3.11 Hydrology and Water Quality

3.11.1 Introduction

This section describes the regulatory setting and affected environment for hydrology and water quality resources and identifies potential temporary and permanent impacts of the proposed Project during construction and operation of the project on those resources. This includes the hydrology and water quality issues that are known or have potential to occur in the Resource Study Area (RSA). This section also addresses the proposed Project's consistency with federal, state, and local regulations, policies, and goals related to hydrology and water quality.

3.11.2 Regulatory Setting

This section identifies federal, state, regional and local laws, regulations, and orders that are relevant to the analysis of hydrology and water quality. It also addresses the proposed Project's consistency with the regulations described herein.

3.11.2.1 Federal

Surface Water Hydrology and Surface Water Quality

Clean Water Act

In 1972, the government of the United States (U.S.) passed the Federal Water Pollution Control Act, which later came to be known as the Clean Water Act (CWA). This legislation, issued by the U.S. Environmental Protection Agency (EPA), established the contemporary legal foundation and structure for regulating water quality throughout the United States. The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The list below summarizes some of its more important sections:

- Sections 303 and 304 provide for water quality standards, criteria, and guidelines for all surface Waters of the U.S.
- Section 401 requires an applicant for any federal project that proposes an activity that may result in a discharge to Waters of the US to obtain certification from the state that the discharge will comply with other provisions of the CWA. The Waters of the U.S. include all navigable water bodies and all water bodies that drain into a navigable water body. The guidelines allow the discharge of dredged or fill material into the aquatic system only if there is no practicable alternative that would have less adverse impacts. The Regional Water Quality Control Board (RWQCB) administer this permitting program in California.
- Section 402 established the National Pollutant Discharge Elimination System (NPDES), which is a permitting system for the discharge of any pollutant (except for dredge or fill material) into Waters of the U.S. The State Water Resources Control Board (SWRCB) and the RWQCB administer this permitting program in the state of California; later sections will discuss the NPDES in detail.

- Section 404 establishes a permit program for the discharge of dredge or fill material into Waters of the U.S. The United States Army Corps of Engineers (USACE) administers this permit program.

National Pollutant Discharge Elimination System (NPDES)

The NPDES permit was established in the CWA to regulate municipal and industrial discharges to surface Waters of the U.S. The ultimate objective of the CWA is zero pollutant discharges, but it recognizes the need for a system to regulate non-zero pollutant discharges until the zero-pollutant objective is feasible. Section 402 of the CWA established the NPDES for this purpose. The NPDES regulates all pollutant discharges, particularly point source discharges, to the Waters of the U.S.

Passage of the Water Quality Act of 1987 amended the CWA to specifically include stormwater discharges as a type of point source discharge and established the framework for regulating municipal and industrial stormwater discharges under the NPDES program. This amendment added stormwater-related discharges associated with construction projects to the list of discharges that require an NPDES permit. This inclusion of stormwater-related discharge is why construction projects are subject to the requirements of the NPDES and must satisfy the requirements of all applicable NPDES permits.

Allowable concentrations and mass emissions of pollutants are only set at a regional level. These set concentrations and mass emissions of pollutants are specifically allowed either through site-specific NPDES permits or through other regulatory mechanisms, such as Total Maximum Daily Loads (TMDL).

Non-point pollution sources are defined as sources originating over a wide area rather than from a definable point. Non-point pollution often enters receiving water bodies in the form of surface water runoff and is not conveyed by way of pipelines or discrete conveyances. As defined in federal regulations, non-point sources are generally exempt from the NPDES permit program requirements. However, non-point source discharges caused by general construction activities are controlled by the NPDES program.

The goal of NPDES non-point source regulations is to improve the quality of stormwater discharged to receiving waters to the “maximum extent practicable” through the use of best management practices (BMP). BMPs can include the development and implementation of various practices, including structural measures (e.g., the construction of biofiltration strips/swales, and detention basins), regulatory measures (e.g., local authority over drainage facility design), public policy measures (e.g., labeling of storm drain inlets as to the impacts of dumping on receiving waters), and educational measures (e.g., workshops informing the public of the impacts of household chemicals dumped into storm drains).

CWA federal regulations define “municipal separate storm sewer” to mean “a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains): (i) owned or operated by a State, city, town, borough, county…” Pursuant to the CWA Section 402, NPDES Permits are required and issued for discharges from a Municipal Separate Storm Sewer System (MS4) serving a population of 100,000 or more for Phase I, and serving a population of 10,000 or more for Phase II. See the Local Regulations and Guidance section below for more details on the MS4 NPDES Permit.

Groundwater

Safe Drinking Water Act of 1974 (42 U.S.C. § 300 et seq.)

The Safe Drinking Water Act of 1974 was originally passed by Congress to protect public health by regulating the nation's public drinking water supply. The act authorizes the EPA to set national health-based standards for drinking water to protect against both naturally-occurring and human-produced contaminants that may be found in drinking water. The act applies to every public water system in the U.S.

The Sole Source Aquifer Protection Program is authorized by Section 1424(e) of the act. The Sole Source Aquifer designation is a tool to protect drinking water supplies in areas where there are few or no alternative sources to the groundwater resource and where, if contamination occurred, using an alternative source would be extremely expensive. All proposed projects receiving federal funds are subject to EPA review so they do not endanger a water source.

Floodplains

Executive Order 11988 (Floodplain Management, 1977)

Executive Order 11988 (Floodplain Management) directs all federal agencies to avoid, to the maximum extent possible, long- and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Requirements for compliance are outlined in Title 23, Code of Federal Regulations, Part 650, Subpart A (23 CFR 650A) titled "Location and Hydraulic Design of Encroachment on Floodplains" (FHWA, 2015).

If the preferred alternative involves significant encroachment within the floodplain, the final environmental document (final Environmental Impact Statement [EIS] or Finding of No Significant Impact [FONSI]) must include:

- The reasons why the proposed action must be located in the floodplain;
- The alternatives considered and why they were not practicable; and
- A statement indicating whether the action conforms to applicable state or local floodplain protection standards.

National Flood Insurance Act (42 U.S.C. § 4001 et seq.) and Flood Disaster Protection Act (42 U.S.C. § 4001 to 4128)

The purpose of the Flood Disaster Protection Act of 1973 is to identify flood-prone areas and provide insurance. The act requires purchase of insurance for buildings in special flood-hazard areas. The act is applicable to any federally-assisted acquisition or construction project in an area identified as having special flood hazards. Projects should avoid construction in, or develop a design to be consistent with, Federal Emergency Management Agency (FEMA)–identified special flood-hazard areas.

The FEMA oversees the National Flood Insurance Program (NFIP), which offers federally-backed flood insurance to homeowners, renters, and business owners in communities that choose to participate in the program. Flood Insurance Studies (FIS) are typically published for each county. Within the study area, the latest FISs were published in 2018 for Alameda County.

Based on the results of the FISs, FEMA develops flood insurance rate maps (FIRM) for participating communities. The FIRMs divide communities into zones of relative flood risk severity. Flood Hazard Zones are areas inundated by the 100-year flood (i.e., 1 percent chance of annual flooding).

To be eligible for federally-backed flood insurance, a community must participate in the NFIP. Participating communities must adopt and enforce floodplain management ordinances meeting or exceeding FEMA requirements for reducing the risks of future flood damage. FEMA has set a minimum national standard, allowing no more than a 1-foot increase in base flood elevations (BFE) (whether mapped or not mapped) because of the cumulative impact of local development.

If a project will substantially alter the extent or depth of the base flood, the owner must submit supporting documentation and modeling. If the development proposal is approved by FEMA, FEMA issues a Conditional Letter of Map Revision (CLOMR). After construction is complete, as-built construction plans and modeling are submitted to FEMA, and FEMA issues a Letter of Map Revision (LOMR), which officially updates the FIRM.

Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.)/General Bridge Act of 1946 (33 U.S.C. § 525 et seq.)

The Rivers and Harbors Act of 1899 (RHA) is the primary federal law regulating activities that may affect navigation on the nation's waterways.

Section 14 of the RHA (33 U.S.C. § 408) requires USACE's permission for the use, including modifications or alterations, of any flood control facility built by the United States to prevent impairment of the usefulness of the federal facility.

Federal Emergency Management Agency Design Standards

FEMA standards are employed for design, construction, and regulation to reduce flood loss and to protect resources. Two types of standards are often employed: design criteria and performance standards.

The design criteria dictates that a provision, practice, requirement, or limit must be met (e.g., using the 1%-annual-chance flood and establishing floodway boundaries so as not to cause more than a 1-foot increase in flood stages).

A performance standard dictates that a goal is to be achieved, leaving it to the individual application as to how to achieve the goal (e.g., providing protection to the regulatory flood, keeping post-development stormwater runoff the same as pre-development, or maintaining the present quantity and quality of water in a wetland).

The 1%-annual-chance flood and floodplain have been adopted as a common design and regulatory standard in the United States. The NFIP adopted it in the early 1970s as a standard for use by all federal agencies with the issuance of Executive Order 11988. States or local agencies are free to impose a more stringent standard within their jurisdiction.

FEMA defines a regulatory floodway as:

> The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation (WSE) more than a designated height. Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations.

Code of Federal Regulations Title 44, Section 60.3(d)(3)

According to Title 44, Section 60.3(d)(3) of the *Code of Federal Regulations* (CFR), a community shall:

> Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge (United States, Federal Emergency Management Agency, Department of Homeland Security, 2002).

The community is responsible for reviewing and maintaining documentation demonstrating that any permitted floodway encroachment meets NFIP requirements. A "no-rise certification" for floodways may be used to document the analyses.

Per Title 44, Section 60.3(d)(4) of the CFR, floodway encroachments that cause an increase may be permitted, provided the community first applies for a conditional FIRM and floodway revision CLOMR and fulfills the requirements for such revisions as established under the provisions of Title 44 Section 65.12 of the CFR and receives the approval of the Floodplain Administrator (U.S. Government Publishing Office, 2002).

3.11.2.2 State

Surface Water Hydrology and Surface Water Quality

Contemporary water quality regulation began in the State of California with the Dickey Act, which was passed in 1949. The Dickey Act created the RWQCBs and the State Water Quality Control Board, which was later combined with the State Water Resources Board and became known as the SWRCB. California's Porter-Cologne Act, enacted in 1969, provides the basis for contemporary water quality regulation in the state.

In the state of California, the SWRCB now administers water rights, water pollution control, and both federal and state water quality functions throughout the state. Each of the RWQCBs is responsible for the protection of beneficial uses of water resources according to federal, state, and local regulatory requirements within its jurisdiction and each uses planning, permitting, and enforcement authorities to meet these responsibilities. In particular, the SWRCB administers statewide NPDES permits, and the RWQCBs administer local NPDES permits.

Porter-Cologne Water Quality Act

The Porter-Cologne Act significantly expanded the mandate and authority of the SWRCB and RWQCBs to regulate water quality, including the requirement of a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or otherwise) to land or surface waters that may impair a beneficial use of surface or ground water of the state.

> The Legislature finds and declares that the people of the state have a primary interest in the conservation, control, and utilization of the water resources of the state, and that the quality of all the waters of the state shall be protected for use and enjoyment by the people of the state. The Legislature further finds and declares that activities and factors which may affect the quality of waters of the state shall be regulated to attain the highest water quality, which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible. The Legislature further finds

and declares that the health, safety and welfare of the people of the state requires that there be a statewide program for the control of the quality of all the waters of the state; the state must be prepared to exercise its full power and jurisdiction to protect the quality of waters in the state from degradation originating inside or outside the boundaries of the state; the waters of the state are increasingly influenced by inter-basin water development projects and other statewide considerations. The Legislature finds that the factors of precipitation, topography, population, recreation, agriculture, industry, and economic development vary from region to region within the state, and that the statewide program for water quality control can be most effectively administered regionally within a framework of statewide coordination and policy (Porter-Cologne Water Quality Act, Chapter 1, pg. 1, 2006).

MS4 General Permit

The Union Pacific Railroad (UPRR) currently does not have any set guidelines for addressing stormwater treatment or hydromodification management. Currently runoff within UPRR's R/W is self-retaining within ballasted track sections. Any discharges from UPRR connecting to a City's or County drainage systems, shall adhere to the local Phase I Municipal Regional Permit (MRP Order R2-2022-2018, NPDES Permit No. CAS612008). Along the corridor, the project passes through the cities of Oakland, San Leandro, Hayward, Union City, Fremont, and Newark as well as unincorporated Alameda County, therefore, the San Francisco Bay RWQCB Municipal Regional Stormwater NPDES Permit (MRP) shall apply. For work proposed that crosses or discharges to BART's right of way (ROW) the non-traditional permittee Phase II MS4 NPDES will apply (Water Quality Order 2013-0001-DWQ, NPDES No. CAS000004). For any discharges connecting to Caltrans ROW or any work within their ROW shall adhere to the Caltrans NPDES Order 2022-0033-DWQ NPDES Permit No. CAS000003.

Construction General Permit

The CGP (NPDES No. CAS000002, SWRCB Order No. 2022-0057-DWQ) was adopted on September 8, 2022, and went into effect on September 1, 2023. The permit regulates stormwater discharges from construction sites that result in a disturbed soil area of one acre or greater, and/or are smaller sites that are part of a larger common plan of development. For all projects subject to the CGP, applicants are required to develop and implement an effective Storm Water Pollution Prevention Plan (SWPPP). A Water Pollution Control Plan is necessary for projects with a disturbed soil area less than 1 acre.

By law, all stormwater discharges associated with construction activity where clearing, grading, and excavation results in soil disturbance of at least one acre must comply with the provisions of the CGP. Construction activity that results in soil disturbances of less than one acre is subject to this CGP, if there is potential for significant water quality impairment resulting from the activity as determined by the RWQCB. Operators of regulated construction sites are required to develop SWPPPs; implement sediment, erosion, and pollution prevention control measures; and obtain coverage under the CGP.

The CGP separates projects into Risk Levels 1, 2, or 3. Risk Levels are determined during the planning and design phases and are based on potential erosion and transport to sensitive receiving waters. Requirements apply according to the Risk Level determined. For example, a Risk Level 3 (highest risk) project would require compulsory stormwater runoff pH and turbidity monitoring, and pre- and post-construction aquatic biological assessments during specified seasonal windows.

McAteer-Petris Act (Gov. Code § 66600 et seq.)

The McAteer-Petris Act created the San Francisco Bay Conservation and Development Commission (BCDC) to administer the policies of the federal Coastal Zone Management Act by regulating the use of land and water in the coastal zone of San Francisco Bay. BCDC regulates nearly all work, including grading, on land within 100 feet of San Francisco Bay shoreline ("shoreline band"), all areas subject to tidal action, such as sloughs and marshes, and certain designated waterways. BCDC carries out its "federal consistency" responsibilities by reviewing federal projects much as it reviews permit applications. The BCDC issues four types of permits: major permits, administrative permits, emergency permits, and region-wide permits.

The agency's decision to grant or deny a permit for the project is guided by the McAteer-Petris Act's provisions and the standards set out in the San Francisco Bay Plan (Bay Plan) (BCDC 2021). BCDC is authorized to regulate fill or dredge in the San Francisco Bay and development of the shoreline band. The McAteer-Petris Act created broad circumstances under which a permit is required by providing that any person wishing to place fill, extract materials, or make any substantial change in the use of water, land, or structures within areas subject to BCDC's jurisdiction obtain a permit. The term fill is defined broadly to include not only earth and other materials, but pilings, structures placed on pilings, and floating structures. BCDC is authorized to issue a permit for fill in the Bay if it determines that the issuance of the permit would be consistent with the provisions of the Act and with the policies established for the Bay Plan or if BCDC determines that the activity to be permitted is necessary for the health, safety, or welfare of the public in the entire Bay Area. Pursuant to Section 66605 of the McAteer-Petris Act, BCDC must determine if the proposed fill in the Bay: (1) is for a water-oriented use and provides public benefits that outweigh the adverse impacts from the loss of open water areas; (2) there is no alternative upland location available for the proposed action; (3) the fill would be the minimum amount necessary to achieve the purpose of the proposed action; (4) the nature, location, and extent of fill minimizes harmful effects on the Bay; (5) the fill is constructed in accordance with sound safety standards.

The McAteer-Petris Act also provides that a permit must be obtained from BCDC prior to undertaking construction activities within the shoreline band jurisdiction. In addition, for permitting purposes, the McAteer-Petris Act allows for areas associated with the shoreline band to be designated by BCDC for priority uses. Within such areas, the proposed use must be consistent with the priority uses specified for the designated area.

For any locations confirmed to be within BCDC jurisdiction, the proposed Project would need to obtain the appropriate permit from BCDC. To obtain a permit for development within the shoreline band, the proposed Project must provide for maximum feasible public access to the Bay and the shoreline. BCDC requires those portions of a project in San Francisco Bay and the shoreline band to plan for and adapt to sea level rise caused by global climate change. BCDC updated their San Francisco Bay Plan Climate Change Policy Guidance (Guidance) in July 2021. The Guidance provides non-regulatory, but interpretive, information to assist in the development of prospective projects in relation to the requirements of the Climate Change policies with permit applicants, local jurisdictions, and the public at large. Further discussion of sea level rise impacts as an aspect of the permit determination for the proposed Project is included in Chapter 4.

Groundwater

California Safe Drinking Water Act (Cal. Health and Safety Code § 116270)

The federal Safe Drinking Water Act requires states to obtain and maintain primary enforcement responsibility for public water systems. Thus, the California Safe Drinking Water Act was developed to meet this criterion of the federal counterpart. The California Safe Drinking Water Act improves the minimum requirements of the federal Safe Drinking Water Act and established primary drinking water standards that are at least as stringent. Because groundwater is used by the Alameda County Water District (ACWD) as a source and East Bay Municipal Utility District as a supplemental source of drinking water, the Safe Drinking Water Act may apply if the groundwater aquifers in the vicinity of the Resource Study Area are impacted by construction activities for this Project.

Sustainable Groundwater Management Act (Senate Bill 1168, Assembly Bill 1739, and Senate Bill 1319)

On September 16, 2014, Governor Edmund G. Brown Jr. signed historic legislation to strengthen local management and monitoring of groundwater basins most critical to the state's water needs. The three bills, Senate Bill 1168 (Pavley), Assembly Bill 1739 (Dickinson), and Senate Bill 1319 (Pavley), together makeup the Sustainable Groundwater Management Act (SGMA). SGMA establishes phased requirements for high- and medium-priority basins to adopt groundwater sustainability plans, depending on whether a basin is in critical overdraft. SGMA requires locally controlled groundwater sustainability agencies to adopt groundwater sustainability plans by January 31, 2020, for all high- or medium-priority basins in overdraft condition, and by January 31, 2022, for all other high- and medium-priority basins unless the basin is legally adjudicated or otherwise managed sustainably.

Floodplains

California's National Flood Insurance Act

In the state of California, nearly all of the state's flood-prone communities participate in the NFIP, which is locally administered by the California Department of Water Resources' (DWR) Division of Flood Management. Under California's NFIP, communities have a mutual agreement with the state and federal government to regulate floodplain development according to certain criteria and standards, which is further detailed in the NFIP.

Cobey-Alquist Flood Plain Management Act (Cal. Water Code § 8400 et seq.)

The Cobey-Alquist Flood Plain Management Act encourages local governments to adopt and enforce land use regulations to implement floodplain management. It also provides state assistance and guidance for flood control.

3.11.2.3 Regional

Surface Water Hydrology and Surface Water Quality

San Francisco Bay Regional Water Quality Control Board Municipal Regional Permit

For the proposed Project improvements that are or will be owned and/or maintained by local jurisdictions (e.g. at-grade crossings, grade separations, and stations) and for the bridge crossings

over local jurisdiction ROW that are owned and maintained by UPRR, the proposed Project would comply with the requirements of the San Francisco Bay RWQCB Municipal Regional Stormwater NPDES Permit (MRP) (Order R2-2022-2018, NPDES Permit No. CAS612008). The MRP provides waste discharge requirements for the discharge of stormwater runoff from the MS4s in the cities of Alameda, Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Newark, Oakland, Piedmont, Pleasanton, San Leandro, and Union City and unincorporated portions of Alameda County.

Alameda Countywide Clean Water Program C. 3 Stormwater Technical Guidance

The Alameda County Flood Control and Water Conservation District (ACFCWCD) and Zone 7 of the ACFCWCD joined together to form the Alameda Countywide Clean Water Program (ACCWP).The ACCWP developed the *C.3 Stormwater Technical Guidance* (2023) to fulfill the post-construction stormwater treatment requirements of the MRP and provide guidance for low-impact development design strategies and specific BMP selection criteria. This manual provides technical guidance for project designs that require the implementation of permanent stormwater BMPs and hydromodification assessment, susceptibility, and management measures throughout Alameda County. Selection, placement, and design of stormwater treatment BMPs within these areas would adhere to the guidance document.

Alameda County Hydrology and Hydraulics Manual

Because the proposed Project is within Alameda County, the proposed Project design should adhere to the guidelines set forth by the most current version of the *Alameda County Hydrology and Hydraulics Manual* (2018), available through the ACFCWCD website.

Groundwater

Dewatering Activities

Within the jurisdiction of the San Francisco Bay RWQCB, dewatering activities are often regulated under one of the following general NPDES waste discharge requirement permits:

- Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Volatile Organic Compounds (VOC), Fuel Leaks and Other Related Wastes (VOC and Fuel General Permit), Order No. R2-2017-0048, NPDES No. CAG912002.
- Discharge or Reuse of Extracted Brackish Groundwater, Reverse Osmosis Concentrate Resulting from Treated Brackish Groundwater, and Extracted Groundwater from Structural Dewatering Requiring Treatment (Groundwater General Permit), Order No, R2-2018-0026, NPDES No. CAG912004.

The VOC and fuel general permit are used for the treatment and discharge of groundwater contaminated with VOCs and petroleum hydrocarbons at construction or remediation sites. The Groundwater General Permit is typically used for long-term structural dewatering of more than 10,000 gallons per day or aquifer reclamation activities requiring reverse osmosis.

Alameda County Water District Groundwater Management Policy

It is the policy of the ACWD to efficiently protect and manage the Niles Cone Groundwater Basin to ensure a reliable supply of high-quality water that satisfies present and future municipal, industrial, recreational, and agricultural water needs in the ACWD service area.

The ACWD adopted the ACWD Groundwater Management Policy in 1989 (amended in 2001) to protect and improve the ACWD's groundwater resources for the benefit of both ACWD's customers and private well owners. The objectives of the ACWD Groundwater Management Policy are to increase groundwater replenishment capability; increase usable storage capacity of the groundwater basin; operate the basin to provide a reliable water supply to meet baseload and peak distribution system demands, emergent source of supply, and reserve storage to augment dry year supplies; and to protect groundwater quality from all sources. It also aims to improve the groundwater quality by removing salts and other contaminants and improving the water quality of source water used for groundwater recharge.

Floodplains

Cobey-Alquist Flood Plain Management Act (Cal. Water Code § 8400 et seq.)

The Cobey-Alquist Flood Plain Management Act encourages local governments to adopt and enforce land use regulations to implement floodplain management. It also provides state assistance and guidance for flood control.

Alameda County Floodplain Data

As part of the NFIP, typically, each county (or community) has a FIS (FEMA, 2018a), which is used to locally develop FIRMs and BFE. The FIS volumes for the proposed Project limits are 06001CV001B, 06001CV002B, and 06001CV003B.

The ACFCWCD is responsible for flood control management for Alameda County.

3.11.2.4 Consistency with Plans, Policies, and Regulations

For improvements that are or will be owned and/or maintained by local jurisdictions (e.g., at-grade crossings, grade separations, and stations) and for the railroad bridge crossings over the local jurisdiction's ROW, which are owned and maintained by UPRR, the proposed Project would also comply with the regulations set forth by the general plans, municipal codes and ordinances within the cities of Oakland, San Leandro, Castro Valley, Hayward, Fremont, Union City, and Newark as well as Alameda County. Refer to Appendix F for other related local policies.

3.11.3 Methods for Evaluating Environmental Impacts

This section defines the RSA for hydrology and water quality and describes the methods used to analyze the impacts on hydrology and water quality, groundwater, and floodplains within the RSA.

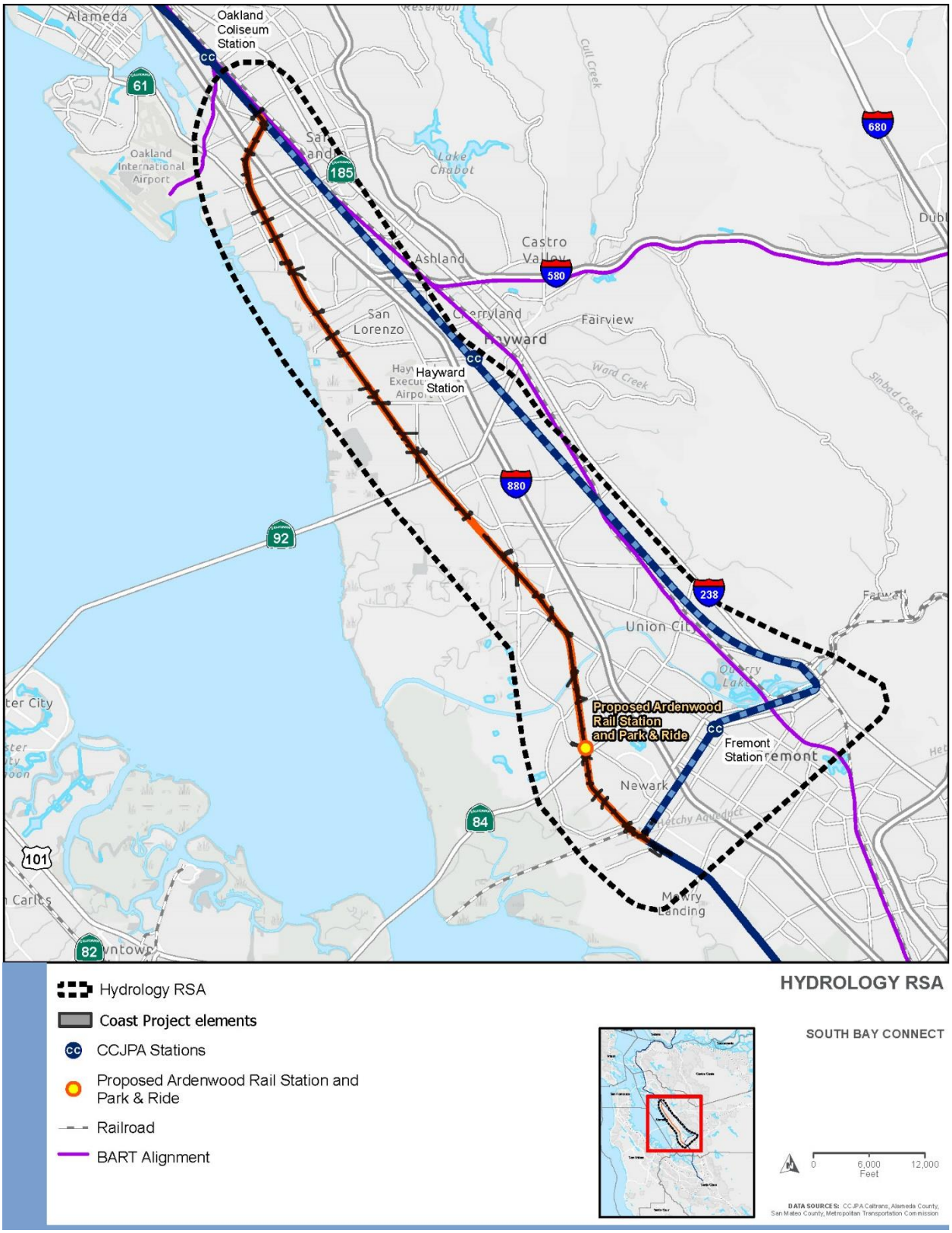
3.11.3.1 Resource Study Area

As defined in Section 3.1, Introduction, RSAs are the geographic boundaries within which the environmental investigations specific to each resource topic were conducted. The hydrology and water quality RSA covers water bodies, groundwater basins, and floodplains that fall within a

boundary extending 0.25 mile upstream of the Niles Subdivision and 1 mile downstream of the Coast Subdivision. See Figure 3.11-1 for the hydrology and water quality RSA for the proposed Project.

The proposed Project is divided into three sections: North (MP 18.38 at Grant Avenue in the unincorporated area of San Lorenzo to approximately MP 13.15 just north of 98th Street in the city of Oakland), Central (from MP 25.25 to MP 25.26 at Smith Street in the city of Union City to MP 18.48 at Grant Avenue in the unincorporated area of San Lorenzo), and South (from MP 31.64 at the southern end of the proposed Project area in the city of Newark to MP 25.25 between MP 25.26 at Smith Street in the city of Union City).

Figure 3.11-1. Hydrology RSA



3.11.3.2 Data Sources

Table 3.11-1 lists the information sources referenced (and associated geographic information system [GIS] data) to describe the affected environment.

Table 3.11-1. Summary of Data Sources

Data Source	Name/Description of Source(s)
Climate, Precipitation, and Topography	
U.S. Geological Survey	The National Map Viewer 2016
Western Regional Climate Center	Period of Record Monthly Summary in Oakland (046332), Oakland Metro INTL AP (0463350), Newark (046144) (2006)
United States Department of Agriculture Natural Resources Conservation Service National Water and Climate Center	Climate Report at Hayward Air Terminal (2019)
Surface Water Hydrology	
Alameda County Clean Water Program (ACCWP)	*C.3 Stormwater Technical Guidance Manual Version 8.* (2023)
ACCWP	Hydro Modification Susceptibility Map (2019)
ACFCWCD	*Alameda County Hydrology and Hydraulics Manual* (2023)
California Department of Forestry and Fire Protection	Calwater 2.2.1 Watershed Boundaries GIS data (2013)
Surface Water Quality	
San Francisco Bay RWQCB	*Water Quality Control Plan Basin Plan for the San Francisco Bay Basin* (2023)
SWRCB	*2020–2022 California Integrated Report* (Clean Water Act Section 303(d) List and 305(b) Report) (2022)

Table 3.11-1. Summary of Data Sources

Data Source	Name/Description of Source(s)
Groundwater	
DWR	California's Groundwater Bulletin 118 and GIS Data (2004a, 2004b, 2004c, 2004d, 2004e, 2004f, 2006, 2020); Water Management Planning Tool (2015)
SWRCB	GeoTracker Database (2021)
SWRCB	Groundwater Ambient Monitoring & Assessment Program (2021)
U.S. Geological Survey (USGS). National Water Information System.	National Water Information System. Groundwater Levels for California (2021)
Floodplains	
FEMA	FIS Number 06001C0256G (2009a) FIS Number 06001C0286G (2009b) FIS Number 06001C0287G (2009c) FIS Number 06001C0288G (2009d) FIS 06001C0289G (2009e) FIS Number 06001C0293G (2009f) FIS Number 06001C0427G (2009g) FIS Number 06001C0429G (2009h) FIS Number 06001C0431G (2009i) FIS Number 06001C0432G (2009j) FIS Number 06001C0433G (2009k) FIS Number 06001C0434G (2009l) FIS Number 06001C0441G (2009m) FIS Number 06001C0443G (2009n) FIS Number 06001C0455G (2009o) FIS Number 06001C0461G (2009p) Guidelines for Implementing Executive Order 11988, Floodplain Management, and Executive Order 13690, Establishing a Federal

Table 3.11-1. Summary of Data Sources

Data Source	Name/Description of Source(s)
	Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input (2015a) Federal Flood Risk Management Standard (FFRMS) (2015b) FIS 06001CV001B for Alameda County (2018a) FIS Number 06001C0258H (2018b) FIS Number 06001C0266H (2018c) FIS Number 06001C0267H (2018d) FIS Number 06001C0269H (2018e)
California Emergency Management Agency, California Geological Survey, and University of Southern California	Tsunami Inundation Maps for Emergency Planning State of California (2021)
USACE	4.1.0. (ACFCC | Run Info: 1D/subcrit/steady state/32,000cfs 100yr/debris included)
FEMA/USACE – Effective Models	Hydraulic Engineering Center's River Analysis System (HEC-RAS), Version 5.0.3 (Zone 5 Line K | Run Info: 1D/subcrit/steady state/1600cfs 100yr) Hydraulic Engineering Center's River Analysis System (HEC-RAS), Version 5.0.6 (Zone 5 Line H | Run info: 1D/subcrit/steady state/610cfs 100yr)
ACFCWCD/USACE	Hydraulic Engineering Center's River Analysis System (HEC-RAS), Version 5.0.7 (ACFCC | Run Info: 1D-2D coupled/unsteady/34,100cfs 100yr peak)
HDR|WRECO	Preliminary Alameda Creek HEC-RAS Model

Thirty-six (36) crossings of creeks and waterways are present in the RSA. Sixteen of these have either no proposed improvements or are not within the 100-year floodplain. CCJPA requested hydraulic models for the other 20 creeks and waterways. Fifteen of these 20 models were requested from FEMA and ACFCWCD because the waterways fall in both the regulated FEMA floodway and ACFCWCD jurisdiction.

All 20 creek models were requested from FEMA in 2022 and 2023; model data for five creeks was provided to CCJPA by March 2023. Modeling data from FEMA for the remaining 15 creek crossings that were requested is unavailable.

Requests for 15 creek models within ACFCWCD jurisdiction were made between October 2021 and October 2023; model data for one creek (ACFCC) was provided to CCJPA in 2023. Modeling data from ACFCWCD for the remaining 14 creek crossings that were requested is unavailable.

Of the 20 proposed Project creek crossings, six effective models have been obtained from FEMA and ACFCWCD. These models were analyzed under assumed proposed Project conditions to conduct a quantitative assessment of the proposed Project impacts, where feasible. LiDAR data, existing infrastructure construction As-Builts, and other available information has been sourced as needed and documented in Table 3.11-1 above.

For the 14 creek crossings within floodplains and floodways[1] where effective models were not available, qualitative assessments were conducted on the potential for proposed Project impacts. A summary of the creek crossings and the model data available is presented in Table 3.11-2.

Table 3.11-2. Models Requested and Agency Response

Name of Creek Crossing	Agency Contacted	Model Data Available	Notes Regarding Data Provided
Zone 2 Line K (Sulphur Creek)	FEMA	Yes	HEC-2 v4.6.2 Model
	ACFCWCD	No	Data unavailable
Zone 5 Line K (Crandall Creek)	FEMA	Yes	HEC-RAS v5.0.3 Model
	ACFCWCD	No	Data unavailable
Zone 3A Line A (Old ACFCC))	FEMA	Yes	HEC-2 v4.6.2 Model received
	ACFCWCD	No	Data unavailable
ACFCC1	FEMA	No	Data unavailable
	ACFCWCD	Yes	HEC-RAS Model. See footnote 1 below.
Line P (San Leandro Creek)	FEMA	No	HEC-2 PDF illegible
	ACFCWCD	No	Data unavailable
Zone 5 Line H	FEMA	Yes	HEC-2 PDF

[1] A floodway is all or a portion of a floodplain that would be inundated under a 100-year flood (base flood) as designated by the local floodplain manager. To avoid impacts related to flooding, FEMA and the local agencies require that an encroachment into a floodplain not increase the WSE of the 100-year flood by more than 1 foot in floodplains and have no increase in regulatory floodways.

Table 3.11-2. Models Requested and Agency Response

Name of Creek Crossing	Agency Contacted	Model Data Available	Notes Regarding Data Provided
	ACFCWCD	No	Data unavailable
Line N (Stonehurst Creek)	FEMA	No	HEC-2 PDF illegible
	ACFCWCD	No	Data unavailable
Zone 4 Line A	FEMA	No	Data unavailable
	ACFCWCD	No	Data unavailable
Zone 3A Line B (Ward Creek)	FEMA	No	Data unavailable
	ACFCWCD	No	Data unavailable
Zone 3A Line D	FEMA	No	Data unavailable
	ACFCWCD	No	Data unavailable
Zone 3A Line E	FEMA	No	Data unavailable
	ACFCWCD	No	Data unavailable
Zone 3A Line A-2	FEMA ACFCWCD	No	Data unavailable
Bockman Canal/Line N (tributary to SF Bay)	FEMA ACFCWCD	No	Data unavailable
Unnamed crossing 0.3 miles south of Line N	FEMA ACFCWCD	No	Data unavailable
	FEMA	No	Data unavailable

Table 3.11-2. Models Requested and Agency Response

Name of Creek Crossing	Agency Contacted	Model Data Available	Notes Regarding Data Provided
Unnamed crossing 0.08 miles south of Dyer Street	ACFCWCD		
Zone 2 Line A	FEMA	No	Data unavailable
	ACFCWCD		
Zone 5 Line M	FEMA	No	Data unavailable
	ACFCWCD		
Zone 2 Line B (San Lorenzo Creek)	FEMA	No	Data unavailable HEC-RAS v4.1.0 Model
	ACFCWCD	Yes	
Zone 5 Line F-1	FEMA	No	Data unavailable
	ACFCWCD		
Unnamed crossing 0.2 miles south of Zone 2 Line A	FEMA	No	Data unavailable
	ACFCWCD		

Note: ACFCC=Alameda Creek Flood Control Canal
1- The ACFCC existing condition HEC-RAS model is from one of the latest studies by ACFCWCD, the model was developed from various sources of information for high level planning purposes. ACFCWCD does not guarantee the hydraulic model accuracy and/or the background data used for the model development.

3.11.3.3 CEQA Thresholds

For this analysis, the proposed Project would result in a significant impact on hydrology and water quality if it would:

a. Violate water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.

b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin.

c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

   1) Result in substantial erosion or siltation on- or off-site.

   2) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.

   3) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

   4) Impede or redirect flood flows.

d. Risk release of pollutants due to Project inundation in flood hazard, tsunami, or seiche zones.

e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

3.11.4 Affected Environment

3.11.4.1 Environmental Setting

Regional Setting

The surface water hydrology, surface water quality, groundwater, and floodplains in the RSA are described in the following subsections. This information provides the context for the environmental analysis and the evaluation of impacts.

Climate, Precipitation, and Topography

The RSA is located in the western part of Alameda County from Oakland to Newark. The topography generally slopes moderately downward to the west. The UPRR Coast Subdivision lays on flat terrain by the San Francisco Bay. The elevation of the RSA varies from sea level (0 feet) to about 50 feet (USGS 2021).

The proposed Project area has a Mediterranean climate, characterized by mild, moist winters and hot, dry summers. Climate summary reports for the proposed Project area were obtained from the Western Regional Climate Center Website for Station Oakland, Oakland Metro INTL AP, and Newark, and United States Department of Agriculture Natural Resources Conservation Service National Water and Climate Center Website for Station Hayward. Mean maximum temperature ranges from 54 to 98 degrees Fahrenheit (°F), mean minimum ranges from 33 to 49, and mean total rainfall ranges from 14.31 to 22.61 inches (Western Regional Climate Center; United States Department of Agriculture Natural Resources Conservation Service National Water and Climate Center 2021). The maximum average temperature reported for the RSA is 79.7 Fahrenheit degree in September, and minimum average temperature is 39.6 Fahrenheit degree in January. The RSA generally experiences precipitation between October and May. The average annual precipitation is 17.3 inches with January being the wettest month at an average of 3.6 inches and July being the driest month with an average of 0.02 inch.

Surface Water Hydrology and Water Quality

Regional Hydrology

According to the Watershed Boundary Dataset defined by the USGS, the proposed Project is contained wholly in the San Francisco Bay Hydraulic Basin. The proposed Project is within two subbasins, the San Francisco Bay and Coyote Subbasins (18050004 and 18050003 respectively), which together contain four watersheds that overlap with the proposed Project: San Lorenzo Creek (106,303 acres), Alameda Creek (86,666 acres), Aqua Caliente Creek (40,752 acres), and San Francisco Bay (202,981 acres).

Another watershed delineation for California exists as the California Interagency Watershed Map of 1999, known today as Calwater 2.2.1. This dataset, defined by DWR, integrates administrative and legal boundaries and is more accurate in mountainous terrain. There are two Calwater Watersheds in the RSA. Specifically, these are defined as California Department of Fish and Wildlife Super Planning Watersheds (CDFSPW). The RSA also contains two Hydrologic Areas and two Hydrologic Sub-Areas, which are listed in Table 3.11-3.

Table 3.11-3. Hydrologic Units, Areas and Sub-Areas in RSA

Hydrologic Unit	Hydrologic Area	Hydrologic Sub-Area (has)	Area (in acres)	CDFSPW Name
Santa Clara	East Bay Cities	undefined HSA, #204.20	320.5	Oakland
				Don Castro Reservoir
				Lake Chabot
Santa Clara	Fremont Bayside	undefined HSA, #205.20	10,988.6	Newark Slough

Source: CALFIRE 2013

According to the ACFCWCD's "Explore Watersheds" Webpage (2017), the RSA lies across Elmhurst Creek Watershed, San Leandro Creek Watershed, San Leandro Marina Watershed, Estudillo Canal Watershed, San Lorenzo Creek Watershed, Bockman Canal Watershed, Hayward Landing Watershed, Old Alameda Creek Watershed, Alameda Creek Watershed, Newark Slough Watershed, Plummer Creek Watershed, and Mowry Slough Watershed.

Receiving Waterbodies and Waterway Crossings

Creeks designated by the ACFCWCD within the hydrology and water quality RSA are presented in Table 3.11-4. Each of the proposed Project's receiving water bodies is listed in Table 3.11-5 and shown in Figure 3.11-2.

Table 3.11-4. Receiving Waterbodies and Waterway Crossings

Receiving Waterbodies and Waterway Name	FEMA designated Line Name	Type of Channel
Coast - North		
Estudillo Canal/San Leandro Creek	Zone 2 Line A	Engineered Channel
San Lorenzo Creek	Zone 2 Line B	Engineered Channel
Elmhurst Creek	Line M	Natural Channel
San Leandro Creek	Line P	Natural Channel
Stonehurst Creek	Line N	Natural Channel
N/A	A crossing of an unnamed creek 0.2 mile south of Zone 2 Line A	Natural Channel
Coast - Central		
Sulphur Creek	Zone 2 Line K	Natural Channel
Old ACFCC	Zone 3A Line A	Natural Channel
Bockman Canal	Line N	Natural Channel
N/A	A crossing of an unnamed creek 0.3 mile south of Line N (Tributary to SF Bay)	Natural Channel
N/A	Zone 4 Line A	Natural Channel

Table 3.11-4. Receiving Waterbodies and Waterway Crossings

Receiving Waterbodies and Waterway Name	FEMA designated Line Name	Type of Channel
N/A	Zone 3A Line A-2	Natural Channel
Coast - South		
Alameda Creek Flood Control Channel/Alameda Creek	N/A	Natural Channel
N/A	A crossing of an unnamed creek 0.08 mile south of Dyer Street	Natural Channel
Crandall Creek	Zone 5 Line K	Natural Channel
N/A	Zone 5 Line H	Engineered Channel
Plummer Creek	Zone 5 Line F-1	Engineered Channel

Source: FEMA, 2018

Table 3.11-5. Proposed Project Watersheds and Receiving Water Bodies

Hydrologic Region	Hydrologic Unit(s)	Hydrologic Area(s)	Planning Watersheds	Local Watersheds	Receiving Water Body
Coast Subdivision - North Section					
San Francisco Bay	South Bay	East Bay Cities (HUC-8 18050004)	Undefined (Oakland Planning Watershed)	Elmhurst Creek Watershed	Elmhurst Creek
				San Leandro Creek Watershed	Stonehurst Creek
					San Leandro Creek/Line P
				Oyster Point Watershed	San Francisco Bay
				San Leandro Marina Creek Watershed	San Francisco Bay
				Estudillo Canal Watershed	Estudillo Canal/San Leandro Creek/Zone 2 Line A
				San Lorenzo Creek Watershed	San Lorenzo Creek
				Bockman Canal Watershed	Bockman Canal

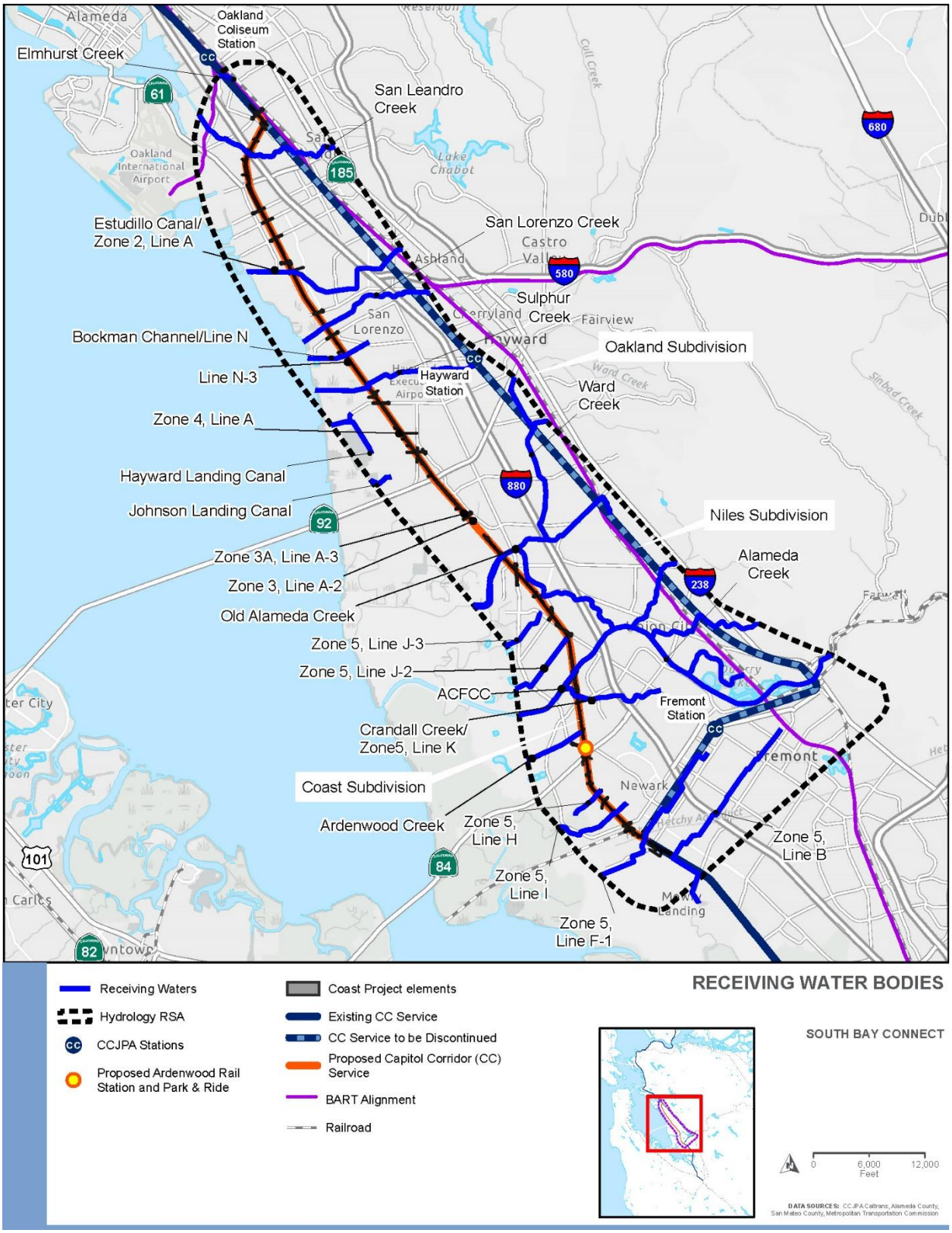
Table 3.11-5. Proposed Project Watersheds and Receiving Water Bodies

Hydrologic Region	Hydrologic Unit(s)	Hydrologic Area(s)	Planning Watersheds	Local Watersheds	Receiving Water Body
Coast Subdivision - Central Section					
San Francisco Bay	South Bay	East Bay Cities (HUC-8 18050004)	Undefined (Oakland Planning Watershed)	Lower Sulphur Creek Watershed	Sulphur Creek(west)
				Hayward Landing Watershed	Hayward Landing Canal
					Zone 4 Line A
				Old Alameda Creek Watershed	Zone 3A Line A-3 Engineered Channel
				Johnson Landing Watershed	Johnson Landing Canal
				Old Alameda Creek Watershed	Old Alameda Creek
					Zone 5 Line J-3 Engineered Channel

Table 3.11-5. Proposed Project Watersheds and Receiving Water Bodies

Hydrologic Region	Hydrologic Unit(s)	Hydrologic Area(s)	Planning Watersheds	Local Watersheds	Receiving Water Body
Coast Subdivision - South Section					
San Francisco Bay	South Bay	East Bay Cities (HUC-8 18050004)	Undefined (Oakland Planning Watershed)	Zone 5 Line J-2 Subwatershed - part of the Alameda Creek Watershed	Zone 5 Line J-2 Engineered Channel (to Alameda Creek Flood Control Channel)
				Crandall Creek Subwatershed - part of the Alameda Creek Watershed	Ardenwood Creek
	Santa Clara	Fremont Bayside (HUC-8 18050003)	Newark Slough (Undefined Planning Watershed)	Newark Slough Watershed	Zone 5 Line H Engineered Channel (to Newark Slough)
					Zone 5 Line I Engineered Channel (to Newark Slough)
				Plummer Creek Watershed	Zone 5 Line F-1 Engineered Channel (to Plummer Creek)
					Zone 5 Line B Engineered Channel (to Mowry Slough)

Figure 3.11-2. Proposed Project Receiving Water Bodies



Beneficial Uses and Water Quality Objectives

The San Francisco Bay RWQCB developed a watershed planning document, called the Basin Plan (2023), which establishes a list of beneficial uses for aquatic resources. Beneficial uses are the useful resources, services, and qualities that certain aquatic resources provide. In addition, the Basin Plan lays out standards, called water quality objectives, that all aquatic resources must meet to preserve the established beneficial uses. When aquatic resources consistently fail to meet a water quality objective, the San Francisco Bay RWQCB must develop and implement a program designed to control sources of pollution through regulatory mechanisms to repair aquatic resources, attain water quality objectives, and support its beneficial uses.

The Basin Plan (San Francisco Bay RWQCB, 2023) does not list the beneficial uses for several of the receiving water bodies outlined below; however, the Basin Plan states that "the beneficial uses of any specifically identified water body generally apply to all its tributaries." Therefore, the beneficial uses of the main streams of creeks that are listed would also apply to their tributaries. See Table 3.11-6 for beneficial uses for receiving water bodies.

Table 3.11-6. Listed Beneficial Uses for Receiving Water Bodies

Subdivision	Receiving Water Body	Existing Beneficial Uses
Coast – North Section	Elmhurst Creek (tributary to San Leandro Bay)	COMM, EST, MIGR, RARE, WILD, REC-1, REC-2, NAV
Coast – North Section	Stonehurst Creek/Line N (tributary to San Leandro Creek)	FRSH, COLD, MIGR, RARE, SPWN, WARM, WILD, REC-1, REC-2
Coast – North Section	San Leandro Creek/Line P	FRSH, COLD, MIGR, RARE, SPWN, WARM, WILD, REC-1
Coast – North Section	San Francisco Bay	IND, COMM, SHELL, EST, MIGR, RARE, SPWN, WILD, REC-1, REC-2, NAV
Coast – North Section	Estudillo Canal/Zone 2 Line A	WARM, WILD, REC-1, REC-2
Coast – North Section	San Lorenzo Creek/Zone 2 Line B	MUN, FRSH, GWR, COLD, MIGR, SPWN, WARM, WILD, REC-1, REC-2
Coast – North Section	Bockman Canal/Line N (tributary to San Francisco Bay)	IND, COMM, SHELL, EST, MIGR, RARE, SPWN, WILD, REC-1, REC-2, NAV
Coast – Central Section	Sulphur Creek	WARM, WILD, REC-1, REC-2

Table 3.11-6. Listed Beneficial Uses for Receiving Water Bodies

Subdivision	Receiving Water Body	Existing Beneficial Uses
Coast – Central Section	Hayward Landing Canal (tributary to San Francisco Bay)	IND, COMM, SHELL, EST, MIGR, RARE, SPWN, WILD, REC-1, REC-2, NAV
Coast – Central Section	Zone 3A Line A-3 Engineered Channel (tributary to Old Alameda Creek)	EST, WILD, REC-1, REC-2
Coast – Central Section	Johnson Landing Canal (tributary to San Francisco Bay)	IND, COMM, SHELL, EST, MIGR, RARE, SPWN, WILD, REC-1, REC-2, NAV
Coast – Central Section	Zone 3A Line A (tributary to Old Alameda Creek)	EST, WILD, REC-1, REC-2
Coast – Central Section	Zone 5 Line J-3 Engineered Channel (tributary to Alameda Creek)	AGR, GWR, COMM, COLD, MIGR, RARE, SPWN, WARM, WILD, REC-1, REC-2
Coast – South Section	Zone 5 Line J-2 Engineered Channel (tributary to Alameda Creek)	AGR, GWR, COMM, COLD, MIGR, RARE, SPWN, WARM, WILD, REC-1, REC-2
Coast – South Section	Ardenwood Creek (tributary to Alameda Creek)	AGR, GWR, COMM, COLD, MIGR, RARE, SPWN, WARM, WILD, REC-1, REC-2
Coast – South Section	Zone 5 Line H Engineered Channel (tributary to Newark Slough)	EST, RARE, WILD, REC-1, REC-2
Coast – South Section	Zone 5 Line I Engineered Channel (tributary to Newark Slough)	EST, RARE, WILD, REC-1, REC-2
Coast – South Section	Zone 5 Line F-1 Engineered Channel (tributary to Plummer Creek)	EST, RARE, WILD, REC-1, REC-2
Coast – South Section	Zone 5 Line B Engineered Channel (tributary to Mowry Slough)	EST, RARE, WILD, REC-1, REC-2

Notes: AGR = agricultural supply; COLD = cold freshwater habitat; COMM = commercial, and sport fishing; EST = estuarine habitat; FRSH = freshwater replenishment; GWR = groundwater recharge; IND = industrial service supply; MIGR = fish migration; MUN = municipal and domestic supply; NAV = navigation; PRO = industrial process supply; RARE = preservation of rare and endangered species; REC-1 = water contact recreation; REC-2 = noncontact water recreation; SPWN = fish spawning; WARM = warm freshwater habitat; WILD = wildlife habitat

Source: San Francisco Bay RWQCB, 2023.

Water Quality Objectives

According to the Basin Plan (San Francisco Bay RWQCB 2023), the overall goals of the water quality regulations are to protect and maintain thriving aquatic ecosystems and the resources those systems provide to the society and to accomplish these in an economically and socially sound manner. The San Francisco Bay RWQCB establishes and enforces Waste Discharge Requirements (WDR) for point and nonpoint source of pollutant levels necessary to meet numerical and narrative water quality objectives. See Table 3.11-7 for the descriptions of the surface water quality objectives from the Basin Plan.

Table 3.11-7. Surface Water Quality Objectives (San Francisco Bay RWQCB)

Parameter	Surface Water Quality Objective
Bacteria	Water quality objectives for bacteria in Table 3-1 of the basin plan shall be strictly applied except when otherwise provided for in a TMDL.
Bioaccumulation	Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life.
Biostimulatory Substances	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.
Color	Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses.
Dissolved Oxygen	In waters with the beneficial use of COLD, dissolved oxygen may not be depressed below 7.0 milligrams per liter. In waters with the beneficial use of WARM, dissolved oxygen may not be depressed below 5.0 milligrams per liter. The basin plan also contains dissolved oxygen objectives for tidal waters.
Floating Materials	Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.
Oil and Grease	Waters shall not contain oils, greases, waxes, or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses.

Table 3.11-7. Surface Water Quality Objectives (San Francisco Bay RWQCB)

Parameter	Surface Water Quality Objective
Population and Community Ecology	All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce significant alterations in population or community ecology or receiving water biota. In addition, the health and life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ significantly from those for the same waters in areas unaffected by controllable water quality factors.
pH	The pH shall not be depressed below 6.5 nor raised above 8.5. This encompasses the pH range usually found in waters within the basin. Controllable water quality factors shall not cause changes greater than 0.5 units in normal ambient pH levels.
Radioactivity	Radionuclides shall not be present in concentrations that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life. Waters designated with the beneficial use of MUN shall not contain concentrations of radionuclides in excess of the limits specified in Table 4 of Section 64443 (Radioactivity) of Title 22 of the California Code of Regulations.
Salinity	Controllable water quality factors shall not increase the total dissolved solids or salinity of waters of the state so as to adversely affect beneficial uses, particularly fish migration and estuarine habitat.
Sediment	The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Controllable water quality factors shall not cause a detrimental increase in the concentrations of toxic pollutants in sediments or aquatic life.
Settleable Material	Waters shall not contain substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses.
Suspended Material	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
Sulfide	All water shall be free from dissolved sulfide concentrations above natural background levels.
Tastes and Odors	Waters shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, that cause nuisance, or that adversely affect beneficial uses.

Table 3.11-7. Surface Water Quality Objectives (San Francisco Bay RWQCB)

Parameter	Surface Water Quality Objective
Temperature	The natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated to the satisfaction of the regional board that such alteration in temperature does not adversely affect beneficial uses. In waters with the beneficial uses of WARM or COLD, the temperature shall not be increased by more than 5° Fahrenheit (2.8° Celsius) above natural receiving water temperature.
Toxicity	All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms.
Turbidity	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity relatable to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 Nephelometric turbidity units.
Un-Ionized Ammonia	The discharge of wastes shall not cause receiving waters to contain concentrations of un-ionized ammonia in excess of the following limits (in milligrams per liter as Nitrogen): annual median: 0.025; maximum, central bay and upstream: 0.16; maximum, lower bay: 0.4.
Chemical Constituents	Waters shall not contain chemical constituents in concentrations that negatively affect beneficial uses. The basin plan contains numerical water quality objectives for specific chemical constituents for specific stream types, aquatic resources, watersheds, tidal areas, and beneficial uses. See the tables in Chapter 3 of the Basin Plan for more information.

Notes: COLD = cold freshwater habitat; MUN = municipal and domestic supply; WARM = warm freshwater habitat
Source: San Francisco Bay RWQCB, 2023

Clean Water Act Section 303(d) List and Total Maximum Daily Loads

A TMDL is a regulatory response initiated by an RWQCB to quantify and enforce the maximum amount of a pollutant that may be discharged to an aquatic resource such that it continues to meet water quality objectives and support its beneficial uses. If an RWQCB can address the impairment through other regulatory means, a TMDL may not be developed and implemented. The 2020-2022 California Integrated Report (CWA Section 303[d]-listed / 305[b] Report) lists several water bodies that have water quality impairments and TMDLs. See Table 3.11-8 for listed receiving water bodies within the hydrology and water quality RSA and their pollutants.

Table 3.11-8. 303(d)-listed Pollutants for the Proposed Project

Receiving Water Body/ Crossing	Impairment	Status of TMDL	Notes on TMDL
San Leandro Creek, Lower[1]	Diazinon	Addressed with approved TMDL	Approved in 2007
San Leandro Creek, Lower[1]	Trash	Addressed with action other than TMDL	Expected attainment: 2029
San Lorenzo Creek[1]	Diazinon	Addressed with approved TMDL	Approved in 2007
San Leandro Bay (part of San Francisco Bay, Lower)	Zinc	TMDL required	Expected completion: 2019
San Leandro Bay (part of San Francisco Bay, Lower)	Dieldrin	TMDL required	Expected completion: 2013
San Leandro Bay (part of San Francisco Bay, Lower)	Dioxin Compounds	TMDL required	Expected completion: 2019
San Leandro Bay (part of San Francisco Bay, Lower)	Furan Compounds	TMDL required	Expected completion: 2019
San Leandro Bay (part of San Francisco Bay, Lower)	Invasive Species	TMDL required	Expected completion: 2019
San Leandro Bay (part of San Francisco Bay, Lower)	Chlordane	TMDL required	Expected completion: 2013
San Leandro Bay (part of San Francisco Bay, Lower)	Lead (sediment)	TMDL required	Expected completion: 2019
San Leandro Bay (part of San Francisco Bay, Lower)	PAHs (sediment)	TMDL required	Expected completion: 2019
San Leandro Bay (part of San Francisco Bay, Lower)	Pesticides (sediment)	TMDL required	Expected completion: 2019
San Leandro Bay (part of San Francisco Bay, Lower)	DDT	TMDL required	Expected completion: 2029

Table 3.11-8. 303(d)-listed Pollutants for the Proposed Project

Receiving Water Body/ Crossing	Impairment	Status of TMDL	Notes on TMDL
San Leandro Bay (part of San Francisco Bay, Lower)	Mercury	Addressed with approved TMDL	Approved in 2008
Old ACFCC[1]	Trash	Addressed with action other than TMDL	Expected attainment: 2029
Alameda Creek[1]	Diazinon	Addressed with approved TMDL	Approved in 2007
San Francisco Bay, Lower	DDT	TMDL required	Expected completion: 2013
San Francisco Bay, Lower	Dioxin Compounds (including 2,3,7,8-TCDD)	TMDL required	Expected completion: 2019
San Francisco Bay, Lower	Invasive Species	TMDL required	Expected completion: 2019
San Francisco Bay, Lower	Furan Compounds	TMDL required	Expected completion: 2019
San Francisco Bay, Lower	PCBs (dioxin-like)	Addressed with approved TMDL	Approved in 2010
San Francisco Bay, Lower	Dieldrin	TMDL required	Expected completion: 2013
San Francisco Bay, Lower	Trash	TMDL required	Expected completion: 2021
San Francisco Bay, Lower	Mercury	Addressed with approved TMDL	Approved in 2008
San Francisco Bay, Lower	Chlordane	TMDL required	Expected completion: 2013

DDT = Dichlorodiphenyltrichloroethane; PAHs = polycyclic aromatic hydrocarbons; PCBs = polychlorinated biphenyl ethers; TCDD = Tetrachlorodibenzo-p-dioxin

[1] These aquatic resources intersect the proposed Project footprint.

Source: SWRCB, 2021

Soil Erosion Potential

Erosion and sedimentation are major contributing factors to water quality degradation and is associated with activities that cause soil disturbances, such as construction. In general, sediment is transported by water as either a suspended load or a bedload. The K factor represents a soil's susceptibility to erosion and the amount and rate of runoff. Fine-textured soils high in clay have low K factors, about 0.02 to 0.15, due to cohesive particles that resist detachment by water. Coarse-textured soils, such as sandy soils, also have low K factors, about 0.05 to 0.2, because of low runoff potential even though soil particles are cohesionless. Medium-textured soils have moderate K factors, about 0.25 to 0.4, because they are moderately susceptible to erosion and produce moderate runoff. Soils with high silt content are the most erodible and typically have K factors greater than 0.4. According to the Caltrans Water Quality Planning Tool (Caltrans, 2024), the K factor throughout the RSA varies from 0.24 bordering much of the Coast Subdivision to 0.49 along the more inland areas where the Coast and Niles subdivisions join.

Groundwater

Groundwater Basins and Subbasins

According to California's Groundwater Bulletin 118 from Department of Water Resources, the proposed Project is located within the East Bay Plain Subbasin (2-9.04) and the Niles Cone Subbasin (2-9.01) of the Santa Clara Valley Groundwater Basin (Figure 3.11-3).

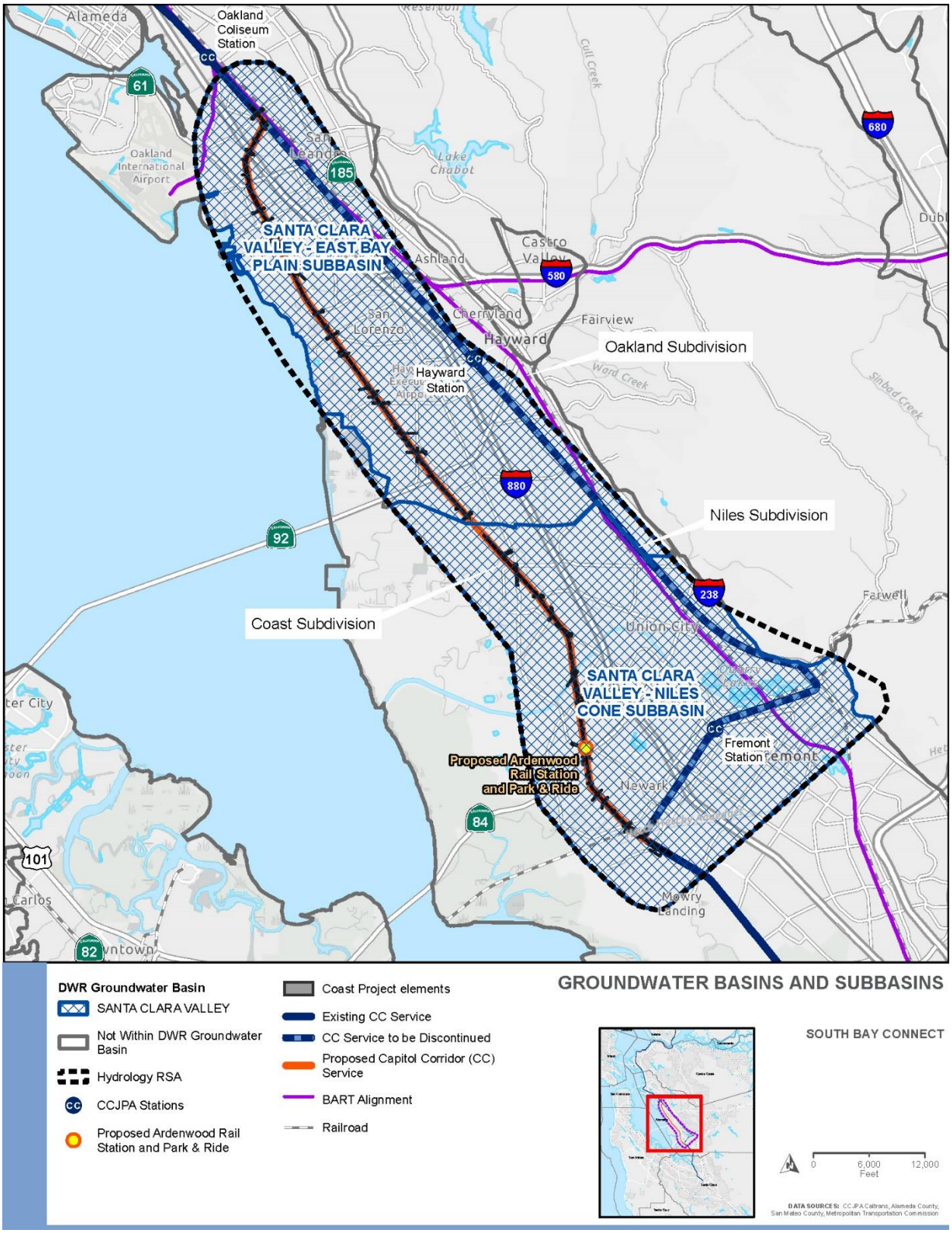
The East Bay Plain Subbasin is a northwest trending alluvial plain bounded by San Pablo Bay, Franciscan Basement rock, and the Niles Cone Subbasin. The water bearing geologic units of this subbasin consists of unconsolidated sediments of quaternary age, including three alluvial fan deposit formations and artificial municipal/construction waste fill along the bay front. Recharge sources include San Pablo Creek, San Leandro Creek, and San Lorenzo Creek.

The Niles Cone Subbasin is bounded by Alameda County lines to the south, the East Bay Plain Subbasin in the north, and the Diablo Range in the east, and the San Francisco Bay in the west. Its principal stream is Alameda Creek. It is separated internally by the Howard Fault, which is largely impermeable. Water bearing geologic materials are quaternary alluvium, most significantly Pleistocene-to-recent-age alluvium, which consists of unconsolidated gravel, silt, and clay.

The Below-Hayward-Fault side of the Niles Cone Subbasin contains a series of four aquifers separated by clay aquitards. These aquifers are (from west to east):

- Newark Aquifer: between 40 and 140 feet below ground surface (bgs); between 20 and 140 feet thick (thicker closer to the Hayward Fault).
- Centerville Aquifer: between 180 and 200 feet bgs, between 10 and 100 feet thick.
- Fremont Aquifer: east of Coyote Hills, between 300 and 390 feet bgs.
- Deep Aquifer: between 400 and 500 feet bgs.

Figure 3.11-3. Groundwater Basins and Subbasins



Groundwater Quality

In the East Bay Plain Subbasin aquifer, water levels are all very near to the surface. The upper 200 feet of groundwater is characterized as calcium bicarbonate type with total dissolved solids (TDS) ranging from 360-1020 milligrams per liter (mg/L), while the lower 200-1000 feet of groundwater is characterized by sodium bicarbonate with TDS ranging from 310-1420 mg/L. Contamination from fuels and solvents has been identified at 13 distinct locations in the upper 50 feet of this subbasin (DWR, 2004).

According to a 2007 Study by the California Groundwater Ambient Monitoring & Assessment (GAMA) Program, at least one out of 12 testing sites in the RSA contained measurable but under threshold concentrations of chloroform, carbon disulfide, tetrachloroethene, and trichloroethene, methyl tert-butyl ether, toluene, benzene, acetone, atrazine, simazine, prometon, caffeine, bentazon, metolachlor, tris (2-cloroethyl) phosphate, perchlorate, and N-nitrosodimethylamine. These compounds are groundwater contaminants related to the discharge and degradation of refrigerants, solvents, gasoline, pesticides, or wastewater. In addition, at least one out of the twelve locations tested above threshold levels of chloride, TDSs, arsenic, manganese, and radon-222. The locations of the wells referenced in this study are shown in Figure 3.11-4 and Figure 3.11-5.

Groundwater Quality Objectives and Beneficial Uses

The Basin Plan (San Francisco Bay RWQCB, 2023) has water quality objectives listed for all groundwaters of the San Francisco Bay Basin. Groundwater objectives consist primarily of narrative objectives combined with a limited number of numerical objectives. In addition, the SWRCB establishes basin- and/or site-specific numerical groundwater objectives as necessary. Per the Basin Plan, at a minimum, groundwater shall not contain concentrations of bacteria, chemical constituents, radioactivity, or substances producing tastes and odors (San Francisco Bay RWQCB, 2023). The proposed Project RSA has existing beneficial uses of municipal water (MUN), industrial process (PRO), industrial service (IND), and agricultural water supply (AGR). See Table 3.11-9 for the descriptions of the groundwater quality objectives from the Basin Plan.

Figure 3.11-4. GAMA Groundwater Quality Monitoring Wells (circled in red)

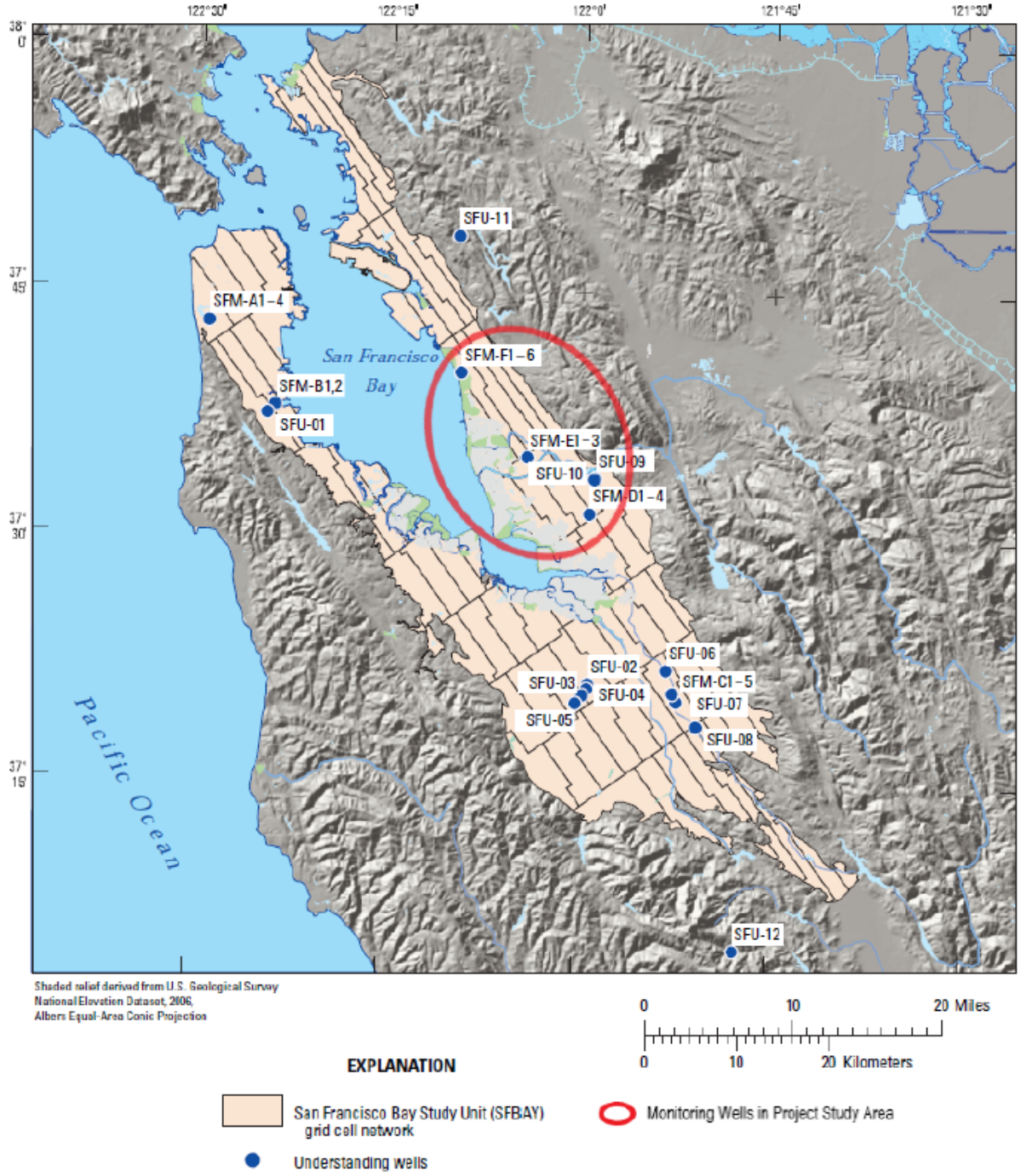


Figure 3.11-5. GAMA Groundwater Quality Monitoring Wells (circled in red) continued

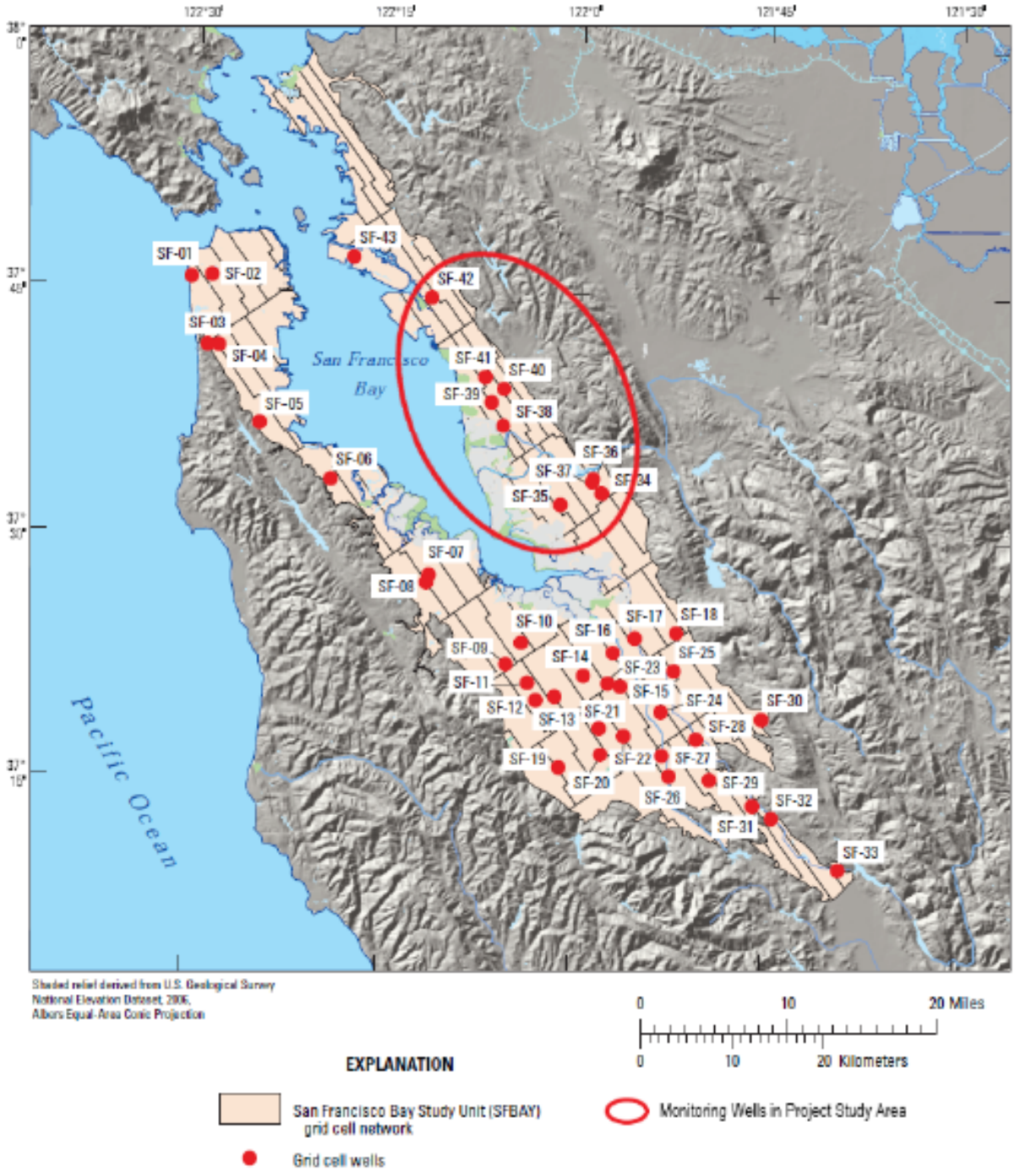


Table 3.11-9. Groundwater Quality Objectives

Parameter	Groundwater Quality Objective
Bacteria	For groundwater basins and/or subbasins with the beneficial use of MUN, the median of the most probable number of coliform organisms over any 7-day period shall be less than 1.1 most probable number per 100 milliliters.
Organic and Inorganic Chemical Constituents	All groundwater shall be maintained free of organic and inorganic chemical constituents in concentrations that adversely affect beneficial uses. For groundwater basins and/or subbasins with the beneficial use of MUN, shall not contain concentrations of constituents in excess of the maximum or secondary maximum contaminant levels specified in Table 3-5 of the basin plan. For groundwater basins and/or subbasins with the beneficial use of AGR, groundwater shall not contain concentrations of chemical constituents in excess of levels specified in Table 3-6 of the basin plan. For groundwater basins and/or subbasins with the beneficial use of IND, groundwater shall not contain pollutant levels that impair current/potential industrial uses.
Radioactivity	For groundwater basins and/or subbasins with the beneficial use of MUN, groundwater shall not contain concentrations of radionuclides in excess of the maximum contaminant levels specified in Table 3-5 of the basin plan and Table 4 (Radioactivity) of Section 64443 of Title 22.
Taste and Odor	For groundwater basins and/or subbasins with the beneficial use of MUN, groundwater shall not contain taste- or odor-producing substances in concentrations that cause a nuisance or adversely affect beneficial uses. At a minimum, groundwater shall not contain concentrations in excess of secondary maximum contaminant levels in Table 3-5 of the basin plan.

Notes: AGR = agricultural supply; MUN = municipal and domestic supply; IND = industrial service supply
Source: San Francisco Bay RWQCB, 2023

Depth to Groundwater

According to the groundwater level measurements data from USGS National Water Information System, and groundwater monitoring reports from SWRCB's GeoTracker, groundwater depths of each section of each subdivision are shown in Table 3.11-10. The overall groundwater depth of the Coast Subdivision is 4.2 to 65.0 feet bgs.

Table 3.11-10. Depth to Groundwater

Coast – North Section	4.2–41 feet bgs
Coast – Central Section	8.0–42 feet bgs
Coast – South Section	7.2–65 feet bgs

Source: USGS. National Water Information System. Groundwater Levels for California, 2021; SWRCB GeoTracker, 2021

Floodplains

Existing Floodplains

Federal Emergency Management Agency Floodplains

The hydrology and water quality RSA is located within the FEMA FIRMS listed Table 3.11-11. Proposed construction activities are located within the following FEMA Zones: A, AE, AH, AO, Shaded X, and Unshaded X. FEMA Zones A, AE, AH, and AO represent special flood hazard areas. FEMA Zones identified within the proposed Project footprint include:

- Zone A represents areas with a 1 percent annual chance flood, or 100-year floodplain.
- Zone AE represents areas with a 1 percent annual chance flood.
- Zone AH represents areas with a 1 percent annual chance of shallow flooding with average depths of 1 to 3 feet.
- Zone AO represents areas with a 1 percent annual chance of shallow flooding with average depths of 1 to 3 feet.
- Shaded Zone X represents areas that have a moderate flood hazard between the 1 percent annual chance flood and the 0.2 percent annual chance flood.
- Unshaded Zone X represents areas that have a minimal flood hazard, which are the areas outside the 0.2 percent annual chance flood.

For areas in Zone A, AE, AH, AO, and Shaded X, see Table 3.11-11 for the mile posts (MP) and locations of these floodplains. Figure 3.11-6 designates FEMA Flood Hazard Areas within the RSA. Table 3.11-12 provides a summary of existing hydrology and 100-year flood discharges to waterways within the RSA. Refer to Appendix F for a more detailed table of hydrology information that has been published by FEMA for the existing creek crossing within the proposed Project's subdivisions.

Table 3.11-11. Proposed Project 100-year Flood Hazard (Coast Subdivision – Alignment "Coast Main")

Approximate Mile Post From	Approximate Mile Post To	FEMA Flood Zone 1	FEMA FIRM Number	100-year Base Flood Elevation 1 (feet, NAVD)	Flood Depth (for Zone AO) 1 (feet)
30.85 (Zone 5 Line F-1)	30.85 (Zone 5 Line F-1)	AE Floodway	06001C0443G	19–23	N/A
29.56 (Zone 5 Line H)	29.09 (Zone 5 Line H at Jarvis Road)	AO/AE Floodway	06001C0441G	14–18	3
27.37	27.37	AE Floodway	06001C0433G	17	N/A
27.00 (ACFCC)	27.00 (ACFCC)	A	06001C0433G	N/A	N/A
26.98 (Lowry Road)	26.98 (Lowry Road)	A	06001C0433G	N/A	N/A
24.18 (Zone 3A Line A (Old ACFCC))	24.18 (Zone 3A Line A (Old ACFCC))	AE	06001C0427G	11–12	N/A
24.09 (Zone 3A Line A (Old ACFCC))	24.09 (Zone 3A Line A (Old ACFCC))	AE	06001C0427G	11–12	N/A
23.78 (Zone 3A Line A (Old ACFCC))	23.78 (Zone 3A Line A (Old ACFCC))	AE	06001C0427G	12	N/A

Table 3.11-11. Proposed Project 100-year Flood Hazard (Coast Subdivision – Alignment "Coast Main")

Approximate Mile Post From	Approximate Mile Post To	FEMA Flood Zone 1	FEMA FIRM Number	100-year Base Flood Elevation 1 (feet, NAVD)	Flood Depth (for Zone AO) 1 (feet)
22.06 (Zone 3A Line A-3 (parallel to UPRR rail; not crossing UPRR crossing))	23.68 (Zone 3A Line A-3)	Shaded X/AE	06001C0426G/ 06001C0427G	12	N/A
20.80 (Zone 4 Line A)	20.80 (Zone 4 Line A)	AE	06001C0269H	12.3	N/A
19.77 (Zone 2 Line K (Sulphur Creek))	19.77 (Zone 2 Line K (Sulphur Creek))	AE	06001C0267H	16	N/A
19.23 (Line N-3, Crossing of an unnamed creek 0.3 m south of Line N)	19.25 (Line N-3, Crossing of an unnamed creek 0.3 m south of Line N)	AE	06001C0267H	10	N/A
18.97 (Bockman Canal / Line N (tributary to SF Bay))	18.97 (Bockman Canal / Line N (tributary to SF Bay))	AE	06001C0267H	10	1
18.24 (Zone 2 Line B (San Lorenzo Creek))	18.24 (Zone 2 Line B (San Lorenzo Creek))	A	06001C0267H	N/A	N/A
17.13 A crossing of an unnamed creek 0.3 miles south of Zone 2 Line A	17.13 A crossing of an unnamed creek 0.3 miles south of Zone 2 Line A	AE	06001C0258H	10–12	N/A

Table 3.11-11. Proposed Project 100-year Flood Hazard (Coast Subdivision – Alignment "Coast Main")

Approximate Mile Post From	Approximate Mile Post To	FEMA Flood Zone 1	FEMA FIRM Number	100-year Base Flood Elevation 1 (feet, NAVD)	Flood Depth (for Zone AO) 1 (feet)
16.93 (Zone 2 Line A (Estudillo Canal San Leandro Creek))	16.93 (Zone 2 Line A (Estudillo Canal San Leandro Creek))	AE	06001C0258H	10–11	N/A
14.22 (Line N (Stonehurst Creek) / Line P (San Leandro Creek))	14.22 (Line N (Stonehurst Creek) / Line P (San Leandro Creek))	Zone AE Floodway / Shaded X	06001C0267H	19–20/N/A	N/A
14.25 (Line N (Stonehurst Creek))	14.25 (Line N (Stonehurst Creek))	Zone AE Floodway	06001C0267H	19–20	N/A
14.00 (Line N (Stonehurst Creek))	14.00 (Line N (Stonehurst Creek))	Zone AE Floodway	06001C0256H	21	N/A
13.75 (Line N (Stonehurst Creek))	13.75 (Line N (Stonehurst Creek))	Zone AE Floodway/A	06001C0256H	20–22/N/A	N/A

Figure 3.11-6. FEMA Flood Hazard Areas

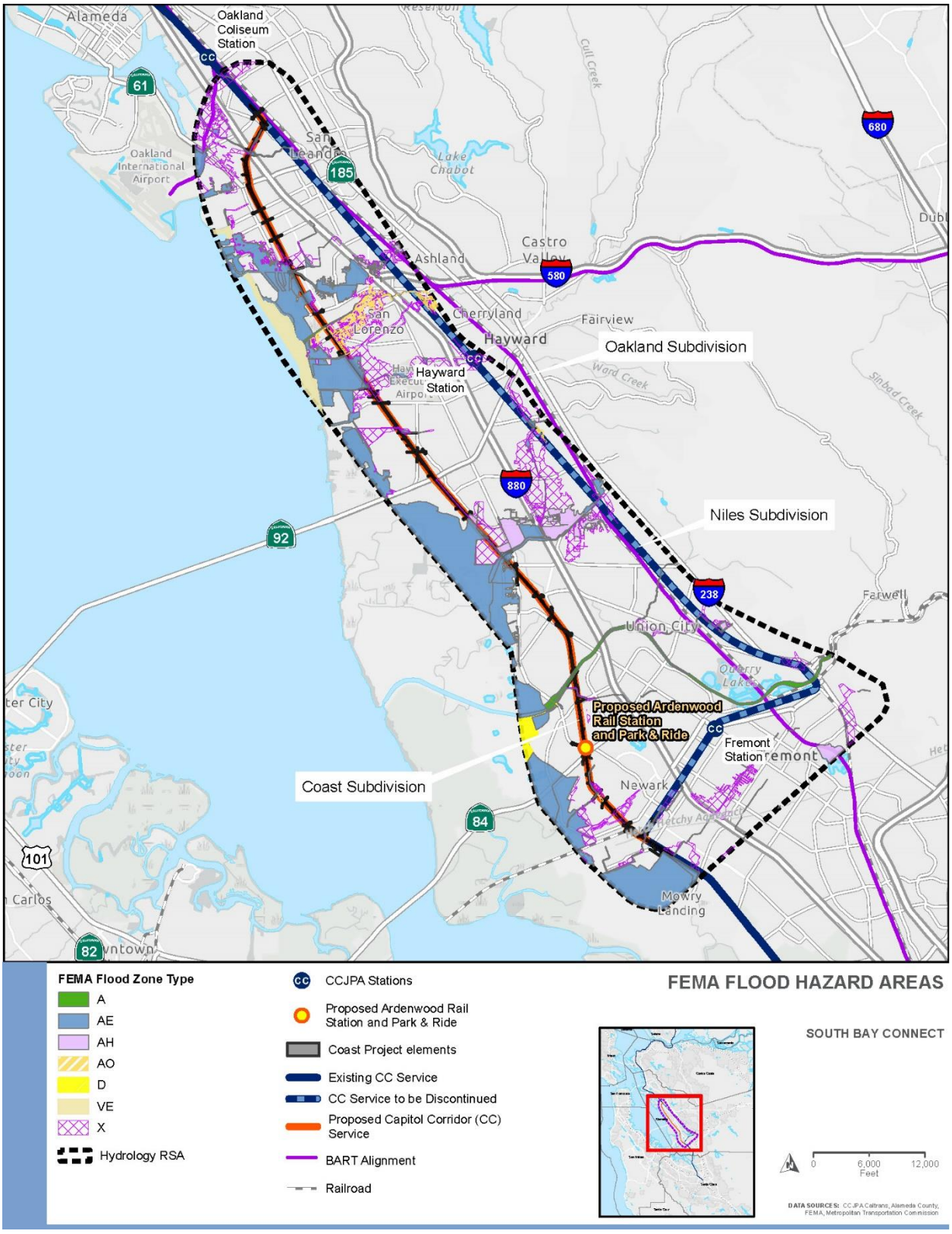


Table 3.11-12. Existing Hydrology

Project's Creeks and Waterbody Crossings	FEMA Zone	Drainage Area (square miles)	100-year Discharge [1] (cfs)	FEMA Base Elevation (ft, NAVD 88) [1,2]
Line P (San Leandro Creek)	Zone AE Floodway	N/A	2,800	N/A
	Zone AE Floodway	N/A	N/A	19
Line N (Stonehurst Creek)	Zone AE Floodway	N/A	N/A	19
Zone 2 Line A	Zone AE	8.90	3,600 [3]	10.5
A crossing of an unnamed creek 0.2 miles south of Zone 2 Line A (Estudillo Canal / San Leandro Creek	Zone AE	N/A	N/A	N/A
Zone 2 Line B (San Lorenzo Creek)	Zone A	N/A	7,615 [4]	N/A
Bochman Canal / Line N (Tributary to SF Bay)	Zone AE	2.4	750	10
A crossing of an unnamed creek 0.3 miles south of Bockman Canal / Line N (Tributary to SF Bay)	Zone AE	N/A	N/A	N/A
Zone 2 Line K (Sulphur Creek)	Zone AE	3.9	740 [3]	16
Zone 4 Line A	Zone AE Floodway	1.53	840	23.2
Zone 3 Line A-2	Zone AE Floodway	2.25	960	12
Zone 3A Line A (Old ACFCC)	Zone AE Floodway	20.48	3,420 [3]	12.3

Table 3.11-12. Existing Hydrology

Project's Creeks and Waterbody Crossings	FEMA Zone	Drainage Area (square miles)	100-year Discharge [1] (cfs)	FEMA Base Elevation (ft, NAVD 88) [1,2]
ACFCC	Zone A	No Published Data from FEMA		
ACFCC	Zone A	No Published Data from FEMA		
Zone 5 Line K (Crandall Creek)	Zone AE Floodway	2.7	1,200	17
Zone 5 Line H	Zone AE Floodway	2	610	13
	Zone AE Floodway	N/A	N/A	14
Ward Creek	Zone AE Floodway	6	1,367 [3]	49.5
Zone 3A Line D	Zone AE	3.86	1,6811	16
Zone 3A Line E	Zone AE	1.00 [5]	910	50-51
Zone 5 Line M	Zone AH	2.09	720	48
	Zone AE	2.44	748	42-43

Notes: 1) Per FEMA FIS, with a base flood elevation profile; 2) Per FEMA FIRMs; 3) Decrease in flow with increase in area is result of spill; 4) Decrease in flow without change in area is result of spill; 5) Drainage Area does not include drainage area upstream. The discharges shown include the effects of the flow diversion.
Source: FEMA, 2018

Tsunamis and Seiche

Tsunami inundation maps of Alameda County indicate that the portions of the floodplain RSA along the Coast Subdivision could be inundated by a tsunami (California Emergency Management Agency, 2021). However, the proposed Project would not change the existing flooding potential due to tsunamis from the Pacific Ocean. Therefore, inundation of the proposed Project from tsunami is not discussed further.

There is also no immediate risk of seiche in the floodplain RSA. Therefore, inundation of the proposed Project due to seiche is not discussed further.

3.11.5 Best Management Practices

As noted in Chapter 2, Project Alternatives, CCJPA would incorporate a range of BMPs to avoid and minimize adverse effects on the environment that could result from implementation of the proposed Project. BMPs are included in the proposed Project description in Section 2.2.4, and the impact analyses were conducted assuming application of these practices.

BMP HYD-1 Construction Stormwater Management.

BMP HYD-2 Creek diversion to address in-creek construction.

BMP HYD-3 Delineate Environmentally Sensitive Areas near construction areas.

BMP HYD-4 Permanent erosion control.

BMP HYD-5 Permanent stormwater treatment and pollution prevention.

BMP HYD-6 Addressing hydromodification impacts.

BMP HYD-7 Dewatering of high groundwater.

BMP-HYD-8 Monitoring weather forecast to avoid construction impacts during storm events.

BMP-HYD-9 Soffit elevations for new bridges.

3.11.6 Environmental Impacts

This section describes the potential environmental impacts on hydrology and water quality as a result of implementation of the proposed Project. Lettering shown within title for each environmental factor below correlates with CEQA Statute and Guidelines, Appendix G table lettering and numbering. Each of the following threshold discussions provides a significance finding and then discusses relevant factors regarding surface water, groundwater, and floodplains as appropriate.

3.11.6.1 (a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

State and federal agencies, including EPA, SWRCB, and RWQCBs, have established basin plans, water quality standards, and waste discharge requirements that are relevant to the proposed Project. These standards and requirements have been developed to prevent the degradation of water quality pursuant to the CWA, including changes in hydrology associated with additions of impervious surfaces (hydromodification), as well as erosion and sedimentation that may result from hydromodification, and thus serve as appropriate thresholds for determining the significance of water quality impacts, as well as hydrology impacts related to hydromodification.

No Project Alternative

No Impact. Under the No Project Alternative, no temporary or permanent impacts are anticipated to the surface or ground water quality within the RSA. The existing railroad tracks are ballasted and self-retaining. There would be no dewatering activities and no changes to current groundwater connections.

Proposed Project

Surface Water Hydrology and Water Quality

Construction

Less than significant impact. Proposed Project cut-and-fill, grading, and excavation activities have the potential to increase erosion and result in temporary water quality impacts for the proposed Project. Potential temporary impacts to water quality due to construction-related activities would be reduced or avoided by implementing the following construction BMPs, BMP HYD-1: Construction Stormwater Management and Treatment Plan, BMP HYD-2: Creek diversion to address in-creek construction, and BMP HYD-3: Delineate Environmentally Sensitive Areas near construction areas . These measures would limit impacts to the beneficial uses of the receiving water bodies for the proposed Project and are described in detail in Section 3.11.5.

The proposed Project would disturb at least 1 acre of soil during construction, triggering the requirement to prepare a SWPPP (see Section 3.11.2.2 State Regulatory Section, Construction General Permit). BMP HYD-1 would require a Stormwater Treatment and Management Plan, as well as a SWPPP. Stormwater runoff over disturbed soil areas could potentially cause sediment-laden flows to enter storm drainage facilities, increasing the turbidity, decreasing the clarity, and potentially impacting their beneficial uses. Generally, as the disturbed soil area increases, the potential for temporary water quality impacts also increases. Major areas with grading and earthwork would include at-grade railroad crossings, grade-separated railroad crossings, railroad bridge improvements and the construction of a passenger rail station. Major improvements that are expected to have large areas of disturbed soils are included in Table 3.11-13. Additional sources of sediment that could result in increases in turbidity include uncovered or improperly covered active and non-active stockpiles, un-stabilized slopes and construction staging areas, and construction equipment not properly maintained or cleaned. Increases in sediment-laden flows throughout the Project would be minimized with BMP HYD-1.

Soil erosion, especially during heavy rainfall, can increase the suspended solids, dissolved solids, and organic pollutants in stormwater runoff generated within the Project limits. These risks would persist until completion of construction activities and implementation of long-term erosion control measures implemented as part of BMP: HYD-4 Permanent erosion control. Implementation of BMPs would minimize sediment within the waterways due to soil erosion. With BMPs, the project would not impact the beneficial uses of Groundwater Recharge (GWR) and Municipal and Domestic Supply (MUN) within the receiving waters of the Project. With implementation of BMPs, the proposed Project would not impact the WILD (that is, wildlife habitat) beneficial use, which is a beneficial use for all receiving water bodies for the proposed Project.

Table 3.11-13. Project Improvements and Potential Construction Impacts

Coast Section	Improvement	Location (Mile Post)	DSA	IWW	Receiving Water Body Affected
North	At-Grade Crossing Roadway Surface Improvement	13.67 to 13.68 "Coast Main" / Edes Avenue	X		Stonehurst Creek
North	At-Grade Crossing Roadway Surface Improvement	15.51 to 15.52 "Coast Main" / Williams Street	X		San Francisco Bay
North	At grade Crossing Roadway Surface Improvement	13.38 to 13.39 "Coast Main" / 98th Avenue	X		Stonehurst Creek
North	At grade Crossing Roadway Surface Improvement	13.99 to 14.00 "Coast Main" / Knight and Kerwin Street	X	X	Stonehurst Creek
North	At grade Crossing Roadway Surface Improvement	13.67 to 13.68 "Coast Main" / 105th Street	X		Stonehurst Creek
North	Bridge	14.29 to 14.30 "Coast Main" / Interstate 880	X	X	San Leandro Creek / Line P
North	At grade Crossing Roadway Surface Improvement	15.77 to 15.78 "Coast Main" / Marina Boulevard	X		San Francisco Bay
North	At grade Crossing Roadway Surface Improvement	16.17 to 16.18 "Coast Main" / Fairway Drive	X		San Francisco Bay
North	At grade Crossing Roadway Surface Improvement	16.73 to 16.74 "Coast Main" / Farallon Drive	X		San Francisco Bay

Table 3.11-13. Project Improvements and Potential Construction Impacts

Coast Section	Improvement	Location (Mile Post)	DSA	IWW	Receiving Water Body Affected
North	Timber Bridge Replacement	16.93 to 16.94 "Coast Main"	X	X	Estudillo Canal / San Leandro Creek / Zone 2 Line A
North	Timber Bridge Replacement or Culvert	17.13 to 17.14 "Coast Main"	X	X	Estudillo Canal / San Leandro Creek / Zone 2 Line A
North	At grade Crossing Roadway Surface Improvement	17.92 to 17.93 "Coast Main" / Bayfront Drive / Lewelling Avenue	X		Estudillo Canal / San Leandro Creek / Zone 2 Line A
North	Timber Bridge Replacement	18.24 to 18.24 "Coast Main"	X	X	San Lorenzo Creek
North	Timber Bridge Replacement or Fill	18.37 to 18.38 "Coast Main"	X	X	Bockman Canal
Central	At grade Crossing Roadway Surface Improvement	18.48 to 18.49 "Coast Main" / Grant Avenue	X		Bockman Canal
Central	Timber Bridge Replacement	18.97 to 18.98 "Coast Main"	X	X	Bockman Canal
Central	Timber Bridge Replacement	19.23 to 19.24 "Coast Main"	X	X	Bockman Canal
Central	Timber Bridge Replacement	19.77 to 19.78 "Coast Main"	X	X	Sulphur Creek

Table 3.11-13. Project Improvements and Potential Construction Impacts

Coast Section	Improvement	Location (Mile Post)	DSA	IWW	Receiving Water Body Affected
Central	At grade Crossing Roadway Surface Improvement	20.17 to 20.18 "Coast Main" / Winton Avenue	X		Hayward Landing Canal
Central	Bridge or Culvert	20.77 to 20.78 "Coast Main"	X	X	Zone 4 Line A
Central	At grade Crossing Roadway Surface Improvement	21.39 to 21.40 "Coast Main" / Depot Road	X		Hayward Landing Canal
Central	At grade Crossing Roadway Surface Improvement	23.08 to 23.09 "Coast Main" / Baumberg Avenue	X		Old Alameda Creek
Central	Bridge Replacement	23.68 to 23.68 "Coast Main"	X	X	Zone 3A Line A-2
Central	Timber Bridge Replacement	24.16 to 24.16 "Coast Main"	X	X	Old Alameda Creek
Central	At grade Crossing Roadway Surface Improvement	24.58 to 24.62 "Coast Main" / Union City Boulevard	X		Old Alameda Creek
Central	Culvert or Fill	24.76 to 24.76 "Coast Main"	X		Old Alameda Creek
Central	Culvert or Fill	24.91 to 24.93 "Coast Main"	X		Old Alameda Creek
Central	Culvert or Fill	25.02 to 25.03 "Coast Main"	X		Old Alameda Creek

Table 3.11-13. Project Improvements and Potential Construction Impacts

Coast Section	Improvement	Location (Mile Post)	DSA	IWW	Receiving Water Body Affected
Central	At-Grade Crossing Roadway Surface Improvement	25.25 to 25.26 "Coast Main" / Smith Street	X		Zone 5 Line B
South	At grade Crossing Roadway Surface Improvement	25.25 to 25.27 "Coast Main" / Smith Street	X		Old Alameda Creek
South	At grade Crossing Roadway Surface Improvement	25.72 to 25.74 "Coast Main" / Dyer Street	X		Alameda Creek
South	Culvert or Fill	25.81 to 25.81 "Coast Main"	X		Alameda Creek
South	At-Grade Crossing Roadway Surface Improvement	26.07 to 26.14 "Coast Main" / Alvarado Boulevard	X		Stonehurst Creek
South	Retaining Wall	26.25 to 26.97 "Coast Main" / Alvarado Niles Boulevard	X		Alameda Creek
South	Culvert or Fill	26.80 to 26.81 "Coast Main"	X		Alameda Creek
South	Surface Improvements, Bridge Construction	26.97 to 26.98 "Coast Main" / Lowry Road	X		Alameda Creek
South	Bridge Construction	27.00 to 27.07 "Coast Main"	X	X	ACFCC

Table 3.11-13. Project Improvements and Potential Construction Impacts

Coast Section	Improvement	Location (Mile Post)	DSA	IWW	Receiving Water Body Affected
South	Clear-span Bridge	27.35 to 27.37 "Coast Main" / Bardance Street and Stage Coach Street	X	X	Zone 5 Line K (Crandall Creek)
South	Culvert or Fill	27.39 to 27.4 "Coast Main"	X		Zone 5 Line K (Crandall Creek)
South	Culvert or Fill	27.52 to 27.52 "Coast Main"	X		Zone 5 Line K (Crandall Creek)
South	Retaining Walls	27.01 to 27.6 "Coast Main" / Paseo Padre Parkway	X		Zone 5 Line K (Crandall Creek)
South	Ardenwood Station Platform Pedestrian Overcrossing	28.58 to 28.79 "Coast Main" / Ardenwood Boulevard	X		Ardenwood Creek
South	At-Grade Crossing Roadway Surface Improvement	29.08 to 29.11 "Coast Main" / Jarvis Avenue	X		Zone 5 Line H
South	At-Grade Crossing Roadway Surface Improvement	29.30 to 29.31 "Coast Main" / Haley Street	X		Zone 5 Line H
South	Extension of Triple 60-inch Reinforced Concrete Pipes and Widening of Track Area over Culverts	29.56 "Coast Main" / Cabernet Street, Birkdale Drive, Indian Wells Drive / Calais Place	X	X	Zone 5 Line H

Table 3.11-13. Project Improvements and Potential Construction Impacts

Coast Section	Improvement	Location (Mile Post)	DSA	IWW	Receiving Water Body Affected
South	At grade Crossing Roadway Surface Improvement	30.05 to 30.06 "Coast Main" / Mayhews Landing Road	X		Zone 5 Line H
South	Culvert	30.09 "Coast Main" / Mayhews Landing Road	X		Zone 5 Line H
South	At-Grade Crossing Roadway Surface Improvement	30.42 to 30.44 "Coast Main" / Thornton Avenue	X		Zone 5 Line I
South	At grade Crossing Roadway Surface Improvement	30.51 to 30.53 "Coast Main" / Ash Street	X		Zone 5 Line H
South	At-Grade Crossing Roadway Surface Improvement	30.61 to 30.63 "Coast Main" / Carter Avenue (Filbert Street)	X		Zone 5 Line F
South	At grade Crossing Roadway Surface Improvement	30.85 to 30.86 "Coast Main" / Sycamore Street	X	X	Zone 5 Line F-1
South	At grade Crossing Roadway Surface Improvement	30.85 to 30.86 "Coast Main" / Cherry Street	X		Zone 5 Line F-1
South	Retaining Wall	31.25 to 31.25 "Coast" Main	X		Zone 5 Line B

DSA=disturbed soils area; IWW=in-water work

BMP HYD-1 would also avoid and minimize the risk of accidental spills or releases. Fueling or maintenance of construction vehicles would occur within the Project site during construction, so there would be a risk of accidental spills or releases of fuels, oils, or other potentially toxic materials. An accidental release of these materials could pose a threat to water quality if contaminants enter the local receiving waters and storm drains. The magnitude of the impact from an accidental release depends on the amount and type of material spilled. The San Francisco Bay, Lower is a receiving water body throughout the entire Project with several pollutant 303d-listed TMDLs. Pollutants of concern for the Project's receiving water bodies are listed in Table 3.11-7 in Section 3.11.4.1.

The proposed Project would require at-grade crossing roadway surface improvements throughout the RSA. In addition, existing railroad bridges would be replaced or modified to accommodate the addition of a new railroad track between Elmhurst and Newark. Dewatering, drilling, and/or pile driving activities would be required during the replacement or modification of the existing bridges and some of the at-grade crossing roadway surface improvements. In some locations, temporary "shoofly" bridges and tracks may also be required to make space for construction of new bridges. As a result, in-water work, stream diversion, and temporary dewatering would be necessary. Furthermore, temporary dewatering is anticipated to be needed for culvert replacements and modification and deep excavations associated with retaining wall installations along the proposed Project corridor. San Leandro Creek is a receiving water body that is tributary to the San Leandro Bay, a water body with several 303d-listed pollutants that are listed in Table 3.11-7 in Section 3.11.4.1. San Lorenzo Creek is a receiving water body within the Coast Subdivision of the proposed Project with GWR listed as a beneficial use which could be impacted by the potential for increased sediment due to in-water work. potential impacts of this in-water, stream diversion, and temporary dewatering work to the beneficial uses of the receiving water bodies may include destabilizing the bed and banks caused by foot traffic of the contractor's personnel; the operation of equipment in the aquatic resource; and modifications to the banks of an aquatic resource to gain access to aquatic areas. In addition, temporary stream diversions and dewatering would be needed to complete these construction activities in aquatic resources. Temporary stream diversions would result in temporary fluctuations in WSE and flow velocity. Project implementation of BMPs HYD-1 and HYD-2 would avoid and minimize impacts to surface water quality as a result of dewatering or stream diversion.

Operations

Less than Significant Impact. The proposed Project would have a less than significant impact to water quality standards and waste discharge requirements with incorporation of BMP HYD-4 Permanent erosion control and BMP HYD-5 Permanent stormwater treatment and pollution prevention as project features. The following section details the potential maintenance and operations impacts of the proposed Project to surface water quality.

The proposed Project would result in the creation of additional impervious area, which would increase the amount of runoff and decrease infiltration or dispersion over unpaved surfaces. Table 3.11-14 lists locations of added or replaced impervious area for the proposed Project. While the added impervious area could result in an increase of sediment-laden flow directly discharging into receiving water bodies, stormwater impacts would be minimized through the proper implementation of permanent stormwater treatment measures and design pollution prevention BMPs. The proper implementation of permanent stormwater treatment measures and design pollution prevention BMPs in compliance with relevant MS4 requirements, would address any

potential impacts to the beneficial uses and TMDLs of the receiving water bodies discussed in Section 3.11.4.1. A discussion of BMPs is above in Section 3.11.5.

The ACCWP's *Hydro Modification Susceptibility Map Application* (2019) indicates that the proposed Project within the Coast Subdivision would discharge stormwater runoff into a tidally influenced/ depositional area or an area with earthen channels that flows into the tidally influenced/ depositional area. These earthen channels include Agua Caliente Creek and Laguna Creek. As such, the proposed Project is exempt from the requirement to implement hydromodification management measures. However, CCJPA will implement BMP HYD-6 Addressing hydromodification impacts to further minimize potential impacts to the extent possible.

Table 3.11-14. Project Hydromodification Summary (New Impervious Surfaces)

Mile Post for Added/Replaced Impervious Area and Location	Improvement	Added Impervious Area Due to At-Grade Crossing or Bridge	ROW
13.67 to 13.68 "Coast Main" / Edes Avenue	At-Grade Crossing Roadway Surface Improvement	X	Local
15.52 to 15.53 "Coast Main" / Williams Street	At-Grade Crossing Roadway Surface Improvement	X	Local
25.25 to 25.26 "Coast Main" / Smith Street	At-Grade Crossing Roadway Surface Improvement	X	Local
26.07 to 26.14 "Coast Main" / Alvarado Boulevard	At-Grade Crossing Roadway Surface Improvement	X	Local
28.58 to 28.79 "Coast Main" / Ardenwood Boulevard	Ardenwood Station Platform Pedestrian Overcrossing	X	Local
29.08 to 29.11 "Coast Main" / Jarvis Avenue	At-Grade Crossing Roadway Surface Improvement	X	Local
30.42 to 30.44 "Coast Main" / Thornton Avenue	At-Grade Crossing Roadway Surface Improvement	X	Local
30.61 to 30.63 "Coast Main" / Carter Avenue (Filbert Street)	At-Grade Crossing Roadway Surface Improvement	X	Local
13.38 to 13.39 "Coast Main"/ 98th Avenue	At-Grade Crossing Roadway Surface Improvement	X	Local

Table 3.11-14. Project Hydromodification Summary (New Impervious Surfaces)

Mile Post for Added/Replaced Impervious Area and Location	Improvement	Added Impervious Area Due to At-Grade Crossing or Bridge	ROW
13.99 to 14.00 "Coast Main" / Knight and Kerwin Street	At-Grade Crossing Roadway Surface Improvement	X	Local
13.67 to 13.68 "Coast Main" / 105th Street	At-Grade Crossing Roadway Surface Improvement	X	Local
14.29 to 14.29 "Coast Main" / Interstate 880	Bridge	X	Local
15.77 to 15.78 "Coast Main" / Marina Boulevard	At-Grade Crossing Roadway Surface Improvement	X	Local
16.17 to 16.18 "Coast Main" / Fairway Drive	At-Grade Crossing Roadway Surface Improvement	X	Local
16.73 to 16.74 "Coast Main" / Fallon Drive	At-Grade Crossing Roadway Surface Improvement	X	Local
16.93 to 16.94 "Coast Main"	Timber Bridge Replacement	X	Local
17.13 to 17.14 "Coast Main"	Timber Bridge Replacement	X	Local
17.92 to 17.93 "Coast Main" / Bayfront Drive / Lewelling Avenue	At-Grade Crossing Roadway Surface Improvement	X	Local
18.24 to 18.24 "Coast Main"	Timber Bridge Replacement	X	Local
18.37 to 18.38 "Coast Main"	Timber Bridge Replacement or Fill	X	UPRR
18.48 to 18.49 "Coast Main" / Grant Avenue	At-Grade Crossing Roadway Surface Improvement	X	Local
18.97 to 18.98 "Coast Main"	Timber Bridge Replacement	X	Local
19.23 to 19.24 "Coast Main"	Timber Bridge Replacement	X	Local

Table 3.11-14. Project Hydromodification Summary (New Impervious Surfaces)

Mile Post for Added/Replaced Impervious Area and Location	Improvement	Added Impervious Area Due to At-Grade Crossing or Bridge	ROW
19.77 to 19.78 "Coast Main"	Timber Bridge Replacement	X	Local
20.17 to 20.18 "Coast Main" / Winton Avenue	At-Grade Crossing Roadway Surface Improvement	X	Local
20.77 to 20.78 "Coast Main"	Bridge or Culvert	X	Local
21.39 to 21.40 "Coast Main" / Depot Road	At-Grade Crossing Roadway Surface Improvement	X	Local
23.08 to 23.09 "Coast Main" / Baumberg Avenue	At-Grade Crossing Roadway Surface Improvement	X	Local
23.68 to 23.68 "Coast Main"	Bridge Replacement	X	Local
24.16 to 24.16 "Coast Main"	Timber Bridge Replacement	X	Local
24.58 to 24.62 "Coast Main" / Union City Boulevard	At-Grade Crossing Roadway Surface Improvement	X	Local
24.75 to 24.76 "Coast Main"	Culvert or Fill	X	Local
24.91 to 24.93 "Coast Main"	Culvert or Fill	X	Local
25.02 to 25.03 "Coast Main"	Culvert or Fill	X	Local
25.72 to 25.74 "Coast Main" / Dyer Street	At-Grade Crossing Roadway Surface Improvement	X	Local
25.81 to 25.81 "Coast Main"	Culvert or Fill	X	Local
26.25 to 26.97 "Coast Main" / Alvarado Niles Boulevard	Retaining Wall	X	Local
26.80 to 26.81 "Coast Main"	Culvert or Fill	X	Local

Table 3.11-14. Project Hydromodification Summary (New Impervious Surfaces)

Mile Post for Added/Replaced Impervious Area and Location	Improvement	Added Impervious Area Due to At-Grade Crossing or Bridge	ROW
26.97 to 26.98 "Coast Main" / Lowry Road	Surface Improvements, Bridge Construction	X	Local
27 to 27.07 "Coast Main"	Bridge Construction	X	Local
27.35 to 27.37 "Coast Main"	Clear-span Bridge	X	Local
27.39 to 27.4 "Coast Main"	Culvert or Fill	X	UPRR
27.52 to 27.52 "Coast Main"	Culvert or Fill	X	UPRR
27.01 to 27.6 "Coast Main" / Paseo Padre Parkway	Retaining Walls	X	Local
29.56 to 29.56 "Coast Main" Cabernet Street, Birkdale Drive, Indian Wells Drive / Calais Place	Extension of Triple 60-inch Reinforced Concrete Pipes and Widening of Track Area over Culverts	X	Local
30.05 to 30.06 "Coast Main" / Mayhews Landing Road	At-Grade Crossing Roadway Surface Improvement	X	Local
30.51 to 30.53 "Coast Main" / Ash Street	At-Grade Crossing Roadway Surface Improvement	X	Local
30.85 to 30.86 "Coast Main" / Sycamore Street	At-Grade Crossing Roadway Surface Improvement	X	Local
30.85 to 30.86 "Coast Main" / Cherry Street	At-Grade Crossing Roadway Surface Improvement	X	Local
31.25 to 31.25 "Coast" Main	Retaining Wall	X	Local

Groundwater

Construction

Less than significant impact with mitigation incorporated. The proposed Project would adhere to the CGP requirements (including implementation of a SWPP), all BMPs implemented during construction would follow standard plans and specifications. This would minimize impacts to groundwater quality during construction of the proposed Project.

Aside from temporary impacts due to dewatering, which are discussed in greater detail under Question b), the other potential impact to the groundwater quality within the proposed Project RSA is for contaminated groundwater, or groundwater that may release contaminated plumes when disturbed, to recharge back into the groundwater subbasins within the proposed Project footprint. If the proposed Project footprint contains contaminated groundwater or groundwater that may release contaminated plumes when disturbed, MM HYD-2 requires a dewatering permit in compliance with the VOC and Fuel General Permit and Groundwater General Permit be obtained prior to construction. Compliance with these permits would prevent the mismanagement of any potentially contaminated groundwater during construction activities. An active treatment system may also be necessary to treat contaminated groundwater exposed during excavation activities. Therefore, with Hydrology and Water Quality BMPs and implementation of MM HYD-2, impacts on groundwater during construction would be less than significant with mitigation incorporated.

Operations

Less than Significant Impact. Long-term dewatering or other construction impacts is not anticipated. Therefore, no impacts to groundwater quality are expected during operation of the proposed Project.

3.11.6.2 (b) Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such the project may impede sustainable groundwater management of the basin?

In 2014, California adopted the SGMA (see Section 3.11.2.2 State Regulatory Setting), which provides a regulatory framework for the management and use of groundwater in a manner that can be maintained through the planning horizon without causing undesirable results. Under this act, undesirable results are defined as the chronic lowering of the groundwater table, reduction of storage capacity, intrusion of seawater, degradation of groundwater quality, subsidence of land, and depletions of interconnected surface water; these conditions must be both significant and unreasonable to be considered an undesirable result. Therefore, compliance with the SGMA and avoidance of undesirable results are appropriate thresholds for determining the significance of groundwater impacts.

No Project Alternative

No Impact. Under the No-Project Alternative, no temporary or permanent impacts are anticipated to the groundwater recharge or sustainable groundwater management because there are no improvements proposed within these groundwater recharge areas.

Proposed Project

Groundwater

Construction

Less than significant impact with mitigation incorporated. Due to anticipated high groundwater elevations, dewatering is anticipated for the proposed Project. This has the potential to result in a temporary decrease of the groundwater table in the localized areas where dewatering activities would occur. As discussed above, the proposed Project would potentially require dewatering for the construction of new bridges over aquatic resources or culvert extension or replacement. Construction dewatering would have minimal impacts on areas with high groundwater elevations because most excavations are anticipated to be shallow and widely spaced throughout the proposed Project corridor. Additionally, the impacts would be temporary, because dewatering would cease once the excavation has been backfilled or the specific task requiring dewatering has been completed. Groundwater depths within the proposed Project area would be confirmed during site investigations in the design phase to estimate dewatering needs and monitored during construction for actual real-time levels. Table 3.11-15 lists locations of improvements for the proposed Project and if proposed Project improvements at these locations are expected to require dewatering.

Temporary dewatering activities within creeks would comply with the most current version of the *Stormwater Best Management Handbook: Construction* (CASQA, 2023), applicable city and Alameda County standards, and ACWD requirements (BMP HYD-2 Creek diversion to address in-creek construction). The Project would also prepare a dewatering plan and comply with relevant groundwater permits (BMP HYD-7) and, if contaminated groundwater is found, prepare a dewatering permit specific to contaminated groundwater (MM HYD-2). If required, a dewatering permit would be obtained from ACWD during construction. Groundwater extracted from temporary dewatering activities would be managed based on the groundwater quality within the Project footprint. Clean groundwater could be used for dust control, collected on-site using desilting basins and/or tanks prior to discharging to receiving waters, and/or transported to a publicly owned treatment works. If the Project footprint contains contaminated groundwater or groundwater that may release contaminated plumes when disturbed, a dewatering permit in compliance with the VOC and Fuel General Permit and Groundwater General Permit would be obtained prior to construction. An active treatment system may also be necessary to treat contaminated groundwater exposed during excavation activities. Since the proposed Project is adhering to the Construction General Permit, all temporary BMPs implemented during construction would follow standard plans and specifications. Therefore, with Hydrology and Water Quality BMPs and implementation of MM HYD-2, impacts on groundwater during construction would be less than significant with mitigation incorporated.

Operations

Less than significant impact. The proposed Project is anticipated to have a less than significant impact to the groundwater recharge. The proposed Project would result in the addition of impervious surface and reduce the available unpaved area that previously allowed runoff to infiltrate into the native soils. The reduction of runoff infiltrating through native soils has the potential to result in loss in volume or amount of water that previously recharged localized aquifers and reduce regional groundwater volumes. The reduction in local aquifer and groundwater recharge also has the potential to impact the beneficial uses of groundwater basins.

Table 3.11-15. Project Dewatering Summary

Section	Improvement	Location (Mile Post)	Depth to Groundwater (bgs)	Dewatering Potentially Required
North	At-Grade Crossing Roadway Surface Improvement	13.67 to 13.68 "Coast Main" / Edes Avenue	4.2–41 feet	X
North	At-Grade Crossing Roadway Surface Improvement	15.52 to 15.53 "Coast Main" / Williams Street	4.2–41 feet	X
Central	At-Grade Crossing Roadway Surface Improvement	25.25 to 25.26 "Coast Main" / Smith Street	8.0–42 feet	
South	At-Grade Crossing Roadway Surface Improvement	26.07 to 26.14 "Coast Main" / Alvarado Boulevard	7.2–65 feet	
South	Ardenwood Station Platform Pedestrian Overcrossing	28.58 to 28.79 "Coast Main" / Ardenwood Boulevard	7.2–65 feet	X
South	At-Grade Crossing Roadway Surface Improvement	29.08 to 29.11 "Coast Main" / Jarvis Avenue	7.2–65 feet	
South	At-Grade Crossing Roadway Surface Improvement	29.30 to 29.31 "Coast Main" / Haley Street	7.2–65 feet	
South	At-Grade Crossing Roadway Surface Improvement	30.42 to 30.44 "Coast Main" / Thornton Avenue	7.2–65 feet	

Table 3.11-15. Project Dewatering Summary

Section	Improvement	Location (Mile Post)	Depth to Groundwater (bgs)	Dewatering Potentially Required
South	At-Grade Crossing Roadway Surface Improvement	30.61 to 30.63 "Coast Main" / Carter Avenue (Filbert Street)	7.2–65 feet	
North	At-Grade Crossing Roadway Surface Improvement	13.38 to 13.39 "Coast Main"/ 98th Avenue	4.2–41 feet	
North	At-Grade Crossing Roadway Surface Improvement	13.99 to 14.00 "Coast Main" / Knight Street	4.2–41 feet	X
North	At-Grade Crossing Roadway Surface Improvement	13.67 to 13.68 "Coast Main" / 105th Street		
North	Bridge	14.29 to 14.29 "Coast Main" / Interstate 880	4.2–41 feet	X
North	At-Grade Crossing Roadway Surface Improvement	15.77 to 15.78 "Coast Main" / Marina Boulevard	4.2–41 feet	
North	At-Grade Crossing Roadway Surface Improvement	16.17 to 16.18 "Coast Main" / Fairway Drive	4.2–41 feet	
North	At-Grade Crossing Roadway Surface Improvement	16.73 to 16.74 "Coast Main" / Fallon Drive	4.2–41 feet	
North	Timber Bridge Replacement	16.93 to 16.94 "Coast Main"	4.2–41 feet	X

Table 3.11-15. Project Dewatering Summary

Section	Improvement	Location (Mile Post)	Depth to Groundwater (bgs)	Dewatering Potentially Required
North	Timber Bridge Replacement or culvert	17.13 to 17.14 "Coast Main"	4.2–41 feet	X
North	At-Grade Crossing Roadway Surface Improvement	17.92 to 17.93 "Coast Main" / Bayfront Drive / Lewelling Avenue	4.2–41 feet	
North	Timber Bridge Replacement	18.24 to 18.24 "Coast Main"	4.2–41 feet	X
North	Timber Bridge Replacement or Fill	18.37 to 18.38 "Coast Main"	4.2–41 feet	X
Central	At-Grade Crossing Roadway Surface Improvement	18.48 to 18.49 "Coast Main" / Grant Avenue	8.0–42 feet	
Central	Timber Bridge Replacement	18.97 to 18.98 "Coast Main"	8.0–42 feet	X
Central	Timber Bridge Replacement	19.23 to 19.24 "Coast Main"	8.0–42 feet	X
Central	Timber Bridge Replacement	19.77 to 19.78 "Coast Main"	8.0–42 feet	X
Central	At-Grade Crossing Roadway Surface Improvement	20.17 to 20.18 "Coast Main" / Winton Avenue	8.0–42 feet	
Central	Bridge or Culvert	20.77 to 20.78 "Coast Main"	8.0–42 feet	X

Table 3.11-15. Project Dewatering Summary

Section	Improvement	Location (Mile Post)	Depth to Groundwater (bgs)	Dewatering Potentially Required
Central	At-Grade Crossing Roadway Surface Improvement	21.39 to 21.40 "Coast Main" / Depot Road	8.0–42 feet	
Central	At-Grade Crossing Roadway Surface Improvement	23.08 to 23.09 "Coast Main" / Baumberg Avenue	8.0–42 feet	
Central	Bridge Replacement	23.68 to 23.68 "Coast Main"		
Central	Timber Bridge Replacement	24.16 to 24.16 "Coast Main"	8.0–42 feet	X
Central	At-Grade Crossing Roadway Surface Improvement	24.58 to 24.62 "Coast Main" / Union City Boulevard	8.0–42 feet	
Central	Culvert or Fill	24.76 to 24.76 "Coast Main"	8.0–42 feet	X
Central	Culvert or Fill	24.93 to 24.93 "Coast Main"	8.0–42 feet	X
Central	Culvert or Fill	25.03 to 25.03 "Coast Main"	8.0–42 feet	X
South	At-Grade Crossing Roadway Surface Improvement	25.72 to 25.74 "Coast Main" / Dyer Street	7.2–65 feet	
South	Culvert or Fill	25.81 to 25.81 "Coast Main"	7.2–65 feet	X

Table 3.11-15. Project Dewatering Summary

Section	Improvement	Location (Mile Post)	Depth to Groundwater (bgs)	Dewatering Potentially Required
South	Retaining Wall	26.25 to 26.97 "Coast Main" / Alvarado Niles Boulevard		
South	Culvert or Fill	26.81 to 26.81 "Coast Main"	7.2–65 feet	X
South	Surface Improvements, Bridge Construction	26.97 to 26.98 "Coast Main" / Lowry Road	7.2–65 feet	X
South	Bridge Construction	27 to 27.07 "Coast Main"	7.2–65 feet	X
South	Clear-span Bridge	27.35 to 27.37 "Coast Main"	7.2–65 feet	X
South	Culvert or Fill	27.52 to 27.52 "Coast Main"	7.2–65 feet	X
South	Culvert or Fill	27.4 to 27.4 "Coast Main"	7.2–65 feet	X
South	Retaining Walls	27.01 to 27.6 "Coast Main" / Paseo Padre Parkway	7.2–65 feet	X
South	Extension of Triple 60-inch Reinforced Concrete Pipes and Widening of Track Area over Culverts	29.56 "Coast Main" / Cabernet Street, Birkdale Drive, Indian Wells Drive/ Calais Place	7.2–65 feet	X

Table 3.11-15. Project Dewatering Summary

Section	Improvement	Location (Mile Post)	Depth to Groundwater (bgs)	Dewatering Potentially Required
South	At-Grade Crossing Roadway Surface Improvement	30.05 to 30.06 "Coast Main" / Mayhews Landing Road	7.2–65 feet	
South	At-Grade Crossing Roadway Surface Improvement	30.51 to 30.53 "Coast Main" / Ash Street	7.2–65 feet	
South	At-Grade Crossing Roadway Surface Improvement	30.85 to 30.86 "Coast Main" / Sycamore Street	7.2–65 feet	X
South	At-Grade Crossing Roadway Surface Improvement	30.85 to 30.86 "Coast Main" / Cherry Street		
South	Retaining Wall	31.25 to 31.25 "Coast" Main		
South	At-Grade Crossing Roadway Surface Improvement	30.51 to 30.53 "Coast Main" / Ash Street	7.2–65 feet	
South	At-Grade Crossing Roadway Surface Improvement	30.85 to 30.86 "Coast Main" / Sycamore Street	7.2–65 feet	

As described under Question a), permanent stormwater measures would be implemented to promote infiltration into the groundwater table and to minimize potential impacts to the groundwater quality within the proposed Project RSA (BMP HYD-5). Long-term dewatering is not anticipated. Therefore, impacts to groundwater recharge capacities from the addition of impervious area are not anticipated under the proposed Project.

3.11.6.3 c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i) result in a substantial erosion or siltation on- or off-site;

No Project

No Impact. Under the No Project Alternative, no temporary or permanent impacts are anticipated to the surface water quality since the current railroad tracks are ballasted and self-retaining.

Proposed Project

Less than Significant. Please see threshold discussion a) for a detailed analysis of potential erosion in regard to the proposed Project.

ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site?

No Project

No Impact. Under the No-Project Alternative, no temporary or permanent impacts are anticipated to the existing drainage patterns within the proposed Project area because no improvements to drainage systems are proposed.

Proposed Project

Less than significant impact with mitigation incorporated. The proposed Project would have less than significant impacts with mitigation incorporated with respect to increases in rate or amount of surface water runoff. As discussed in Section 3.11.2, the proposed Project must comply with Executive Order 11988 Floodplain Management: any long- and short-term adverse impacts to the floodplain must be avoided to the greatest extent possible. The proposed Project proposes work within floodplains that either result in an increase to floodplain elevations or occupy the floodplain with a structure. The proposed Project proposes improvements within several floodplains. The following sections detail the hydraulic impacts of the proposed structures to the floodplains.

Hydraulic Analysis

This section analyzes hydraulic changes with the proposed Project improvements within existing creek crossings within floodplains or floodways. As noted in Section 3.11.4.1, Environmental Setting, these creeks include:

- Line P (San Leandro Creek).

- Line N (Stonehurst Creek).
- Zone 2 Line A (San Leandro Creek/Estudillo Canal).
- A crossing of an unnamed creek 0.2 miles south of Zone 2 Line A.
- Zone 2 Line B (San Lorenzo Creek).
- Bockman Canal/ Line N (Tributary to SF Bay).
- A crossing of an unnamed Creek 0.3 miles south of Line N.
- Zone 2 Line K (Sulphur Creek).
- Zone 4 Line A.
- Zone 3 Line A-2.
- Zone 3A Line A (Old ACFCC).
- Zone 5 Line K (Crandall Creek).
- Zone 5 Line H.
- Zone 3A Line B (Ward Creek).
- Zone 3A Line E.
- Zone 3A Line D.
- ACFCC.
- Zone 5 Line F-1.
- A crossing of an unnamed creek 0.08 miles south of Dyer Street.
- Zone 2 Line M.

All the listed creeks and waterways are within FEMA regulatory floodways and therefore, FEMA requires proposed work in these areas to not increase in flood levels or alter drainage patterns. The USACE National Levee Inventory and FEMA FIS designate the following locations as part of the USACE's Levee System: Zone 2 Line P (San Leandro Creek), Bockman Canal/Line N, Zone 2 Line K (Sulphur Creek), Zone 2 Line B (San Lorenzo Creek), Zone 3A Line A (Old ACFCC/Ward Creek), Zone 3 Line A-2, and ACFCC. At these locations, proposed Project improvements would require a Section 408 permit and increases in flood levels must be avoided for permit approvals.

Models for the existing creek crossings were requested from FEMA and ACFCWCD. Refer to Table 3.11-2 for a status of the models requested and obtained. For creek crossings where existing models were not available, a qualitative impact analyses will be provided based on general assessments of available information. As shown in Figure 3.11-2, models were obtained for five creeks and were used to quantitatively analyze for hydraulic changes as a result of the proposed Project.

Alameda Creek Flood Control Channel (ACFCC) Hydraulics

The proposed Project proposes to replace an existing 18-foot-wide 1-track concrete bridge supported by five 3.5-foot-wide diaphragm bents at an existing UPRR crossing in ACFCC,

approximately 0.6 miles downstream of Alvarado Boulevard, with two parallel 17.5-foot-wide 1-track bridges comprised of steel deck plate girder (DPG) spans supported by three 8-foot diameter piles. The bent caps for the piles would be 7-feet-deep and 9-feet-wide. The parallel bridges would be less than 10 feet apart. The crossing is in a FEMA Zone A. Implementation of BMP HYD-9 Soffit elevations for new bridges, will require that the proposed soffit elevation for a new bridge be matched to existing soffit elevations to limit the potential impact of the bridge replacement on the floodplain.

Existing Conditions

Under existing conditions, the 1-track UPRR concrete bridge has a soffit elevation of approximately 29.3 feet near its southern abutment. The Alvarado Boulevard Crossing, approximately 0.6 miles upstream of the UPRR crossing, has a soffit elevation of 32 feet near its southern abutment. The I-880 crossing is approximately 0.2 miles further upstream of Alvarado Boulevard and has a soffit elevation of 33.8 feet. WSE's for ACFCC are provided in Table 3.11-16. The existing model shows a 4.2-foot drop in WSE immediately downstream of the existing UPRR bridge.

Proposed Conditions

The proposed bridge replacement results in an increase in WSE of 0.09 feet upstream of the proposed bridge that extends for approximately 2,850 feet. WSEs for both existing and proposed conditions are contained within the existing levees for the extent of the proposed impacts. This alternative would impact the WSE within USACE jurisdiction, which would require a Section 408 permit and discussion with regulatory agencies to determine if mitigation is required. A comparison of hydraulic results showing the rise upstream of the crossing improvements is provided in Table 3.11-16.

Table 3.11-16. ACFCC Existing and Proposed Conditions 100-year WSE Comparison

Cross Section Station[1]	Existing WSE[2]	Proposed WSE[2]	Change in WSE[2]
30991	30.44	30.45	0.01
30842	30.26	30.26	0.00
30755 BR U	29.90	29.91	0.01
30755 BR		**I-880**	
30755 BR D	29.53	29.55	0.02
30541	29.38	29.40	0.02
30391	29.20	29.22	0.02
29791	28.53	28.56	0.03

Table 3.11-16. ACFCC Existing and Proposed Conditions 100-year WSE Comparison

Cross Section Station[1]	Existing WSE[2]	Proposed WSE[2]	Change in WSE[2]
29570.9	28.32	28.35	0.03
29487.9 BR	**Alvarado Boulevard**		
29371	27.87	27.91	0.04
29191	27.79	27.82	0.03
26394.6	25.29	25.37	0.08
26184	25.06	25.15	0.09
26058.5 BR	**Location of Proposed Improvements**		
26035	25.04	25.04	0.00
25825.1	24.91	24.91	0.00

1 Order of stations listed from upstream of Alameda Creek to downstream.
2 WSE precision increased to the nearest 1/100th of a foot to accurately describe impact of model limitations.

Zone 3A Line A (Old ACFCC/Ward Creek) Hydraulics

The Project proposes to replace an existing 30-foot-wide 1-track timber trestle bridge supported by 11 piers, approximately 2 feet in diameter and spaced 15 feet, at a UPRR crossing in Zone 3A Line A, approximately 0.2 miles downstream of Hesperian Boulevard. The proposed replacement is two 17.5-foot-wide parallel 1-track bridges comprising 30-inch concrete box beams supported by 2-foot diameter piles spaced 30 feet on center, for a total of 5 piers. The proposed piles would have 5-foot-deep bent caps that are 5-feet-wide. The crossing is within FEMA Zone AE and an USACE jurisdiction accredited leveed area. The replacement must cause zero increase in WSE of the base flood. The proposed soffit elevation would be matched to existing soffit elevations to limit the potential impact of the bridge replacement on the floodplain. The proposed bridge would result in a reduced volume of piers within the floodplain, however, since the proposed bent caps would protrude into the floodplain, the overall obstruction volume would remain similar to existing conditions.

Existing Conditions

Under existing conditions, the 1-track timber trestle and steel bridge has a soffit elevation of approximately 10.4 feet, NAVD 88. The Hesperian Boulevard crossing has a soffit elevation of approximately 11.8 feet and is a concrete bridge supported by 4 pier walls, 0.8 feet in width and an additional center pier wall that is 4 feet wide. WSE's for Zone 3A Line A is provided in Table 3.11-17. The drop in WSE downstream of the bridges are the result of backwater conditions formed by the

overtopped bridges. Once flows pass over the structure, they start to normalize to the channel slope before experiencing the backwater from the next downstream bridge.

Proposed Conditions

With implementation of BMP HYD-9, the soffit elevation for a new bridge will be matched to existing soffit elevations to limit the potential impact of the bridge replacement. The proposed soffit elevation of the bridge replacement would match existing soffit elevation at approximately 10.4 feet. Under proposed conditions, the UPRR bridge structure would continue to be overtopped by the 100-year storm. The model shows no rise in the 100-year WSE upstream and downstream of the proposed UPRR bridge replacement compared to existing conditions. The proposed Project would replace a structure within USACE jurisdiction and would require a Section 408 permit. A comparison of hydraulic results showing no rise around the crossing improvements is provided in Table 3.11-17.

Table 3.11-17. Zone 3A Line A Existing and Proposed Conditions 100-year WSE Comparison

Cross Section Station	Existing WSE[1]	Proposed WSE[1]	Change in WSE[1]
24524	14.8	14.8	0.0
24255	14.6	14.6	0.0
24205 BR	**Barret Pedestrian Crossing**		
24155	14.5	14.5	0.0
23640	14.3	14.3	0.0
23017	14.1	14.1	0.0
22990 BR	**Location of Proposed Improvements**		
22963	13.6	13.6	0.0
22913	13.6	13.6	0.0

1 WSE values rounded to the nearest 1/10th of a foot.

Zone 5 Line H Hydraulics

The proposed Project proposes to widen an existing triple 60-inch culvert at the UPRR crossing of Zone 5 Line H, approximately 600 feet downstream of Haley Street, to support the expansion from a 1-track to a 2-track line. The improvements consist of widening a triple 60-inch reinforced concrete pipe culvert and the deck approximately 11.0 feet in the upstream direction. The crossing is in a FEMA Zone AE within a regulated floodway and therefore must not increase the WSE. The deck

elevation, pipe slope, pipe diameter, and number of pipes were retained to limit the impact of the culvert widening on the floodplain.

Existing Conditions

Under existing conditions, the triple-barrel culvert is 40-feet-long with a slope of 0.65% and an upstream deck elevation of 14.2 feet. Haley Street, 600 feet upstream of the UPRR crossing, has an upstream deck elevation of 15.3 feet, and the crossing contains a box culvert with a 6-foot span and 5-foot rise. WSE's for Zone 5 Line H are provided in Table 3.11-18. The large drop in WSE is due to a significant backwater effect upstream of the existing UPRR crossing. Flows normalize downstream of the crossing. The UPRR crossing is submerged 2.1 feet and Haley Street is submerged 1.4 feet under existing conditions.

Proposed Conditions

Head loss is the reduction in head, or pressure, that occurs as fluid flows through a pipe or other hydraulic system due to friction, turbulence or other factors. Head loss results in a reduction of pipe capacity. Due to the large diameter of the pipes, the increase in head loss due to friction against the lengthened inside wall would not be significant. The model shows no rise in the 100-year WSE upstream and downstream of the proposed UPRR crossing widening in comparison to existing conditions. The crossings continue to be overtopped under proposed conditions. A comparison of hydraulic results showing no rise around the crossing improvements is provided in Table 3.11-18.

Table 3.11-18. Zone 5 Line H Existing and Proposed Conditions 100-year WSE Comparison

Cross Section Station	Existing WSE[1]	Proposed WSE[1]	Change in WSE[1]
6557	16.8	16.8	0.0
6542	16.7	16.7	0.0
6503 BR	**Haley Street**		
6464	16.5	16.5	0.0
6463	16.5	16.5	0.0
5185	16.4	16.4	0.0
5147	16.3	16.3	0.0
5135	16.3	16.3	0.0
5115 BR	**UPRR Crossing (Triple 60-inch reinforced concrete pipes)**		
5095	14.3	14.3	0.0

Table 3.11-18. Zone 5 Line H Existing and Proposed Conditions 100-year WSE Comparison

Cross Section Station	Existing WSE[1]	Proposed WSE[1]	Change in WSE[1]
5080	14.2	14.2	0.0
5030	14.2	14.2	0.0

1 WSE values rounded to the nearest 1/10th of a foot.

Zone 5 Line K (Crandall Creek) Hydraulics

The proposed Project proposes to widen an existing 18-foot-wide 1-track timber trestle bridge supported by 3 piers approximately 4.5 feet in diameter, at a UPRR crossing in Zone 5 Line K, approximately 0.3 miles downstream of Paseo Padre Parkway. The improvements consist of replacing the existing bridge with two 22-feet-wide parallel clear-span bridges. The parallel bridges would be less than 10 feet apart. The centerline of the proposed structures would be located 16.5 feet east of the existing bridge in the upstream direction and 10 feet west of the existing bridge in the downstream direction. The crossing is in FEMA Zone AE within a regulated floodway and must not increase the WSE. The proposed soffit elevation would be maintained to reduce the impact on the floodplain.

Existing Conditions

Under existing conditions, the 1-track timber trestle bridge has an upstream deck elevation of approximately 20 feet. WSE's for Zone 5 Line K (Crandall Creek) are provided in Table 3.11-19.

Proposed Conditions

The proposed bridge is a clear-span structure that would remove the existing piers within the floodplain. The model shows removal of the wooden piers reduces WSEs by up to 0.2 feet compared to existing conditions. The reduction in WSE propagates upstream until the grade control structure at Deep Creek Road, approximately 2,960 feet upstream of the proposed improvements. The decrease in WSE results in a slight increase in freeboard at the UPRR crossing of 7.5 feet. The removal of the piers also results in a minor increase to the peak velocity of approximately 0.1 ft/s within the extent of the WSE reduction. Channel velocities range from 12.6 ft/s to 14.0 ft/s within the extent of the WSE reduction. The increase in velocity is considered negligible. With implementation of BMP HYD-9, the soffit elevation for a new bridge will be matched to existing soffit elevations to limit the potential impact of the bridge replacement.

The proposed Project would reduce the WSEs within a Zone AE regulatory floodway. A comparison of hydraulic results showing no increase in WSE around the bridge replacement is provided in Table 3.11-19.

Table 3.11-19. Zone 5 Line K Existing and Proposed Conditions 100-year WSE Comparison

Cross Section Station	Existing WSE[1]	Proposed WSE[1]	Change in WSE[1]
13509		**Deep Creek Road**	

Table 3.11-19. Zone 5 Line K Existing and Proposed Conditions 100-year WSE Comparison

Cross Section Station	Existing WSE[1]	Proposed WSE[1]	Change in WSE[1]
13420	13.8	13.8	0.0
12602	13.9	13.9	0.0
11650	13.0	12.9	-0.1
10640	12.6	12.5	-0.1
10560	12.6	12.4	-0.2
10550	**Location of Proposed Improvements**		
10540	12.4	12.4	0.0
10510	12.4	12.4	0.0
10492.5	**Existing Pedestrian Crossing**		
10475	12.4	12.4	0.0
10460	12.4	12.4	0.0

1 WSE values rounded to the nearest 1/10th of a foot.

Zone 2 Line B (San Lorenzo Creek) Hydraulics

The proposed Project proposes to replace an existing 22-foot-wide 1-track timber trestle and steel through plate girder (TPG) bridge, supported by two 6-foot diameter piles and four 1-foot diameter piles, at a UPRR crossing in Zone 2 Line B, approximately 0.5 mile upstream of where San Lorenzo Creek discharges to San Francisco Bay. The replacement consists of two 17.5-foot-wide parallel 1-track bridges comprising 20-inch concrete slab beams supported by two 2-foot diameter piles and a center steel TPG span supported by two 4-foot diameter piles. The caps for the 2-foot diameter piles would be 4.5 feet-deep and for the 4-foot diameter piles would be 6-feet-deep; the pile cap width is 4 feet and 5 feet, respectively. The soffit of the steel TPG span would be 1 foot lower than adjacent spans. The parallel bridges would be less than 10 feet apart. The crossing is within FEMA Zone A and USACE jurisdiction. The replacement must cause zero increase in WSE of the base flood. The proposed soffit elevation would be matched to existing to limit the impact of the bridge replacement on the floodplain.

Existing Conditions

Under existing conditions, the 1-track timber trestle and steel bridge has a soffit elevation of approximately 16.5 feet where its center steel TPG span is approximately 1 foot lower than adjacent spans. The Barret Pedestrian Crossing, approximately 1,200 feet upstream of the UPRR crossing, has a soffit elevation of 20.7 feet and is a clear-span bridge. WSE's for Zone 2 Line B (San Lorenzo Creek) are provided in Table 3.11-20.

Proposed Conditions

The proposed soffit of the center TPG span and adjacent spans are at the same elevation as the existing conditions. Replacing the existing four 1.17-foot piers and two 6-foot piers, with two 2-foot piers and two 4-foot piers, reduces pier volume in the floodplain, but does not result in an impact to the WSE. The model shows no rise in the 100-year WSE upstream and downstream of the proposed UPRR bridge replacement compared to existing conditions. The proposed Project would replace a structure within USACE jurisdiction and would require a Section 408 permit. A comparison of hydraulic results showing no rise around the crossing improvements is provided in Table 3.11-20.

Table 3.11-20. Zone 2 Line B Existing and Proposed Conditions 100-year WSE Comparison

Cross Section Station	Existing WSE[1]	Proposed WSE[1]	Change in WSE[1]
4552.75	18.0	18.0	0.0
4152.75	17.5	17.5	0.0
3952.75 BR	**Barret Pedestrian Crossing**		
3752.75	17.1	17.1	0.0
3352.75	16.7	16.7	0.0
2952.75	16.0	16.0	0.0
2852.75	15.3	15.3	0.0
2752.75 BR	**Location of Proposed Improvements**		
2702.75	15.3	15.3	0.0
2552.75	13.0	13.0	0.0

1 WSE values rounded to the nearest 1/10th of a foot.

Zone 2 Line K (Sulphur Creek) Hydraulics

The proposed Project proposes to replace an existing 20-foot-wide 1-track timber clear-span bridge at a UPRR crossing in Zone 2 Line K, approximately 0.5 miles downstream of the Hayward Airport. The replacement consists of two 22-foot-wide parallel 1-track bridges comprising steel TPG clear-spans; similar to Zone 5 Line K. The parallel bridges would be less than 10 feet apart. The crossing is within FEMA Zone AE and USACE jurisdiction. The replacement must not cause an increase in the base flood. The soffit elevation would be maintained to reduce the impact on the floodplain.

Existing Conditions

Under existing conditions, the 1-track timber clear-span bridge has a deck elevation of approximately 15.4 feet. The Hayward Airport Culvert, approximately 0.5 mile upstream of the UPRR crossing, has a deck elevation of approximately 25.0 feet, and is a double box culvert each with a span of 8.5 feet and a rise of 6.5 feet. WSE's for Zone 2 Line K (Sulphur Creek) are provided in Table 3.11-21. The subcritical conditions[2] of Sulphur Creek and overtopping of structures create backwater conditions[3] within the floodplain. This condition results in immediate drops in WSE across the overtopped structures. The gradual decreases in WSE between structures are the result of flows normalizing with the channel slope.

Proposed Conditions

The proposed soffit of the parallel TPG spans is at the same elevation as under existing conditions. Due to the proposed addition of a parallel span, the additional span would also be submerged. The proposed structure would be submerged for an additional 24 feet further downstream than under existing conditions. The impacts dissipate after flowing over the structure. As a result, the model shows no rise in the 100-year WSE upstream and downstream of the proposed UPRR bridge replacement compared to existing conditions. The proposed Project would replace a structure within USACE jurisdiction and would require a Section 408 permit. A comparison of hydraulic results showing no rise around the crossing improvements is provided in Table 3.11-21.

Table 3.11-21. Zone 2 Line K Existing and Proposed Conditions 100-year WSE Comparison

Cross Section Station	Existing WSE[1]	Proposed WSE[1]	Change in WSE[1]
8768	27.4	27.4	0.0
8241	26.7	26.7	0.0
8192 CU		**Hayward Airport Culvert**	

[2] Under subcritical (also known as submerged) flow conditions, a change in the flow depths (WSE) downstream of a flow constriction (e.g., bridge, pier, other in water structure) also affects the flow conditions upstream of the in-water constriction. Alternatively, under supercritical flow conditions changes in WSE downstream of a flow constriction has no effect on flow conditions upstream of the in-water constriction.

[3] Backwater is water that is stagnant (unmoving) and out of the flow current. This results from increases in water surface levels that causes water to move into the floodplains.

Table 3.11-21. Zone 2 Line K Existing and Proposed Conditions 100-year WSE Comparison

Cross Section Station	Existing WSE[1]	Proposed WSE[1]	Change in WSE[1]
8143	20.4	20.4	0.0
8142	21.1	21.1	0.0
8126	21.0	21.0	0.0
7746	20.7	20.7	0.0
7206	20.2	20.2	0.0
6671	19.6	19.6	0.0
6130	19.2	19.2	0.0
5630	18.8	18.8	0.0
5560 BR	**Location of Proposed Improvements**		
5450	15.6	15.6	0.0
5083	15.1	15.1	0.0

1 WSE values rounded to the nearest 1/10th of a foot.

Qualitative Analysis of Hydraulics at Proposed Structures

The following 13 existing creek crossings and 1 lateral encroachment are within a FEMA Zone AE floodway with known BFEs; see Table 3.11-11. The proposed structures must not increase the base flood WSE by more than 1 foot. Model data is unavailable for these crossings and the lateral encroachment and therefore impacts of the proposed improvements are analyzed qualitatively at this time.

- Zone 3A Line A-2: 1-track timber trestle.
- Zone 4 Line A: multi-track concrete box culvert.
- Line P (San Leandro Creek): 1-track concrete bridge.
- Line N (Stonehurst Creek): 1-track concrete bridge.
- Unnamed crossing 0.3 miles south of Line N: 1-track bridge.
- Unnamed crossing 0.2 miles south of Zone 2, Line A: 1-track bridge.

- Zone 2 Line A: 1-track timber trestle.
- Zone 3A Line D: 1-track timber trestle.
- Zone 3A Line E: 1-track longitudinal encroachment.
- Bockman Canal/Line N (tributary to SF Bay): 1-track timber trestle.
- Unnamed crossing 0.08 miles south of Dyer Street: 1-track timber trestle.
- Zone 5 Line M: 1-track culvert.
- Zone 5 Line F-1: multi-track culvert.

Removal of a 1-track timber trestle in favor of a 2-track bridge would reduce or maintain the existing pier volume in the floodplain and lead to a lower or similar WSEs upstream of the bridge as seen in the hydraulic analysis for Zone 3A Line A. This scenario applies to the Zone 2 Line A, Bockman Canal/Line N (tributary to SF Bay), Zone 3A Line A-2, Zone 3A Line B (Ward Creek), Zone 3A Line D, and unnamed crossing 0.08 miles south of Dyer Street proposed improvements. The subcritical assumption is backed by the shallow slopes in these creeks and that timber trestles generally are not safe to install under supercritical conditions.

Widening of an existing culvert or multi-track culvert crossing by extension of the culvert while maintaining culvert size would generally have minimal impact on WSEs in shallow sloped creeks with large culverts. Major headloss through the culvert is related to the ratio of flow to culvert diameter and culvert length, while minor headloss is related to the shape of entrance and exit. If both remain mostly unchanged, impacts to the floodplain would be minimal, as seen in the hydraulic analysis for Zone 5 Line H. This scenario applies to Zone 4 Line A, Zone 5 Line M, and Zone 5 Line F-1.

Widening a 1-track bridge to a 2-track bridge would place additional piers in the floodplain, possibly of larger diameter. Placing the piers in line with existing ones would help minimize the impacts. Replacing a 1-track bridge with a 2-track bridge would likely replace the piers in the floodplain with fewer, but larger diameter piers. The result would be either no rise or a small rise in WSE that would require implementation of MM-HYD-2 Balancing cut and fill and increasing flow and detention capacity. This scenario applies to Line P (San Leandro Creek), Line N (Stonehurst Creek), the unnamed crossing 0.3 mile south of Line N, and the unnamed crossing 0.2 miles south of Zone 2 Line A.

Zone 3A Line E is a longitudinal encroachment. At crossing locations or encroachments, where fill is proposed, an equal amount of cut would be provided through grading or storage to maintain the volume of the floodplain. Implementation of MM-HYD-2 Balancing cut and fill and increasing flow and detention capacity, would maintain existing volume of floodplain. Additional mitigation measures for crossings that propose piers within the floodplain are presented in Section 3.5, Biological Resources, regarding in-water and floodplain work.

Construction

Construction of the proposed Project would require temporary fill due to grading work within the 100-year floodplains regulated by FEMA. Depending upon the specific construction methods selected by the contractor, temporary fill within floodplains during the construction phase could include temporary structures, such as formworks (temporary molds for new concrete structures), falseworks (temporary supports for new structures), and trestles (temporary elevated working

surfaces); equipment, including excavators; and construction materials. When floodwaters are present, temporary fill reduces the storage capacity of the floodplain, resulting in localized changes in WSE, flow velocity, flood flow patterns, or extents of the floodplain. The proposed Project would also involve construction of a bridge over Alameda Creek. Constructing of a bridge would potentially increase the WSE temporarily due to the presence of construction machinery and structures. The proposed Project would minimize the temporary impacts to extent practicable with the inclusion of BMP HYD-8, Monitoring weather forecast to avoid construction impacts during storm events. In addition to floodplains along or in proximity to aquatic resources, floodplains in the proposed Project footprint occur on local roadways or in isolated areas that are not associated with aquatic resources. Refer to the sections below for discussion of each specific temporary impacts for each subdivision and section.

The proposed Project crosses the following 100-year floodplains: Zone A, AE, AO, and Shaded X. The locations of the temporary fill and construction work in 100-year floodplains on the Coast Subdivision are discussed below.

- Temporary at-grade work would include grading within the 100-year floodplain (as mentioned in Table 3.11-13) at approximately MP 13.75 near Knight Street in the city of Oakland and MP 16.73 near Fallon Drive in the city of San Leandro.
- Grading, placing SWPPP measures for construction, removing old piles and other temporary work within this section would occur at approximately MP 23.09 at Baumberg Avenue due to proposed work in the 100-year floodplain. Bockman Canal crosses the proposed Project at approximately MP 18.97, Line N-3 at approximately MP 19.23, Sulphur Creek at approximately MP 23.619.77, Zone 4 Line A at approximately MP 20.77, Zone 3A Line A-2 at approximately MP 23.68, and Old ACFCC at approximately MP 24.16.
- Grading, placing SWPPP measures for construction, removing old piles and other temporary work would occur at approximately MP 27.00, 27.35, and 29.09 to 29.56 in the city of Newark due to proposed work in the 100-year floodplain. Zone 5 Line H is located parallel to the railroad from MP 29.09 to 29.56 and is a Zone AE floodway. ACFCC cross the proposed Project at approximately MP 27.00 between Lowry Road and Caliban Drive/Bunkhouse Street in the city of Fremont. Temporary at-grade work would occur in the city of Newark near MP 29.31 near Haley Street and MP 30.06 near Mayhews Landing Road due to grading in the 100-year floodplain.

The proposed Project on the Coast Subdivision alignment would also have bridge construction over Alameda Creek near MP 27.00 and at Zone 5 Line K (Crandall Creek) near MP 27.35. The construction of new bridges at both of these locations would replace the existing bridges and have temporary impacts such that temporary structures, formworks, falsework, and construction equipment could potentially block flows in the creek.

The proposed improvements would widen the track area over the existing triple 60-inch reinforced concrete pipes and lengthen the culverts for Zone 5 Line H at MP 29.57. Temporary impacts would include temporary structures, formworks, falsework, and construction equipment could potentially block flows in the creek.

Additionally, the proposed Project would widen the track area over Zone 5 Line H near MP 29.56 on the Coast Subdivision, over the confluence of Line N (Stonehurst Creek) and Line P (San Leandro Creek) at MP 14.29, Zone 2 Line A (Estudillo Canal (San Leandro Creek) at MP 16.93, a crossing of a unnamed creek 0.2 miles south of Zone 2 Line A (Estudillo Canal) (San Leandro Creek) at MP 17.13,

Zone 2 Line B (San Lorenzo Creek) at MP 18.24, Line N at MP 18.97, Line N-3, a crossing of a unnamed creek 0.3 miles south of Line N at MP 19.23, Sulphur Creek at MP 19.77, Zone 4 Line A at MP 20.77, Zone 3A Line A-2 at MP 23.68, and Zone 3A Line A (old ACFCC) at MP 24.61. The construction of new bridges over these creek crossings would replace the existing bridges and have temporary impacts because the temporary structures, formworks, falsework, and construction equipment could potentially block creek flows.

The proposed Project would also potentially include a construction culvert through Zone 4 Line A at MP 20.77 and multiple culvert construction at MP 30.09 in a Shaded Zone X area. The construction of culverts would result in head losses through the extended cross culvert that has a potential to increase the upstream WSE.

Due to temporary work within the floodplains during construction and implementation of BMP HYD-8, the proposed Project would have a less than significant impact with respect to substantially altering the stream or course of a river during construction.

Operations

The net new impervious area within the proposed Project is minimal and would have minimal impacts on a 100-year floodplain. The proposed Project would manage stormwater runoff from impervious surfaces by implementing BMPs HYD-5 and HYD-6 to maintain pre-Project hydrology through on-site stormwater management measures, such as infiltration and retention of stormwater runoff, where appropriate. Accordingly, the proposed Project would not increase flooding on- or off-site as a result of new or reworked impervious surfaces.

As discussed above in the Hydraulic Analysis section, the proposed Project would cross the 100-year floodplains at zones A, AE, AO, and Shaded X. Permanent impacts on the 100-year floodplains would result from development in the floodplain, including new bridges, earthwork, and increases in impervious area. For new siding tracks and areas of shifted tracks within the 100-year floodplain, the new top of rail elevation would be 2 to 8 feet above the original top of rail elevation. This could potentially affect the 100-year WSE. The proposed Project would also involve construction of new bridges and culverts within creeks. Constructing a bridge would potentially increase the WSE and impact the 100-year floodplain. The proposed Project would minimize the impacts to extent practicable. The locations of the permanent fill in 100-year floodplains along the Coast Subdivision are discussed below.

- North Section
    - As a result of grading in the 100-year floodplain and as mentioned in Table 3.11-13, permanent fill and track work would occur at approximately MP 13.67 near Edes Avenue through MP 14.29 near the confluence of Line N (Stonehurst Creek) and Line P (San Leandro Creek) in the city of Oakland. Permanent fill and track work locations are also located at approximately MP 16.17 near Fairway Drive in the city of San Leandro to MP 18.38 near Grant Avenue in the unincorporated area of San Lorenzo. Permanent fill and track work at those locations is due to grading in the 100-year floodplain.
    - The proposed Project would also have bridge construction over the following crossings:
        - The confluence of Line N (Stonehurst Creek) and Line P (San Leandro Creek) at MP 14.29;

- Zone 2 Line A (Estudillo Canal (San Leandro Creek) at MP 16.93;
- a crossing of an unnamed creek 0.2 miles south of Zone 2 Line A (Estudillo Canal) (San Leandro Creek) at MP 17.13; and
- Zone 2 Line B (San Lorenzo Creek) at MP 18.24.

The construction of new bridges over these creek crossings would replace the existing bridges and have permanent impacts to the creek including partial blockage of flows.

- Central Section
  - As mentioned in Table 3.11-13, permanent fill and track work would occur at approximately MP 18.38 near Grant Avenue in the unincorporated area of San Lorenzo to MP 20.17 near Winton Avenue in the city of Hayward due to grading in the 100-year floodplain. Permanent fill and track work would also be needed at approximately MP 20.77 near Zone 4 Line A in the city of Hayward due to grading in the 100-year floodplain. Permanent fill and track work would occur at approximately MP 22.06 at State Route 92 in the city of Hayward to MP 24.58 at Union City Boulevard in the city of Union City due to grading in the 100-year floodplain.
  - The proposed Project would also have bridge construction over the following crossings:
    - Bockman Canal/Line N (tributary to SF Bay) at MP 18.97;
    - Line N-3, a crossing of an unnamed creek 0.3 miles south of Line N at MP 19.23;
    - Zone 2 Line K (Sulphur Creek) at MP 19.77, Zone 4 Line A at MP 20.77; and
    - Zone 3A Line A-2 at MP 23.68, and Zone 3A Line A (old ACFCC) at MP 24.61.

    The construction of new bridges over these creek crossings would replace the existing bridges and have permanent impacts to the creek including partial blockage of flows.
  - The proposed Project would also potentially construct a culvert through Zone 4 Line A at MP 20.77. The construction of a new bridge over Zone 4 Line A would replace the existing bridge and have permanent impacts to the creek including partial blockage of flows.
- South Section
  - As mentioned in Table 3.11-13, permanent fill in the 100-year floodplain would occur at approximately MP 27.01, 27.35, and 29.09 to 29.56 in the city of Newark. ACFCC crosses the proposed Project at approximately MP 27.00 between Lowry Road and Caliban Drive/ Bunkhouse Street in the city of Fremont. Zone 5 Line H is located parallel to the railroad from MP 29.09 to 29.56 and is a Zone AE floodway between Jarvis Avenue and Indian Wells Drive/Calais Place in the city of Fremont. Per FEMA, there must be no increase in flood elevations within floodways. Detailed hydraulic analysis might be needed in later phase to support permitting and confirm that final design is consistent with the impacts described below. Permanent at-grade work would occur in the city of Newark near MP 29.31 near Haley Street, MP 30.06 near Mayhews Landing Road, MP 30.85 near Sycamore Street, and MP 30.85 near Cherry Street due to grading in the 100-year floodplain.

The proposed Project would also include bridge construction over Alameda Creek near MP 27.00 on the Coast Subdivision. The construction of a new bridge over Alameda Creek would replace the

existing bridge and have permanent impacts to the creek including partial blockage of flows. The proposed improvements would replace the existing bridge with two separate bridges on either side that would be constructed while the existing bridge remains in operation. The proposed bents and piers of the new bridges would not be at the same location as existing bents and piers; there would be four proposed bents and piers for both new bridges each with singular piers of approximately 7 feet in diameter oriented in the direction of creek flow. The existing bridge contains five piers, each with a width of 3 feet. The proposed bridge soffit would match the soffit of the existing bridge. The proposed bridge would avoid placement of piers in the existing low flow channel and levee embankment. The proposed improvements would impact the floodplain; and mitigation measures that address these impacts are included in Section 3.5, Biological Resources. Further, implementation of MM-HYD-1 Balancing cut and fill and increasing flow and detention capacity, would maintain existing volume of floodplain.

The proposed Project would also have bridge construction over Zone 5 Line K (Crandall Creek) near MP 27.35 on the Coast Subdivision. The construction of a new bridge over Zone 5 Line K (Crandall Creek) would replace the existing bridge and have permanent impacts to the creek including partial blockage of flows. The proposed improvements would replace the existing bridge with a clear-span bridge.

The proposed Project would widen the track area over Zone 5 Line H near MP 29.56 on the Coast Subdivision. The proposed improvements would widen the track area over the existing triple 60-inch reinforced concrete pipes and lengthen the culverts. This would result in head losses through the extended cross culvert, which has a potential to increase the upstream WSE. The existing triple 60-inch culvert was recently upsized from a double 60-inch culvert. Since FEMA did not have the third 60-inch culvert modeled, it is unknown how WSE has changed with the additional 60-inch culvert. The mapped floodplain does not account for the recent expansion of the crossing from double 60-inch culverts to triple 60-inch culverts.

The proposed Project would also potentially construct multiple culverts at MP 30.09 in a Shaded Zone X area. The construction of culverts would result in head losses through the extended cross culvert, which has a potential to increase the upstream WSE. With implementation of BMP HYD-9, the soffit elevations for all proposed bridges will be matched to existing soffit elevations to limit the potential impact of the bridge replacement.

Impacts within an existing floodplain or floodway will be mitigated by balancing cut and fill of earthwork, installing equalizer pipes to perpetuate flood flows, or implementing underground storage or add detention basins to provide more flood flow storage. Potential impacts would be blockage of flows and implementation of MM-HYD-1 Balancing cut and fill and increasing flow and detention capacity, would maintain existing volume of floodplain so that the potential impacts are less than significant.

iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

No Project

No Impact. Under the No Project Alternative, no temporary or permanent impacts are anticipated to the surface water quality since the current railroad tracks are ballasted and self-retaining.

Proposed Project

Less than Significant.

Construction and Operations

As discussed in the analysis for threshold (a), the proposed Project would result in an increase in impervious surface area, potentially increasing runoff during significant weather events. Application of BMP HYD-1, BMP HYD-4, and BMP HYD-5 would ensure that runoff from construction or operation of the proposed Project would not cause an impact.

In addition, the proposed Project discharges stormwater runoff into a tidally influenced/depositional area. As runoff from the project would flow into water bodies that regularly interact with the ocean, the proposed Project would be exempt from implementation of hydromodification management measures and would have no impact.

iv) impede or redirect flood flows

No Project

No Impact. Under the No-Project Alternative, no temporary or permanent impacts are anticipated to the surface water quality since the current railroad tracks are ballasted and self-retaining.

Proposed Project

Construction and Operations

No Impact. As addressed in the Hydraulic Analysis under threshold c(ii), regulated waterways within the proposed Project's footprint would be within the jurisdiction of FEMA and ACFCWCD. USACE would have jurisdiction for those regulated waterways with levees that are managed by USACE. Any change to WSE must be permitted with ACFCWCD and the USACE and controlled for during improvements. As ACFCWCD already oversees the floodplains, ACFCWCD requirements ensure that projects do not unintentionally change the level of obstruction so as to significantly change WSE. Therefore, it would have no impact in regard to impeding or redirecting flood flows. Contractors would also apply BMP HYD-1 which would reduce potential for impacts.

3.11.6.4 d) Would the project, in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

For impacts related to flood hazards, the analysis relies on standards established by FEMA and local agencies. FEMA oversees federal floodplain management policies and runs the NFIP adopted under the National Flood Insurance Act of 1968. FEMA prepares FIRMs that delineate the regulatory floodplain to assist local governments with land use and floodplain management decisions to avoid flood-related hazards. To avoid impacts related to flooding, FEMA and the local agencies require that an encroachment into a floodplain not increase the WSE of the 100-year flood by more than 1 foot in floodplains and have no increase in regulatory floodways.

No Project Alternative

No Impact. Under the No Project Alternative, no temporary or permanent impacts are anticipated to the risk of release of pollutants due to flood hazards, tsunami, or seiche zones.

Proposed Project

Floodplains

Construction

Less than significant impact. The proposed Project would pose a less than significant impact regarding the risk of release of pollutants due to project inundation within any flood hazard, tsunami, or seiche zones. Construction activities associated with the proposed Project could result the potential release of pollutants in the event of flooding. If flooding of construction areas occurs, stockpiles of construction materials could be inundated and result in pollution of on-site or off-site downstream surface waters. The impact would be addressed by implementing BMP HYD-1, which includes creation of a SWPPP that would define materials storage outside of floodplains. Implementation of this BMP would also prevent construction materials from being exposed to storm flooding hazards and, therefore, reduce potential construction-related impacts from substantial sources of additional polluted runoff and the release of pollutants due to proposed Project inundation to a less than significant level. Further, implementing BMP-HYD-8 Monitoring weather forecast to avoid construction impacts during storm events, would provide information needed daily to determine potential for flooding. As discussed in Section 3.11.3, the proposed Project would not change flooding patterns during a tsunami and there is no immediate risk of seiche anywhere throughout the proposed Project RSA.

Operations

No impact. There would be a no impact by the proposed Project to the risk of release of pollutants due to project inundation within any flood hazard, tsunami, or seiche zones.

3.11.6.5 e) Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

No Project Alternative

No Impact. The No Project Alternative would not conflict with or obstruct the implementation of the water quality control plan for the region.

Proposed Project

Less Than Significant Impact.

Surface Water Hydrology and Water Quality

Construction

As discussed under Question a), the proposed Project would be implementing the appropriate temporary BMPs (BMP HYD-1) in response to any potential temporary impacts from construction activities. Hydrology and Water Quality BMPs are fully described in Section 3.11.5. With the implementation of appropriate construction BMPs for the proposed Project, the Project would meet NPDES CGP conditions and would not impact the beneficial uses or water quality objectives

specified in the Basin Plan. Therefore, the construction of the proposed Project would not conflict with or obstruct the implementation of the water quality control plan for the region.

Operations

As discussed under Question a), the proposed Project would implement the appropriate temporary BMPs per NPDES requirements to minimize any potential permanent impacts from Project design (BMP HYD-4 and BMP HYD-5). Hydrology and Water Quality BMPs are fully described in Section 3.11.5. With the implementation of appropriate permanent BMPs for the proposed Project, the proposed Project meets NPDES permit conditions and would not impact the beneficial uses or water quality objectives specified in the Basin Plan. Therefore, operation of the proposed Project would not conflict with or obstruct the implementation of the water quality control plan for the region.

Groundwater

Construction

As discussed under Questions a) and b), the proposed Project would implement the appropriate temporary BMPs (BMP HYD-1 and BMP HYD-7) to minimize any potential temporary impacts to groundwater from construction activities. Hydrology and Water Quality BMPs are fully described in Section 3.11.5. With the implementation of appropriate construction BMPs for the proposed Project, there would not be a significant impact to groundwater quality or quantity. Therefore, the proposed Project would not conflict with or obstruct the implementation of the sustainable groundwater management plan as a result of temporary proposed Project impacts.

Operations

As discussed under Questions a) and b), the proposed Project is anticipated to have less than significant impact to the groundwater recharge as well as the groundwater quality. Therefore, the proposed Project is not anticipated to conflict with or obstruct the implementation of the sustainable groundwater management plan for the proposed Project.

3.11.7 Mitigation Measures

MM-HYD-1 Balancing cut and fill and increasing flow and detention capacity.

Impacts within an existing floodplain or floodway will be mitigated by balancing cut and fill of earthwork, installing equalizer pipes to perpetuate flood flows, or implementing underground storage or add detention basins to provide more flood flow storage.

MM-HYD-2 Dewatering permit in case of contaminated groundwater.

If the groundwater is found to be contaminated, a dewatering permit will be obtained from the Regional Water Quality Control Board directly, or through an application with the local Sewer company. An Active Treatment Systems may be specified by the permit conditions if the quality of the groundwater warrants their use.

3.11.8 Cumulative Impact Analysis

There may be cumulative impacts from a combination of the proposed Project and other nearby projects. However, because each project would be subject to NPDES requirements, implement BMPs, and adhere to federal floodplain regulations the cumulative impacts from the proposed Project and all nearby projects would be minimal. The proposed Project's Cumulative Impact Map and Project List are included in Chapter 1.

Surface Water Hydrology and Surface Water Quality

Less Than Significant Impact. This analysis is focused on potential cumulative impacts of the proposed Project in addition to other planned projects within the proposed Project corridor on surface water quality.

The proposed Project would implement the required temporary and permanent BMP measures as detailed in the Phase II MRP for non-traditional permittees. As such, the proposed Project itself would not contribute to any cumulative temporary or permanent impacts to the surface water hydrology and water quality within the proposed Project area. The impact under CEQA would be less than significant for the proposed Project because proposed Project activities would not result in a substantial alteration of the existing drainage patterns, substantially increase the rate or amount of surface runoff, result in substantial erosion or siltation on- or off-site, or create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems. Temporary impacts on drainage patterns and stormwater runoff would result from the following activities: grading, construction staging areas, temporary roadways, temporary stream diversion, temporary dewatering, and temporary drainage systems.

Nearby Projects are also anticipated to have a less than significant impact on the surface water hydrology and water quality of the surrounding proposed Project area as they are also bound by the region's MRP and subsequent NPDES permits whether traditional or non-traditional permittees and must maintain drainage patterns to the fullest extent possible and implement both temporary and permanent BMPs should there be any increases to the impervious surface area greater than 5,000 square feet. Related projects within the proposed Project's Hydrology and Water Quality RSA that could have potential impacts to the surface water hydrology and water quality are listed below.

- **I-5: 4150 Point Eden Way Industrial Development Project.** This project proposes the construction of a new industrial building and the creation of an open space/wetland preserve within the city of Hayward and west of the Coast Subdivision of the proposed Project. Potential stormwater impacts from this project would result from the increase in impervious area due to the construction of the new industrial building. Less than significant impact is anticipated to the surface water hydrology and water quality due to the inclusion of bioretention areas that would capture and treat stormwater runoff prior to discharging into the existing storm drain system.
- **D-1: Bay Area 2050.** This is a long-range regional plan that outlines 35 integrated strategies across four key issues – housing, the economy, transportation, and the environment. The Plan proposes mitigating anticipated population growth and subsequent development by promoting compliance with the existing state and local regulations regarding LID and stormwater management. These state and local regulations stipulate that new construction must maintain pre-project hydrology and incorporate proper pollutant source controls, therefore less than significant impact is anticipated as a result of the regional plan.

The proposed Project features include maintaining existing drainage patterns (BMP HYD-4 and BMP HYD-5) to the extent feasible and developing and implementing an SWPPP (BMP HYD-1) that would prescribe the BMPs necessary to effectively control erosion and sedimentation. Nearby Projects are also anticipated to have a minimal impact on the surface water hydrology and water quality of the surrounding proposed Project area as they are also bound by the region's MRP and subsequent NPDES permits whether traditional or non-traditional permittees and must maintain drainage patterns to the fullest extent possible and implement both temporary and permanent BMPs should there be any increases to the impervious surface area greater than 5,000 square feet. Through effective management and control measures and compliance with the CGP and municipal/regional NPDES permits, project features would avoid substantial temporary impacts on drainage patterns and stormwater runoff. In combination with other projects, the proposed Project would not have a significant cumulative impact with respect to surface waters.

Groundwater

Less Than Significant Impact with Mitigation Incorporated. No cumulative temporary or permanent impacts related to groundwater are anticipated during construction or operations of the proposed Project in combination with nearby current and proposed projects because regulatory standards (e.g., Sustainable Groundwater Management Act and local well ordinances) and conditions of individual project approvals (e.g., CWA § 401, § 404) would minimize impacts on groundwater associated with construction. On this basis the proposed Project would not result in cumulatively considerable contributions to construction or operational impacts on groundwater under CEQA; therefore, CEQA does not require any mitigation.

As detailed under Project D-1: Plan Bay Area 2050, nearby planned development and transportation projects throughout the proposed Project RSA would result in construction of new impervious surfaces, dewatering, and subsurface construction activities, which would affect both groundwater quantity and quality. Many of the planned development projects are anticipated to increase the imperviousness of the RSA. New impervious surfaces associated with planned development would result in potential impacts on groundwater recharge by minimizing opportunities for infiltration. Further, many of these planned developments are entirely in areas designated for groundwater recharge in the Santa Clara Subbasin. Projects that propose to widen existing roadways and modify existing roadway interchanges and new transit centers are anticipated to result in new impervious surfaces.

The increase in impervious surfaces from planned development of nearby projects, would affect groundwater in the RSA. Planned development is expected to comply with existing laws, regulations, and agencies that protect groundwater resources, including the SGMA. Groundwater sustainability plans prepared under or consistent with the SGMA for the Santa Clara subbasin would provide a pathway for sustainable groundwater management by 2040.

Floodplains

Less Than Significant Impact with Mitigation Incorporated. No temporary or permanent cumulative impacts related to floodplains are anticipated during construction of the proposed Project in combination with nearby current and proposed projects because regulatory standards (e.g., National Flood Insurance Act with local floodplain management ordinances), conditions of individual project approvals (e.g., permits from local floodplain managers and coordination with the USACE), and implementation of BMPs (HYD-1 through HYD-9) and mitigation (Biological Resources

MMs, HYD-1 and HYD-2) would avoid substantial impacts on floodplains associated with construction.

The Cumulative Project List includes numerous residential and transportation projects. Many of these projects are within or adjacent to 100-year floodplains delineated by FEMA. These projects could include the construction or modification of existing culverts, bridges, roadways, structures, and other temporary and permanent impacts within existing 100-year floodplains. Such improvements could require the placement of temporary and permanent fill inside of floodplains and floodways, which can alter existing WSE, footprints, and peak flows of 100-year floodplains. Development of the projects included in the Project List is anticipated to comply with floodplain management regulations that minimize impacts on floodplains, or these projects would include various forms of mitigation to address impacts on floodplains. Projects of note within the proposed Project RSA that may require coordination are listed below.

- **T-7: Interstate 880 Interchange Improvements (Whipple Road/Industrial Parkway Southwest and Industrial Parkway West).** This project proposes improvements along I-880 from 0.6 miles south of the I-880/Whipple Road-Industrial Parkway Southwest Interchange to 0.3 miles north of the I-880/Industrial Parkway West Interchange within the cities of Hayward and Union City. Improvements would include interchange on- and off-ramp reconfigurations, modifications and/or replacement of bridge structures, local roadway realignments and restriping, and bicycle and pedestrian improvements. Potential floodplain impacts from this project would result from the realignment of approximately 1,000 linear feet of the Zone 3A Line D channel. Less than significant impacts are anticipated from this realignment as the realigned portion of the channel would remain earthen and similar in size to the existing dimensions. Coordination with ACFCD would be recommended during the construction of both projects to limit any potential cumulative impacts (**BMP UT-1: Utility Verification and Coordination with Utility Providers and CPUC)**.
- **T-10: State Route 84 Intermodal Bus Facility.** This project proposes the construction of an Intermodal Bus Facility to be located on SR-84 near the Ardenwood Park and Ride Facility to improve access and travel times for regional buses along the SR-84 corridor. Improvements include construction of westbound and eastbound bus stop platforms on SR-84. The SR-84 Intermodal Bus Facility project is located within the cities of Fremont and Newark and crosses UPRR ROW along the Coast Subdivision for the proposed Project. The SR-84 project would be adjacent to and potentially impact a ACFCD channel within the Newark Slough watershed. Both projects are being sponsored by CCJPA and coordination would be recommended to limit any potential cumulative impacts (**BMP UT-1: Utility Verification and Coordination with Utility Providers and CPUC)**.

Mitigation strategies for the proposed Project crossings (MM HYD-1), balancing cut and fill within the proposed Project floodplains, addition of underground storage, and implementation of flood protection plans, among others, are listed and described in Section 3.11.5. With the implementation of these mitigation measures, as well as BMPs HYD-1 through HYD-9, no cumulative permanent impacts to the floodplains are anticipated by the proposed Project.

Given the proposed Project features and mitigation proposed by the proposed Project to address the proposed Project impacts to surface water quality, groundwater, and floodplains, the proposed Project would not contribute to a significant cumulative impact in combination with nearby Projects. Given the proposed mitigation measures (Section 3.11.5) for the proposed Project, it would not

result in cumulatively considerable contributions to construction or operational impacts on floodplains under CEQA; therefore, CEQA does not require any additional mitigation specifically to address cumulative impacts.

3.11.9 CEQA Significance Findings Summary Table

Table 3.11-22 summarizes the hydrology and water quality impacts of the proposed Project.

Table 3.11-22. Hydrology Impacts Summary

Impact	Level of Significance Before Mitigation	Incremental Project Contribution to Cumulative Impacts	Mitigation	Level of Significance with Mitigation Incorporated	Incremental Project Cumulative Impact after Mitigation
(a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	SI	NCC	MM HYD-2	S/M	NCC
(b) Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such the project may impede sustainable groundwater management of the basin?	SI	NCC	MM HYD-2	S/M	NCC
c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: **(i) result in a substantial erosion or siltation on- or off-site?**	LTS	NCC	N/A	LTS	NCC
(ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site?	SI	NCC	MM HYD-1	S/M	NCC

Table 3.11-22. Hydrology Impacts Summary

Impact	Level of Significance Before Mitigation	Incremental Project Contribution to Cumulative Impacts	Mitigation	Level of Significance with Mitigation Incorporated	Incremental Project Cumulative Impact after Mitigation
(iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? or	LTS	NCC	N/A	LTS	NCC
(iv) impede or redirect flood flows?	NI	NCC	N/A	NI	NCC
d) Would the project in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	LTS	NCC	N/A	LTS	NCC
e) Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	LTS	NCC	N/A	LTS	NCC

Notes: LTS = Less than Significant Impact, NI = No Impact, N/A = Not Applicable, SI = Significant Impact, S/M = Significant Impact but Mitigable to a Less than Significant Level, CC = Cumulatively Considerable, NCC = Not Cumulatively Considerable.

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