places

2.5 Avoidance and Minimization Measures

This section sets out the avoidance and minimization measures that would be implemented to reduce impacts to aquatic resources, biological resources, and cultural resources. For biological and cultural resources, measures to mitigate unavoidable impacts are also identified. Full text of the measures is provided in Appendix E.

2.5.1 Project-Level Avoidance and Minimization of Impacts on Aquatic Resources

The following measures would be incorporated as part of the project to avoid and minimize impacts on aquatic resources:¹¹

- BIO-IAMF#3: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training
- BIO-IAMF#4: Conduct Operation and Maintenance Period WEAP Training
- BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan
- BIO-IAMF#8: Delineate Equipment Staging Areas and Traffic Routes
- BIO-IAMF#9: Dispose of Construction Spoils and Waste
- BIO-IAMF#10: Clean Construction Equipment
- BIO-MM#2: Prepare and Implement a Weed Control Plan
- BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones
- BIO-MM#4: Conduct Monitoring of Construction Activities
- BIO-MM#5: Establish and Implement a Compliance Reporting Program

¹¹ The measures listed in this section reflect the same nomenclature and numbering as the same measures included in the Draft EIR/EIS. Not all measures identified in the Draft EIR/EIS are included in this Checkpoint C Summary Report; therefore, the numbering of some measures in this document may appear non-sequential.

Additionally, the Authority would implement the following design refinements to Alternative A to minimize fill in waters of the U.S.:¹²

- Modification of the Tunnel Avenue and Lagoon Road realignments and use of retaining walls rather than embankment to avoid fill in wetlands and constructed basins in Brisbane.
- Relocation of stand-alone radio tower 3 in San Bruno approximately 200 feet north of its current location to avoid fill in Highline Creek Tributary.

2.5.2 Project-Level Avoidance, Minimization, and Mitigation of Impacts on Biological Resources

2.5.2.1 Special-Status Plant Species

The Authority would implement the following measures during project design and construction to avoid, minimize, and mitigate impacts on special-status plant species:¹³

- BIO-IAMF#1: Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors
- BIO-IAMF#3: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training
- BIO-IAMF#4: Conduct Operation and Maintenance Period WEAP Training
- BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan
- BIO-IAMF#8: Delineate Equipment Staging Areas and Traffic Routes
- BIO-IAMF#9: Dispose of Construction Spoils and Waste
- BIO-IAMF#10: Clean Construction Equipment
- BIO-IAMF#11: Maintain Construction Sites
- BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan
- BIO-MM#2: Prepare and Implement a Weed Control Plan
- BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones
- BIO-MM#4: Conduct Monitoring of Construction Activities
- BIO-MM#5: Establish and Implement a Compliance Reporting Program
- BIO-MM#6: Conduct Presence/Absence Pre-Construction Surveys for Special-Status Plant Species and Special-Status Plant Communities
- BIO-MM#7: Prepare and Implement Plan for Salvage, Relocation, or Propagation of Special-Status Plant Species
- BIO-MM#8: Prepare a Compensatory Mitigation Plan for Species and Species Habitat
- BIO-MM#9: Implement Measures to Minimize Impacts during Off-Site Habitat Restoration or Enhancement, or Creation on Mitigation Sites
- BIO-MM#10: Compensate for Impacts on Listed Plant Species

¹² These design refinements will be included in the Final EIR/EIS.

¹³ The measures listed in this section reflect the same nomenclature and numbering as the same measures included in the Draft EIR/EIS. Not all measures identified in the Draft EIR/EIS are included in this Checkpoint C Summary Report, therefore the numbering of some measures in this document may appear non-sequential.

2.5.2.2 *Special-Status Fish and Wildlife*

The Authority would implement the following measures during project design and construction to avoid, minimize, and mitigate impacts on special-status fish and wildlife species:¹⁴

- BIO-IAMF#1: Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors
- BIO-IAMF#3: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training
- BIO-IAMF#4: Conduct Operation and Maintenance Period WEAP Training
- BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan
- BIO-IAMF#6: Establish Monofilament Restrictions
- BIO-IAMF#7: Prevent Entrapment in Construction Materials and Excavations
- BIO-IAMF#9: Dispose of Construction Spoils and Waste
- BIO-IAMF#10: Clean Construction Equipment
- BIO-IAMF#11: Maintain Construction Sites
- BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan
- BIO-MM#2: Prepare and Implement a Weed Control Plan
- BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones
- BIO-MM#4: Conduct Monitoring of Construction Activities
- BIO-MM#5: Establish and Implement a Compliance Reporting Program
- BIO-MM#8: Prepare a Compensatory Mitigation Plan for Species and Species Habitat
- BIO-MM#9: Implement Measures to Minimize Impacts During Off-Site Habitat Restoration or Enhancement, or Creation on Mitigation Sites
- BIO-MM#11: Compensate for Impacts on Listed Butterfly Habitat
- BIO-MM#12: Work Stoppage
- BIO-MM#13: Restore Temporary Riparian Habitat Impacts
- BIO-MM#14: Prepare Plan for Dewatering and Water Diversions
- BIO-MM#15: Prepare and Implement a Cofferdam Fish Rescue Plan
- BIO-MM#17: Provide Compensatory Mitigation for Permanent Impacts on Steelhead, Green Sturgeon Habitat, and Essential Fish Habitat
- BIO-MM#18: Conduct Pre-Construction Surveys for Special-Status Reptile and Amphibian Species
- BIO-MM#19: Implement Avoidance and Minimization Measures for Special-Status Reptile and Amphibian Species
- BIO-MM#20: Install San Francisco Garter Snake and California Red-Legged Frog Exclusion Fencing at SFO West-of-Bayshore Property

¹⁴ The measures listed in this section reflect the same nomenclature and numbering as the same measures included in the Draft EIR/EIS. Not all measures identified in the Draft EIR/EIS are included in this Checkpoint C Summary Report, therefore the numbering of some measures in this document may appear non-sequential.

- BIO-MM#21: Compensate for Impacts on San Francisco Garter Snake and California Red-Legged Frog Habitat
- BIO-MM#25: Conduct Pre-Construction Surveys and Delineate Active Nest Buffers Exclusion Areas for Breeding Birds
- BIO-MM#30: Conduct Pre-Construction Surveys for Special-Status Bat Species
- BIO-MM#31: Implement Bat Avoidance and Relocation Measures
- BIO-MM#32: Implement Bat Exclusion and Deterrence Measures
- BIO-MM#33: Install Aprons or Barriers within Security Fencing

2.5.2.3 Special-Status Plant Communities

The Authority would implement the following measures during project design and construction to avoid, minimize, and mitigate impacts on special-status plant communities:¹⁵

- BIO-IAMF#1: Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors
- BIO-IAMF#3: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training
- BIO-IAMF#4: Conduct Operation and Maintenance Period WEAP Training
- BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan
- BIO-IAMF#8: Delineate Equipment Staging Areas and Traffic Routes
- BIO-IAMF#9: Dispose of Construction Spoils and Waste
- BIO-IAMF#10: Clean Construction Equipment
- BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan
- BIO-MM#2: Prepare and Implement a Weed Control Plan
- BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones
- BIO-MM#4: Conduct Monitoring of Construction Activities
- BIO-MM#5: Establish and Implement a Compliance Reporting Program
- BIO-MM#6: Conduct Presence/Absence Pre-Construction Surveys for Special-Status Plant Species and Special-Status Plant Communities
- BIO-MM#13: Restore Temporary Riparian Habitat Impacts
- BIO-MM#35: Provide Compensatory Mitigation for Permanent Impacts on Riparian Habitat

¹⁵ The measures listed in this section reflect the same nomenclature and numbering as the same measures included in the Draft EIR/EIS. Not all measures identified in the Draft EIR/EIS are included in this Checkpoint C Summary Report, therefore the numbering of some measures in this document may appear non-sequential.

2.5.2.4 **Wildlife Corridors**

The Authority would implement the following measures during project design and construction to avoid and minimize impacts on wildlife corridors:¹⁶

- BIO-IAMF#3: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training
- BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan
- BIO-IAMF#8: Delineate Equipment Staging Areas and Traffic Routes

2.5.3 **Project-Level Avoidance, Minimization, and Mitigation of Impacts on Cultural Resources**

The Authority would implement the following measures during project design and construction to avoid, minimize, and mitigate impacts on cultural resources:¹⁷

- CUL-MM#1: Mitigate Adverse Effects on Archaeological and Built Resources Identified during Phased Identification and Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the PA and MOA
- CUL-MM#2: Halt Work in the Event of an Archaeological Discovery, and Comply with the PA, MOA, ATP, and all State and Federal Laws, as Applicable
- CUL-MM#3: Other Mitigation for Effects on NRHP-Eligible Pre-Contact Archaeological Resources

2.6 **Comparative Analysis of Project Alternatives**

This chapter provides comparative analyses of each alternative's impacts on aquatic resources (i.e., wetlands and nonwetland waters of the U.S.), biological resources, including special-status plant and wildlife species and special-status plant communities, and cultural resources, including archaeological and historic built resources. Impacts are described both in terms of direct and indirect impacts and in terms of *construction* and *operations* impacts.

Construction and operations impacts are generally defined as follows:

- **Construction impacts**—Permanent (short-term and long-term) and temporary impacts associated with construction of the HSR infrastructure.
- **Operations impacts**—Impacts related to the ongoing, routine, and occasional activities associated with the operations of the HSR and related services (e.g., operating HSR transit services and maintaining associated equipment and facilities of the HSR system). Operations impacts also include running trains during testing of the HSR system before passenger service begins.

2.6.1 **Aquatic Resources**

2.6.1.1 **Methodology for Aquatic Resources Impacts**

The three categories of impacts on aquatic resources are defined as follows:

- **Direct permanent**—The permanent loss of aquatic resources that results from the discharge of dredge or fill material. These impacts are generally caused by the construction of permanent infrastructure, including the HSR tracks, stations, and supporting infrastructure.

¹⁶ The measures listed in this section reflect the same nomenclature and numbering as the same measures included in the Draft EIR/EIS. Not all measures identified in the Draft EIR/EIS are included in this Checkpoint C Summary Report, therefore the numbering of some measures in this document may appear non-sequential.

¹⁷ The measures listed in this section reflect the same nomenclature and numbering as the same measures included in the Draft EIR/EIS. Not all measures identified in the Draft EIR/EIS are included in this Checkpoint C Summary Report, therefore the numbering of some measures in this document may appear non-sequential.

For the purpose of this analysis, it is assumed that any aquatic resource located within the project footprint would be permanently affected. Actual impacts are anticipated to be less because of opportunities for avoidance provided by design refinements and construction planning. Direct impacts were quantified using geographic information systems (GIS). Specifically, GIS analysts calculated area of impact by intersecting aquatic resource feature layers with feature layers in the project design drawings (i.e., project activities) associated with permanent HSR track and systems. Prior to analysis, GIS analysts converted electronic project design files provided by project engineers to GIS geodatabases to facilitate intersects between design drawing and biological resource feature layers.

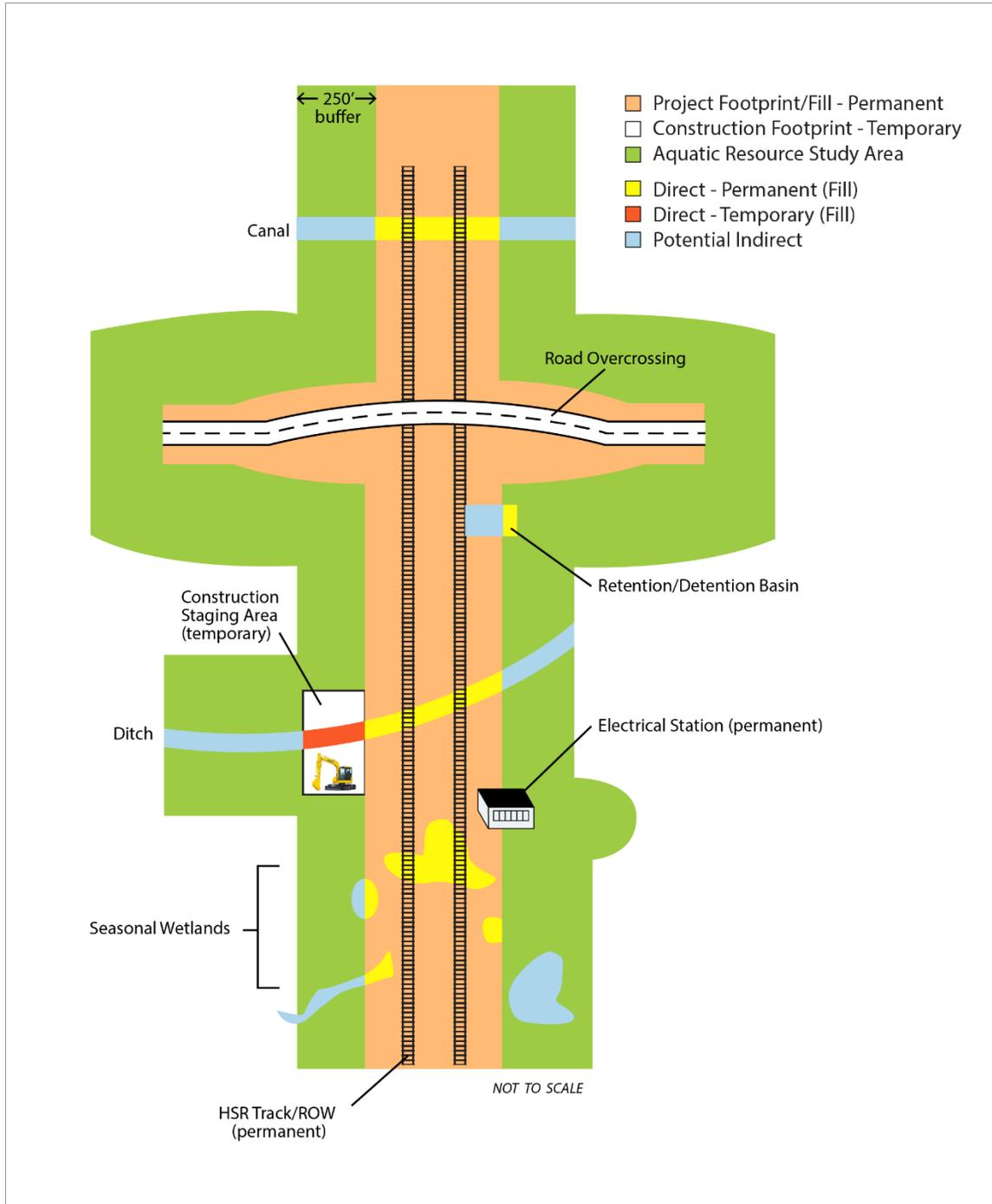
- **Direct temporary**—The temporary loss of aquatic resources that occurs primarily as a result of short-term construction activities in laydown and storage areas. Areas affected by these short-term activities would be restored to pre-project conditions following the completion of construction. GIS analysts calculated area of direct temporary impact by intersecting aquatic resource feature layers with feature layers in the project design drawings associated with laydown and staging areas and temporary construction easements. Temporary impacts that last more than 1 year would be treated as permanent.
- **Indirect or secondary**—Indirect impacts occur later in time (after the discharge) or are farther removed in distance from the discharge, but are reasonably foreseeable. Secondary impacts are those impacts on aquatic resources that are associated with the discharge of dredged or fill material, but do not result from the actual placement of the material. Such impacts could result from construction-related actions, such as the modification of hydrology, degradation of water quality or habitat conditions, or other adverse changes in environmental conditions. Potential indirect and secondary impacts are qualitatively assessed only for those aquatic resources within the aquatic RSA (i.e., within 250 feet of project footprint).

Figure 2-12 depicts the areal extent of these impact categories relative to the project footprint and aquatic RSA and is consistent with how impacts are characterized in other HSR project sections.

2.6.1.2 *Direct Impacts*

Although pre-construction and construction avoidance and minimization measures to protect aquatic resources would be implemented, these measures would not prevent the permanent conversion or temporary disturbance of some aquatic resources in the project footprint. Certain construction activities would cause temporary disturbances of aquatic resources, thereby reducing the ecological value of the resources until such time as the features were restored.

Construction activities in all subsections would take place in areas that support jurisdictional waters. Both project alternatives would require the construction of new bridges and culverts for the railbed, roadways, and other infrastructure to cross over watercourses, and the modification of existing bridges and culverts for the same purpose. The project alternatives also include the construction of the LMF in Brisbane. Both the East Brisbane LMF and West Brisbane LMF would involve the discharge of fill into waters of the U.S. Temporary stream diversions would be needed to conduct the work within perennial watercourses. Table 2-12 sets out the potential permanent and temporary impacts of the project alternatives on aquatic resources.



OCTOBER 2019

Figure 2-12 Depiction of Aquatic Resource Study Area Relative to the Assessment of Project Impacts on Aquatic Resources

Alternative A would result in the discharge of fill into 11.8 acres of aquatic resources: 6.1 acres of wetlands and 5.7 acres of nonwetlands (Table 2-12). Most of these impacts would occur in the areas associated with the construction of the LMF. Construction at or near the LMF site would result in the placement of fill (i.e., direct permanent impact) into 2.1 acres of wetlands and 1.6 acres of nonwetlands (Table 2-13). Specifically, construction of the East Brisbane LMF would result in the placement of fill (i.e., direct permanent impact) into approximately 0.4 acre of freshwater emergent wetlands and 0.3 acre of scrub/shrub wetlands north of the existing refinery west of Tunnel Avenue, and approximately 0.8 acre (1,050 linear feet) of Visitacion Creek (constructed watercourse) to build the foundation of the LMF (Table 2-13, Figure 2-13). Track modifications associated with LMF construction would also fill approximately 0.1 acre of Guadalupe Valley Creek (natural watercourse) to accommodate widening of the existing bridge. Additionally, 1.4 acres of saline emergent wetland to the northwest of Brisbane Lagoon could be permanently affected because this area is within the existing Caltrain right-of-way, but it is expected that the majority of this wetland could be avoided during construction. Similarly, 0.3 acre of saline emergent wetland to the southwest of Brisbane Lagoon (not counted in Table 2-13 or illustrated on Figure 2-13) is within the existing Caltrain right-of-way and therefore counted as a permanent impact but it is expected that it could be avoided during construction. Impacts in remaining portions of the project footprint (i.e., north and south of Brisbane) are primarily associated with crossings of constructed watercourses. These areas are included in Table 2-12 because they overlap with the existing Caltrain right-of-way but actual impacts are expected to be minimal to none because no in-water activities are anticipated.

Alternative B would result in the discharge of fill into 16.3 acres of aquatic resources: 11.4 acres of wetlands and 4.9 acres of nonwetlands (Table 2-12). Most of these impacts would occur in the areas associated with the construction of the LMF. Construction at or near the LMF site would result in the placement of fill (i.e., direct permanent impact) into 9.3 acres of wetlands and 1.1 acre of nonwetlands (Table 2-13). Specifically, construction of the West Brisbane LMF would result in the placement of fill into approximately 7.8 acres of freshwater emergent wetlands, 0.1 acre of scrub/shrub wetland, and 0.4 acre of unnamed constructed watercourse between the existing Caltrain corridor and Industrial Way to build the foundation of the West Brisbane LMF (Table 2-13, Figure 2-14). Track modifications associated with LMF construction would also fill approximately 0.2 acre of Guadalupe Valley Creek (natural watercourse) to accommodate a culvert extension under a relocated fire station access road. Additionally, 1.4 acres of saline emergent wetland to the northwest of Brisbane Lagoon could be affected because this area is within the existing Caltrain right-of-way, but it is expected that the majority of this wetland could be avoided during construction. Similarly, 0.3 acre of saline emergent wetland to the southwest of Brisbane Lagoon (not counted in Table 2-13 or illustrated on Figure 2-14) is within the existing Caltrain right-of-way and therefore counted as a permanent impact but it is expected that it could be avoided during construction. Impacts in remaining portions of the project footprint (i.e., north and south of Brisbane) are primarily associated with crossings of constructed watercourses. Again, these areas are included in Table 2-12 because they overlap with the existing Caltrain right-of-way but actual impacts are expected to be minimal to none because no in-water activities are anticipated.

Activities related to project operations would include inspection and maintenance of the Caltrain right-of-way, stations, and the Brisbane LMF. Because these activities would largely be conducted in previously disturbed areas in which any impacts on aquatic resources associated with project construction would have already occurred, inspection and maintenance activities would be unlikely to result in discharges into waters of the U.S.

Alternative A would result in lower overall permanent impacts on aquatic resources (8.8 acres of discharge of fill into waters of the U.S.), relative to Alternative B (15.4 acres of discharge into waters of the U.S.). The difference in aquatic resource impacts between the project alternatives occurs primarily in the San Francisco to South San Francisco Subsection at the location of the Brisbane LMF. As shown in Table 2-13, Alternative B would have greater impacts on aquatic resources because of the extent of freshwater emergent wetland in the West Brisbane LMF project footprint.

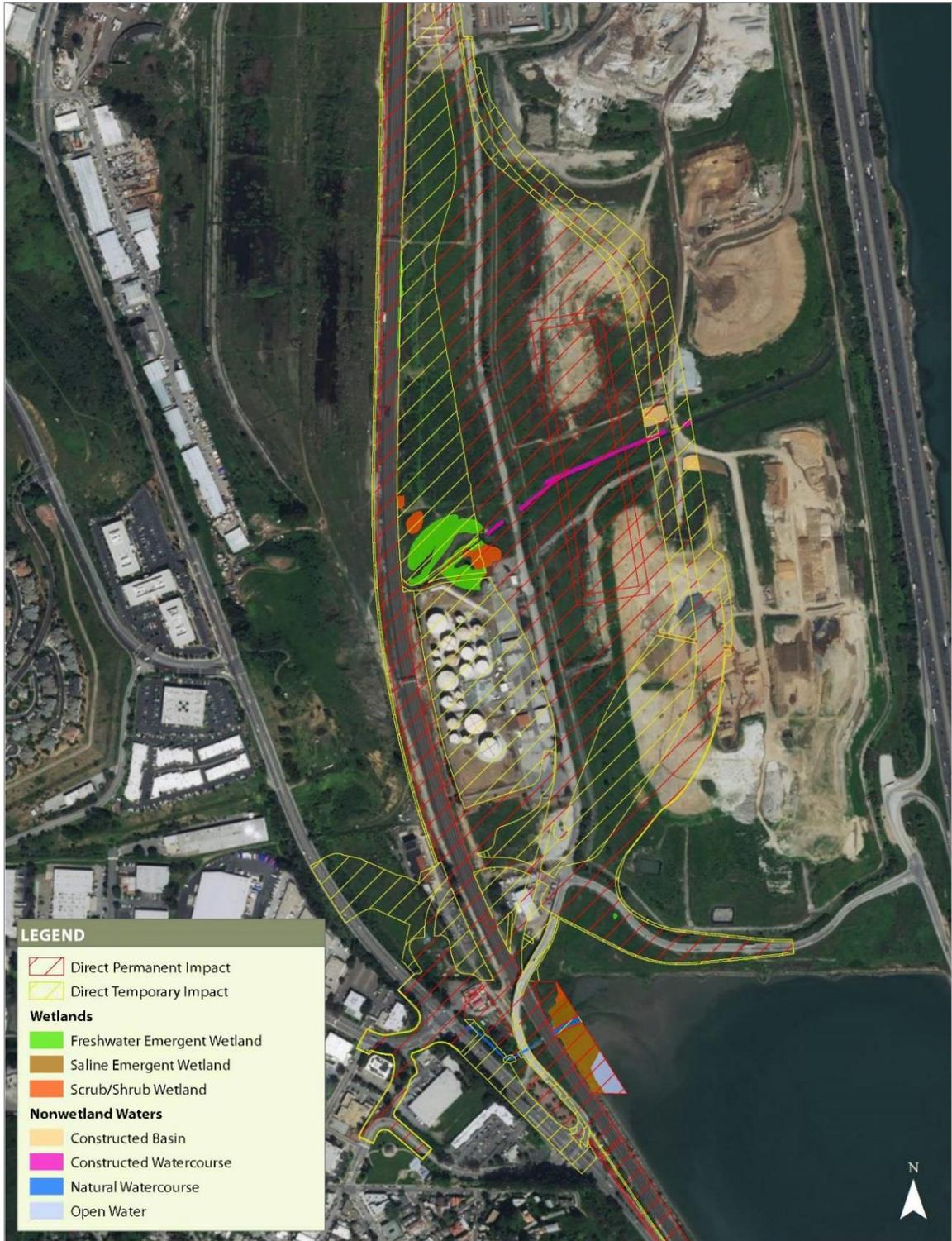
Table 2-12 Direct Permanent and Temporary Impacts¹ on Aquatic Resources by Alternative (acres)

Aquatic Resource	Alternative A			Alternative B		
	Permanent	Temporary	Total	Permanent	Temporary	Total
Wetlands						
Freshwater emergent wetland	1.8	1.9	3.7	9.1	0.4	9.5
Saline emergent wetland	1.7	0.0	1.7	1.7	0.0	1.7
Scrub/shrub wetland	0.3	0.4	0.7	0.1	0.1	0.2
<i>Subtotal Wetlands</i>	3.8	2.3	6.1	10.9	0.5	11.4
Nonwetlands						
Constructed basin	0.2	0.2	0.4	0.0	0.0	0.0
Constructed watercourse	3.9	0.3	4.2	3.5	0.3	3.8
Natural watercourse	0.4	0.2	0.6	0.5	0.1	0.6
Open water	0.5	0.0	0.5	0.5	0.0	0.5
<i>Subtotal Nonwetlands</i>	5.0	0.7	5.7	4.5	0.4	4.9
Total	8.8	3.0	11.8	15.4	0.9	16.3

Table 2-13 Direct Permanent and Temporary Impacts¹ on Aquatic Resources at Brisbane by Alternative (acres)

Aquatic Resource	Alternative A			Alternative B		
	Permanent	Temporary	Total	Permanent	Temporary	Total
Wetlands						
Freshwater emergent wetland	0.4	1.9	2.3	7.8	0.4	8.2
Saline emergent wetland	1.4	0.0	1.4	1.4	0.0	1.4
Scrub/shrub wetland	0.3	0.4	0.7	0.1	0.1	0.2
<i>Subtotal Wetlands</i>	2.1	2.3	4.4	9.3	0.5	9.8
Nonwetlands						
Constructed basin	0.2	0.2	0.4	0.0	0.0	0.0
Constructed watercourse	0.8	0.1	0.9	0.4	0.0	0.4
Natural watercourse	0.1	0.2	0.3	0.2	0.1	0.3
Open water	0.5	0.0	0.5	0.5	0.0	0.5
<i>Subtotal Nonwetlands</i>	1.6	0.5	2.1	1.1	0.1	1.2
Total	3.7	2.8	6.5	10.4	0.6	11.0

¹ Actual impacts would not be known until field verification of these aquatic resources in the project footprint.



MARCH 2020

Figure 2-13 Direct Impacts of Alternative A on Aquatic Resources at Brisbane



Figure 2-14 Direct Impacts of Alternative B on Aquatic Resources at Brisbane

2.6.1.3 *Indirect and Secondary Impacts*

Unlike direct impacts, which involve the discharge of fill material into a wetland or other waters of the U.S., indirect impacts occur later or at a distance from the placement and may include changes or disruptions to hydrology, loss of vegetation, degradation of water quality conditions through erosion, siltation, and runoff into natural and constructed water features downstream of the project footprint. In addition, construction of the project could result in the introduction of nonnative aquatic vegetation. The potential for these indirect impacts to occur would be either avoided or substantially reduced as a result of the measures that would be implemented before and during construction.

In addition, both alternatives would require periodic maintenance within the right-of-way (e.g., removal of vegetation, litter, and debris from culverts, drains, and other structures). These actions may result in indirect impacts on aquatic resources (e.g., changes in turbidity); however, any indirect impacts would occur on a limited basis because measures would be implemented to control erosion and siltation.

2.6.1.4 *Cumulative Impacts*

Past and ongoing development in the Bay Area has resulted in the widespread conversion of undeveloped land to commercial, residential, transportation, and agricultural land uses, which has resulted in large-scale loss and degradation of wetlands. For example, between 1800 and 1998, 79 percent (150,000 acres) of tidal marshes and 42 percent (21,000 acres) of tidal flats in the San Francisco Bay Estuary were lost to diking and filling (California State Coastal Conservancy 2015). Most of the areas between the San Francisco Bay shoreline and surrounding foothills (i.e., the Bay Terraces/Lower Santa Clara Valley ecoregion) were developed for urban and residential uses in the same period. These trends have slowed in the last decade because of extensive wetland restoration around San Francisco Bay (California State Coastal Conservancy 2015) and increased regulatory protection of aquatic resources (i.e., wetlands and nonwetland waters) in a heavily urbanized landscape.

Cumulative impacts on the aquatic ecosystem are those changes that are attributable to the collective effect of a number of individual discharges of dredged or fill material. Although the impact of a particular discharge may constitute a minor change in itself, the cumulative effect of numerous such piecemeal changes can result in a major impairment of the water resources and interfere with the productivity and water quality of existing aquatic ecosystems (40 C.F.R. § 230.11(g)(1)). Impacts could result from the project and other past, present, and reasonably foreseeable projects. Construction of such projects within or near the aquatic RSA would also affect aquatic resources, leading to direct and indirect impacts such as removal of aquatic features, modification of local hydrology, and redirection of flow. The area evaluated for cumulative impacts on aquatic resources (i.e., surface water RSA) consists of two U.S. Geological Survey (USGS) HUC-8 watershed subbasins—San Francisco Bay (HUC 118050003) in the north and Coyote (HUC 18050003) in the south (USEPA 2018). The watershed divide between the San Francisco Bay watershed and the Coyote watershed is in the Palo Alto area, and the surface water RSA encompasses the entirety of the watershed subbasins and therefore the receiving waters for all discharges.

A number of existing or foreseeable transportation projects are expected to result in temporary and permanent impacts on aquatic resources. These projects include roadway widening projects, such as the following: SR 92 between Interstate (I-) 280 and US 101 as well as US 101 between Whipple Avenue and Millbrae in San Mateo County; Woodside Road (SR 84) between El Camino Real and Broadway in Redwood City; and San Tomas Expressway from El Camino Real to Williams Road and SR 237 from Mathilda Avenue to SR 85 in Santa Clara County. Highway projects that modify existing roadway interchanges may also require earthwork and may add new impervious surfaces in the surface water RSA. Such projects would include the following interchanges with US 101: Sierra Point Parkway in San Mateo County, Candlestick in Brisbane, Broadway in Burlingame, Holly Street in San Carlos, Woodside Road in Redwood City, Willow Road in Menlo Park, Trimble Road/De La Cruz Boulevard/Central and Montague Expressway in Santa Clara County, and SR 237/Mathilda in Sunnyvale. Several more interchanges, not

involving US 101, would be rebuilt in the surface water RSA, such as SR 92/EI Camino Real in San Mateo.

Several development projects would also have direct impacts on aquatic resources. These include residential projects, such as development anticipated by the 2018 Brisbane General Plan Amendment at the Brisbane Baylands site¹⁸ and the Inner Harbor Specific Plan in Redwood City. Impacts would occur if activities associated with these projects resulted in the direct discharge or hydrological interruption of these resources within or adjacent to the project footprints.

Implementation of the measures referenced in Section 2.5.1, Project-Level Avoidance and Minimization of Impacts on Aquatic Resources, of this Summary Report would result in the avoidance of or *de minimis* contribution to cumulative impacts on aquatic resources.

2.6.2 Biological Resources

2.6.2.1 Special-Status Plants

Direct Impacts

Both project alternatives would affect habitat for eight special-status plant species, including one federally listed species (California seablite). Construction activities in all subsections would take place in habitat known to support or that could potentially support these species. Such activities would result in the permanent conversion or temporary disturbance of habitat and could result in the removal of special-status plant occurrences, if present in affected habitat.

Table 2-14 shows the potential impacts of the project alternatives on habitat for special-status plant species. The impacts shown in Table 2-14 would be avoided, reduced, or mitigated through the implementation of applicable measures.

Table 2-14 Direct Permanent and Temporary Impacts¹ on Special-Status Plant Habitat by Alternative (acres)

Impacts	Alternative A	Alternative B
Permanent Conversion or Temporary Disturbance of Habitat for Special-Status Plant Species	Construction activities would remove or disturb habitat for eight special-status plant species, one of which is listed under FESA (California seablite).	
Habitat for bent-flowered fiddleneck	94.1	43.8
Habitat for bristly sedge	3.7	9.5
Habitat for California seablite	1.7	1.7
Habitat for coastal marsh milkvetch	1.7	1.7
Habitat for Congdon's tarplant	81.7	35.7
Habitat for pappose tarplant	1.7	1.7
Habitat for saline clover	1.7	1.7
Habitat for Point Reyes salty bird's-beak	1.7	1.7

FESA = federal Endangered Species Act

¹ Includes permanent and temporary impacts during construction because temporarily impacted areas may still contain special-status plant occurrences.

¹⁸ At the November 2018 general election the City of Brisbane approved a General Plan Amendment for the Baylands area that designated locations and densities for residential, commercial and hotel development. A revised Specific Plan is under preparation to reflect the approved General Plan Amendment. This cumulative impacts analysis considers the proposed changes to zoning and land use designations, consistent with the 2018 Brisbane General Plan Amendment when assessing the potential contribution of the project to cumulative impacts.

Indirect Impacts

Ground disturbance associated with project construction could indirectly affect special-status plant habitat by creating new areas of bare soil that are easily colonized by nonnative invasive plants. Such plants could spread into adjacent natural areas and outcompete native plants, including special-status plants.

Implementation of the measures listed in Section 2.5.2.1, Special-Status Plant Species, of this Summary Report would result in the avoidance or reduction of indirect impacts on special-status plant habitat because measures would involve:

- Cleaning of construction equipment before entering work areas to minimize opportunities for weeds and invasive species to enter the project footprint
- Preparing and implementing a weed control plan that would establish procedures for preventing the spread of invasive weeds into special-status species habitat

2.6.2.2 Special-Status Fish and Wildlife

Direct Impacts

Construction activities of both project alternatives across all subsections would take place in habitat known to support or that could potentially support special-status fish and wildlife species. Such activities would result in the permanent conversion or temporary disturbance of habitat and could result in the injury or mortality of special-status fish and wildlife individuals, if present in affected habitat. Both project alternatives would affect habitat for 12 special-status fish and wildlife species, including 4 federally listed species (i.e., central California coast steelhead, green sturgeon, California red-legged frog, and San Francisco garter snake); In addition, Alternative B would affect habitat for the federally endangered callippe silverspot butterfly and Mission blue butterfly, and federally threatened Bay checkerspot butterfly.

Table 2-15 shows the potential impacts of the project alternatives on habitat for special-status fish and wildlife species. The impacts shown in Table 2-15 would be avoided, reduced, or mitigated through implementation of applicable measures. Avoidance of impacts on listed butterfly species habitat under Alternative B would not be feasible because all 8.0 acres of existing habitat on top of Icehouse Hill in Brisbane would be removed to build the West Brisbane LMF. Implementation of BIO-MM#11 would offset permanent habitat loss for listed butterfly species.

Table 2-15 Direct Permanent and Temporary Impacts¹ on Special-Status Fish and Wildlife Habitat by Alternative (acres)

Impacts	Alternative A	Alternative B
Permanent Conversion of Habitat for and Direct Mortality of Listed Butterfly Species	Construction activities would not remove habitat for listed butterfly species at Icehouse Hill in Brisbane because the LMF would be constructed east of the existing Caltrain tracks and would not require grading of Icehouse Hill.	Construction activities would remove habitat for listed butterfly species at Icehouse Hill in Brisbane, and could result in direct mortality of individuals, if present in affected habitat.
Habitat for Bay checkerspot butterfly, callippe silverspot butterfly, and Mission blue butterfly	0.0	8.0

Impacts	Alternative A	Alternative B
Permanent Conversion or Degradation of Habitat for Central California Coast Steelhead, Pacific Lamprey, and Green Sturgeon, and Permanent Conversion or Degradation of Essential Fish Habitat	Construction activities would remove potential habitat for central California coast steelhead and green sturgeon and designated EFH for Pacific Coast salmon. Modification of the existing bridge over Guadalupe Valley Creek under both alternatives would affect a small amount of habitat for these same species. Trimming or removal of riparian vegetation could temporarily degrade freshwater migration habitat for central California coast steelhead and Pacific lamprey. In-water activities at Sanchez Creek would impact designated EFH for Pacific Coast salmon and Pacific Coast groundfish. In-water activities at Guadalupe Valley Creek could generate underwater sound levels that result in injury or mortality of individual fish.	
Habitat for central California coast steelhead	2.1	1.2
Habitat for green sturgeon	1.9	1.2
Habitat for Pacific lamprey	0.2	0.3
Essential fish habitat for Pacific Coast salmon	3.4	2.7
Essential fish habitat for Pacific Coast groundfish	0.2	0.2
Permanent Conversion or Temporary Disturbance of Habitat for and Direct Mortality of California Red-Legged Frog and Western Pond Turtle	Construction activities would remove or disturb habitat for California red-legged frog and western pond turtle. Activities could also result in mortality of individuals, if present in affected habitat.	
Habitat for California red-legged frog and western pond turtle	8.3	8.3
Permanent Conversion or Temporary Disturbance of Habitat for and Direct Mortality of San Francisco Garter Snake	Construction activities would remove or disturb habitat for San Francisco garter snake. Activities could also result in mortality of individuals, if present in affected habitat.	
Habitat for San Francisco garter snake	6.5	6.5
Permanent Conversion or Temporary Disturbance of Habitat for and Direct Mortality or Disturbance of Burrowing Owl	Construction activities in Brisbane (i.e., construction of LMF and associated track modifications) would remove or disturb migratory and wintering habitat and could result in injury and mortality of individual owls, if present in affected habitat.	
Habitat for burrowing owl	117.1	93.3
Removal or Disturbance of Active Alameda Song Sparrow and Saltmarsh Common Yellowthroat Nests	Construction activities would remove or disturb nesting habitat for Alameda song sparrow and saltmarsh common yellowthroat. Activities during the breeding season (February 1 to August 31) could result in injury and mortality of individual birds and eggs, as well as nest abandonment, if present in affected habitat.	
Nesting habitat for Alameda song sparrow	1.7	1.7
Nesting habitat for saltmarsh common yellowthroat	4.7	10.0

Impacts	Alternative A	Alternative B
Removal or Disturbance of Active White-Tailed Kite Nests	Construction activities would remove or disturb nesting habitat for white-tailed kite. Activities during the breeding season (February 1 to August 31) could result in injury and mortality of individual birds and eggs, as well as nest abandonment, if present in affected habitat.	
Nesting habitat for white-tailed kite	22.5	18.5
Removal of Roost Sites for and Direct Mortality or Disturbance of Special-Status Bats	Construction activities would remove or disturb roosting habitat for special-status bats. Modification of bridges and culverts and tree removals could destroy or cause abandonment of active roost sites, if present in affected habitat.	
Roosting habitat for pallid bat	1.0	1.1
Roosting habitat for Townsend's big-eared bat	1.0	1.1
Roosting habitat for western red bat	10.0	11.1
Intermittent Disturbance of Habitat for and Direct Mortality of Special-Status Wildlife during Operations	Operations activities would be a continuation of existing inspection and maintenance activities by Caltrain and are not expected to cause any new impacts on habitat for special-status wildlife. Special-status amphibians, reptiles, and mammals with small body sizes may still be able to access and occasionally move through or along the right-of-way. Any special-status species that do use the right-of-way after construction would be subjected to increased mortality risk from the operation of HSR trains.	

EFH = essential fish habitat
 FESA = federal Endangered Species Act
 LMF = light maintenance facility

¹ Acreages includes permanent and temporary impacts during construction because temporarily impacted areas may still support individual animals that could be harmed.

Pre-construction and construction avoidance and minimization measures to protect special-status fish and wildlife species would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint, nor would they necessarily eliminate the risk of disturbance, injury, or mortality of individual animals. Construction-related ground disturbance (e.g., grading, excavation) and vehicle traffic may injure or kill special-status wildlife individuals through vehicle strike or by crushing animals in subterranean burrows. Animals may become entrapped in excavated areas, pipes, or other equipment used for construction. Vegetation removal and structure modification or demolition activities could cause mortality of special-status birds and bats. Noise and vibration generated by construction activities may impair breeding, feeding, and sheltering behaviors of special-status fish and wildlife individuals in affected habitat. The use of chemicals and hazardous substances during construction (e.g., oils, gasoline) may cause mortality if individuals enter aquatic habitat that has been contaminated by spills or other vehicle and equipment leaks.

Project operations would include train operation and inspection and maintenance activities along the Caltrain right-of-way, at stations, and at the Brisbane LMF. Because inspection and maintenance activities at the site of the stations and Brisbane LMF would be conducted in areas that had already been cleared of vegetation and subjected to extensive ground disturbance to construct the facilities, it is highly unlikely that any special-status species habitat would remain within the right-of-way. Inspection and maintenance activities along the Caltrain right-of-way would be a continuation of existing inspection and maintenance activities for Caltrain, and therefore would not cause any new direct impacts on existing special-status fish and wildlife habitat.

Special-status amphibians, reptiles, and mammals with small body sizes may still be able to access and occasionally move through or along the project footprint, but any features that once supported breeding (e.g., aquatic features) would either be removed or degraded during construction. Any

special-status wildlife species that use the project footprint after construction would be subjected to increased mortality risk from the operation of HSR trains.

Indirect Impacts

Ground disturbance associated with project construction could indirectly affect special-status fish and wildlife habitat by creating new areas of bare soil that are easily colonized by nonnative invasive plants. Such plants could spread into adjacent natural areas and outcompete native plants that provide habitat for special-status fish and wildlife. Increased cover of nonnative invasive plants with thick stems and dense growth (e.g., thistles, mustard, perennial pepperweed) in grassland or marsh would reduce the herbaceous ground cover preferred for nesting by Alameda song sparrow and saltmarsh common yellowthroat.

Implementation of the measures listed in Section 2.5.2.2, Special-Status Fish and Wildlife, of this Summary Report would result in the avoidance or reduction of indirect impacts on special-status fish and wildlife habitat where practicable because measures would involve:

- Cleaning of construction equipment before entering work areas to minimize opportunities for weeds and invasive species to enter the project footprint
- Preparing and implementing a weed control plan that would establish procedures for preventing the spread of invasive weeds into special-status species habitat

2.6.2.3 Special-Status Plant Communities

Direct Impacts

Special-status plant communities are plant communities that are of limited distribution statewide or within a county or region, and that are often vulnerable to the environmental impacts of projects. Both project alternatives would affect land cover types potentially supporting two special-status plant communities: mixed riparian and scrub-shrub wetland could support arroyo willow thickets and saline emergent wetlands could support pickleweed mats. Alternative A would have slightly greater permanent impacts on special-status plant communities than Alternative B: Alternative A would permanently affect 4.2 acres of land cover types potentially supporting special-status plant communities (i.e., 2.5 acres of arroyo willow thickets and 1.7 acres of pickleweed mats) and Alternative B would permanently affect 3.8 acres (i.e., 2.1 acres of arroyo willow thickets and 1.7 acres of pickleweed mats). Table 2-16 shows the potential impacts of the project alternatives on special-status plant communities.

Table 2-16 Direct Permanent and Temporary Impacts¹ on Special-Status Plant Communities by Alternative (acres)

Impacts	Alternative A	Alternative B
Permanent Conversion or Degradation of Special-Status Plant Communities	Construction activities would remove or disturb land cover types potentially supporting special-status plant communities.	
Permanent conversion or degradation of riparian and scrub/shrub wetland potentially supporting arroyo willow thickets	2.5	2.1
Permanent conversion or degradation of saline emergent wetland potentially supporting pickleweed mats	1.7	1.7

Impacts	Alternative A	Alternative B
Intermittent Disturbance of Special-Status Plant Communities	Operations activities would be a continuation of existing inspection and maintenance activities by Caltrain or conducted in areas that had already been subject to construction impacts and are expected to cause minor impacts on special-status plant communities in the project footprint (e.g., trimming of arroyo willow thickets). Annual environmental awareness training for maintenance personnel would further reduce the likelihood of intermittent direct impacts on special-status plant communities.	

¹ Acreages represent direct permanent and temporary impacts during construction.

While certain pre-construction and construction actions to protect special-status plant communities have been incorporated into the project, permanent conversion or temporary disturbance of special-status plant communities within the project footprint may nonetheless still occur. Replacement of the Tunnel Avenue overpass near Brisbane Lagoon in the San Francisco to South San Francisco Subsection may temporarily disturb small areas of pickleweed mats in the lagoon. Track and associated structure modifications near mixed riparian land cover at stream crossings in all subsections may require trimming or removal of arroyo willow thickets. Construction of the LMF in Brisbane under both project alternatives would remove scrub/shrub wetlands known to contain arroyo willow thickets.

Project operations would include inspection and maintenance activities along the Caltrain right-of-way, at stations, and at the Brisbane LMF. Such activities would include vegetation management, including potential trimming of arroyo willow thickets growing within or adjacent to the project footprint. Such direct impacts would be short in duration and sporadic and would not remove existing stands of arroyo willow thickets.

Indirect Impacts

Ground disturbance associated with project construction could indirectly affect special-status plant communities by creating new areas of bare soil that are easily colonized by nonnative invasive plants. Such plants could spread into and degrade adjacent special-status plant communities. There would be no indirect impacts during operations.

Implementation of the measures listed in Section 2.5.2.3, Special-Status Plant Communities, of this Summary Report would result in the avoidance or reduction of indirect impacts on special-status plant communities during construction where practicable because measures would involve:

- Cleaning of construction equipment before entering work areas to minimize opportunities for weeds and invasive species to enter the project footprint
- Preparing and implementing a weed control plan that would establish procedures for preventing the spread of invasive weeds into special-status plant communities

2.6.2.4 Wildlife Corridors

Direct Impacts

Neither project alternative would affect wildlife corridors that have been identified in statewide or regional reports (Penrod et al. 2013) or by the wildlife agencies (i.e., U.S. Fish and Wildlife Service [USFWS] or CDFW) as important for the preservation of connectivity for federally or state-listed species. Construction activities at 6 of the 16 watercourses that currently facilitate wildlife movement under the existing Caltrain tracks (i.e., Guadalupe Valley Creek, Borel Creek, Belmont Creek, Cordilleras Creek, San Francisquito Creek, and Stevens Creek) would temporarily disrupt local wildlife movement but would not create any new permanent movement barriers to wildlife. HSR operations would not affect existing wildlife movement through the 16 corridors because any local wildlife that use them would have habituated to existing Caltrain operations and maintenance (O&M). Table 2-17 shows the potential impacts of the project alternatives on wildlife corridors.

Table 2-17 Impacts on Wildlife Corridors by Alternative

Impacts	Alternative A	Alternative B
Temporary Disruption of Wildlife Movement	Construction activities in or near 6 of the 16 watercourses that facilitate local wildlife movement under the Caltrain right-of-way may temporarily disrupt such movement by creating temporary barriers and disturbance that cause animals to delay or alter movements.	Same as Alternative A except for slightly higher potential for impacts at Borel, Belmont, and Cordilleras Creeks because of culvert modification activities associated with construction of the passing track.
Permanent Disruption of Wildlife Movement	Operations activities would have minimal impacts on wildlife corridors because any wildlife that use these corridors are expected to habituate to the regular occurrence of HSR train traffic and operations and maintenance activities or time their movement outside peak activity periods as they have for existing Caltrain operations.	

HSR = high-speed rail

Construction activities in or near the 6 of the 16 watercourses that facilitate local wildlife movement under the Caltrain right-of-way (Guadalupe Valley Creek, Borel Creek, Belmont Creek, Cordilleras Creek, San Francisquito Creek, and Stevens Creek) would potentially affect wildlife movement on a temporary basis through several mechanisms. Construction fencing and dewatering could create temporary barriers to movement, precluding the normal movement of animals. Noise and vibration from construction vehicles and pile driving may alter or delay movement of individuals as they attempt to avoid the construction area. Nighttime construction or security lighting could cause animals to delay or alter movement patterns because they may avoid lighted areas. These impacts would be similar under both project alternatives, with slightly higher potential for impacts at Borel, Belmont, and Cordilleras Creeks under Alternative B because of culvert modification activities at these locations as part of the passing track.

Project operations would have minimal impacts on wildlife corridors under both project alternatives. All 16 watercourses that facilitate local wildlife movement under the existing Caltrain tracks are already subject to daily train traffic and regular O&M activities along the tracks. Any wildlife that use these corridors have adapted to these activities by becoming habituated to their regular occurrence or by timing their movement outside peak activity periods (e.g., at night). The addition of HSR trains operating at speeds up to 110 mph would increase the frequency of noise from train traffic to which wildlife would be exposed but is not expected to prevent continued wildlife use of the corridors over time. Species that use these corridors are primarily generalists with life history traits enabling survival and reproduction in dense urban environments, and they are expected to habituate to HSR operations as they have to Caltrain operations.

Indirect Impacts

No indirect impacts on wildlife corridors are anticipated. The project alternatives would not cause any spatial or temporal changes in habitat connectivity across the project footprint in the foreseeable future.

2.6.3 Cultural Resources

This section describes cultural resource impacts associated with Alternative A and Alternative B.

2.6.3.1 Archaeological Resources

Construction of the project may result in permanent disturbance of known archaeological resources. Twenty-one archaeological resources are known to exist in the archaeological RSA. Alternatives A and B would affect the same number of resources, a total of 20 archaeological resources. Both alternatives would not allow public access within the project footprint, diminishing the potential for disturbance from temporary public access. However, grading or excavation for construction could damage or destroy these archaeological resources, eliminating the resources' ability to provide important scientific information, which would diminish the resources' integrity.

2.6.3.2 Historic Built Resources

Construction of the project would not result in the permanent demolition, destruction, relocation, or alteration of any built resources, the setting of the resources, or both. Surveys identified 21 historic built National Register of Historic Places (NRHP)-listed and eligible-for-listing properties within the RSA. Of these 21 built historic properties, none would be affected by Alternative A or Alternative B. However, it is possible that additional properties surveyed and evaluated as NRHP-eligible during phased identification may experience demolition, destruction, relocation, or alteration to the property or its setting due to construction of the project. Impacts could include crossing a historic property and demolishing it or altering the setting in a way that impairs the resource's integrity or setting. Both Alternatives A and B would relocate the historic Southern Pacific Railroad Depot/Millbrae Station (previously relocated to accommodate past station improvements) approximately 100 feet north and 40 feet west to accommodate track modifications. Although the historic station building would be relocated, neither alternative would materially impair characteristics that qualify the historic Millbrae Station for listing in the NRHP. Neither project alternative would result in construction- or operations-related noise and vibration impacts on historic built resources.

2.6.4 Practicability Analysis

Pursuant to the Section 404(b)(1) Guidelines, an alternative is practicable if it is "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purposes" (40 C.F.R. § 230.10(a)(2)). This section analyzes the consistency of Alternative A, Alternative B, and the No-Fill Alternative with the overall project purpose, as well as the practicability of each alternative pursuant to other considerations.

In summary, the practicability analysis concludes both project alternatives are consistent with the overall project purpose. Both project alternatives are also available and capable of being implemented in light of cost, existing technology, and logistical considerations. The No-Fill Alternative is not practicable from a logistical standpoint.

2.6.4.1 Consistency with Overall Project Purpose

The following discussion summarizes the consistency of the project alternatives and the No-Fill Alternative with the overall project purpose. The Authority has determined both project alternatives and the No-Fill Alternative are consistent with the overall project purpose, as described in Section 2.2.2, Purpose and Need and Overall Project Purpose.

Project Alternatives

Both project alternatives are consistent with the overall project purpose.

No-Fill Alternative

The No-Fill Alternative is consistent with the overall project purpose.

2.6.4.2 Other Practicability Factors

The discussion in this section summarizes whether the project alternatives and the No-Fill Alternative are available and capable of being done in light of cost, logistics, and existing technology. The Authority has determined that both project alternatives are practicable from an availability, cost, logistics, and existing technology standpoint. The No-Fill Alternative, however, is not practicable on the basis of logistical considerations.

2.6.4.3 Availability

Under the 404(b)(1) guidelines, an area not "presently" owned by an applicant may be considered as an alternative discharge location if it could be reasonably "obtained, utilized, expanded or managed to fulfill the basic purpose of the proposed action" (40 C.F.R. § 230.10(a)(2)). Although both project alternatives would use existing rail alignments in an established transportation corridor, both full and partial parcel acquisitions would be required. Land acquisitions would result from the need for the placement of track, station modifications, the Brisbane LMF, road

realignments, communication facilities and other associated structures. As a state agency, the Authority may select and acquire land needed for construction of the HSR system; therefore, all project alternatives are considered available for the purposes of the 404(b)(1) guidelines.

2.6.4.4 Cost

The Authority developed the conceptual level cost estimates for both of the project alternatives by using recent bid data from large transportation projects in the western United States and by developing specific, bottom-up unit pricing to reflect common HSR elements and construction methods with an adjustment for labor and material costs in the Project Section. HSR elements in the Project Section include stations and the LMF sites in Brisbane. These cost estimates also include land acquisition costs for right-of-way, which are estimated in broad categories (i.e., urban, suburban, and rural and by land use density level), based on local land values rather than relying on a parcel-by-parcel assessment at this phase of project development. Right-of-way costs include the estimated cost to acquire properties needed for the future right-of-way and costs associated with temporary easements for construction that are assumed to be part of the construction contractor's responsibility to negotiate for use. Land acquisition costs consume a disproportionate share of the total capital costs associated with construction of the Project Section.

In addition to the HSR elements in the Project Section, the No-Fill Alternative would require: elevating the East Brisbane LMF to clear-span Visitacion Creek; adjustments to the Lagoon Road alignment and embankment to avoid fill in a wetland; replacement of an existing bridge at Tunnel Avenue to clear-span Guadalupe Valley Creek; and replacement of an existing bridge at Sanchez Avenue to clear-span Sanchez Creek. The elevated structures and bridge replacements required for the No-Fill Alternative would be moderately more expensive than the features proposed under both project alternatives. The engineers estimated all material quantities for the project based on a preliminary level of design. The Authority generally defines this level of design as encompassing at-grade, below-grade, or elevated profiles; structure types; placement of retaining walls; and amounts of earth fill. Stations are still conceptual, but roadway and utility relocations have been identified. The capital cost estimates include the total labor effort and materials to build the Project Section, necessary roadway modifications, land acquisition, contingency, and finance charges. Based on that analysis, all project alternatives are practicable from a cost standpoint.

2.6.4.5 Logistics

Logistics may affect the practicability of an alternative in light of the project's overall purpose. Both project alternatives have been evaluated and determined to be feasible to construct and operate. The logistical requirements for each of the project alternatives would be generally the same and, therefore, both project alternatives would be practicable from a logistics perspective.

The No-Fill Alternative would pose logistical challenges associated with the need to minimize disruptions to Caltrain service and maintain roadway connectivity to the Brisbane Baylands area. The No-Fill Alternative would require the construction of two new bridges spanning over Guadalupe Valley Creek and Sanchez Creek to avoid fill associated with culvert extension into jurisdictional waters. Construction of each of these bridges to avoid a limited amount of fill would require either single-tracking of train operations or additional temporary construction easements and right-of-way demolition to maintain two-track operations. This would result in extensive disruption to Caltrain operations during an approximately 9-month construction period, severely affecting the tens of thousands of daily riders who depend upon Caltrain for transportation throughout the region and therefore rendering these design refinements not practicable. At the Guadalupe Valley Creek location, four-track (passing track) operations would need to be restricted to two-track (one track in each direction) where trains could not pass each other, thus affecting the Bayshore Caltrain Station. At the Sanchez Creek location, the Broadway Caltrain Station would also be affected by single-track operations (requiring similar operations as used for a hold-out rule station). The single-track operations would require Caltrain to reschedule its trains for these areas as northbound and southbound trains would need to use the same track. The specific amount of reduction or adjustment in operations would be determined by Caltrain.



Figure 2-14 Direct Impacts of Alternative B on Aquatic Resources at Brisbane



Source: Authority 2019b

MARCH 2020

Figure 2-15 Alternative A

2.7.2 Basis for the Selection of the Preliminary Least Environmentally Damaging Practicable Alternative

Based on the foregoing analysis, the Preliminary LEDPA under Section 404(b)(1) of the CWA has been identified as Alternative A. This section provides a summary of the analysis, including the following:

- Impacts on aquatic resources
- Impacts on other environmental resources: biological resources and cultural resources
- Practicability, including consistency with the overall project purpose

Table 2-18 summarizes the analysis of Alternatives A and B relative to these considerations.

Table 2-18 Factors in the Preliminary Least Environmentally Damaging Practicable Alternative Analysis

Factor	Alternative A	Alternative B
Least aquatic resource impacts	X	
Least biological resource impacts	X	
Practicability	X	X

2.7.2.1 Aquatic Resource Impacts

Alternative A would result in fewer overall permanent impacts on aquatic resources (8.8 acres of wetlands and nonwetland waters of the U.S) than Alternative B (15.4 acres of wetlands and nonwetland waters of the U.S.). Table 2-19 shows a summary of all permanent direct impacts on aquatic resources. The acreages presented in the table reflect the impacts that are reported in tables in Section 2.6.1, Aquatic Resources. Actual impacts on aquatic resources may be substantially less than these acreages because of opportunities for avoidance provided by design refinements and construction planning.

Table 2-19 Direct Permanent Impacts on Aquatic Resources by Project Alternative (acres)

Aquatic Resource	Alternative A	Alternative B
Wetlands		
Freshwater emergent wetland	1.8	9.1
Saline emergent wetland	1.7	1.7
Scrub/shrub wetland	0.3	0.1
<i>Subtotal Wetlands</i>	3.8	10.9
Nonwetlands		
Constructed basin	0.2	0.0
Constructed watercourse	3.9	3.5
Natural watercourse	0.4	0.5
Open water	0.5	0.5
<i>Subtotal Nonwetlands</i>	5.0	4.5
Total	8.8	15.4

2.7.2.2 Biological Resource Impacts

Alternative A would generally result in a slightly lower potential for impacts on wildlife corridors than Alternative B. Conversely, Alternative A would generally result in a higher acreage of *total* direct permanent impacts on special-status plant habitat, but only because of the higher amount (approximately 50 acres) of bent-flowered fiddleneck and Congdon's tarplant habitat affected by the East Brisbane LMF; neither of these species are listed under the FESA or CESA (they are both California Rare Plant Rank 1B species). Alternative A would have a lower impact on freshwater emergent wetland habitat for bristly sedge and identical impact on saline emergent wetland habitat for the remaining species (including California seablite, which is federally endangered under FESA) than Alternative B. Alternative A would also result in a higher acreage of total direct permanent impacts on special-status plant communities than Alternative B, but only because of a slightly higher (0.4 acre) impact on arroyo willow thickets in the East Brisbane LMF footprint. Both project alternatives would affect habitat for 12 special-status fish and wildlife species, including 4 federally listed species (i.e., central California coast steelhead, green sturgeon, California red-legged frog, and San Francisco garter snake). In addition, Alternative B would result in the permanent loss of 8 acres of grassland habitat for the federally endangered callippe silverspot butterfly and Mission blue butterfly, and federally threatened Bay checkerspot butterfly. Because it would result in fewer overall permanent impacts on special-status fish and wildlife species habitat and would not affect any listed butterfly habitat, Alternative A would have the least impact on biological resources.

Actual impacts on biological resources may be substantially less than the impacts described in the report. Because the presence or absence of special-status species in the project footprint would not be verified until the completion of pre-construction surveys, actual impacts on these resources can only be roughly approximated using a conservative methodology. A complete comparison of impacts for each subtopic is discussed in Section 2.6.2, Biological Resources.

2.7.2.3 Cultural Resources Impacts

Alternatives A and B would generally affect cultural resources at the same level. Both Alternatives A and B would permanently disturb 20 archaeological resources, and Alternatives A and B would result in no adverse effects on any built historic resources from permanent demolition, destruction, relocation, or alteration. In addition, Alternatives A and B would not result in any impacts on built historic resources related to temporary and intermittent noise and vibration impacts. The Authority would also implement CUL-MM#1, CUL-MM#2, and CUL-MM#3 as described in Section 2.5.3, Project-Level Avoidance, Minimization, and Mitigation of Impacts on Cultural Resources, to avoid and minimize impacts on archaeological resources. Neither project alternative would cause significant adverse environmental consequences on cultural resources.

3 COMMUNITY CONSIDERATIONS AND PUBLIC INVOLVEMENT

3.1 Impacts on Communities

3.1.1 Residential, Business, and Community and Public Facility Displacements

Alternative A would result in fewer residential, business, and community and public facility displacements overall. The project alternatives would result in the same number of displacements in the San Francisco to South San Francisco, San Bruno to San Mateo, and Mountain View to Santa Clara Subsections. Displacements would differ in the northern portion of the San Mateo to Palo Alto Subsection, and these differences are described by community as follows:

- **San Mateo**—Alternative A would result in the displacement of one business but would not require displacement of any residences or community and public facilities in San Mateo because permanent right-of-way acquisition is required only for construction of communication radio towers. Alternative B would result in the displacement of 2 residences, 23 businesses, and 1 preschool in San Mateo because it would require additional right-of-way acquisition for expansion of the existing railway corridor from two to four tracks to accommodate the passing tracks.
- **Belmont**—Alternative A would result in the displacement of 1 residence and 10 businesses but would not require displacement of any community and public facilities in Belmont because permanent right-of-way acquisition is required only for construction of communication radio towers. Alternative B would result in the displacement of 8 residences, 65 businesses, and 1 animal shelter in Belmont because it would require additional right-of-way acquisition for expansion of the existing railway corridor from two to four tracks to accommodate the passing tracks.
- **San Carlos**—Alternative A would not require displacement of any residences, businesses, or community and public facilities in San Carlos because permanent right-of-way acquisition is required only for construction of communication radio towers. Alternative B would result in the displacement of two businesses because it would require additional right-of-way acquisition for expansion of the existing railway corridor from two to four tracks to accommodate the passing tracks; it would not require displacement of any residences or community and public facilities in San Carlos.

A summary of overall residential displacements follows in Section 3.1.1.1, Residential Displacements, and a summary of commercial and industrial displacements follows in Section 3.1.1.2, Commercial and Industrial Displacements. A summary of displacement and other impacts on community facilities follows in Section 3.1.1.3, Other Impacts.

3.1.1.1 Residential Displacements

In total, the acquisition of land for construction of the project could result in the displacement of 10 residential units under Alternative A and 19 residential units under Alternative B. An analysis of currently available residential properties for sale or rent supports that there would likely be sufficient housing available for residents to relocate within their current city, although long-term affordability of rental residential properties may be problematic for lower- or middle-income residents. The Authority would provide displaced persons or owners of acquired property relocation assistance and counseling, thereby minimizing direct impacts as a result of residential displacements. The final acquisition determinations would be made on a case-by-case basis during the land acquisition and real estate appraisal phase for the project. This would occur after the project engineering and design process is finalized and before a construction contract for any alternative is awarded by the Authority Board of Directors.

3.1.1.2 Commercial and Industrial Displacements

In total, the acquisition of land for construction of the project alternatives would result in the displacement of 29 commercial and industrial businesses under Alternative A and 108

displacements under Alternative B. A wide variety of types of businesses would be affected, including retail stores, restaurants, automotive sales and repair, healthcare, offices, studios, storage facilities and warehouses, and interior design and decorating businesses. An analysis of currently available commercial and industrial properties for sale or rent supports that there would likely be sufficient numbers and types of available businesses or vacant properties with land zoned for commercial or industrial uses to accommodate displaced businesses. However, some displaced businesses may be unable to relocate within the same city or community. Additionally, the Authority would provide relocation assistance and counseling to minimize impacts resulting from the displacement of commercial and industrial businesses. The final acquisition determinations would be made on a case-by-case basis during the land acquisition and real estate appraisal phase for the project.

3.1.1.3 Other Impacts

Construction of the project would affect two community facilities under Alternative A and four community facilities under Alternative B. Affected facilities include a fire station in Brisbane, the Millbrae Station Historic Depot, a preschool in San Mateo, and an animal shelter in Belmont. While some of these affected facilities would be fully displaced and require relocation, other properties may be reconfigured with the same facilities and amenities. The final acquisition determinations would be made on a case-by-case basis during the land acquisition and real estate appraisal phase for the project.

3.1.2 Land Use Impacts

Both project alternatives would construct an LMF in Brisbane on lands that are currently, primarily vacant. Alternative A would not permanently alter existing land use patterns; however, some of the vacant lands in the study area for Alternative B include Icehouse Hill, which is a prominent habitat area for a federally listed species and which the General Plan Amendment designates for preservation. Alternative B would require the grading of this hill and would result in the permanent alteration of this existing land use, which is also designated for preservation in the General Plan. Alternative A would not affect Icehouse Hill.

Furthermore, although the lands in Brisbane are currently, primarily vacant, these lands have been designated for planned development per the City of Brisbane's recent general plan amendment (City of Brisbane 2018). The approved general plan amendment identifies the Baylands area as "a transit-oriented variety of residential, employment- and revenue-generating uses; natural resource management; and public and semi-public facilities" (City of Brisbane 2018). The approved general plan amendment identifies the planned development of 1,800–2,200 dwelling units, up to 6.5 million square feet of commercial development, and 500,000 square feet for hotel development. The General Plan amendment identifies two planned development designations. One designation prohibits residential development [planned development (residential prohibited)], which is anticipated to be characteristic of commercial land uses. The other designation permits residential development [planned development (residential permitted)], which is anticipated to be characteristic of mixed-use land uses because both residential and commercial uses can be developed in this area. The planned development (residential prohibited) land use designation is located on both sides (east and west) of the Caltrain right-of-way; however, the planned development (residential permitted) land use designation is only located on the northwest quadrant of the site.

Under Alternative A, the East Brisbane LMF would be located primarily in an area designated for planned development (residential prohibited). Construction of the East Brisbane LMF would require the permanent conversion of 93.3 acres of lands designated as planned development (residential prohibited) and 2.0 acres of lands designated as planned development (residential permitted). Construction of the East Brisbane LMF would permanently alter planned land use patterns by reducing the area of planned commercial land uses [i.e., lands designated as planned development (residential prohibited)] by approximately 19.2 percent and the area planned for a mix of commercial and residential land uses [i.e., lands designated as planned development (residential permitted)] by approximately 2.0 percent.

In comparison, construction of the West Brisbane LMF under Alternative B would require the permanent conversion of approximately 90.1 acres of lands designated as planned development (residential prohibited) and 20.7 acres of lands designated as planned development (residential permitted). The West Brisbane LMF would reduce the area of planned commercial land uses [i.e., lands designated as planned development (residential prohibited)] by approximately 18.6 percent and the area planned for a mix of commercial and residential land uses [i.e., lands designated as planned development (residential permitted)] by approximately 20.3 percent. The reduction in available land where residential development is permitted under the West Brisbane LMF could affect the development of residential units on the site.

3.2 Summary of Public Comments Received During Scoping

The scoping meetings and comments received on the Notice of Intent and Notice of Preparation helped the lead agencies identify general environmental issues to be addressed in the Draft EIR/EIS. The scoping process identified issues with the proposed alignments and stations, suggestions for new or modified alignments and stations, and issues of potential concern related to the project. The scoping period extended from January 8, 2009 to April 6, 2009. During that period, the Authority received 955 comment submissions. The scoping comments received from the public, agencies, and organizations are available in appendices to the *Draft Scoping Report for the San Francisco to San Jose High-Speed Train Project-Level EIR/EIS* (Authority and FRA 2009). The Authority reinitiated public scoping outreach activities for the two-track blended system in April 2016, including pre-scoping briefings, development of project information materials, establishment of a project information phone line, early engagement with interested parties, and media communications. As part of public outreach for the Draft EIR/EIS, three public and agency scoping meetings were held between May 23 and May 25, 2016, in San Francisco, San Mateo, and Mountain View. These meetings were an important component of the scoping process for both state and federal environmental review, and additional information from the scoping meetings is available on the Authority’s website.

The scoping meetings and comments received on the 2016 Notice of Intent and Notice of Preparation helped the lead agencies identify general environmental issues to be addressed in the Draft EIR/EIS. The scoping process identified issues with project elements and stations, community concerns, environmental concerns, technical and engineering concerns, and project costs and operations concerns. The scoping period for the environmental process lasted from May 9, 2016 to July 20, 2016. A total of 152 written and verbal comments were received.

The *Scoping Report for the San Francisco to San Jose Project Section* (Authority and FRA 2016) is available on the Authority’s website and provides a more comprehensive discussion of the scoping comments. A detailed summary of these comments is provided in Section 10.2, Reinitiated Public Scoping (May 2016–July 2016), of the Checkpoint B Summary Report.

3.3 Summary of Outreach to Stakeholders

After the close of the scoping period on July 20, 2016, and throughout the development of the Draft EIR/EIS, the project team held nearly 350 meetings with elected officials and staff, communities with high concentrations of low-income and minority populations, key stakeholders, and the public. Among these meetings were community working group (CWG) meetings, city/county staff coordinating group meetings, and local policy maker group (LPMG) meetings to discuss the range of alternatives and gather input from community members. Additionally, as part of the environmental review process, the Authority conducted a Preliminary Engineering for Project Definition review with jurisdictions along the corridor in July and August 2018. The objective of the review was for local jurisdictions to better understand the design elements, provide feedback to the regional design team on the preliminary designs, and to discuss areas of interest or concern for each jurisdiction. A summary of the types of meetings is provided in the following subsections.

3.3.1 Public Information Materials and Meetings

Public information meetings took place during preparation of the Draft EIR/EIS to inform the public about the range of alternatives being studied and the environmental review process. In addition, these meetings provided information on various HSR project components and served as forums for obtaining feedback. The public information meetings included brief presentations and project information materials (on display and in fact sheets), and project staff were available to answer questions. Among the public meetings held during development of the Draft EIR/EIS were a series of three community open house meetings in April 2017 in San Francisco (April 5, 2017), Mountain View (April 11, 2017), and San Mateo (April 13, 2017). Open house meetings were announced through direct mail to those in the stakeholder database, advertisements in local newspapers, and postings on the Authority's website. Various publications and materials were also made available on the website. Open house meetings allowed the public to learn about the range of alternatives, get an update on the environmental review process, and ask questions and provide input. Open house materials included meeting presentations, display exhibits, and maps.

A series of CWG meetings were also held during development of the Draft EIR/EIS. A CWG is a voluntary group of community members composed of representatives from various constituencies along the San Francisco to San Jose corridor and local interest groups involved in transportation, environmental sustainability, and social issues in the region. Three CWGs were established: San Francisco CWG, San Mateo County CWG, and Santa Clara County/South Peninsula CWG. All three CWGs met from 2016 to 2018. The purpose of the CWGs was to enable informal information exchange between community members, Authority staff members, and the engineering, environmental, and planning team. CWG meetings were conducted in a small group meeting format (approximately 15 to 20 members) to allow members to voice concerns and identify local projects for Authority consideration. Community values, considerations, projects, and programs were collected and validated by CWG members to confirm their feedback was accurately captured. Potential stakeholder projects were evaluated to determine whether there was a connection with the HSR project and to allow the Authority to consider such projects in preliminary engineering or in developing project mitigation measures.

The Authority participated in additional public meetings hosted by other agencies, such as a San Carlos City Council Meeting on June 26, 2017, Santa Clara Valley Transportation Authority Small Business Event on June 13, 2016, and ongoing Native American Heritage Commission meetings to provide project information and obtain feedback.

Meetings of the Authority Board of Directors also provided an opportunity for the public to learn about the statewide program and project sections, and to provide feedback. Meetings of the Board of Directors and of its committees are noticed and conducted in compliance with the Bagley-Keene Open Meeting Act.¹⁹ Board of Directors meetings are generally held once a month. Special board meetings may be held as needed to address Authority business, but those meetings are announced 10 days in advance. Meeting agendas are published on the Authority's website in advance of the hearings, notifying the public of the topics being considered, and include an opportunity for public comment on agenda and non-agenda items.

The Authority also conducted extensive outreach from July through September 2019 to share Alternative A as the Staff-Recommended Preferred Alternative with project stakeholders and members of the public. A handout was prepared to distribute at the meetings, which included a description of how the alternatives were developed; the alternatives under evaluation; prior stakeholder, public, and agency input; and the evaluation of alternatives. More than 200 community members, stakeholders, and agency officials attended briefings and meetings held throughout the project corridor during this outreach period.

¹⁹ The Bagley-Keene Open Meeting Act implements a provision of the California Constitution which declares that "the meetings of public bodies and the writings of public officials and agencies shall be open to public scrutiny," and explicitly mandates open meetings for California State agencies, boards, and commissions.

3.3.2 Tribal Coordination Meetings

Tribal coordination during the alternatives development for the Draft EIR/EIS included three meetings—a tribal information meeting with local tribes, a statewide tribal outreach meeting with the Native American Heritage Commission, and a meeting with the California Department of Transportation Native American Advisory Committee at which a program update and an overview of tribal involvement were provided. Section 3.16 of the Draft EIR/EIS provides more information on Native American outreach and consultation efforts.

3.3.3 Technical Working Group Meetings

During the development of the Draft EIR/EIS, several advisory groups met regularly to facilitate information exchanges and collaborate on project alternatives carried forward for analysis in the Draft EIR/EIS, HSR station planning, and identification of potential resource impacts and avoidance alternatives. These groups included a Caltrain blended infrastructure working group, an LPMG, and a city/county staff coordination group.

The Caltrain blended infrastructure working group met regularly in 2016 and 2017 to discuss technical issues related to the two-track blended system. The LPMG consists of elected officials, and their representatives, from cities and counties along the Project Section. The LPMG meets monthly, with alternating meetings hosted by the Authority and Caltrain. The city/county staff coordination group includes staff representatives of the cities, counties and other public agencies along the project corridor. Similar to the LPMG, the city/county staff coordination group meets monthly, with alternating meetings hosted by the Authority and Caltrain.

3.3.4 Agency Meetings and Consultation

The Authority consulted with cooperating federal, state, and local agencies under NEPA and with trustee and responsible agencies under CEQA regarding specific resource areas associated with these agencies. Interested state, federal, and local agencies were also consulted throughout the process.

Two cooperating agencies participated in the NEPA review process—the USACE and the Surface Transportation Board. Multiple other federal agencies have been involved and contributed to the environmental review:

- USEPA
- USFWS
- National Marine Fisheries Service
- National Park Service
- Advisory Council on Historic Preservation

A number of California agencies (state and regional) serve as CEQA responsible agencies for the Draft EIR/EIS:

- CDFW²⁰
- California Department of Transportation
- California Public Utilities Commission
- California State Lands Commission²¹
- PCJPB (Caltrain)
- State Water Resources Control Board
- Bay Area Air Quality Management District
- San Francisco Bay Conservation and Development Commission (BCDC)

The Authority participated in additional meetings with representatives of federal, state, regional, and local agencies throughout the environmental review process.

²⁰ CDFW is also a trustee agency under CEQA.

²¹ California State Lands Commission is also a trustee agency under CEQA.

In addition, the Authority conferred with USACE and USEPA pursuant to the process outlined in the MOU. As part of this process, Checkpoint A was submitted to USACE and USEPA in April 2016. USACE agreed with the Purpose and Need statement on May 3, 2016, and USEPA agreed with the Purpose and Need statement on May 5, 2016. Checkpoint B was submitted to USACE and USEPA in May 2019 and then resubmitted in July 2019. USACE and USEPA agreed with the two alternatives recommended for the EIR/EIS in the Checkpoint B Report on August 14, 2019 and July 26, 2019, respectively.

4 PRELIMINARY COMPENSATORY MITIGATION OF IMPACTS ON JURISDICTIONAL WATERS

4.1 Watershed Approach

The pCMP (included in Appendix C) supports this Summary Report by identifying potential approaches to compensatory mitigation for discharges associated with the Preliminary LEDPA. The pCMP integrates the requirements of several resource agencies into a comprehensive plan. Among the purposes of the pCMP is to set out a general approach to compensatory mitigation for impacts on waters of the U.S. as well as habitat for federally listed species. As part of that approach, the pCMP sets out potential mitigation strategies that occur within the same watershed as the impacts.

In 2008, USACE adopted the *Compensatory Mitigation for Losses of Aquatic Resources: Final Rule* (2008 Final Rule) (33 C.F.R. Part 332), which established compensatory mitigation requirements. The 2008 Final Rule states that compensatory mitigation may be achieved using restoration, enhancement, establishment, and in certain circumstances preservation (33 C.F.R. § 332.3). The final rule prioritizes restoration as the preferred mitigation method because it is typically most successful, has fewer upland impacts than establishment, and adds greater value in terms of aquatic resource function than enhancement or preservation. Additionally, where preservation is used, it is generally required to be done in conjunction with aquatic resource restoration, establishment, or enhancement activities.

The 2008 Final Rule identifies the following mechanisms for providing compensatory mitigation ranked in order from most preferable to least-preferable: mitigation banks, in-lieu fee (ILF) mitigation, permittee-responsible mitigation (PRM) under a watershed approach, PRM through on-site and in-kind mitigation, and PRM through off-site or out-of-kind mitigation. The 2008 Final Rule requires use of a watershed approach to establish compensatory mitigation requirements to the extent appropriate and practicable (33 C.F.R. § 332.3(c)). If available, a watershed plan should be used to guide the watershed approach. Where no such plan is available, the watershed approach should be based on other available sources.

The project would have impacts within two watershed boundaries as defined by the USGS HUC-8: San Francisco Bay (18050004) and Coyote (18050003). The pCMP proposes that compensatory mitigation occur within the same HUC-8 boundary where the impact would occur to the extent practicable. The pCMP also proposes that available watershed plans and existing restoration programs be used to guide compensatory mitigation needs.

4.2 Summary of Mitigation Options

As described in the pCMP, there are not sufficient mitigation banks and ILF programs available to address the likely mitigation needs for all of the types of waters of the U.S. in which fill would be placed. Therefore, some PRM would be required. The pCMP proposes that a combination of mitigation bank credit purchase, on-site restoration, and off-site restoration would be used to satisfy mitigation requirements under Section 404. This approach would address both temporary impacts and permanent impacts. The following sections describe the compensatory mitigation options.

4.2.1 On-Site Compensatory Mitigation

On-site compensatory mitigation is a form of PRM and is the planned mitigation for temporary impacts relating to all aquatic resources. Based on USACE guidance, fill placed within jurisdictional waters for less than 1 year is considered a temporary impact. All temporary construction areas would be returned to pre-project contours and revegetated. With respect to wetlands, temporary impacts would be addressed in a manner most appropriate for the affected resource. For example, to promote reestablishment of wetland conditions in temporary construction areas, the topsoil may be removed and stockpiled during construction and then returned to the disturbed areas and revegetated following construction activities. Site-specific avoidance measures would be developed as project details become known.

On-site compensatory mitigation is also planned to offset permanent impacts on multiple constructed watercourses and two constructed basin aquatic resources throughout the Project Section. Constructed features that are permanently affected would be restored or replaced in kind either on-site or adjacent to the project footprint.

On-site compensatory mitigation may be proposed to offset permanent impacts on wetland and nonwetland aquatic features associated with the East Brisbane LMF. This proposed LMF site is bisected by Visitacion Creek, a tidally influenced creek. The Authority is seeking a BCDC permit, and as part of that process, is exploring a potential Visitacion Creek/Bay resiliency mitigation concept..

The Visitacion Creek/Bay resiliency mitigation concept proposes rerouting Visitacion Creek from where it daylight just east of the Caltrain tracks to the south rather than east to under US 101, and to terminate at the Brisbane Lagoon rather than at San Francisco Bay. The existing channel would still need to be filled; however, this approach would avoid culverting a channel under the widest point of the LMF and provide a more open channel. The rerouted creek would be open air with one rail and two vehicular bridges spanning over the creek. The realigned creek would model the existing creek profile and cross section and would maintain the tidal gate just east of the existing Caltrain tracks. The creek would flow as a tidally influenced channel into the Brisbane Lagoon. Further information on the Visitacion Creek/Bay resiliency mitigation concept is provided in Appendix C of this Summary Report (Exhibit 1, Potential Visitacion Creek/Bay Resiliency Mitigation Concept, located in Appendix B of the Preliminary Compensatory Mitigation Plan).

4.2.2 Off-Site Compensatory Mitigation

4.2.2.1 In-Lieu Fee Programs

There are no existing ILF programs with service areas overlapping the RSA. However, informal conversations between the National Fish and Wildlife Foundation (NFWF) and Authority permitting staff indicate that NFWF holds a limited number unallocated mitigation credits for stream impacts. In the event that NFWF unallocated credits could be used to compensate for project impacts, an ILF program could provide a potential mitigation option.

4.2.2.2 Mitigation Banks

One mitigation bank is currently available with a service area overlapping the San Francisco Bay HUC-8 watershed: the San Francisco Bay Wetland Mitigation Bank. This bank is primarily used for tidal wetland and other waters (includes tidal sloughs and other tidal open water areas). It could potentially provide credits for nontidal/seasonal wetland and other waters on a case-by-case basis where the impacts on nontidal/seasonal wetlands or other waters may have been historic tidal wetlands or other waters. As of January 2, 2019, the Regulatory In-Lieu Fee and Bank Information Tracking System notes that this bank has 15.6 acres of wetland credit available, and 0.35 acre of tidal/other waters of the U.S. Contingent on approval by the USACE, credits from this bank could be used to mitigate for impacts on saline emergent wetland, and potentially on freshwater emergent wetland and scrub/shrub wetland. There are no mitigation banks that serve the Coyote HUC-8 watershed, which stops short of the tidal areas of the San Francisco Bay.

4.2.2.3 Permittee-Responsible Mitigation

Mitigation needs that are not met by on-site compensatory mitigation or through mitigation banks would require PRM. PRM sites would be protected by a conservation easement or deed restriction and managed in perpetuity under agreements with third-party land owners, managers, or both. Off-site PRM opportunities in the HUC-8 watersheds affected by the project could include projects developed through a partnership with one or more of the open space or parkland management agencies in the region, or through financial contributions to ongoing restoration efforts. Several potential mitigation partners acquire or manage lands within the same watersheds as the project alignment. These potential partners and associated mitigation options are summarized in Table 2 of Appendix C. Analysts have reached out to these potential PRM partners and have confirmed that they are willing to discuss a partnership to implement mitigation

projects. The Authority has not yet proposed any specific PRM sites for compensatory mitigation purposes to USACE. Each of these potential sites would need to be evaluated for its suitability to satisfy the range of agency needs.

PRM projects would be informed by available and applicable watershed plans. Within the San Francisco Bay watershed, a few key watershed plans have been developed addressing tidal and subtidal areas. These plans include:

- San Francisco Bay Plan (BCDC 2019)
- *San Francisco Bay Subtidal Habitat Goals Report* (California State Coastal Conservancy 2010)
- *Baylands Ecosystem Habitat Goals Report* (California State Coastal Conservancy 2000)
- *Baylands Ecosystem Habitat Goals Science Update 2015* (California State Coastal Conservancy 2015)

While not a watershed plan, the 2007 Final Environmental Impact Statement/Report for the South Bay Salt Pond Restoration Project (Final EIS/EIR) may serve as guidance for the potential scope of restoration activities associated with the South Bay Salt Pond Restoration Project, the largest tidal wetland restoration project on the West Coast (USFWS and CDFG 2007). The Final EIS/EIR, together with the ongoing work conducted for the South Bay Salt Pond Restoration Project, may identify opportunities for compensatory mitigation for some aquatic features that may be affected by the project.

Within the Coyote HUC-8 watershed, key watershed plans include:

- *The Santa Clara Valley Habitat Plan* (County of Santa Clara et al. 2012)
- *The Santa Clara Valley Greenprint* (Santa Clara Valley Open Space Authority 2014)
- *The One Water Plan* (under development by the Santa Clara Valley Water District [2020]).

5 FACTUAL DETERMINATIONS REGARDING IMPACTS OF PRELIMINARY LEDPA (40 C.F.R. § 230.11 AND SUBPARTS C, D, E, AND F) AND FINDINGS OF COMPLIANCE (40 CFR § 230.12)

5.1 Overview of Approach

In accordance with 40 C.F.R. Section 230.11, the USACE determines the potential short-term or long-term impacts of the proposed discharge of dredged or fill material on the physical, chemical, and biological components of the aquatic environment in light of subparts C through F of the 404(b)(1) Guidelines. This determination is based on an assessment of the potential impacts on physical and chemical characteristics of the aquatic ecosystem, on biological characteristics of the aquatic ecosystem, and on special aquatic sites as well as on other factors set out in 40 C.F.R. Section 230.11. These factual determinations are used by the USACE to make findings of compliance or noncompliance with the restrictions on discharge (40 C.F.R. § 230.12), including whether the proposed discharge would cause or contribute to significant degradation of waters of the U.S. (40 C.F.R. § 230.10(c)).

Appendix D sets out proposed factual determinations to support USACE's findings of compliance with the discharge restrictions (per 40 C.F.R. § 230.12). The following section provides a summary of that analysis.

5.2 Summary of Conclusions

Based on the proposed factual determinations set out in Appendix D, the issuance of a Section 404 permit authorizing the discharge of fill material associated with the Alternative A would be consistent with the restrictions on discharge under 40 C.F.R. Section 230.12 and would not cause or contribute to significant degradation of waters of the U.S. The following subsections present conclusions reached in the proposed factual determinations.

5.2.1 Physical Substrate Determinations (40 C.F.R. §§ 230.11(a), 230.20)

As described in Section D.1.1, Physical Substrate Determinations (40 C.F.R. §§ 230.11(a), 230.20), of Appendix D, Alternative A would require discharges of fill material into waters of the U.S., which would alter the substrate of those waters, usually replacing the aquatic area with dry land or infrastructure and changing the physical, chemical, and biological characteristics of the substrate. Placement and compaction of imported fill would lead to direct impacts on the substrate in waters of the U.S. Fill materials may change elevations or bottom contours in areas where they are placed. Quarry stone, cobbles, or other erosion control materials may be placed near concrete structures at stream crossings and may also change substrate elevations and bottom contours. Grading and placement of fill in waters of the U.S. would result in a direct, permanent loss of jurisdictional waters and irreversible changes to the physical, chemical, and biological characteristics of the substrates at the location of the fill. Measures to avoid and minimize this impact to the maximum extent practicable are described in Section D.3.1.1, Substrate (40 C.F.R. § 230.20) of Appendix D. Unavoidable impacts of the discharge of fill material on the substrates of waters of the U.S. would be offset through the implementation of compensatory mitigation. Indirect impacts of the project on the substrate of waters of the U.S., in the form of sedimentation of waters of the U.S. from erosion of fill areas, would occur only on a limited basis because measures would be implemented to control erosion and siltation.

5.2.2 Water Circulation, Fluctuation, and Salinity Determinations (40 C.F.R. §§ 230.11(b), 230.23–230.25)

As described in Section D.1.2, Water Circulation, Fluctuation, and Salinity Determinations (40 C.F.R. §§ 230.11(b), 230.23–230.25), the Alternative A would result in permanent, direct, and localized impacts on existing drainage patterns. Discharges of fill could alter normal water fluctuations. Measures to avoid and minimize these impacts are specified in Section D.3.1.5, Current Patterns and Water Circulation (40 C.F.R. § 230.23), and Section D.3.1.6, Normal Water Fluctuations (40 C.F.R. § 230.24), of Appendix D. Discharges of fill are not expected to change

existing salinity gradients because all waterway crossings, as well as the proposed realignment of Visitacion Creek under the East Brisbane LMF and the extension of the culvert at Guadalupe Valley Creek, would be designed to provide unobstructed tidal water exchange

5.2.3 Suspended Particulates/Turbidity Determinations (40 C.F.R. §§ 230.11(c), 230.21)

As described in Section D.1.3, Suspended Particulates/Turbidity Determinations (40 C.F.R. §§ 230.11(c), 230.21), potential impacts on the aquatic ecosystem as a result of suspended particulates/turbidity would include reduced light penetration leading to lower rates of photosynthesis and the primary productivity of the aquatic area, increased sedimentation, and degraded water quality. Alternative A could result in short-term direct impacts caused by suspended particles or turbidity. There would be no long-term impacts. Measures to avoid and minimize this impact to the maximum extent practicable are described in Section D.3.1.2, Suspended Particulates/Turbidity (40 C.F.R. § 230.21), of Appendix D.

5.2.4 Contaminant Determinations (40 C.F.R. § 230.11(d))

As described in Section D.1.4, Contaminant Determinations (40 C.F.R. § 230.11(d)), construction of Alternative A would involve discharge of fill material, which could introduce, relocate, or increase contaminants in the affected waters, including chemical constituents in suspended or dissolved forms. The discharge of fill in waters of the U.S. could also change current patterns and water circulation which could result in downstream substrate erosion, which could result in impacts on aquatic communities or wetland plant communities downstream of the discharge. The design of Alternative A includes measures, described in Section D.3.1.3, Contaminant Determinations (40 C.F.R. § 230.11(d)), of Appendix D, that would reduce the potential for contaminants in fill material, and thus would reduce the potential for discharge of such contaminants to waters of the U.S.

5.2.5 Aquatic Ecosystem and Organism Determinations (40 C.F.R. §§ 230.11(e), 230.30–230.32)

As described in Section D.1.5, Aquatic Ecosystem and Organism Determinations (40 C.F.R. §§ 230.11(e), 230.30–230.32), of Appendix D, Alternative A would have direct impacts, through the introduction of fill material, on aquatic organisms that occur in waters of the U.S., including fish, crustaceans, mollusks, and other organisms. Threatened and endangered species and other wildlife (resident and transient mammals, birds, reptiles, and amphibians [40 C.F.R. § 230.32 (a)]) that occur in aquatic ecosystems would also be affected. Alternative A would also have indirect impacts, through habitat degradation, on aquatic organisms in the food web and other wildlife associated with aquatic ecosystems. With the inclusion of the measures specified in Section D.3.2, Subpart D—Potential Impacts on Biological Characteristics of the Aquatic Ecosystem, of Appendix D, however, the proposed discharge associated with Alternative A would not affect the structure and function of the aquatic ecosystem and organisms. The support for this conclusion is provided in the discussions of direct impacts, indirect impacts, cumulative impacts, and secondary effects on threatened and endangered species, aquatic organisms in the food web, and other wildlife presented in Sections D.3.2.1, Threatened and Endangered Species (40 C.F.R. § 230.30), D.3.2.2, Fish, Crustaceans, Mollusks, and Other Aquatic Organisms in the Food Web (40 C.F.R. § 230.31), and D.3.2.3, Other Wildlife (40 C.F.R. § 230.32), of Appendix D, respectively.

5.2.6 Proposed Disposal Site Determinations (40 C.F.R. § 230.11(f))

As described in Section D.1.6, Proposed Disposal Site Determinations (40 C.F.R. § 230.11(f)), of Appendix D, Alternative A would entail the placement of fill material in waters of the U.S. (i.e., disposal sites). Permanent fill material may include imported well-graded soils, subballast, ballast, slab or precast reinforced concrete, or concrete girders. Culverts placed in natural and constructed watercourses would consist of precast reinforced concrete pipe or concrete box culverts. At larger crossings (e.g., major watercourses or waterbodies), bridges and elevated

structures would consist of cast-in-place or precast reinforced concrete girders and piles. The fill material would consist of solid or otherwise stable materials, such as precast concrete, which would not leach contaminants into waters of the U.S. or otherwise degrade water quality.

Disposal sites include the following:

- Freshwater emergent wetland drainage ditch west of Caltrain tracks between Egbert Avenue and Salinas Ave (San Francisco)
- Freshwater emergent wetlands west of Tunnel Avenue (Brisbane)
- Scrub-shrub wetlands west of Tunnel Avenue (Brisbane)
- Saline emergent wetlands at northwestern and southwestern corners of Brisbane Lagoon
- Freshwater emergent wetland between Caltrain tracks and Ingold Road (Millbrae)
- Freshwater emergent wetland along Sanchez Creek Tributary, southwest of Caltrain tracks (Burlingame)
- Freshwater emergent wetland along Fiesta Creek between Caltrain tracks and South Delaware Street (San Mateo)
- Freshwater emergent wetland along Laurel Creek Tributary between Caltrain tracks and El Camino Real (Belmont)
- Constructed watercourses:
 - Visitacion Creek
 - Drainage ditches east or west of Caltrain tracks between South Linden Avenue and I-380 (San Bruno)
 - Colma Creek
 - El Zanjon (aka Cupid Row Canal)
 - Highline Creek Tributary (aka South Lomita Canal)
 - Easton Creek
 - Sanchez Creek
 - Burlingame Creek
 - Matadero Creek
 - Barron Creek
 - Belmont Creek
 - Pulgas Creek
 - Atherton Channel
 - Matadero Creek
 - Adobe Creek
 - Permanente Creek
 - Sunnyvale East Channel
 - Calabazas Creek
 - San Tomas Aquino Creek
- Natural Watercourses
 - Guadalupe Valley Creek
 - Mills Creek
 - San Mateo Creek
 - Borel Creek
 - Cordilleras Creek
 - San Francisquito Creek
 - Stevens Creek

The listed disposal sites were identified based on their location within the project footprint and are therefore a conservative representation of the total number of sites that would actually be filled. It is anticipated that many of these sites would be avoided during construction because of opportunities for avoidance provided by design refinements and construction planning. Where fill does occur, the mixing zone would be confined to the smallest practicable zone at each disposal site by implementing the measures described in Section D.3.1.2, Suspended Particulates/Turbidity (40 C.F. R. § 230.21). Such measures would also specify how the dispersion of discharged fill into adjacent waters would be controlled, including methods to confine suspended particulate/turbidity to a small area (40 C.F.R. § 270.73(c)).

5.2.7 Determination of Cumulative Effects on the Aquatic Ecosystem (40 C.F.R. § 230.11(g))

As described in Section D.1.7, Determination of Cumulative Effects on the Aquatic Ecosystem (40 C.F.R. § 230.11(g)), of Appendix D, Alternative A would result in an incremental contribution to cumulative impacts on the physical and chemical characteristics of the aquatic ecosystem from other development and transportation projects in the region, but this incremental contribution would be minimized through the implementation of measures described in Section D.3.1, Subpart C—Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem, of Appendix D.

Alternative A would also contribute to cumulative impacts on biological characteristics of the aquatic ecosystem from other development and transportation projects in the region, but this incremental contribution would be minimized through the implementation of measures described in Section D.3.2 of Appendix D.

5.2.8 Determination of Secondary Effects on the Aquatic Ecosystem (40 C.F.R. § 230.11(h))

As described in Section D.1.8, Determination of Secondary Effects on the Aquatic Ecosystem (40 C.F.R. § 230.11(h)), of Appendix D, Alternative A may cause secondary effects on the aquatic ecosystem associated with affected waters of the U.S. Surface runoff and erosion from the placement of fill could degrade water quality of aquatic features outside but adjacent to the project footprint and stream reaches downstream of the project footprint. However, due to the generally low hazard of runoff and erosion in the project footprint and with the inclusion of the avoidance and minimization measures specified in Section D.3 of Appendix D, Alternative A would not result in substantial secondary effects on the aquatic ecosystem of aquatic features outside or downstream of the project footprint.

5.3 Findings of Compliance with the Discharge Restrictions (40 C.F.R. § 230.12)

As described in Section D.1.9, Findings of Compliance (40 C.F.R. § 230.12), Alternative A would result in the discharge of fill material in waters of the U.S. Based on the evaluations contained in the factual determinations, the proposed discharges associated with Alternative A would comply with the Section 404(b)(1) Guidelines with the inclusion of appropriate and practicable discharge conditions to minimize adverse effects to the aquatic ecosystem. The measures identified in Section 2.5.1 of this Summary Report would be implemented to avoid and minimize impacts on the chemical, physical, and biological integrity of waters of the U.S. such that these sites would avoid a net loss of aquatic function and value.

6 PRELIMINARY SECTION 4(F) ASSESSMENT

There are 50 parks and recreational resources within 200 feet of the project footprint for both project alternatives. Construction of both project alternatives could result in the temporary use of 0.04 acre of Brisbane Community Park in the city of Brisbane, and could result in temporary but partial reduction in access to 19 parks and recreational resources; full access to all parks and recreational resources would be restored upon the completion of construction. The project alternatives would not permanently incorporate land from any of the parks or recreational facilities into the project footprint. Operations would increase the number of trains operating in the corridor and increase the frequency of train horn noise at 30 parks and recreational resources, but the increased frequency of train horn noise and visual impacts would not substantially impair the protected activities, features, or attributes that qualify the parks or recreational facilities for protection under Section 4(f). As a result, no permanent or constructive uses of parks or recreational resources would occur under the project alternatives.

Both project alternatives would result in a *de minimis* preliminary Section 4(f) use determination of one historic property: the Southern Pacific Railroad Depot/Millbrae Station. Additionally, depending on the location chosen for a new radio tower, there could be a second *de minimis* preliminary Section 4(f) use determination of the Southern Pacific Depot/Menlo Park Railroad Station (ID#28).

Because the project alternatives would result in a *de minimis* preliminary Section 4(f) use determination, an analysis of alternatives that would avoid using these Section 4(f)-protected properties is not needed (23 C.F.R. § 774.14).

7 COMPLIANCE WITH FEDERAL AND STATE LAWS

The NEPA/Section 404 Integration MOU includes a request to provide a status of the Authority's compliance with applicable federal and state laws, regulations, and executive orders, including, but not limited to:

- Sections 404, 401, and 402 of the CWA
- Section 14 of the Rivers and Harbors Act (Section 408)
- Section 4(f) of the U.S. Transportation Act of 1966
- Section 106 of the National Historic Preservation Act
- Section 307(c) General Conformity Determination of the Clean Air Act
- Section 7 of the FESA
- Fish and Wildlife Coordination Act
- U.S. Presidential Executive Order 12989 (Environmental Justice)
- Coastal Zone Management Act
- Section 2081(b) of CESA
- Section 1600 of the California Fish & Game Code
- The McAteer-Petris Act
- The Porter Cologne Water Quality Control Act

Table 7-1 provides the status of the permitting efforts required under the applicable federal and state environmental laws. The Authority has completed fieldwork, and has initiated coordination and preparation of various permitting documents in accordance to the agreements including the NEPA/404/408 MOU (Authority and FRA 2010) and the *Section 106 Programmatic Agreement* (FRA et al. 2011) established with environmental resource agencies to facilitate the environmental permitting required during final design and construction. Consultation with the relevant federal and state agencies as part of NEPA and the associated permitting processes would also meet the Fish and Wildlife Coordination Act requirements.

Table 7-1 Status of Permitting for Federal and State Environmental Laws and Regulations

Agency	Permits/Regulations/Executive Orders	Status	Next Steps
Federal			
U.S. Army Corps of Engineers U.S. Environmental Protection Agency	Section 404 of the CWA Permit for Discharge of Dredge or Fill Materials into Waters of the U.S., including wetlands	The Authority is scheduled to submit applications for a Section 404 individual permit and Section 401 water quality certification in 2020.	U.S. Army Corps of Engineers and U.S. Environmental Protection Agency concurrence on the Preliminary LEDPA, in support of future permit applications, followed by agency pre-application meetings.
U.S. Army Corps of Engineers	Section 14 of the Rivers and Harbors Act (Section 408) for alteration, use, or occupation of federal facilities and additional features subject to Section 408 jurisdiction	No Section 408 facilities would be affected by the project.	None.
Authority (pursuant to NEPA Assignment MOU) U.S. Department of the Interior	Section 4(f) of the U.S. Transportation Act of 1966	The Section 4(f) chapter (Chapter 4) of the Draft EIR/EIS is in the process of revision.	Coordinate with agencies with jurisdiction over Section 4(f) properties on use determinations. Respond to comments in the Draft EIR/EIS. Make least harm determinations in Final EIR/EIS.
Authority (pursuant to NEPA Assignment MOU) U.S. Advisory Council on Historic Preservation via the State Historic Preservation Office	Section 106 of the National Historic Preservation Act of 1966	The Historic Architectural Survey Report and Archaeological Survey Report, which will identify historic properties affected by the project alternatives.	State Historic Preservation Office concurrence with identification of historic properties.
Federal Railroad Administration U.S. Army Corps of Engineers	Section 307(c) General Conformity Determination (Clean Air Act), which includes the six major air pollutants under National Ambient Air Quality Standards	Section 3.3, Air Quality, of the Draft EIR/EIS is in the process of revision.	Coordinate with agencies with jurisdiction over the CAA. Respond to comments in the Draft EIR/EIS. Continue outreach to environmental justice populations.
National Marine Fisheries Service	Section 7 Consultation, FESA	Ongoing coordination with agencies.	Preparation and submission of Biological Assessment in late 2020.

Agency	Permits/Regulations/Executive Orders	Status	Next Steps
U.S. Fish and Wildlife Service	Section 7 Consultation, FESA Fish and Wildlife Coordination Act	Ongoing coordination with agencies.	Preparation and submission of Biological Assessment in late 2020. Consultation with the federal and state resource agencies as part of NEPA and the associated permitting processes are expected to demonstrate compliance with the Fish and Wildlife Coordination Act requirements.
Office of Environmental Justice	U.S. Presidential Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	Chapter 5, Environmental Justice, of the Draft EIR/EIS is in the process of revision.	Continue agency coordination and engagement of environmental justice populations. Respond to comments in the Draft EIR/EIS.
State			
California Department of Fish and Wildlife	Section 2081(b) Incidental Take Permit (California Endangered Species Act)	The draft 2081 permit application will be submitted in late 2020.	Continue coordination with California Department of Fish and Wildlife.
California Department of Fish and Wildlife	California Fish and Game Code Section 1600 et seq., Lake and Streambed Alteration	The draft 1600 permit application will be submitted in late 2020.	Continue coordination with California Department of Fish and Wildlife.
State Water Resources Control Board	CWA Section 401 Water Quality Certification CWA Section 402 National Pollutant Discharge Elimination System Program Permit Waste Discharge Requirements per the Porter-Cologne Water Quality Control Act	The draft application for Waste Discharge Requirements/ Water Quality Certification will be submitted in late 2020. The design-build contractor is responsible for obtaining a Section 402 NPDES permit, consistent with the SWRCB NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit, Order No. 2009-0009-DWQ as modified by 2010-0014-DWQ).	Continue coordination with State Water Resources Control Board.

Agency	Permits/Regulations/Executive Orders	Status	Next Steps
San Francisco Bay Conservation and Development Commission	Consistency determination review per Section 307 of the Coastal Zone Management Act Major permits for fill and shoreline development per the McAteer-Petris Act	The draft permit application for San Francisco Bay Conservation and Development Commission will be submitted in late 2020.	Continue coordination with San Francisco Bay Conservation and Development Commission.

Authority = California High-Speed Rail Authority
 CAA = Clean Air Act
 CDFW = California Department of Fish and Wildlife
 CWA = Clean Water Act
 EIR = environmental impact report
 EIS = environmental impact statement
 FESA = federal Endangered Species Act
 LEDPA = least environmentally damaging practicable alternative
 MOU = memorandum of understanding
 NEPA = National Environmental Policy Act
 NPDES = National Pollutant Discharge Elimination System
 SWRCB = State Water Resources Control Board

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Senior Environmental Planner	Aaron Carter	13 years of experience B.A. Geography, California State University Fullerton
Assistant Planner	Caroline Vurlumis	2 years of experience B.A., Environmental Analysis, Scripps College
Biologist	Matt Ricketts, M.S.	19 years of experience M.S., Biology/Applied Ecology, Eastern Kentucky University, Richmond B.S., Natural Resources and Environmental Science, University of Illinois at Urbana-Champaign
Biologist	Torrey Edell	14 years of experience BS, Ecology and Systematic Biology, California Polytechnic State University, San Luis Obispo
Biologist	Danielle Tannourji	17 years of experience MS, Conservation Biology, San Jose State University, 2009 BS, Ecology and Evolution, University of California, Santa Barbara, 2001
Senior Soil and Wetland Scientist	Joel Butterworth, PWS, QSD, CPESC	31 years of experience M.S., Geography (minor in Soil Science), Oregon State University, Corvallis B.A., Geography, University of California, Santa Barbara
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Publications Specialist	Anthony Ha	14 years of experience BA, English, Saint Mary's College of California
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