2.2 Physical Environment

2.2.1 Hydrology and Floodplain

Regulatory Setting

Executive Order 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The Federal Highway Administration requirements for compliance are outlined in 23 Code of Federal Regulations 650 Subpart A.

To comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments.
- Risks of the action.
- Impacts on natural and beneficial floodplain values.
- Support of incompatible floodplain development.
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values affected by the project.

The base floodplain is defined as “the area subject to flooding by the flood or tide having a one percent chance of being exceeded in any given year.” An encroachment is defined as “an action within the limits of the base floodplain.”

Affected Environment

The information in this section is from the Floodplain Evaluation Report (September 2022a) (WRECO) and the Water Quality Assessment Report prepared for the project in September 2022b (WRECO).

The Caltrans Water Quality Planning Tool (2022) identifies the project within the Aptos-Soquel hydrologic subarea, the Santa Cruz hydrologic area, and the Big Basin hydrologic unit. The northern portion of the Coastal Rail Trail Segment 12 of the project is in the Soquel Watershed and drains directly to the Pacific Ocean through a system of stormwater drains. Receiving waters for the project are Aptos Creek, Valencia Creek, Valencia Lagoon, and the Pacific Ocean; Aptos Creek and Valencia Creek are creeks within designated Federal Emergency Management Area floodplains and located within the project’s footprint.

The project limits are within Aptos Creek, Soquel Creek, and San Andreas watersheds.

The Aptos Creek watershed lies within the southern portion of the county of Santa Cruz. The Aptos Creek watershed originates in the San Rosalia Mountains. The watershed includes portions of the Forest of Nisene Marks State Park. Major tributaries that contribute to Aptos Creek are: Mangels Gulch, with a confluence with Aptos Creek approximately 0.5 mile upstream of the State Route 1 bridge crossing; Valencia Creek, which originates along the northeastern boundary of the Aptos Creek watershed and flows in a north to south direction.

Trout Creek Gulch is a major tributary to Valencia Creek, and their confluence is approximately 0.3 mile upstream of the confluence of Valencia Creek with Aptos Creek. Aptos Creek crosses State Route 1 at a five-span bridge, and Valencia Creek crosses State Route 1 at an arch culvert which crosses under State Route 1 and outfalls into Aptos Creek. An overflow channel just upstream (north) of the State Route 1 crossing allows the Valencia Creek flows not conveyed through the culvert to overflow into Aptos Creek upstream of the State Route 1 bridge crossing over Aptos Creek. Downstream (south) Aptos Creek continues to flow south to the Pacific Ocean.

The northern limits of the study area for State Route 1 and the western limit of the study area for Coastal Rail Trail Segment 12 are in the Soquel Creek watershed and San Andreas watershed. The stormwater drains in the Soquel Creek watershed drain through underground pipes to the Pacific Ocean. The Soquel Creek watershed is one of the major watersheds in Santa Cruz County.

A small portion of the southwestern portion of the project area is within the San Andreas watershed. The San Andreas watershed is bordered on the north and east by the Pajaro River watershed and on the west by the Aptos Creek watershed. The San Andreas watershed drains an area of approximately 15 square miles and is comprised of Bush Gulch and two unnamed streams. Land use is predominantly agriculture with some rural and urban residential areas.

Federal Emergency Management Area flood insurance rate maps in the project vicinity (06087C0356F, 06087C0357F, 06087C0378F, and 06087C0380F) were reviewed to obtain floodplain information. The project; however, is within the Federal Emergency Management Area Flood Insurance Rate Map Zone 06087C0357F (Figure 2-16). The Aptos Creek floodplain is designated as a special flood hazard area Zone AE. Zone AE represents areas subject to flooding by the 100-year flood event. A floodway has also been defined by Federal Emergency Management Area along this reach of Aptos Creek (Figure 2-17). Although the railroad structures would cross over Aptos Creek, the improvements would be outside the special flood hazard area. The Valencia Creek Federal Emergency Management Area floodplain is designated as shaded Zone X, which represents areas subject to flooding by storm events between the 100-year and 500-year floods. Most of the project site is in the unshaded Zone X regions. An area within unshaded Zone X is outside of Federal Emergency Management Area's special flood hazard areas and represent areas of minimal flood hazard. These areas are outside of the Federal Emergency Management Area base floodplain.

The project would not be a significant encroachment on the base floodplain. Therefore, alternatives to significant encroachments were not analyzed.

Environmental Consequences

Build Alternative

The potential risk associated with the Build Alternative would include but not be limited to: change in land use, change in impervious surface area, fill inside the floodplain, or change in the 100-year water surface elevation. Direct impacts on hydrological

resources generally occur during construction and operational activities within the floodplain. Project improvements for both the interim and ultimate trail configurations would not impact the base floodplain. For the interim condition, the project improvements would be isolated to the railroad bridge decks, which are located outside of the floodplain. For the ultimate condition, the grading, piers, and structures would also be located outside of the base floodplain. Therefore, the project would have the same potential for effects and, except where noted, different trail configurations are not discussed separately in this section.

Change in Land Use

The project proposes improvements along the existing State Route 1 roadway with minimal modifications to the roadway profile. The overall existing land use of the project watershed area would be maintained. The effect of the proposed project on water surface elevation and stream flow are anticipated to be negligible and there would be no significant floodplain encroachment.

Change in Impervious Surface Area

The project would result in a net increase of impervious area of 3.61 acres in Caltrans' right-of-way, 6.28 acres for the optional first phase trail in Santa Cruz County's right-of-way, and 6.51 acres for the ultimate trail configuration in Santa Cruz County's right-of-way. Section 2.2.2, *Water Quality*, provides additional information on changes in impervious area for the project. The Aptos Creek watershed area is approximately 12.2 square miles, and the Valencia Creek watershed area is approximately 12.1 square miles for a combined watershed area of 24.3 square miles at the project locations. Based on the net increase of impervious area that would drain to receiving waters within the project limits, substantial impacts on base floodplains are not anticipated.

Fill Inside the Floodplain

Grading associated with project improvements is proposed to be above the 1-year water surface elevation. The minimal fill in the floodplain would be the additional 4-foot by 4-foot square columns in the channel for the bridge widening. The additional fill is anticipated to be offset be grading the banks. Therefore, the minimal fill anticipated to be inside the floodplain will be offset by grading around the State Route 1 bridge.

Change in the 100-Year Water Surface Elevation

The proposed improvements would result in negligible changes in the water surface elevations at and upstream of the structures. There would be a localized increase in water surface elevation of 0.02 feet upstream of the proposed State Route 1 bridge at Aptos Creek during the 100-year storm event and an increase of 0.02 feet during the 100-year flows with sea level rise. Because the project is associated with a floodway at Aptos Creek, the project could potentially result in a change in the Base Flood Elevation. However, the local floodplain administrator should review the project and decide if a Conditional Letter of Map Revision or Letters of Map Revision would be required for the project. Overall, there would be little change in water surface elevation

upstream of State Route 1 and the 100-year water surface elevations would be below the roadway elevations of State Route 1.

Potential Encroachments

The Federal Highway Administration defines a significant encroachment as a highway encroachment, and any direct support of likely base floodplain development, that would involve one or more of the following construction or flood-related impacts: (1) significant potential for interruption or termination of a transportation facility that is needed for emergency vehicles or provides a community's only evacuation route, (2) a significant risk, or (3) a significant adverse impact on the natural and beneficial floodplain values.

The results of the hydraulic modeling show the base flood would pass under the soffit of the proposed Aptos Creek bridge with freeboard (approximately 23 feet during the 100-year flood, and 19 feet during the 100-year flood with sea level rise). The proposed bridge would not be overtopped by the base flood and therefore, traffic interruptions are not anticipated to result from the base flood at Aptos Creek.

Natural and beneficial floodplain values include, but are not limited to: fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural moderation of floods, water quality maintenance, and groundwater recharge. Potential short-term adverse effects during project construction on natural and beneficial floodplain values include: (1) loss of vegetation during construction activity; and (2) temporary disturbance to wildlife and aquatic habitat. Construction should be planned to avoid adverse effects on the natural and beneficial floodplain areas to the maximum extent practicable. The project design, as well as best management practices, standard measures, and avoidance, minimization and mitigation measures included for biological resources would reduce effects on floodplain areas.

As defined by the Federal Highway Administration, the support of incompatible base floodplain development would encourage, allow, serve, or otherwise facilitate incompatible base floodplain development, such as commercial development or urban growth. The project would not trigger incompatible floodplain development and be designed to have minimal work in the designated floodplains. The project would generally maintain local and regional access and would not create new access routes to developed or undeveloped lands.

As defined by the Federal Highway Administration, a longitudinal encroachment is an action within the limits of the base floodplain that is longitudinal to the normal direction of the floodplain. A longitudinal encroachment is "[a]n encroachment that is parallel to the direction of flow. Example: A highway that runs along the edge of a river is usually considered a longitudinal encroachment." The requirement for consideration of avoidance alternatives must be included in a location hydraulic study by including an evaluation and a discussion of the practicability of alternatives to any significant encroachment or any support of incompatible floodplain development.

The improvements along the upstream reach of Valencia Creek are considered to be longitudinal to the direction of the flow. However, the Federal Emergency Management

Area depicts the area at the upstream reach of Valencia Creek as a shaded Zone X area, which is not considered an Special Flood Hazard Area. In addition, the hydraulic model indicates that the improvements would not increase the 100-year water surface elevations. Therefore, the project would not cause a significant longitudinal encroachment.

Sea Level Rise Impacts

The project is not anticipated to be inundated by the estimated sea level rise with the 100-year storm and therefore, the project is not anticipated to have any impacts due to sea level rise. Sea level rise is further analyzed in Section 3.3, Climate Change.

No-Build Alternative

Under the No-Build Alternative, there would be no construction of auxiliary lanes or Bus-on-Shoulder features on State Route 1 within the project area, and Coastal Rail Trail Segment 12 would not be constructed. The existing transportation facilities within the project area would remain unchanged. The No-Build Alternative assumes the construction of other planned and programmed projects in the region, including other auxiliary lanes projects on State Route 1 and other segments of the Coastal Rail Trail. The No-Build Alternative would not change hydrology in the project area because no construction would take place.

Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation measures would be required. The list of applicable standard measures is shown in Chapter 1, Project Description.

References

Caltrans. 2017. Construction Site Best Management Practices Manual. Sacramento. May.

WRECO. 2022a. State Route Highway 1 Auxiliary Lanes and Bus-on-Shoulder Improvements Freedom Blvd to State Park Dr. and Coastal Rail Trail Segment 12 Project Santa Cruz County, California 05-SCR-01, 8.1/10.7; EA 05-0C7340; Project ID 0520000083. Floodplain Evaluation Report. September.

WRECO. 2022b. State Route Highway 1 Auxiliary Lanes and Bus-on-Shoulder Improvements—Freedom Boulevard to State Park Drive and Coastal Rail Trail Segment 12 Project. Final Water Quality Assessment Report. September.

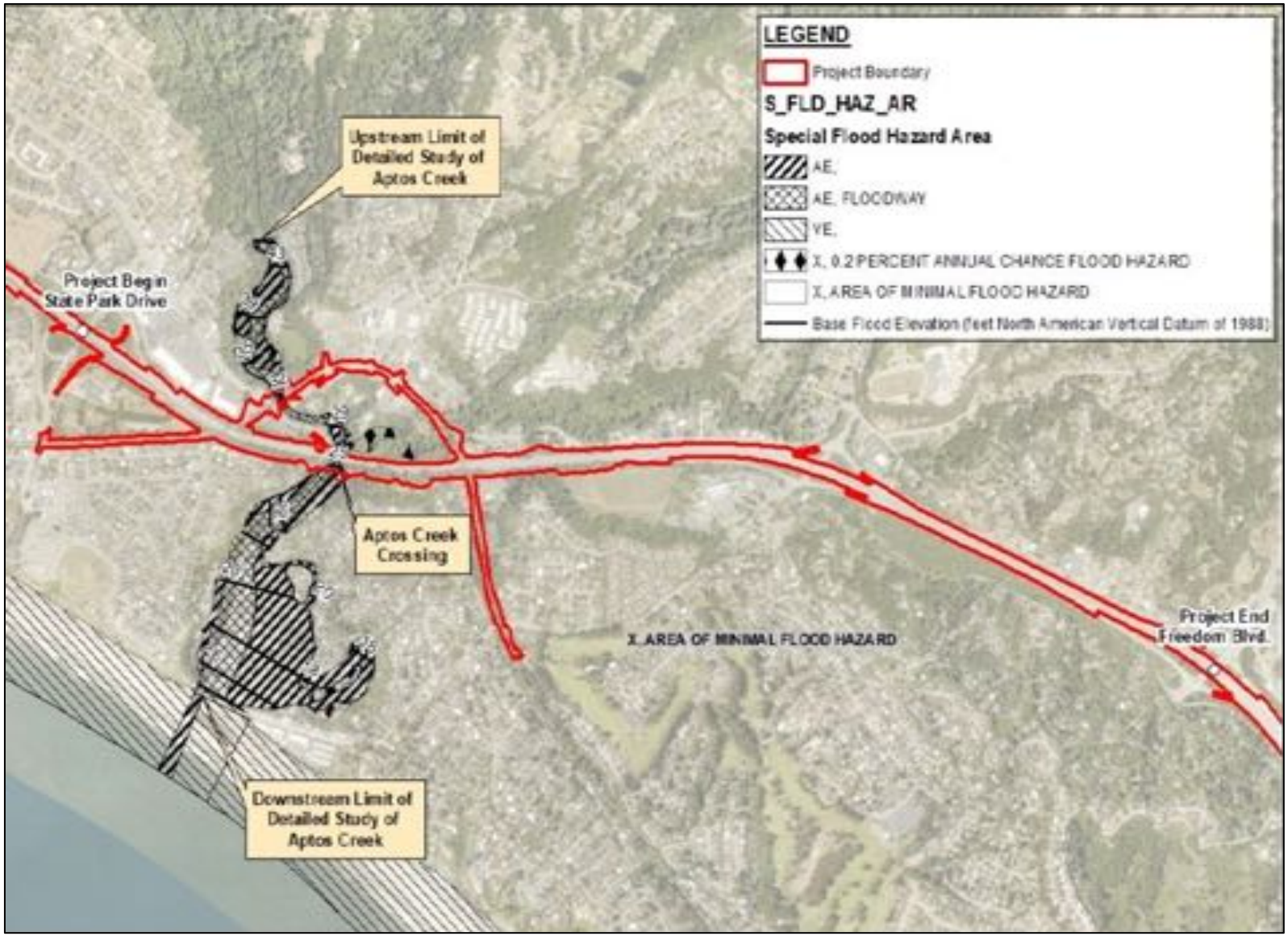

Figure 2-16. Federal Emergency Management Area Floodplain Map, Project Vicinity

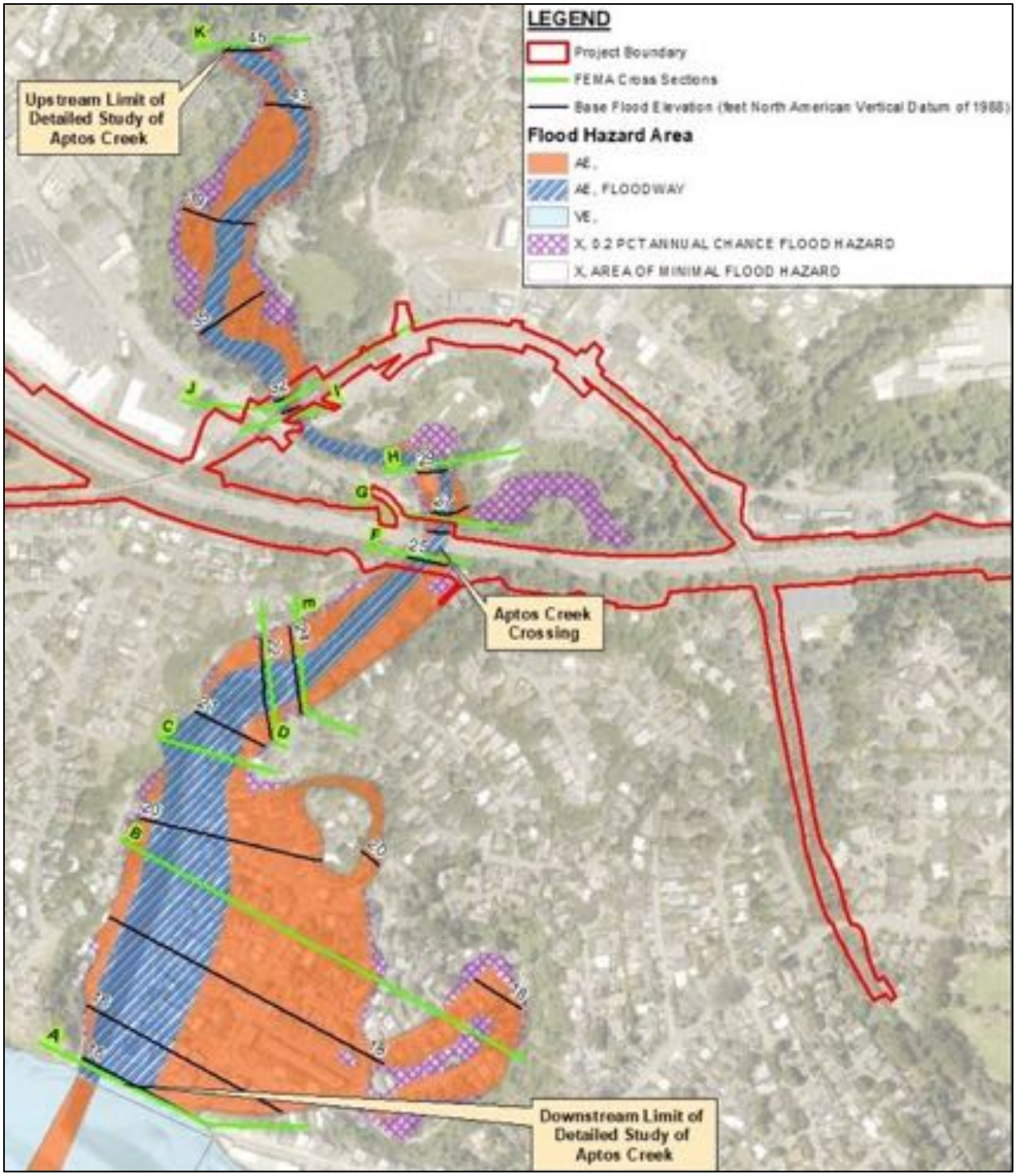

Figure 2-17. Federal Emergency Management Area Floodplain Map, Aptos Creek

2.2.2 Water Quality and Stormwater Runoff

Regulatory Setting

Federal Requirements: Clean Water Act

In 1972, Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the U.S. from any point source unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System permit. This act and its amendments are known today as the Clean Water Act. Congress has amended the act several times. In the 1987 amendments, Congress directed dischargers of stormwater from municipal and industrial/construction point sources to comply with the National Pollutant Discharge Elimination System permit scheme. The following are important Clean Water Act sections:

- Sections 303 and 304 require states to issue water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for a federal license or permit to conduct any activity that may result in a discharge to waters of the U.S. to obtain certification from the state that the discharge will comply with other provisions of the act. This is most frequently required in tandem with a Section 404 permit request (see below).
- Section 402 establishes the National Pollutant Discharge Elimination System, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the U.S. Regional Water Quality Control Boards administer this permitting program in California. Section 402(p) requires permits for discharges of stormwater from industrial/construction and municipal separate storm sewer systems.
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the U.S. This permit program is administered by the U.S. Army Corps of Engineers.

The goal of the Clean Water Act is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”

U.S. Army Corps of Engineers issues two types of 404 permits: general and individual. There are two types of general permits: regional and nationwide. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to allow a variety of minor project activities with no more than minimal effects.

Ordinarily, projects that do not meet the criteria for a regional or nationwide permit may be permitted under one of U.S. Army Corps of Engineer’s individual permits. There are two types of individual permits: standard permits and letters of permission. For individual permits, the U.S. Army Corps of

Engineers decision to approve is based on compliance with U.S. Environmental Protection Agency's Section 404 (b)(1) Guidelines (Guidelines) (40 Code of Federal Regulations Part 230), and whether the permit approval is in the public interest. The Guidelines were developed by the Environmental Protection Agency in conjunction with U.S. Army Corps of Engineers, and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative that would have less adverse effects. The Guidelines state that U.S. Army Corps of Engineers may not issue a permit if there is a least environmentally damaging practicable alternative (LEDPA) to the proposed discharge that would have lesser effects on waters of the U.S. and not have any other significant adverse environmental consequences. According to the Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures has been followed, in that order. The Guidelines also restrict permitting activities that violate water quality or toxic effluent standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to waters of the U.S. In addition, every permit from U.S. Army Corps of Engineers, even if not subject to the Section 404(b)(1) Guidelines, must meet general requirements. See 33 Code of Federal Regulations 320.4. A discussion of the LEDPA determination, if any, for the document is included in Section 2.3.2, *Wetlands and Other Waters*.

State Requirements: Porter-Cologne Water Quality Control Act

California's Porter-Cologne Water Quality Control Act (Porter-Cologne Act), enacted in 1969, provides the legal basis for water quality regulation within California. The Porter-Cologne Act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface water and/or groundwater of the state. It predates the Clean Water Act and regulates discharges to waters of the state. Waters of the state is a broader category than waters of the U.S., including groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of "waste" as defined, and this definition is broader than the Clean Water Act definition of "pollutant." Discharges under the Porter-Cologne Act are permitted by waste discharge requirements and may be required even when the discharge is already permitted or exempt under the Clean Water Act.

The State Water Resources Control Board and Regional Water Quality Control Boards are responsible for establishing the water quality standards (objectives and beneficial uses) required by the Clean Water Act and regulating discharges to ensure compliance with the water quality standards. Details about water quality standards in a project area are included in the applicable Regional Water Quality Control Board Basin Plan. In California, Regional Water Quality Control Boards designate beneficial uses for all waterbody segments in their jurisdictions and then set criteria necessary to

protect those uses. As a result, the water quality standards developed for particular water segments are based on the designated use and vary depending on that use. In addition, the State Water Resources Control Board identifies waters failing to meet standards for specific pollutants. These waters are then state listed in accordance with Clean Water Act Section 303(d). If a state determines that waters are impaired for one or more constituents and the standards cannot be met through point source or non-point source controls (National Pollutant Discharge Elimination System permits or waste discharge requirements), the Clean Water Act requires the establishment of Total Maximum Daily Loads. Total Maximum Daily Loads specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed.

State Water Resources Control Board and Regional Water Quality Control Boards

The State Water Resources Control Board administers water rights, sets water pollution control policy, issues water board orders on matters of statewide application, and oversees water quality functions throughout the state by approving Basin Plans, Total Maximum Daily Loads, and National Pollutant Discharge Elimination System permits. Regional Water Quality Control Boards are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

National Pollutant Discharge Elimination System Program

Municipal Separate Storm Sewer Systems

Section 402(p) of the Clean Water Act requires the issuance of National Pollutant Discharge Elimination System permits for five categories of stormwater discharges, including Municipal Separate Storm Sewer Systems. A *Municipal Separate Storm Sewer System* is defined as “any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over storm water, that is designed or used for collecting or conveying storm water.” The State Water Resources Control Board has identified Caltrans as an owner/operator of a Municipal Separate Storm Sewer System under federal regulations. Caltrans’ Municipal Separate Storm Sewer System permit covers all Caltrans rights-of-way, properties, facilities, and activities in the state. The State Water Resources Control Board or the Regional Water Quality Control Board issues National Pollutant Discharge Elimination System permits for 5 years, and permit requirements remain active until a new permit has been adopted.

The Caltrans Municipal Separate Storm Sewer System Permit, Order Number 2012-0011-DWQ (adopted on September 19, 2012 and effective on July 1,

2013), as amended by Order Number 2014-0006-EXEC (effective January 17, 2014), Order Number 2014-0077-DWQ (effective May 20, 2014) and Order Number 2015-0036-EXEC (conformed and effective April 7, 2015) has three basic requirements:

1. Caltrans must comply with the requirements of the Construction General Permit (see below).
2. Caltrans must implement a year-round program in all parts of the state to effectively control stormwater and non-stormwater discharges.
3. Caltrans stormwater discharges must meet water quality standards through implementation of permanent and temporary (construction) best management practices, to the maximum extent practicable, and other measures as the State Water Resources Control Board determines to be necessary to meet the water quality standards.

To comply with the permit, Caltrans developed the Statewide Storm Water Management Plan to address stormwater pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The Storm Water Management Plan assigns responsibilities within Caltrans for stormwater management procedures and practices as well as training, public education and participation, monitoring and research, program evaluation, and reporting activities. The Storm Water Management Plan describes the minimum procedures and practices Caltrans uses to reduce pollutants in stormwater and non-stormwater discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of Best Management Practices. The proposed project would be programmed to follow the guidelines and procedures outlined in the latest Storm Water Management Plan to address stormwater runoff.

The project would include rail trail and road alignment work within the unincorporated portion of Santa Cruz County. The County of Santa Cruz is a permittee under the statewide Phase 2 Small Municipal Separate Storm Sewer System permit (National Pollutant Discharge Elimination System Number CAS000004, State Water Resources Control Board Order Number 2013-0001-DWQ). The project would be subject to Post-Construction Stormwater Requirements issued by the Central Coast Regional Water Quality Control Board, which give additional project size–based requirements for site design, water quality treatment, runoff retention, and peak management. Additionally, the County of Santa Cruz has developed *Design Criteria Containing Standards for the Construction of Streets, Storm Drains, Sanitary Sewers, Water Systems, and Driveways within the Unincorporated Portion of Santa Cruz County* (County of Santa Cruz 2019).

Caltrans's Municipal Separate Storm Sewer System permit covers all Caltrans rights-of-way, properties, facilities, and activities in the state and would apply to those portions of the project.

Road realignment work within the County of Santa Cruz's right-of-way would be subject to the requirements outlined in the Phase 2 Municipal Separate Storm Sewer System Permit.

The Santa Cruz County Design Criteria summarizes the requirements of the Phase 2 Small Municipal Separate Storm Sewer System Permit and the Central Coast Regional Water Quality Control Board's *Post-Construction Stormwater Management Requirements Development Projects in the Central Coast Region* (Regional Water Quality Control Board Post-Construction Stormwater Requirements) (Central Coast Regional Water Quality Control Board 2013). It also provides guidance for low-impact development design strategies and specific Best Management Practice selection criteria. The Design Criteria document provides technical requirements for project designs throughout Santa Cruz County that include permanent stormwater treatment best management practices. Placement of stormwater treatment best management practices within unincorporated Santa Cruz County's right-of-way would comply with the Santa Cruz County Design Criteria.

Per the Phase 2 Municipal Separate Storm Sewer System permit, sidewalks, bicycle lanes, and trails constructed with permeable surfaces, or sidewalks, bicycle lanes, and impervious trails built to direct stormwater to adjacent vegetated areas are excluded from the post-construction stormwater treatment control and hydromodification management requirements of this permit. Because all of the Project's rail trail improvements within unincorporated Santa Cruz County's right-of-way fit the criteria of exclusion described above, these improvements would be exempt from implementing stormwater treatment and baseline hydromodification management.

Construction General Permit

Construction General Permit Order Number 2009-0009-DWQ (adopted on September 2, 2009 and effective on July 1, 2010), as amended by Order No. 2010-0014-DWQ (effective February 14, 2011) and Order No. 2012-0006-DWQ (effective July 17, 2012) regulates stormwater discharges from construction sites that result in a disturbed soil area of 1 acre or greater, and/or are smaller sites that are part of a larger common plan of development. By law, all stormwater discharges associated with construction activity where clearing, grading, and excavation result in soil disturbance of at least 1 acre must comply with the provisions of the General Construction Permit. Construction activity that results in soil disturbances of less than 1 acre is subject to this Construction General Permit if there is potential for significant water quality impairment resulting from the activity as determined by the Regional Water Quality Control Board. Operators of regulated construction sites are required to develop Stormwater Pollution Prevention

Plans; to implement sediment, erosion, and pollution prevention control measures; and to obtain coverage under the Construction General Permit.

The Construction General Permit 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 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. For all projects subject to the permit, applicants are required to develop and implement an effective Stormwater Pollution Prevention Plan. In accordance with Caltrans' Storm Water Management Plan and Standard Specifications, a Water Pollution Control Program (WPCP) is necessary for projects with disturbed soil area less than 1 acre.

Section 401 Permitting

Under Section 401 of the Clean Water Act, any project requiring a federal license or permit that may result in a discharge to waters of the U.S. must obtain a 401 Certification, which certifies that the project will be in compliance with state water quality standards. The most common federal permits triggering 401 Certification are Clean Water Act Section 404 permits issued by U.S. Army Corps of Engineers. The 401 permit certifications are obtained from the appropriate Regional Water Quality Control Board, dependent on the project location, and are required before U.S. Army Corps of Engineers issues a 404 permit.

In some cases, the Regional Water Quality Control Board may have specific concerns with discharges associated with a project. As a result, the Regional Water Quality Control Board may issue a set of requirements known as waste discharge requirements under the State Water Code (Porter-Cologne Act) that define activities, such as the inclusion of specific features, effluent limitations, monitoring, and plan submittals that are to be implemented for protecting or benefiting water quality. Waste discharge requirements can be issued to address both permanent and temporary discharges of a project.

Affected Environment

The information in this section is from the Water Quality Assessment Report prepared for the project in September 2022.

Surface Waters

The project's receiving waters are Aptos Creek and Valencia Creek, Valencia Lagoon, and the Pacific Ocean. The northern portion of Coastal Rail Trail Segment 12 is in the Soquel Watershed and drains directly to the Pacific Ocean through a system of stormwater drains. Valencia Creek is a tributary to Aptos Creek, and Aptos Creek drains directly to the Pacific Ocean.

Surface Water Quality Objectives and Beneficial Uses

According to the Water Quality Control Plan for the Central Coast Region (Basin Plan) (Central Coast Regional Water Quality Control Board 2019), the overall goals of water quality regulation are to "show how the quality of surface water and groundwater in the Central Coast Region should be managed to provide the highest water quality reasonably possible." The Regional Water Quality Control Board establishes and enforces waste discharge requirements for point and non-point sources of pollutants at levels necessary to meet numeric and narrative water quality objectives. Water quality objectives are numeric and narrative objectives used to define the appropriate levels of environmental quality and to manage activities that can affect aquatic environments. The Basin Plan lists the following water quality objectives for surface waters: color, tastes and odors, floating material, suspended material, settleable material, oil and grease, bio-stimulatory substances, sediment, turbidity, pH, dissolved oxygen, temperature, toxicity, pesticides, chemical constituents, other organics, and radioactivity.

The Basin Plan lists beneficial uses for Aptos Creek, Valencia Creek, and Valencia Lagoon, and that any surface waterbodies within the region that do not have beneficial uses designated for them are assigned the following designations: municipal and domestic water supply and protection of both recreation and aquatic life. The beneficial uses for Aptos Creek include the following: municipal and domestic supply, agricultural supply, industrial process supply, groundwater recharge, water contact recreation, non-water contact recreation, wildlife habitat, cold freshwater habitat, fish migration, fish spawning, preservation of biological habitats of special significance, estuarine habitat, freshwater replenishment, and commercial and sports fishing. The beneficial uses for Valencia Creek are the same except it does not include agricultural supply, industrial process supply, groundwater recharge, fish spawning, or freshwater replenishment. Valencia Lagoon beneficial uses are the same as Valencia Creek except it does not include municipal and domestic supply, cold freshwater habitat, or estuarine habitat; however, it does include warm freshwater habitat, freshwater replenishment, and rare, threatened, or endangered species. Each of the project's receiving waterbodies discharge to the Pacific Ocean, which is approximately 0.5 mile south of the project site. The Pacific Ocean, as stated in the State Water Resources Control Board's California Ocean Plan, has the following beneficial uses: industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation: commercial and sport fishing; mariculture; preservation and enhancement of designated Areas of Special Biological Significance; rare and endangered species; marine habitat; fish migration; fish spawning; and shellfish harvesting.

Areas of Special Biological Significance are defined in the California Ocean Plan as areas requiring protection of species or biological communities to the extent that maintenance of natural water quality is assured. There are six designated Areas of Special Biological Significance within the Central Coast

Regional Water Quality Control Board's jurisdiction. However, none of these lie within the proposed project limits.

Waterbody segments that fail to meet standards for specific pollutants are included in a statewide list in accordance with Clean Water Act Section 303(d). If a Regional Water Quality Control Board determines that waters are impaired for one or more constituents, the Clean Water Act requires the establishment of Total Maximum Daily Loads to specify allowable pollutant loads from all sources for a given watershed. Tables 2-41 through 2-43 list the water quality impairments and Total Maximum Daily Loads for Aptos Creek, Valencia Creek, and the Pacific Ocean at Rio Del Mar.

Table 2-41. Clean Water Act Section 303(d)-Listed Pollutants, Aptos Creek

Pollutant	Potential Source	Total Maximum Daily Load Completion Date (Estimated)
Indicator Bacteria	Collection System Failure, Natural Sources, Urban Runoff/Storm Sewers, Other Urban Runoff	Environmental Protection Agency Approval Date: January 20, 2011
Sedimentation/ Siltation	Source Unknown	2027

Source: State Water Resources Control Board 2021

Table 2-42. Clean Water Act Section 303(d)-Listed Pollutants, Valencia Creek

Pollutant	Potential Source	Total Maximum Daily Load Completion Date (Estimated)
Escherichia coli	Source Unknown	2027
Fecal Coliform	Collection System Failure, Domestic Animals/Livestock, Natural Sources, Urban Runoff/Storm Sewers	Environmental Protection Agency Approval Date: January 20, 2011
Sedimentation/ Siltation	Source Unknown	2027

Source: State Water Resources Control Board 2021

Table 2-43. Clean Water Act Section 303(d)-Listed Pollutants, Ocean at Rio Del Mar (Santa Cruz County), Aptos Creek Mouth

Pollutant	Potential Source	Total Maximum Daily Load Completion Date (Estimated)
Total Coliform	Source Unknown	2027

Source: State Water Resources Control Board 2021

Municipal Supply

There are no drinking water reservoirs or recharge facilities near the project area. However, the Basin Plan does identify Aptos Creek and its tributaries, Valencia Creek and Trout Gulch Creek, as having beneficial use of municipal and domestic supply. Part of the project traverses through the Soquel Creek Water District and the Central Water District, which is 100% groundwater-sourced. The Santa Cruz Mid-County Groundwater Basin is currently overdrafted, and there is a *Groundwater Sustainability Plan* developed for the Santa Cruz Mid-County Groundwater Basin (Santa Cruz Mid-County Groundwater Agency 2019).

Groundwater

The project area is in the Santa Cruz Mid-County Groundwater Basin, as defined by California Department of Water Resources Bulletin 118. The Santa Cruz Mid-County Groundwater Basin is located near the towns of Aptos, Capitola, and Soquel, extending inland from the Pacific Ocean in Santa Cruz County. The northeastern boundary generally follows the northwest trending Zayante Fault. The eastern boundary is marked by the Central Water District and Pajaro Valley Water Management Agency. The southern boundary follows the Pacific Ocean up to the Santa Cruz Small Craft Harbor. The western boundary follows the watershed boundary between Carbonera Creek and Branciforte Creek up through Blackburn Gulch.

The water-bearing sediments consist of the Pliocene Purisima Formation, which is overlain by Quaternary terrace deposits, and the Pleistocene Aromas Red Sands Formation. The Purisima and Quaternary terrace deposit have been locally incised by streams filled with Quaternary alluvium. The Purisima Formation is exposed along Monterey Bay where it is a cliff-forming unit. The Aromas Red Sands Formation extends into the Pajaro Valley Basin. It appears the basin is supplied mostly from the Quaternary alluvium and terrace deposits. Groundwater cannot be the only viable water source for the surrounding areas due to sustainability and reliability issues of the local aquifers.

Based on the *Preliminary Geotechnical Design Report* (Parikh Consultants, Inc. 2021) prepared for the project, groundwater level is anticipated to vary with the passage of time due to seasonal groundwater fluctuation, surface and subsurface flows into nearby water course, ground surface runoff, and other environmental factors that may not be present at the time of previous field explorations. Information obtained from the State Water Resources Control Board's GeoTracker website, for sites within proximity to the project limit, indicated depth to groundwater ranges from 16 to 26.5 feet below ground surface, and groundwater flow direction is to the south-southwest.

The Basin Plan has water quality objectives listed for all groundwaters of the Central Coast Basin. Groundwater objectives consist primarily of narrative objectives combined with a limited number of numerical objectives. In

addition, the State Water Resources Control Board will establish basin- or site-specific groundwater objectives as necessary. At a minimum, all groundwaters will not contain concentrations of taste- or odor-producing substances or radionuclides. Groundwaters designated with the beneficial use of municipal and domestic supply will not contain concentrations of organic chemicals, inorganic chemicals, or radionuclides. Groundwaters designated with the beneficial use of agriculture supply will not contain concentrations of chemical constituents.

The Basin Plan does not list beneficial uses for specific groundwater basins. However, it does state that "Groundwater throughout the Central Coastal Basin, except for that found in the Carrizo Plain Groundwater Basin, is suitable for agricultural water supply, municipal and domestic water supply, and industrial use (Central Coast Regional Water Quality Control Board 2019)."

Environmental Consequences

Build Alternative

Because the project would disturb more than 1 acre of land, a construction stormwater general permit would be required for the build alternative. The project would have the same potential for effects and, except where noted, different trail configurations are not discussed separately in this section.

Construction

During construction, potentially sediment-laden flow can result from runoff over disturbed soil areas that enter storm drainage facilities or directly discharge into the receiving water bodies, increasing the turbidity, decreasing the clarity, and potentially affecting the beneficial uses of the receiving waterbodies. Additional sources of sediment that could result in increases in turbidity include uncovered or improperly covered active and non-active stockpiles, unstabilized slopes and construction staging areas, and improperly maintained or cleaned construction equipment. Earth moving and other construction activities could cause minor erosion and runoff of topsoil into the drainage systems along the project limits during construction, which could temporarily affect water quality in local waterways.

Also, during construction, the project would have the potential for water quality impacts due to grading and excavation activities, which can cause increased erosion. Stormwater runoff from the project site may transport pollutants to nearby receiving waters and storm drains if Best Management Practices are not properly implemented. Generally, as the disturbed soil areas increase, the potential for temporary water quality impacts also increases. The project would have an estimated 17.06 acres disturbed soil area in Caltrans' right-of-way and 7.12 acres of disturbed soil area in Santa Cruz County's right-of-way. The project has some potential for short-term water quality impacts during construction.

Temporary water quality impacts can result from sediment discharge from the disturbed soil areas and construction near water resources or drainage facilities that discharge to waterbodies. Permanent impacts on water quality result from the addition of impervious area; this additional impervious area prevents runoff from naturally dispersing and infiltrating into the ground, resulting in increased concentrated flow. The estimates for disturbed soil area, added impervious area, and reworked impervious area for the first phase and ultimate trail configurations are listed in Table 2-44. The disturbed soil area and impervious area values will be further refined during the design phase once the limits of grading, construction staging locations, off-ramp geometry, and other areas of improvement have been further developed.

Permanent impacts from runoff from the increased impervious surface area could increase pollutants to the receiving waterbodies. In compliance with the Caltrans and Phase 2 Municipal Separate Storm Sewer System permits, the project is required to construct permanent Best Management Practice design features that reduce these potential impacts. Erosion control measures such as hydroseeding and erosion control blankets will be applied on all disturbed soil areas to minimize post-construction erosion. Reducing pervious areas could also reduce the amount of rainfall that is able to percolate into the water table.

The project will also consider post-construction stormwater treatment best management practices that are designed to infiltrate, recharge, or store stormwater. The project would result in net new impervious surface areas of 6.28 acres under the interim trail option and 6.51 acres under the ultimate trail configuration. Because the 1999 Caltrans Municipal Separate Storm Sewer System permit does not require projects to treat the replaced impervious surface within Caltrans' right-of-way, and the Phase 2 Small Municipal Separate Storm Sewer System Permit does not require projects to treat bicycle or pedestrian facilities, the project is required to treat (to the maximum extent possible) the post-construction treatment area of the new impervious surface area of 3.61 acres within Caltrans' right-of-way and the post-construction treatment area of added and replaced area of 0.23 acre within the County's right-of-way only. As a result, the project is required to infiltrate, or treat with flow through treatment best management practices, the stormwater runoff from 3.84 acres of impervious surfaces. The project would disturb a total of 24.65 acres of soil.

Table 2-44. Build Alternative Disturbed Soil Area and Impervious Surface Area

Impact	Caltrans Right-of-Way (Acres)	Santa Cruz County Right-of-Way (Acres) State Route 1	Santa Cruz County Right-of-Way (Acres) Interim Trail	Santa Cruz County Right-of-Way (Acres) Ultimate Trail	Total (Acres) Interim Trail	Total (Acres) Ultimate Trail
Disturbed Soil Area	17.06	0.47	7.12	7.12	24.65	24.65
Pre-Project Impervious Area	32.47	0.08	2.31	2.31	34.86	34.86
Post-Project Impervious Area	30.01	0.31	4.75	4.98	35.07	35.3
Net New Impervious Area	3.61	0.23	2.44	2.67	6.28	6.51
Replaced Impervious Surface	N/A	0	0	0	N/A	N/A
Total New Impervious Surface	3.61	0.23	2.44	2.67	6.28	6.51
Post Construction Treated Area	3.61	0.23	0	0	3.84	3.84

If fueling or maintenance of construction vehicles occurs within the project site during construction, there is a risk of accidental spills or releases of fuels, oils, or other potentially toxic materials. An accidental release of these materials may pose a threat to water quality if contaminants enter storm drains, open channels, or surface receiving waterbodies. The magnitude of the impact from an accidental release depends on the amount and type of material spilled.

The Construction General Permit, Caltrans, and Santa Cruz County standards require the project's contractor to implement a Stormwater Pollution Prevention Plan to comply with the conditions of the Construction General Permit. The Stormwater Pollution Prevention Plan would be submitted by the contractor and approved by Caltrans prior to the start of construction. The Stormwater Pollution Prevention Plan is intended to address construction-phase impacts, and must include, at a minimum, the following elements:

- Project Description—The project description includes maps and other information related to construction activities and potential sources of pollutants.

- Minimum Construction Control Measures—These measures may include limiting construction access routes, stabilization of areas denuded by construction, and using sediment controls and filtration.
- Erosion and Sediment Control—The Stormwater Pollution Prevention Plan is required to contain a description of soil stabilization practices, control measures to prevent an increase in sediment load in stormwater, controls to reduce tracking sediment onto roads, and controls to reduce wind erosion.
- Non-Stormwater Management—The Stormwater Pollution Prevention Plan includes provisions to reduce and control discharges other than stormwater.
- Post-Construction Stormwater Management—The Stormwater Pollution Prevention Plan includes a waste management section including equipment maintenance waste, used oil, batteries, etc. All waste must be disposed of as required by state and federal law.
- Maintenance, Inspection, and Repair— the Stormwater Pollution Prevention Plan requires an ongoing program to ensure that all controls are in place and operating as designed.
- Monitoring—This provision requires documented inspections of the control measures.
- Reports—The contractor would repair an annual report on the construction project and submit the report on July 15 of each year, with the final annual report being submitted upon project completion. This report would be submitted to the State Water Resources Control Board on the Stormwater Multiple Application and Report Tracking System website.
- Training—The Stormwater Pollution Prevention Plan provides documentation of the training and qualifications of the designated Qualified Stormwater Pollution Prevention Plan Developer and Qualified Stormwater Pollution Prevention Plan Practitioner. Inspections, maintenance, and repair of construction site Best Management Practices must be done by trained personnel.
- Construction Site Monitoring Program—The Stormwater Pollution Prevention Plan includes a Construction Site Monitoring Program, which details the procedures and methods related to the visual monitoring and sampling and analysis plans for non-visible pollutants, sediment and turbidity, pH, and bioassessment.

Water quality impacts that occur during construction can be avoided or minimized by implementing temporary construction site Best Management Practices. Typical construction site Best Management Practices that should be considered for this project include but are not limited to, stabilized construction access, stabilized construction roadway, tire wash, street cleaning, dust control, rolled erosion control products, hydraulic mulch, hydroseeding, soil binders, inlet and catch basin protection, fiber rolls,

temporary large sediment barriers, gravel berms, stockpile management, and spill prevention and control. Non-stormwater and waste/material management measures include implementing procedures for water conservation, concrete management, paving and grinding operations, material delivery and storage, stockpile management, sanitary/hazardous/solid/liquid waste, contaminated soils, and discharge.

The selected Best Management Practices are consistent with the practices required under the Construction General Permit and the Phase 2 Small Municipal Separate Storm Sewer System General Permit. The actual minimum temporary construction site Best Management Practices necessary for the project to comply with the Construction General Permit, Caltrans, and County standards will be determined during the design phase. Furthermore, the contractor would be required to detail actual in-field implementation of the Best Management Practices in the Stormwater Pollution Prevention Plan during construction. The contractor would also be required to amend the Stormwater Pollution Prevention Plan as necessary to match both field conditions and project phasing.

The project design includes the widening of the existing State Route 1 bridge over Aptos Creek and Spreckels Drive. This proposed widening would occur on the south side of State Route 1 and require abutment walls along the existing embankments along the south side of Aptos Creek and the embankment on the north side of Spreckels Drive. Temporary dewatering of the work zone would be required. Therefore, the project is likely to need to implement temporary clear water diversions and groundwater dewatering. Dewatering activities would comply with Caltrans' Standard Specifications.

A spill on the roadway would trigger immediate response actions to report, contain, and mitigate the incident. The California Office of Emergency Services has developed a *California Hazardous Materials Incident Contingency Plan* (1991), which provides a program for response to spills involving hazardous materials. The plan designates a chain of command for notification, evacuation, response, and cleanup of spills.

Currents, Circulation, and Drainage Patterns

The project would result in a net new impervious area of 6.28 acres under the interim trail or a net new impervious area of 6.51 acres under the ultimate trail configuration that would not be infiltrated or dispersed over unpaved surfaces. The added impervious area created by the project may result in impacts on the existing hydrograph, including increases in low flow and peak flow velocity and volume to the receiving waterbodies. Portions of the project along State Route 1 within the local jurisdictions' right-of-way would be subject to the hydromodification management requirements included in the Central Coast Regional Water Quality Control Board Post Stormwater Requirements and the Santa Cruz County Design Criteria.

Suspended Particulates (Turbidity)

The project would create new impervious areas, which would increase the amount of runoff not infiltrated or dispersed over permeable surfaces. Although the added impervious area could result in an increase of sediment-laden flow directly discharging to receiving waterbodies, stormwater impacts would be minimized through the proper implementation of permanent stormwater treatment measures and design pollution prevention Best Management Practices. Permanent erosion control measures would be applied to all exposed areas once grading or soil disturbance work is completed as a permanent measure to achieve final slope stabilization. These measures may include hydraulically applying a combination of hydroseed with native seed mix, hydro mulch, straw, tackifier, and compost to promote vegetation establishment, and installing fiber rolls to prevent sheet flow from concentrating and causing gullies. For steeper slopes or areas that may be difficult for vegetation to establish, measures such as netting, blankets, or slope paving could be considered to provide stabilization.

The following design pollution prevention Best Management Practices should be considered for incorporation into the project design:

- Conserve natural areas, including existing trees, stream buffer areas, vegetation, and soils.
- Minimize the impervious footprint of the project.
- Minimize disturbances of natural drainages.
- Design and construct pervious areas to effectively receive runoff from impervious areas, taking into consideration the pervious area's soil conditions, slope, and other design factors.
- Implement landscape and soil-based Best Management Practices such as amended soils and vegetated strips and swales where feasible.
- Use climate-appropriate landscaping that minimize irrigation and runoff. This promotes surface infiltration and minimizes the use of pesticides and fertilizers.
- Design landscapes to comply with state, local, and Caltrans requirements.

The Project Initiation Document for this project was signed in 2002 and therefore, the project is grandfathered under the 1999 Caltrans Permit (Section E.2.d). This project is subject to the treatment threshold requirements contained within the 1999 Caltrans Permit. Per the 1999 Caltrans Permit, the project will treat the net new impervious to the maximum extent practicable. Caltrans has an approved list of treatment best management practices that have been studied and verified to remove targeted design constituents and provide general pollutant removal.

In addition, portions of the project under the Santa Cruz County's right-of-way are subject to the requirements under the Phase 2 Municipal Separate Storm Sewer System Permit. The project proposes to create 2.44 acres of impervious bicycle

and pedestrian facilities under the interim trail and 2.67 acres of impervious bicycle and pedestrian facilities under the ultimate trail configuration. Per the Phase 2 Municipal Separate Storm Sewer System permit, rail trail improvements within Santa Cruz County's right-of-way would be classified as bicycle and pedestrian facilities, which drain to vegetated areas and therefore, these areas would be exempt from implementing site design, source control, runoff reduction, stormwater treatment, and baseline hydromodification management. Also, the project proposes to create 0.23 acre of impervious surface where Moosehead Drive is realigned within the County's right-of-way. The realignment of Moosehead Drive within the County's right-of-way would be subject to the site design, source control, runoff reduction, stormwater treatment, and baseline hydromodification management requirements of the Phase 2 Municipal Separate Storm Sewer System permit.

Per the County's design criteria, the project would be required to treat 0.23 acre of impervious surface within the County's right-of-way. Because the project proposes to increase the impervious surface area by less than 50% of the pre-project impervious area, runoff from only the added and replaced impervious areas would be treated to the maximum extent practicable. The project would be designed to treat runoff using any of the following (in order of preference):

- Retention treatment systems
- Low-impact development treatment systems
- Biofiltration treatment systems
- Non-retention-based treatment systems

Oil, Grease, and Chemical Pollutants

Heavy metals associated with vehicle tire and brake wear, oil and grease, and exhaust emissions are the primary pollutants associated with transportation corridors. Generally, roadway stormwater runoff has the following pollutants: total suspended solids, nitrate nitrogen, total Kjeldahl nitrogen, phosphorus, ortho-phosphate, copper, lead, and zinc. The pollutants are dispersed from combustion products from fossil fuels, the wearing of brake pads and tires, and tree leaves that have been exposed through aerial deposition. The project is expected to ease traffic delay, leading to less deposition of particulates from exhaust and heavy metals from braking.

The project would implement treatment best management practices such as biofiltration swales/strips, bioretention areas, and trash capture devices to remove pollutants from stormwater runoff. Treatment best management practices would avoid or minimize impacts on water quality.

Erosion and Accretion Patterns

As seen in Table 2-43, the project would result in a combined net new impervious surface of 6.28 acres under the interim trail or 6.51 acres under

the ultimate trail within the Caltrans' and Santa Cruz County's rights-of-way. The project can be expected to increase the volume and velocity of the stormwater discharge, which is likely to affect the downstream waterways. Existing vegetation will be preserved to slow the stormwater flow to the receiving waterbodies.

The project is grandfathered under the 1999 Caltrans Municipal Separate Storm Sewer System permit and therefore the project is not required to implement hydromodification management measures within Caltrans' right-of-way. For non-exempt portions of the project within Santa Cruz County's right-of-way, the project would have to comply with the hydromodification management requirements included under the Central Coast Regional Water Quality Control Board post-construction stormwater requirements of the Phase 2 Municipal Separate Storm Sewer System permit. The project proposes to add or replace less than 15,000 square feet of non-exempt impervious areas within Santa Cruz County's right-of-way and therefore, the project would not be subject to hydromodification requirements.

Aquifer Recharge/Groundwater

This project would add impervious area and thereby reduce the available unpaved area that previously allowed runoff to infiltrate into the native soils. Aptos Creek is listed in the Basin Plan as having the groundwater recharge beneficial use (Central Coast Regional Water Quality Control Board, 2019). The reduction of runoff infiltrating through native soils has the potential to result in loss in volume or amount of water that may have previously recharged localized aquifers and thereby reduce regional groundwater volumes. The reduction in local aquifer and groundwater recharge also has the potential to affect the beneficial uses of groundwater basins. Because the project is anticipated to have to comply with Caltrans' Municipal Separate Storm Sewer System post-construction permit requirements, treatment best management practices from the Caltrans list of approved treatment best management practices that allow stormwater infiltration will be considered for the project.

Baseflow

The net new impervious for the project ranges between 6.28 acres (0.001 square mile) and 6.51 acres (0.010 square mile), depending on if the interim or ultimate trail option is chosen. The overall combined watersheds area for Soquel Creek, which drains approximately 41 square miles, and Aptos Creek, which drains approximately 25 square miles, is 66 square miles. This results in a maximum of 0.15% increase in the amount of runoff not infiltrated or dispersed over unpaved surfaces. As the amount of surface runoff infiltrating into groundwater would likely be affected, the amount of base flow to Soquel Creek and Aptos Creek would likely be affected. The portions of the project area along State Route 1 that are under the local jurisdictions' right-of-way

would be subject to the Central Coast Regional Water Quality Control Board and Santa Cruz County hydromodification management requirements.

Human Use Characteristics of the Aquatic Environment

The project is not expected to have long-term impacts on beneficial uses for surface waters or groundwater. However, the project may temporarily affect these beneficial uses during construction, as discussed above. Temporary impacts may result from road closures during construction that would limit or prohibit access to stretches of Aptos Creek and its tributaries. The project limits do not extend to the Pacific Ocean and therefore, access to the Pacific Ocean fisheries would not be affected. Potential impacts on water-related recreation would be avoided with standard construction site Best Management Practices, water quality monitoring, and housekeeping practices.

No-Build Alternative

The No-Build (No-Action) Alternative would not affect water quality in the project area because no construction would occur.

Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation measures would be required. The list of applicable standard measures is shown in Chapter 1, Project Description.

References

Parikh Consultants, Inc. 2021. Preliminary Geotechnical Design Report Santa Cruz County Regional Transportation Commission-State Route 1 Aux Lanes and Bus-on-Shoulder (Freedom Boulevard to State Park Drive) County of Santa Cruz, California 05-SCR-1- R8.1/10.7 EA: 05-0C734. Prepared for Mark Thomas. August.

Santa Cruz Mid-County Groundwater Agency. 2019. Groundwater Sustainability Plan. Soquel, CA. November.

WRECO. 2022. State Route Highway 1 Auxiliary Lanes and Bus-on-Shoulder Improvements—Freedom Boulevard to State Park Drive and Coastal Rail Trail Segment 12 Project. Final Water Quality Assessment Report. September.

2.2.3 Geology, Soils, Seismicity and Topography

Regulatory Setting

Federal Requirements

For geologic and topographic features, the key federal law is the Historic Sites Act of 1935, which establishes a national registry of natural landmarks and protects "outstanding examples of major geological features." Topographic and geologic features are also protected under CEQA.

This section also discusses geology, soils, and seismic concerns as they relate to public safety and project design. Earthquakes are prime considerations in the design and retrofit of structures. Structures are designed using Caltrans' Seismic Design Criteria. The Seismic Design Criteria provide the minimum seismic requirements for highway bridges designed in California. A bridge's category and classification determine its seismic performance level and which methods are used for estimating the seismic demands and structural capabilities. For more information, please see the Department's Division of Engineering Services, Office of Earthquake Engineering, Seismic Design Criteria.

Clean Water Act Section 402 General Permit for Construction and Other Land Disturbance Activities (Order No. 2009-009-DWQ)

The Clean Water Act is discussed in detail in Section 2.2.2, *Water Quality and Stormwater Runoff*. However, because Clean Water Act Section 402 is directly relevant to grading activities, additional information is provided herein. Section 402 of the Clean Water Act mandates that certain types of construction activity comply with the requirements of the U.S. Environmental Protection Agency's National Pollutant Discharge Elimination System program. The U.S. Environmental Protection Agency has delegated to the State Water Resources Control Board the authority for the National Pollutant Discharge Elimination System program in California, where it is implemented by the state's nine Regional Water Quality Control Boards.

Dischargers whose projects disturb 1 or more acres of soil, or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the 2009 Construction General Permit (Order 2009-009-DWQ). Construction activity subject to the Construction General Permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. Construction General Permit applicants are required to prepare a Notice of Intent and a Stormwater Pollution Prevention Plan, and to implement and maintain Best Management Practices to avoid adverse effects on receiving water quality as a result of construction activities, including earthwork.

Coverage under the Construction General Permit is obtained by submitting permit registration documents to the State Water Resources Control Board that include a risk-level assessment and a site-specific Stormwater Pollution Prevention Plan identifying an effective combination of erosion control, sediment control, and non-stormwater Best Management Practices. The Construction General Permit requires that the Stormwater Pollution Prevention Plan define a program of regular inspections of the Best Management Practices and, in some cases, sampling of water quality parameters.

Because the proposed project would result in disturbance of an area greater than 1 acre, the project applicant will need to obtain coverage under the National Pollutant Discharge Elimination System General Construction Activity Storm Water Permit and obtain a state National Pollutant Discharge Elimination System Stormwater Permit from the Central Coast Regional Water Quality Control Board.

State Requirements

Alquist-Priolo Earthquake Fault Zoning Act

California's Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (California Public Resources Code 2621 et seq.), originally enacted in 1972 as the Alquist-Priolo Special Studies Zones Act and renamed in 1994, is intended to reduce risks to life and property from surface fault rupture during earthquakes. The Alquist-Priolo Act prohibits the location of most types of structures intended for human occupancy across the traces of active faults and strictly regulates construction in the corridors along active faults (earthquake fault zones). It also defines criteria for identifying active faults, giving legal weight to terms such as *active*, and establishes a process for reviewing building proposals in and adjacent to earthquake fault zones.

Under the Alquist-Priolo Act, faults are zoned, and construction along or across them is strictly regulated if they are sufficiently active and well defined. A fault is considered *sufficiently active* if one or more of its segments or strands shows evidence of surface displacement during Holocene time (defined for purposes of the act as referring to approximately the last 11,000 years). A fault is considered *well defined* if its trace is clearly detectable by a trained geologist as a physical feature at or just below the ground surface (California Geological Survey 2018:72).

Seismic Hazards Mapping Act

Like the Alquist-Priolo Act, the Seismic Hazards Mapping Act of 1990 (Public Resources Code 2690–2699.6) is intended to reduce damage resulting from earthquakes. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong ground shaking, liquefaction, and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo

Act—the state is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards; and cities and counties are required to regulate development within mapped seismic hazard zones.

Under the Seismic Hazards Mapping Act, permit review is the primary mechanism for local regulation of development. Specifically, cities and counties are prohibited from issuing development permits for sites within seismic hazard zones until appropriate site-specific geologic and/or geotechnical investigations have been carried out and measures to reduce potential damage have been incorporated into the development plans. Geotechnical investigations conducted within seismic hazard zones must incorporate standards specified by CGS Special Publication 117a, *Guidelines for Evaluating and Mitigating Seismic Hazards in California* (CGS 2008).

Local Requirements

County of Santa Cruz General Plan

The *Santa Cruz County 1994 General Plan* (County of Santa Cruz 1994:6-4) addresses seismic and geologic hazards as discussed below.

> **Objective 6.1 Seismic Hazards.** To reduce the potential for loss of life, injury, and property damage resulting from earthquakes by: regulating the siting and design of development in seismic hazard areas; encouraging open space, agricultural or low-density land use in the fault zones; and increasing public information and awareness of seismic hazards.
>
> Policy 6.1.1 Geologic Review for Development in Designated Fault Zones. Require a review of geologic hazards for all discretionary development projects, including the creation of new lots, in designated fault zones. Fault zones designated for review include the Butano, Sargent, Zayante, and Corralitos complexes, as well as the State designated Seismic Review Zones. Required geologic reviews shall examine all potential seismic hazards, and may consist of a Geologic Hazards Assessment and a more complete investigation where required. Such assessment shall be prepared by County staff under supervision of the County Geologist, or a certified engineering geologist may conduct this review at the applicant's choice and expense.
>
> Policy 6.1.2 Geologic Reports for Development in Alquist-Priolo Zones. Require a preliminary geologic report or full engineering geology report for development on parcels within Alquist-Priolo State-designated seismic review zones.
>
> Policy 6.1.3 Engineering Geology Report for Public Facilities in Fault Zones. Require a full engineering geology report by a certified engineering geologist whenever a significant potential hazard is identified by a Geologic Hazard Assessment or Preliminary Geologic Report, and prior to the approval of any new public facility or critical structure within the designated fault zones.

Policy 6.1.4 Site Investigation Regarding Liquefaction Hazard. Require site-specific investigation by a certified engineering geologist and/or civil engineer of all development proposals of more than four residential units in areas designated as having a high or very high liquefaction potential. Proposals of four units and under and non-residential projects shall be reviewed for liquefaction hazard through environmental review and/or geologic hazards assessment, and when a significant potential hazard exists a site-specific investigation shall be required.

Policy 6.1.5 Location of New Development Away From Potentially Hazardous Areas. Require the location and/or clustering of development away from potentially hazardous areas where feasible and condition development permits based on the recommendations of the site's Hazard Assessment or other technical reports.

Objective 6.2 Slope Stability. To reduce safety hazards and property damage caused by landslides and other ground movements affecting land use activities in areas of unstable geologic formations, potentially unstable slopes and coastal bluff retreat.

Policy 6.2.1 Geologic Hazards Assessments for Development On and Near Slopes. Require a geologic hazards assessment of all development, including grading permits, that is potentially affected by slope instability, regardless of the slope gradient on which the development takes place. Such assessment shall be prepared by County staff under supervision of the County Geologist, or a certified engineering geologist may conduct this review at the applicant's choice and expense.

Policy 6.2.2 Engineering Geology Report. Require an engineering geology report by a certified engineering geologist and/or a soils engineering report when the hazards assessment identifies potentially unsafe geologic conditions in an area of proposed development.

Policy 6.2.3 Conditions for Development and Grading Permits. Condition development and grading permits based on the recommendations of the Hazard assessment and other technical reports.

Affected Environment

This section is primarily a summary of the analysis documented in the *Preliminary Geotechnical Design Report Santa Cruz County Regional Transportation Commission-State Route 1 Aux Lanes and Bus-on-Shoulder (Freedom Boulevard to State Park Drive), County of Santa Cruz, California* prepared for the project (Parikh Consultants, Inc. 2022). Where data from other sources have been used, those sources are cited.

Regional Geology

The project lies on the coastal plain between the Santa Cruz Mountains and north shore of Monterey Bay being contained within the geologically complex and seismically active California Coast Ranges Geomorphic Province. Sub-

parallel northwest-trending faults, mountain ranges, and valleys characterize Coast Ranges topography.

The Jurassic-Cretaceous Franciscan Complex and Great Valley sequence sediments comprise the oldest Coast Ranges bedrock units. Subsequently, younger volcanic and sedimentary rocks were deposited throughout the province. Extensive late Cretaceous through early Tertiary folding and thrust faulting created complex geologic structural conditions that underlie the highly varied topography of today. Valley bedrock of the Coast Ranges is covered by thick locally and distally derived alluvium and soils.

Site Geology

The project alignment appears to be built upon Pleistocene lowest emergent coastal terrace deposits and cut and filled where drainages or overpasses/underpasses occur. Topography is relatively flat with creeks incising into Pleistocene lowest emergent coastal terrace deposits. The main creeks drain south from Pleistocene coastal terrace deposits and the Santa Cruz Mountains and have typically incised into the Pleistocene lowest emergent coastal terrace deposits at about 40–55 feet. Elevations increase along the project alignment from west to east from approximately 33 feet to 166 feet.

Bedrock of the project area consists primarily of the Purisima Formation which is described as very thick bedded yellowish-gray tuffaceous and diatomaceous siltstone containing thick interbeds of bluish-gray, semi-friable, fine- grained andesitic sandstone, with a thickness of 3,000 feet. The unit is mapped as outcropping between about SCR-1-post mile 10.15 to 9.99 and SCR-1-post mile 9.67 to 9.59 covering approximately 20% of the project alignment.

No protected natural landmarks, “outstanding examples of major geological features,” or protected topographic and geologic features are in the project area (National Park Service 2022).

Primary Seismic Hazards

The project site is located in Santa Cruz County and lies within one of the most seismically active areas of the United States. The area is influenced mostly by the San Andreas fault system, which spans the Coast Ranges from the Pacific Ocean to the San Joaquin Valley. The project is between two major active faults, the San Andreas and San Gregorio, approximately 6.1 miles northeast and 15.2 miles southwest to the project site, respectively. A fault map of the area is shown on Plate 3 of the geotechnical report.

The State of California considers two aspects of earthquake events primary seismic hazards: surface fault rupture (i.e., disruption at the ground surface as a result of fault activity) and seismic ground shaking.

Surface Fault Rupture

The project site is not within the Alquist-Priolo Earthquake Zone. The U.S. Geological Survey Quaternary Fault and Fold Database does not show any faults aged less than 15,000 years within 1,000 feet of the project site (USGS 2017). Therefore, the potential for ground surface rupture due to faulting is considered low.

Strong Ground Shaking

According to the Santa Cruz County *Local Hazard Mitigation Plan 2021–2026* (County of Santa Cruz 2021), past experience has shown that the entire county is vulnerable to earthquake hazards including severe ground shaking. The preliminary geotechnical report for the project has identified a horizontal peak ground acceleration of 0.74 gravity at the project location (Parikh Consultants, Inc. 2022).

Secondary Seismic Hazards

Secondary seismic hazards refer to seismically induced landsliding, liquefaction, and related types of ground failure. These hazards are addressed briefly below.

Liquefaction

Liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary but essentially total loss of shear strength under the reversing, cyclic shear stresses associated with earthquake shaking. Submerged cohesionless sands and silts of low relative density are the type of soils that usually are susceptible to liquefaction. Clays are generally not susceptible to liquefaction.

The liquefaction potential was evaluated in accordance with the methods proposed in Liquefaction Evaluation Module of Caltrans Geotechnical Manual (January 2020). The evaluation was done using the boring data from all the available borings using a magnitude 7.07 earthquake and a peak ground acceleration of about 0.74 gravity. This method compares the estimates of the earthquake-induced shear stress to the susceptibility of soil liquefaction.

Based on the preliminary liquefaction analysis of as-built subsurface data, the liquefaction potential along a majority of the alignment is low since groundwater was not encountered in most of the as-built boring logs. The liquefaction potential needs to be studied further in the plans, specifications, and estimates phase based on additional subsurface data. If liquefaction potential exists, the loss of strength due to liquefaction should be considered in the design (Parikh Consultants, Inc. 2022).

Landslides

Landslides occur when shear stress in a soil or rock mass exceeds shear strength. Shear stress can be increased by adding to the weight of soil or rock mass through saturation or loading. Shear strength can be reduced by erosion or by grading at the toe of a slide mass. Slope failure can be caused by an increase in shear stress or a decrease in shear strength. Zones of low shear strength are often associated with the presence of expansive clays and weak bedrock units. Earthquake-induced ground shaking can cause activation of new or previously existing landslides and other slope instabilities, especially during periods of high groundwater.

The geomorphology of the project alignment is dominated by coastal terraces with creeks incising down to alluvial covered bedrock; the steepest natural slopes are found along creek banks. The steepest slopes of the alignment appear to be engineered. Geological mapping does not indicate the presence of historical or Quaternary landslides along the project alignment. However, several Quaternary landslides are mapped within about 300–500 feet from the southern part of the alignment.

Tsunami

Tsunamis are large ocean waves generated by major seismic events. Santa Cruz County is located on Monterey Bay. Several active and potentially active earthquake faults are located within or near Santa Cruz County. An earthquake occurring in or near any of the nearby faults could result in local source tsunamis from submarine landsliding in Monterey Bay. Additionally, distinct-source tsunamis from the Cascadia Subduction Zone to the north, or teletsunamis from elsewhere in the Pacific Ocean, are also capable of causing significant destruction. According to the Soquel Tsunami Inundation Map for Emergency Planning, Aptos Creek is susceptible to tsunami inundation. According to the county's *Local Hazard Mitigation Plan 2021–2026*, the tsunami inundation area includes Aptos Creek up from the Pacific Ocean to just north of State Route 1 (County of Santa Cruz 2021).

Erosion

According to the preliminary geotechnical report for the project, erosion ratings in the project area primarily fall into the severe category with a few areas slight to moderate (Parikh Consultants, Inc. 2022). A rating of *slight* indicates that little or no erosion is likely; *moderate* indicates that some erosion is likely, that roads or trails may require occasional maintenance, and that simple erosion control measures are needed; and *severe* indicates that significant erosion is expected, that roads or trails require frequent maintenance, and that costly erosion control measures are needed.

Expansive Soil

Expansive soils are generally clays or sedimentary rocks derived from clays, which experience volume changes as a result of moisture variation. The hazard that expansive soils create can be significant. Many of the expansive soils do not create large areas of destruction; however, they can disrupt supply lines (i.e., roads, power lines, railways, and bridges) and damage structures. The effects on structures can be dramatic if expansive soils supporting structures are allowed to become too wet or too dry.

According to the preliminary geotechnical report for the project, expansive clays were not encountered near the surface in the borings. This should be verified during the Plans, Specs, and Estimates phase. If expansive soils are encountered during the Plans, Specs, and Estimates phase field investigation, it is recommended to perform laboratory tests such as Plasticity Index, Expansion Index, and R-value to investigate the expansive soil properties of the subsurface soils underlying the project site. There would be an impact on the structural pavement design and/or shallow footings if expansive soil is encountered in the pavement subgrade or footing subgrade (Parikh Consultants, Inc. 2022).

Environmental Consequences

Build Alternative

Geological conditions are similar along much of the project alignment for both State Route 1 and the Coastal Rail Trail. Therefore, the project would have the same potential for effects and, except where noted, different trail configurations are not discussed separately in this section.

Seismic Hazards and Slope Instability

The risk of strong seismic ground shaking in the project area is high; however, compliance with appropriate building regulations would ensure that the bridge foundations, bridge, roadways, trails, retaining walls and other project features are not damaged as a result of seismic activity. The project would comply with Caltrans' Seismic Design Criteria to implement earthquake design and construction measures.

There is a risk of secondary seismic hazards related to slope instability and liquefaction because of the slope of the creek banks, the potential for creek erosion, and the potential for liquefaction. Liquefaction or excessive erosion could cause bridge damage or failure. Site-specific field exploration and laboratory testing, including cone penetration tests and borings, would be necessary to develop final geotechnical engineering properties and design criteria for bridge foundations, project retaining walls, earthwork, and pavement design. This work would be performed as part of the final bridge design process. As described in the preliminary geotechnical report (Parikh Consultants, Inc. 2022), this work would include evaluating the engineering

properties of the subsurface soil materials for recommendation of geotechnical parameters and to address geotechnical hazards associated with different design elements (e.g., slope stability, settlement) and hazards associated with strong ground motion (e.g., shaking, liquefaction). Accordingly, seismic hazards would be evaluated further and addressed during final design. All structures would be designed using Caltrans' Seismic Design Criteria to meet the minimum seismic requirements for highway bridges designed in California.

Liquefaction

Liquefaction potential is low at the project location based on existing subsurface data; however, it would be verified during the Plans, Specs, and Estimates phase (Parikh Consultants, Inc. 2022.

Landslides

Geological mapping does not indicate the presence of historical or Quaternary landslides along the project alignment. However, several Quaternary landslides are mapped within about 300–500 feet from the southern part of the alignment. These landslides do not appear to be a potential hazard to the project (Parikh Consultants, Inc. 2022). In addition, retaining walls would be constructed as described in Chapter 1, which would reduce effects of potential landslides.

Tsunami

Conditions under the project would be similar to the existing conditions and would not increase the potential of site inundation. According to the County's Local Hazard Mitigation Plan, the tsunami inundation area includes Aptos Creek up from the Pacific Ocean to just north of State Route 1 (County of Santa Cruz 2021). People would be given sufficient warning to evacuate the project site by the West Coast and Alaska Tsunami Warning Center, which monitors earthquakes and issues tsunami warnings when a tsunami is forecast to occur.

Erosion

Ground-disturbing earthwork associated with construction at the project site may increase soil erosion rates or loss of topsoil. Compliance with the erosion-related requirements applicable to the project would ensure that the construction activities do not result in significant erosion. These requirements are described in the Caltrans' *Construction Site Best Management Practices Manual* (2017) and the *Statewide Stormwater Management Plan* (2016) *and Water Pollution Control Program (WPCP) Preparation Manual* (2021).

Expansive Soil

Expansive soil, as defined in Table 18-1 of the Uniform Building Code (1994), do not appear to be extensive in the project area but could occur locally; the potential impact on project structures would be evaluated during final design. All construction and engineered fills would comply with Caltrans' Standard Specifications, and all construction would compact the roadway subgrade in accordance with Caltrans' Standard Specifications.

No-Build Alternative

There are no known seismic issues related to the existing bridge, roads, or other structures. The No-Build Alternative would not result in adverse effects related to strong ground motion, liquefaction, slope instability, or seismic settlement. Because the No-Build Alternative would not involve soil disturbance, soil erosion would not increase.

Avoidance, Minimization, and/or Mitigation Measures

The project would be designed to meet all Caltrans seismic engineering requirements. The following avoidance and minimization measures would reduce impacts relating to geology.

- **AMM-GEO-1**: A site-specific seismic hazard engineering analysis will be conducted during final design, which will include engineering recommendations for retaining walls, expansive soil treatment, cuts and fills, and bridge foundation elements.
- **AMM-GEO-2**: The specific seismic hazard engineering analysis will include design measures to address surface drainage, slope maintenance, and surface protection/erosion control. In addition, the seismic hazard engineering analysis will include design measures to minimize the potential damage from ground shaking, fault rupture, liquefaction, lateral spreading, and slope instability. The following requirements will be incorporated as part of the seismic hazard engineering analysis:
  - Replanting will be incorporated into project plans to protect any new slopes.
  - Permanent erosion control measures, such as infiltration devices, media filters, and detention devices, will be applied to all new or exposed slopes. Ditches, berms, dikes, swales, overside drains, flared end sections, and outlet protection/velocity dissipation devices will be designed to handle concentration flows.
  - Slope and surface protection systems with vegetated surfaces and hard surfaces will be employed to minimize erosion.
- **AMM-GEO-3**: To minimize potential damage from ground shaking, structures associated with this project will meet maximum credible earthquake standards, as established by the Caltrans Office of

Earthquake Engineering. Caltrans has established Seismic Design Criteria for incorporating seismic loads in the design of structures (Caltrans 2019). Structure design, including bridges, will reflect these design guidelines. Impacts from ground shaking and fault rupture are to be mitigated using appropriate Caltrans design methods, such as the use of stone columns, subexcavation, dynamic compaction, or dewatering methods. For foundation design of structures having concentrated loads (e.g., bridges), design will address the additional loads generated by the liquefaction conditions. The most suitable method(s) will be selected based on site-specific subsurface investigations conducted as part of the seismic hazard engineering analysis.

- **AMM-GEO-4**: Site-specific engineering recommendations to minimize impacts from lateral spreading will be incorporated into the final design plans and construction contract documents. Angled piles may be needed to lessen lateral pressures of creek banks to resist lateral spreading.
- **AMM-GEO-5**: Localized movements along creek banks will be controlled by incorporating in the project design appropriate permanent slope protection, including rock riprap or revetment. Structures, such as retaining walls, will be required to mitigate specific conditions. Site-specific engineering recommendations to minimize long-term impacts due to landsliding will be defined based upon field testing during the final design phase and incorporated in the final design.

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2.2.4 Paleontology

Regulatory Setting

Paleontology is a natural science focused on the study of ancient animal and plant life as it is preserved in the geologic record as fossils.

A number of federal statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally authorized projects.

16 United States Code (U.S. Code) 461–467 established the National Natural Landmarks program. Under this program property owners agree to protect biological and geological resources such as paleontological features. Federal agencies and their agents must consider the existence and location of designated National Natural Landmarks, and of areas found to meet the criteria for national significance, in assessing the effects of their activities on the environment under NEPA.

23 U.S. Code 1.9(a) requires that the use of federal-aid funds must be in conformity with all federal and state laws. 23 U.S. Code 305 authorizes the appropriation and use of federal highway funds for paleontological salvage as necessary by the highway department of any state, in compliance with 16 U.S. Code 431–433 above and state law.

The countywide Conservation and Open Space elements of the County of Santa Cruz General Plan (County of Santa Cruz 1994) includes one goal (objective) and three policies regarding paleontological resources. Objective 5.9 is to protect paleontological, geological, and hydrological resources that stand out as rare or unique and representative in the county of Santa Cruz because of their scarcity, scientific or educational value, aesthetic quality, or cultural significance. Policy 5.9.1 protects paleontological, geological, and hydrological resources through the environmental review process and by designating such sites in the County of Santa Cruz General Plan. Policy 5.9.2 protects paleontological, geological, and hydrological resources through easements and land dedications where possible. Policy 5.10.1 protects paleontological resources through designation as a visual resource defined as having regional public importance for their natural beauty or rural agricultural character.

Affected Environment

A Paleontological Evaluation Report was prepared for this project in March 2022 (Cogstone Resource Management Inc. and Stantec Consulting Services, Inc. 2022). This section is based on the findings of that report.

The project lies on the coastal plain between the Santa Cruz Mountains and the north shore of Monterey Bay contained within the California Coast Ranges Geomorphic Province. State Route 1 crosses a relatively flat-lying

portion of the coastal plain in the project area where uplifted coastal terrace deposits and underlying sedimentary bedrock have been incised by several streams. The streams are heavily vegetated, and the surface of the terraces is mostly built over due to the project being in an urban environment.

The surface of the project is mapped as Holocene-aged (less than about 11,7000 years old) alluvium, alluvial fan deposits, and colluvium; Pleistocene-aged (about 11,700 years to 2.6 million years old) alluvial fan deposits, undivided and eolian Aromas Sand and marine terrace deposits; and the Purisima Formation which is Miocene to Pliocene in age (about 2.5 to 6.9 million years old). Pleistocene-aged sediments and/or the Purisima Formation occur at depth below the Holocene-aged sediments.

Holocene-aged alluvial and floodplain deposits generally consist of loose gravel, sand, silt, and clay that was deposited by streams, and can be found in drainages across the project alignment. These deposits are considered to have low paleontological potential because they are too young to contain fossils. However, the thickness of these deposits varies across the project alignment and older, paleontologically sensitive deposits may underlie them as shallow as 1 foot below the ground surface.

A record search from the University of California Museum of Paleontology did not identify Pleistocene-aged fossil localities within the project limits or within a 1-mile radius of the project. However, fossils are known from Pleistocene-age deposits in the greater Santa Cruz area, including two occurrences of extinct Columbian mammoth (*Mammuthus columbi*), deer (*Cervus* sp.), and unidentified mammal. Pleistocene-aged deposits are therefore considered to have a high paleontological potential.

The records search from the University of California Museum of Paleontology indicated there are 11 invertebrate localities from the Purisima Formation within a 1-mile radius of the project area. The Purisima Formation is considered to have a high paleontological potential. Thirty-five vertebrate localities were present from the Purisima Formation throughout Santa Cruz County, many of which were recovered from the Santa Cruz area. Specimens of sea cow, various pinnipeds, dolphins and whales, sea birds, and fish have been recovered from this formation throughout the county. The Purisima Formation is widespread in the Santa Cruz-Aptos area and underlies coastal terrace deposits within the project limits. The Purisima Formation is well exposed in sea cliffs to the south of the project. The Purisima Formation generally consists of weakly cemented, conglomerate, sandstone, siltstone, and claystone deposited in a marine environment.

Environmental Consequences

Build Alternative

Direct impacts on paleontological resources generally occur during ground-disturbing construction operations. Excavations into geologic rock units with high paleontological potential can result in the physical destruction of fossils. The potential for sensitive paleontological resources is similar along much of the project alignment for both State Route 1 and the Coastal Rail Trail. Therefore, the project would have the same potential for effects and, except where noted, different trail configurations are not discussed separately in this section.

The project has the potential to disturb high paleontological potential units which include Pleistocene-aged alluvial fan deposits, undivided and eolian Aromas Sand and marine terrace deposits; and the Miocene to Pliocene-aged Purisima Formation. Additionally, Pleistocene-aged sediments and/or the Purisima Formation occur at depth below low paleontological potential Holocene-aged sediments. The Pleistocene sediments and the Purisima Formation have produced fossils near the project area and elsewhere in the county.

For the most part, fossils of extinct Pleistocene animals start appearing at about 8 feet below the surface of California's large valleys where Holocene-aged deposits are mapped at the surface. Accordingly, all areas mapped as Holocene-aged sediments are assigned low paleontological sensitivity less than 8 feet below the original surface and high sensitivity at depths of over 8 feet (Figures 2-18 through 2-20 and Table 2-45). Due to the abundant vertebrate fossils that have been recovered from Pleistocene-aged sediments and the Purisima Formation elsewhere in the county, these units are given a high paleontological sensitivity at any depth.

Table 2-45. Geologic Unit Sensitivity

Geologic Unit	Caltrans Sensitivity
Holocene deposits (alluvium, alluvial fans, colluvium) 0-8 feet below ground surface	Low
Holocene deposits (alluvium, alluvial fans, colluvium) greater than 8 feet below ground surface	High
Pleistocene deposits (alluvial fan, undivided and eolian Aromas Sand, marine terrace deposits)	High
Purisima Formation, Pliocene and late Miocene	High

No-Build Alternative

Under the No-Build (No-Action) Alternative, there would be no impacts on paleontological resources because no construction would occur.

Avoidance, Minimization, and/or Mitigation Measures

Ground disturbance during project construction in areas or at depths where geologic units with high paleontological potential are present could adversely affect paleontological resources. However, implementation of Mitigation Measure PALEO-1 as described in Section 2.2.4, would reduce impacts on paleontological resources.

Preparation and Implementation of a Paleontological Mitigation Plan

- **Mitigation Measure-PALEO-1**: Prior to the start of excavations, a qualified Principal Paleontologist (M.S. or Ph.D. in paleontology or geology familiar with paleontological procedures and techniques) will be retained to prepare and implement a detailed Paleontological Mitigation Plan prior to the start of construction. The Paleontological Mitigation Plan will include the following elements and stipulations:
  - The Paleontological Mitigation Plan will identify all areas where excavation will disturb in situ geologic units identified as highly sensitive for paleontological resources.
  - Spot checking may be required to confirm the extent of the low sensitivity deposits should they overlie high sensitivity units. This includes areas of artificial fill and Holocene-aged sediments.
  - Full-time monitoring will be required where disturbance would be more than 8 feet deep into Holocene-aged sediments as well as all impacts on the Purisima Formation and Pleistocene-aged sediments.
  - Requirements for reduction of monitoring effort.
  - The paleontological monitor's authority to temporarily halt or divert construction equipment to investigate finds.
  - Protocols for fossil recovery, preparation, and curation.
  - Other pertinent items for the Paleontological Mitigation Plan as per Chapter 8 of Caltrans' Paleontology Standard Environmental Reference (Caltrans 2016).
- The qualified Principal Paleontologist will be present at pre-grading meetings to consult with grading and excavation contractors.
- Before excavation begins, a training session on fossil identification and the procedures to follow should fossils be encountered will be conducted by the Principal Paleontologist or their designee for all personnel involved in earthmoving for the project.
- If unanticipated discoveries of paleontological resources occur during project construction, all work within 25 feet of the discovery must cease and the find must be protected in place until it can be evaluated by a qualified paleontologist. Work may resume immediately outside of the 25-foot radius.

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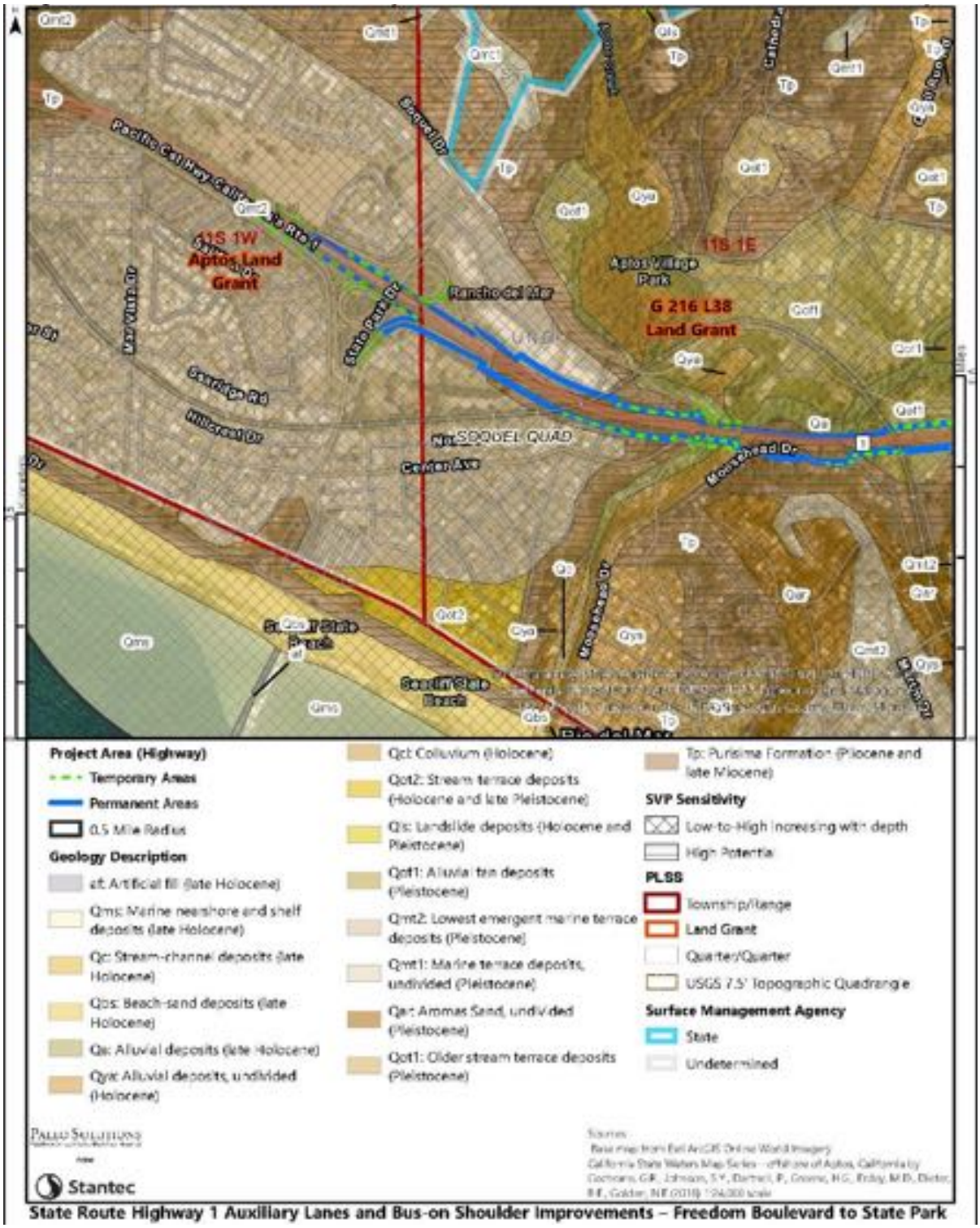

Figure 2-18. Geological Map of Western Project Area

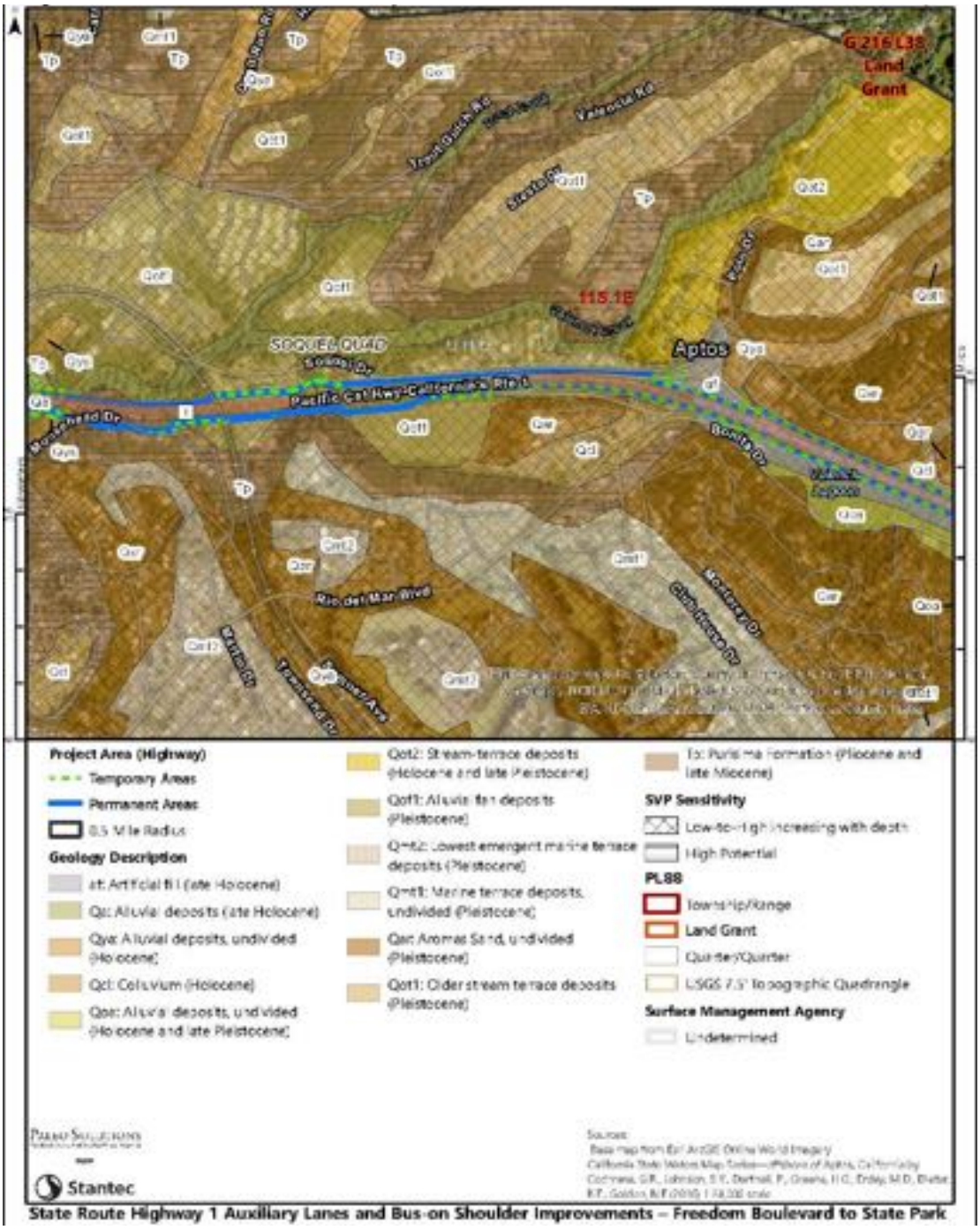

Figure 2-19. Geological Map of Central Project Area

Figure 2-20. Geological Map of Eastern Project Area

2.2.5 Hazardous Waste/Materials

Regulatory Setting

Hazardous materials, including hazardous substances and wastes, are regulated by many state and federal laws. Statutes govern the generation, treatment, storage, and disposal of hazardous materials, substances, and waste; and the investigation and mitigation of waste releases, air and water quality, human health, and land use.

The primary federal laws regulating hazardous wastes/materials are the Comprehensive Environmental Response, Compensation and Liability Act of 1980, and the Resource Conservation and Recovery Act of 1976. The purpose of the Compensation and Liability Act, often referred to as "Superfund," is to identify and cleanup abandoned contaminated sites so that public health and welfare are not compromised. The Resource Conservation and Recovery Act provides for "cradle-to-grave" regulation of hazardous waste generated by operating entities. Other federal laws include:

- Community Environmental Response Facilitation Act of 1992
- Clean Water Act
- Clean Air Act
- Safe Drinking Water Act
- Occupational Safety and Health Act
- Atomic Energy Act
- Toxic Substances Control Act
- Federal Insecticide, Fungicide, and Rodenticide Act

In addition to the acts listed above, Executive Order 12088, *Federal Compliance with Pollution Control Standards*, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

California regulates hazardous materials, waste, and substances under the authority of the California Health and Safety Code and is authorized by the federal government to implement the Resource Conservation and Recovery Act in the state. California law addresses specific handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning of hazardous waste. The Porter-Cologne Water Quality Control Act also restricts disposal of wastes and requires cleanup of wastes that are below hazardous waste concentrations but could affect ground and surface water quality. California regulations that address waste management and prevention and cleanup of contamination include Title 22 Division 4.5 *Environmental Health Standards for the Management of Hazardous Waste*, Title 23 *Waters*, and Title 27 *Environmental Protection*.

Worker and public health and safety are key issues when addressing hazardous materials that may affect human health and the environment. Proper management and disposal of hazardous material are vital if it is found, disturbed, or generated during project construction.

Santa Cruz County Environmental Health Division

The Santa Cruz County Environmental Health Division has been designated by Cal-EPA as the Certified Unified Program Agency for the County. As the Certified Unified Program Agency, the division is responsible enforcing the local ordinance and state laws pertaining to use and storage of hazardous materials, including the issuance and administration of Hazardous Materials Management Plans.

The Regional Transportation Commission and Santa Cruz County Environmental Health have entered into a Remedial Action Agreement for the Santa Cruz Branch rail line right-of-way. Under the agreement, the Regional Transportation Commission must notify the County Environmental Health Division of projects along the rail line. The Santa Cruz County Environmental Health is the regulatory oversight agency for characterization and potential remedial action under Sections 101480 through 101490 of the California Health and Safety Code.

Affected Environment

This section was prepared using information from the Initial Site Assessment prepared for the project (WRECO 2022). Additional site investigations would be conducted during the design phase of the project to further analyze potential routine hazardous waste construction issues

The Initial Site Assessment identified the following potential recognized environmental conditions within the project corridor:

Site Reconnaissance

The purpose of a site reconnaissance is to assess for current land-use activities and environmental conditions and to identify any existing or potential recognized environmental conditions within the project limits and adjoining properties. The visual survey is to collect information regarding potential hazardous material contamination, including evidence of current or past use; evident storage of toxic or hazardous materials; presence of onsite lagoons, pits, sumps, landfills, drywells, waste streams, or other disposal units; visible soil contamination; and aboveground or underground storage tanks, drums, barrels, and other storage containers.

Site visits were conducted on February 3, 2021, to evaluate the existing conditions within the proposed Segment 12 and on February 8, 2021, for State Route 1 project limits.

Agricultural Land Uses

Previous land uses in the project area include residential, commercial, agricultural, and railroad right-of-way. Review of old aerial photographs and topographic maps indicated that properties along the proposed project area right-of-way have been in agricultural use from the early 1940s to mid- to late 1950s. Therefore, soils within the project area could be contaminated with hazardous levels of herbicides, pesticides, and arsenic (used as an herbicide in the early 20th century).

Aerially Deposited Lead

Aerially deposited lead from the historical use of leaded gasoline, exists along roadways throughout California. There is the likely presence of soils with elevated concentrations of lead as a result of aerially deposited lead on the state highway system right-of-way within the limits of the project alternatives. Soil determined to contain lead concentrations exceeding stipulated thresholds must be managed under the July 1, 2016, Aerially Deposited Lead Agreement between Caltrans and the California Department of Toxic Substances Control. This Aerially Deposited Lead Agreement allows such soils to be safely reused within the project limits as long as all requirements of the Aerially Deposited Lead Agreement are met.

Aerially deposited lead can be found in the surface and near-surface soils along nearly all roadways because of the historical use of tetraethyl lead in motor vehicle fuels. Areas of primary concern are soils along routes that have had high vehicle emissions from large traffic volumes or congestion during the period when leaded gasoline was in use (generally prior to 1986). Typically, aerially deposited lead is found in shoulder areas and has high solubility when subjected to the low pH conditions of waste characterization tests. Shoulder soils along urban and heavily traveled rural highways are commonly above the Soluble Threshold Limit Concentration criteria.

Aerially deposited lead could be encountered during construction and grading activities within the proposed project limits along State Route 1, Rio Del Mar Boulevard, Soquel Drive, and State Park Drive, which have been present in various alignments since 1954 and, therefore, have the potential to be contaminated with aerially deposited lead.

Treated Wood and Pole-Mounted Transformers

Treated wood is wood that has preservative chemicals that protect it from insect attack and fungal decay during its use. Typical uses in the highway environment include signposts, metal beam guardrail wood posts, and lagging on retaining walls. The chemical preservatives used, however, are hazardous and pose a risk to human health and the environment. Metals (arsenic, chromium, and copper), and polyaromatic hydrocarbons (creosote and pentachlorophenol), are among the chemicals used. These chemicals are known to be toxic or carcinogenic. Harmful exposure to these chemicals may

result from skin contact with treated wood waste or from inhalation or ingestion of treated wood waste particulate (e.g., sawdust, smoke) as this material is handled. Utility poles along the frontage roads and railroad ties along the Santa Cruz Branch Rail Line likely contain chemical preservatives and would pose a threat to human health if mishandled.

Pole-mounted electrical transformers associated with overhead electrical services may contain polychlorinated biphenyls. Utility poles along the frontage roads and bridges crossing State Route 1 have pole-mounted transformers.

Railroad Corridor

Soils next to railroad tracks typically have been affected by heavy metals, total petroleum hydrocarbons as diesel, fuel oil, and polychlorinated biphenyls. Soils along railroad tracks may be affected by locomotives (total petroleum hydrocarbons as diesel), railroad ties (polynuclear aromatics), and slag ballast used to set the ties (heavy metals). Consequently, it is possible that soil and groundwater in the immediate area of the railroad line are contaminated.

Previous investigations identified arsenic and other pesticides, lead, petroleum products, and polycyclic aromatic hydrocarbons along the rail corridor. Railroad ties are typically treated with creosote, a pesticide product used as a wood preservative. The major chemicals in coal tar creosote that can be harmful to humans are phenols, cresols, and polycyclic aromatic hydrocarbons.

As development along the rail corridor has taken place, further soil testing has confirmed that there is contamination along the rail corridor, with arsenic being the primary contaminate of concern. Arsenic is highly toxic to humans and the screening levels for arsenic are very low (0.06 parts per million in soil for residential use). Remediation is complicated by the fact that there is naturally occurring levels of arsenic in soil that varies dramatically from location to location in the County. (Santa Cruz County 2018).

Asbestos-Containing Materials

The National Emissions Standards for Hazardous Air Pollutants (40 Code of Federal Regulations 61(M)) and federal Occupational Safety and Health Administration classify asbestos-containing materials as any materials or products that contain more than 1% asbestos. Nonfriable asbestos-containing materials are classified by the National Emissions Standards for Hazardous Air Pollutants as either Category I or II material, including materials sometimes found in bridges, rail shims, pipes, pipe coverings, expansion joint facings, and certain cement products. Regulated asbestos-containing materials, which are a hazardous waste when friable, are classified as any

materials that contain more than 1% asbestos by dry weight and have any of the following attributes.

- Friable (i.e., can be crumbled, pulverized, or reduced to powder by hand pressure)
- A Category I material that has become friable
- A Category I material that has been subjected to sanding, grinding, cutting, or abrading
- A Category II nonfriable material with a high probability of becoming crumbled, pulverized, or reduced to a powder during demolition or renovation activities

Activities that disturb materials containing any amount of asbestos are subject to certain requirements of the California Division of Occupational Safety and Health asbestos standard found in 8 California Code of Regulations 1529. Typically, removal or disturbance of more than 100 square feet of materials containing more than 1% asbestos must be performed by a registered asbestos abatement contractor, but associated waste labeling is not required if the materials contain 1% or less of asbestos. When the asbestos content of materials exceeds 1%, virtually all requirements of the standard become effective.

Materials containing more than 1% asbestos are also subject to National Emissions Standards for Hazardous Air Pollutants. Regulated asbestos-containing materials (friable asbestos-containing materials and nonfriable asbestos-containing materials that will become friable during demolition operations) must be removed from structures before they are demolished. Certain nonfriable asbestos-containing materials and materials containing 1% or less of asbestos may remain in highway structures, such as guardrail and bridges, during demolition; however, waste handling and disposal issues and the California Division of Occupational Safety and Health work requirements may make this cost prohibitive. With respect to potential worker exposure, notification, and registration requirements, the California Division of Occupational Safety and Health defines asbestos-containing materials as construction materials that contain more than 1% asbestos (8 CCR 341.6).

Asbestos-containing materials could be in buildings built before 1980 slated for demolition and the piers and abutments of the railroad bridges over State Route 1, which would be reconstructed to accommodate the widened highway and to include the Coastal Rail Trail on the reconstructed bridges.

Known Recognized Environmental Conditions

This section describes known recognized environmental conditions in the project study area (i.e., project limits plus 1-mile buffer) that are considered moderate to high for contamination potential. Recognized environmental conditions with a low potential for contamination outside of project limits can

be found in the Initial Site Assessment (WRECO 2022). Prepared for the project and consist mostly of cases considered closed, listings of storage tanks and hazardous waste generators not in violation, and several regulatory-related infractions.

The Safeway Fuel Station located at 18 Rancho Del Mar in Aptos (Assessor's Parcel Number 039-221-04), is approximately 440 feet from the project limits. Soil and groundwater at this location were contaminated with gasoline. Cleanup was completed and the case closed as of September 17, 2012. However, residual soil and groundwater contamination may still exist onsite that could expose workers and the public to contaminants during activities such as site grading, excavation, or dewatering.

The Central Coast Water Board, Santa Cruz County Environmental Health Services, and the appropriate local planning and building departments must be notified prior to any changes in land use, grading activities, excavation, or dewatering. This notification must include a statement that residual soil and groundwater contamination underlie the property and nearby properties. The levels of residual contamination and any associated risks are expected to reduce with time.

Environmental Consequences

Build Alternative

Construction activities involving ground disturbance or dewatering activities could potentially expose workers and the public to the following hazards and hazardous conditions, regardless of phase or configuration. Both the interim first phase and the ultimate trail configuration would require similar ground disturbance and would encounter similar recognized environmental condition types. Therefore, the project would have the same potential for effects involving similar hazards and hazardous materials and, except where noted, different trail configurations are not discussed separately in this section.

All impacts discussed in this section could happen during construction of the project, particularly during ground disturbance and dewatering activities.

<u>Soil and Groundwater Contamination</u>

Humans and the environment could be exposed to soil and groundwater contamination from construction activities. Acquisition of right-of-way from parcels with the potential to contain soil/groundwater contamination discussed above include the Safeway Fuel Station (Assessor Parcel Number 039-221-04).

Although there are no known recognized environmental conditions of high contamination potential, testing for contaminants should be conducted prior to property acquisition and construction of the proposed project to determine the extent and nature of possible contamination; and identify and implement

appropriate avoidance and containment measures. During construction of the project, the potential for human exposure (i.e., construction workers) to existing contaminated soil or groundwater would occur mainly during ground-disturbing and dewatering activities.

Previously Unknown Hazardous Materials

The potential exists for exposure of construction workers or nearby sensitive land uses to previously unknown hazardous materials during construction activities. Due to previous land uses that include tank farms, the project area generally has a moderate risk of previously unreported hazardous materials that could be discovered during construction of the proposed project.

Known Hazardous Land Uses

The project area generally has the potential for presence of hazardous materials in the form of aerially deposited lead, lead-based paint, and chromium in yellow/white traffic striping. Construction workers could be exposed to hazardous materials during ground-disturbing activities such as grading and roadbed resurfacing at any of the areas known to contain hazardous substances.

The Initial Site Assessment identified areas of moderate concern that would be affected by the project. These areas and topics of concern include the following.

- Aerially deposited lead could be encountered during construction and grading activities within the proposed project limits along State Route 1, Rio Del Mar Boulevard, Soquel Drive, and State Park Drive, which have been present in various alignments since 1954.
- Yellow and white traffic striping and markings are located along Trout Gulch Road, Soquel Drive, State Park Drive, Spreckels Drive, Rio Del Mar Boulevard, and State Route 1.
- Heavy metals, arsenic, total petroleum hydrocarbons as diesel, fuel oil, polycyclic aromatic hydrocarbons, and polychlorinated biphenyls are potentially present in parcels containing railroad tracks or former railroad alignments. Regardless of project phase, there is the potential to encounter any number of hazardous materials within the railroad corridor. However, because the optional first phase would remove the existing rails and railroad ties, which likely contain creosote, the potential to encounter hazardous materials is somewhat greater than under the ultimate trail configuration.
- Past agricultural land uses could contain hazardous materials such as herbicides, pesticides, and arsenic (used as an herbicide in the early 20th century).

- Pole-mounted electrical transformers associated with overhead electrical services may contain polychlorinated biphenyls. Utility poles along the frontage roads and bridges crossing State Route 1 have pole-mounted transformers. Whether any of these transformers contain polychlorinated biphenyls, which are typically associated with pole-mounted transformers, is unknown.
- Treated wood waste containing chemicals known to be toxic or carcinogenic. Harmful exposure to these chemicals may result from skin contact with treated wood waste or from inhalation or ingestion of treated wood waste particulate (e.g., sawdust, smoke) as this material is handled. Utility poles along the frontage roads and railroad ties along the Santa Cruz Branch Rail Line likely contain chemical preservatives and would pose a threat to human health if mishandled.
- Asbestos-containing materials could be in buildings built before 1980 slated for demolition and the piers and abutments of the railroad bridges over State Route 1. Lead-based paint could be in painted surfaces of pre-1980 buildings and the railroad bridges, which would be reconstructed to accommodate the widened highway and to include the Coastal Rail Trail on the reconstructed bridges.

Hazardous Conditions from Construction Equipment

Humans and the environment could be exposed to hazardous conditions from the accidental release of hazardous materials during construction activities. Construction would involve the use of heavy equipment, involving small quantities of hazardous materials (e.g., petroleum and other chemicals used to operate and maintain construction equipment) that may result in hazardous conditions in the project area.

In addition to environmental protections established by state and federal law, County and Caltrans policies and standards address responsibilities for hazardous conditions. Construction of the proposed project would conform with applicable policies related to hazards and hazardous materials in the elements of the County General Plan, and Caltrans Standard Specifications Section 14, Environmental Stewardship (Caltrans 2018:225–240). Complying with all applicable laws and regulations would avoid adverse effects related to hazardous waste and materials.

No-Build Alternative

No construction would take place under the No-Build Alternative; therefore, there would be no potential to expose workers or nearby land uses to soil or groundwater contamination, or hazardous materials from construction activities. The No-Build Alternative would not result in right-of-way acquisition or construction disturbance related to a new trail or highway improvements. Therefore, this alternative would not result in any direct effects regarding hazardous waste and materials.

Avoidance, Minimization, and/or Mitigation Measures

No mitigation is necessary. Compliance with local, state, and federal policies, standards, and laws would avoid or minimize effects related to hazardous waste and materials. The following avoidance and minimization measures provide project-specific direction and would be implemented prior to and during construction, consistent with applicable regulations.

AMM HAZ-1: A Preliminary Site Investigation of the subsurface soils and/or groundwater will be completed within the project boundaries to investigate the depth and lateral extent of contamination within the project. At a minimum, the Preliminary Site Investigation screening will investigate each area identified below where construction is anticipated to disturb the subsurface soil or encounter groundwater.

The project proponent will conduct a Preliminary Site Investigation for the following recognized environmental conditions within the proposed acquisition area of the project.

- Agricultural Land Uses: Sample and test soils for pesticides and metals along State Route 1 from State Park Drive to Freedom Boulevard where historic agricultural land uses were identified in the Initial Site Assessment. The estimated cost of collection and testing soil within these parcels totals approximately $54,000. Implementation could take up to 4 days.
- Aerially deposited lead: Analyze soil samples from road shoulders along State Route 1, Rio Del Mar Boulevard, Soquel Drive, and State Park Drive for total lead.
- Treated wood waste /Pole-Mounted Transformers: Analyze soil samples for polycyclic aromatic hydrocarbons, polychlorinated biphenyls, and metals near utility pole where soil disturbance might occur during construction.
- Railroad Corridor Hazards: Analyze soil samples for metals, arsenic, semi-volatile organic compounds polycyclic aromatic hydrocarbons, and polychlorinated biphenyls along the railroad corridor.

  The project proponent will coordinate and consult with the Santa Cruz Environmental Health Division for soil testing and remediation along the railroad corridor.
- Asbestos-containing materials: Sample and test for asbestos-containing materials in any buildings build before 1980 slated for demolition and concrete portions of the Rio Del Mar Boulevard overcrossing and the railroad bridges.
- Traffic Striping: Sample and test traffic striping and painted surfaces on the railroad bridges for lead-based paint. Samples to be obtained from areas that will be disturbed during construction.

Based on the findings of the Preliminary Site Investigation, if a soils management plan and health and safety plan are necessary, they will be prepared and implemented. Should the Preliminary Site Investigation indicate the presence of soil or groundwater contamination within the project area to be above regulatory thresholds, a Phase 3 Assessment will be conducted to investigate the depth and lateral extent of contamination within the project and remediate if necessary.

AMM HAZ-2: The project proponent will develop and implement the necessary plans and measures required by Caltrans and federal and state regulations, including a health and safety plan, best management practices, and/or an injury and illness prevention plan. The plans will be prepared and implemented to address worker safety when working with potentially hazardous materials, including potential lead or chromium in traffic stripes, aerially deposited lead, asbestos-containing materials, and other construction-related materials within the right-of-way during any soil-disturbing activity.

References

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2.2.6 Air Quality

Regulatory Setting

The federal Clean Air Act, as amended, is the primary federal law that governs air quality, while the California Clean Air Act is its companion state law. These laws, and related regulations by the U.S. Environmental Protection Agency and the California Air Resources Board, set standards for the concentration of pollutants in the air. At the federal level, these standards are called national ambient air quality standards. National ambient air quality standards and state ambient air quality standards have been established for six criteria pollutants that have been linked to potential health concerns: carbon monoxide, nitrogen dioxide, ozone, particulate matter—which is broken down for regulatory purposes into particles of 10 micrometers or smaller and particles of 2.5 micrometers and smaller, Lead, and sulfur dioxide. In addition, state standards exist for visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. The national ambient air quality standards and state standards are set at levels that protect public health with a margin of safety and are subject to periodic review and revision. Both state and federal regulatory schemes also cover toxic air contaminants (air toxics); some criteria pollutants are also air toxics or may include certain air toxics in their general definition.

Federal air quality standards and regulations provide the basic scheme for project-level air quality analysis under NEPA. In addition to this environmental analysis, a parallel conformity requirement under the Clean Air Act also applies.

Conformity

The conformity requirement is based on Clean Air Act Section 176(c), which prohibits the U.S. Department of Transportation and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to State Implementation Plan (SIP) for attaining the national ambient air quality standards. Transportation conformity applies to highway and transit projects and takes place on two levels: the regional (or planning and programming) level and the project level. The proposed project must conform at both levels to be approved.

Conformity requirements apply only in nonattainment and maintenance (i.e., former nonattainment) areas for the national ambient air quality standards, and only for the specific national ambient air quality standards that are or were violated. U.S. Environmental Protection Agency regulations at 40 Code of Federal Regulations 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/attainment areas for national ambient air quality standards and do not apply at all for state standards regardless of the status of the area.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the national ambient air quality standards for carbon monoxide, Nitrogen Dioxide, ozone, Particulate Matter (10 micrometers or smaller) and Particulate Matter (2.5 micrometers or smaller), and in some areas (although not in California), Sulfur Dioxide. California has nonattainment or maintenance areas for all of these transportation-related "criteria pollutants" except Sulfur Dioxide, and also has a nonattainment area for lead; however, lead is not currently required by the Clean Air Act to be covered in transportation conformity analysis. Regional conformity is based on emission analysis of regional transportation plans (RTPs) and federal transportation improvement programs that include all transportation projects planned for a region over a period of at least 20 years (for the Regional Transportation Plan) and 4 years (for the federal transportation improvement program). Regional Transportation Plan and federal transportation improvement program conformity uses travel demand and emission models to determine whether or not those projects would conform to emission budgets or other tests at various analysis years showing that requirements of the Clean Air Act and the SIP are met. If the conformity analysis is successful, the metropolitan planning organization, Federal Highway Administration, and Federal Transit Administration make the determinations that the Regional Transportation Plan and federal transportation improvement program are in conformity with the SIP for achieving the goals of the Clean Air Act. Otherwise, the projects in the Regional Transportation Plan and federal transportation improvement program must be modified until conformity is attained. If the design concept and scope and the "open-to-traffic" schedule of a proposed transportation project are the same as described in the Regional Transportation Plan and federal transportation improvement program, then the proposed project meets regional conformity requirements for purposes of project-level analysis.

Project-level conformity is achieved by demonstrating that the project comes from a conforming Regional Transportation Plan and federal transportation improvement program; the project has a design concept and scope that has not changed significantly from those in the Regional Transportation Plan and federal transportation improvement program; project analyses have used the latest planning assumptions and U.S. Environmental Protection Agency-approved emissions models; and in PM areas, the project complies with any control measures in the SIP. Furthermore, additional analyses (known as hot-spot analyses) may be required for projects located in carbon monoxide and PM nonattainment or maintenance areas to examine localized air quality impacts.

Affected Environment

Information presented in this section is based on the Air Quality Report prepared for the proposed project (Terry A. Hayes Associates Inc. 2022a).

The project is in Santa Cruz County, an area within the North Central Coast Air Basin, which includes Monterey, Santa Cruz, and San Benito counties. Air quality regulation in the North Central Coast Air Basin is administered by the Monterey Bay Air Resources District. The following discussion provides an overview of the environmental setting with regard to air quality in the North Central Coast Air Basin.

Climate, Meteorology, and Topography

Meteorology (weather) and terrain can influence air quality. Certain weather parameters are highly correlated to air quality, including temperature, the amount of sunlight, and the type of winds at the surface and above the surface. Winds can transport ozone and ozone precursors from one region to another, contributing to air quality problems downwind of source regions. Furthermore, mountains can act as a barrier that prevents ozone from dispersing.

The semi-permanent high-pressure cell in the eastern Pacific is the basic controlling factor in the climate of the North Central Coast Air Basin. In Santa Cruz County, coastal mountains also exert strong influence on atmospheric circulation and result in generally good air quality. However, in the summer, the generally northwest-southeast orientation of mountainous ridges tends to restrict and channel the summer onshore air currents. Surface heating in the interior portion of the Salinas and San Benito Valleys creates weak low pressure, which intensifies the onshore air flow during the afternoon and evening. Air flow in the fall can also be restricted by the Pacific High, which allows pollutants to build up over a period of a few days. It is most often during this season that the north or east winds develop to transport pollutants from either the San Francisco Bay Area or the Central Valley into the North Central Coast Air Basin.

The Watsonville Water Works climatological station, maintained by the National Oceanic and Atmospheric Administration, is located near the project site and is representative of meteorological conditions near the project. The climate of the project area is generally Mediterranean in character, with cool, wet winters (average 50.5 degrees Fahrenheit in January) and warm, dry summers (average 63.3 degrees Fahrenheit in July). Temperature inversions are common, affecting localized pollutant concentrations in the winter and enhancing ozone formation in the summer. Mountains averaging 3,000 to 2,000 feet in altitude tend to trap pollutants in the region by limiting air flow. Annual average rainfall is 21.52 inches (at Watsonville Climatological Station), mainly falling during the winter months.

Regional Air Quality

The Clean Air Act requires the U.S. Environmental Protection Agency to set National Ambient Air Quality Standards for six criteria air contaminants: ozone, particulate matter, carbon monoxide, nitrogen dioxide, lead, and sulfur

dioxide. It also permits states to adopt additional or more protective air quality standards, if needed.

The principal health and atmospheric effects, as well as typical sources, of regulated pollutants are listed in Table 2-46. Additionally, the state and federal attainment status of those pollutants in the project area within the North Central Coast Air Basin are summarized in Table 2-47. The project area is classified as attainment or unclassifiable for all national ambient air quality standards. Unclassifiable generally indicates that there is a lack of representative data to classify a basin.

Table 2-46. State and Federal Criteria Air Pollutant Effects and Sources

Pollutant	Principal Health and Atmospheric Effects	Typical Sources
Ozone (O_3)	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage and cancer. Long-term exposure damages plant materials and reduces crop productivity.	Low-altitude ozone is almost entirely formed from reactive organic gases/volatile organic compounds and nitrogen oxides in the presence of sunlight and heat. Common precursor emitters include motor vehicles and other internal combustion engines, solvent evaporation, boilers, furnaces, and industrial processes.
Carbon Monoxide (CO)	Carbon monoxide interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen. Carbon monoxide also is a minor precursor for photochemical ozone. Colorless, odorless.	Combustion sources, especially gasoline-powered engines and motor vehicles. Carbon monoxide is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.
Respirable Particulate Matter (10 micrometers or smaller) Particulate Matter (PM_{10})	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many toxic & other aerosol and solid compounds are part of PM_{10}Particulate Matter (10 micrometers or smaller).	Dust- and fume-producing industrial and agricultural operations; combustion smoke & vehicle exhaust; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources.

Pollutant	Principal Health and Atmospheric Effects	Typical Sources
Fine Particulate Matter ($PM_{2.5}$Particulate Matter (2.5 micrometers or smaller))	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter – a toxic air contaminant – is in the particulate matter (2.5 micrometers or smaller) $_{2.5}$ size range. Many toxic and &other aerosol and solid compounds are part of particulate matter(2.5 micrometers or smaller)$_{2.5}$	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning.
Nitrogen Dioxide (NO_2)	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain & nitrate contamination of stormwater.	Motor vehicles and other mobile or portable engines, especially diesel; refineries; industrial operations.
Sulfur Dioxide (SO_2)	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing; some natural sources like active volcanoes.
Lead (Pb)	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also a toxic air contaminant and water pollutant.	Lead-based industrial processes like battery production and smelters. Lead paint, leaded gasoline. Aerially deposited lead from older gasoline use may exist in soils along major roads.
Sulfates	Premature mortality and respiratory effects. Contributes to acid rain. Some toxic air contaminants attach to sulfate aerosol particles.	Industrial processes, refineries and oil fields, mines, natural sources like volcanic areas, salt-covered dry lakes, and large sulfide rock areas.
Hydrogen Sulfide (H_2S)	Colorless, flammable, poisonous. Respiratory irritant. Neurological damage and premature death. Headache, nausea. Strong odor.	Industrial processes such as: refineries and oil fields, asphalt plants, livestock operations, sewage treatment plants, and mines. Some natural sources like volcanic areas and hot springs.
Visibility Reducing Particles (VRP)	Reduces visibility. Produces haze.	See particulate matter above. May be related more to aerosols than to solid particles.
Vinyl Chloride	Neurological effects, liver damage, cancer. Also considered a toxic air contaminant.	Industrial processes

Table 2-47. State and Federal Criteria Air Pollutant Standards and Project Area Attainment Status (CARB 2016).

Pollutant	State Project Attainment Status	Federal Project Area Attainment Status
ozone	Nonattainment	Attainment-Unclassified
Carbon monoxide	Unclassified	Attainment-Unclassified
Particulate Matter (10 micrometers or smaller) [vi]	Nonattainment	Unclassified
Particulate matter$_{2.5}$	Attainment	Attainment-Unclassified
Nitrogen Dioxide	Attainment	Attainment-Unclassified
Sulfur Dioxide	Attainment	Attainment-Unclassified
lead [xii]	Attainment	N/A
Sulfates	Attainment	N/A
Hydrogen Sulfide	Unclassified	N/A
Vinyl Chloride [xii]	N/A	N/A

Local Ambient Air Quality

The Monterey Bay Air Resources District operates a network of air monitoring stations throughout the North Central Coast Air Basin to monitor air pollutants. The nearest air monitoring station to the project is the Santa Cruz–Soquel Avenue Monitoring Station. This station is considered representative of conditions in the project vicinity because it experiences similar meteorological conditions. Data recorded at the station for the years 2016 to 2020 indicates that air quality in the vicinity of the station is relatively good, with only one violation of the 8-hour ozone standard recorded over the five-year period.

Sources of mobile source air toxic emissions in the project area include State Route 1 and surface streets. No mobile source air toxic monitoring sites were identified in the vicinity of the project. The nearest mobile source air toxic monitoring site is located in the city of San Jose, approximately 25 miles north of the project site. Mobile source air toxic concentrations in the city of San Jose would not be representative of the project area due to differences in traffic conditions, climate, meteorology, and topography.

Naturally Occurring Asbestos

Naturally occurring asbestos (NOA) can be released from serpentinite and ultramafic rocks when the rock is broken or crushed. The State Department of Conservation, in conjunction with the United States Geological Survey, has prepared a map and spreadsheet inventory of asbestos areas and areas known to contain serpentinite and ultramafic rocks. The project is not in an area containing naturally occurring asbestos.

Sensitive Receptors

Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. California Air Resources Board has identified the following typical groups who are most likely to be affected by air pollution: children under 14, the elderly over 65 years of age, athletes, and people with cardiovascular and chronic respiratory diseases. Sensitive receptors include residences, schools, playgrounds, child-care centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes.

On the basis of research showing that the zone of greatest concern near roadways is within 500 feet (or 150 meters), sensitive receptors within 500 feet (or 150 meters) of the project have been identified and are documented in Table 2-48.

Table 2-48. Sensitive Receptors Located Within 500 feet of the Project Site

Receptor	Description	Distance Between Receptor and State Route 1 (ft)
Residences	Residences	Adjacent throughout
Seacliff Village Park	Park	230
Aptos Village County Park	Park	150
Tennis Club of Rio del Mar	Athletic Center	50
Valencia Elementary School	K-6 School	500

Environmental Consequences

Build Alternative

The following analysis is based on the project's Air Quality Analysis Report (Terry A. Hayes Associates, Inc. 2022) unless cited otherwise. Direct impacts associated with air quality are primarily related to construction and highway operations. The emissions associated with construction and operation of the highway and trail are combined in the analysis below, and, except where noted, different trail configurations are not discussed separately in this section.

Regional Conformity

The project is located in an attainment/unclassified area for all current national ambient air quality standards (see Table 2-46). Therefore, conformity requirements do not apply. No further analysis is required.

Project-Level Conformity

The project is located in an attainment/unclassified area for all current national ambient air quality standards. Therefore, conformity requirements do not apply. No further analysis is required.

Additional Environmental Analysis

Operational Criteria Pollutant Emissions

Project operations would generate emissions of criteria air pollutants and precursors that could potentially affect regional air quality. Operational emissions take into account long-term changes in emissions due to the project (excluding the construction phase). The operational emissions analysis compares forecasted emissions for existing/baseline, No-Build, and Build Alternatives that would be generated by vehicle travel within the project limits along State Route 1. Regional operational emissions attributed to roadway vehicle travel with and without project implementation were calculated using EMFAC2017. EMFAC2017 is the most recent on-road emissions modeling tool in California that has been approved for use by the U.S. Environmental Protection Agency. EMFAC2017 contains a comprehensive emissions inventory of motor vehicles that provides estimated emission rates for air pollutants. The emission rates provided by EMFAC2017 in grams per mile were used in conjunction with information from the Traffic Operations Analysis Report prepared for the project in March 2021 (CDM Smith 2021), as well as analysis conducted for the Senate Bill 1 Trade Corridor Enhancement Program grant application support (CDM Smith 2022). The emissions analyses demonstrate slight reductions in tons emitted per day for all pollutants.

Table 2-49. Summary of Total Daily Comparative Emissions Analysis for Baseline Conditions (2019)

Scenario/Analysis Year	Particulate matter $_{2.5}$ (tons/day)	Particulate matter $_{10}$ (tons/day)	NO_X (tons/day)	Carbon monoxide (tons/day)	ROG (tons/day)
Baseline/Existing Conditions (2019)					
Existing Conditions	0.02	0.04	0.23	1.21	0.04
Existing Conditions + Build Alternative	0.02	0.04	0.23	1.22	0.04

Source: Terry A. Hayes Associates, Inc. 2022a

Table 2-50. Summary of Total Daily Comparative Emissions Analysis for the Opening Year (2025)

Scenario/Analysis Year	Particulate matter $_{2.5}$ (tons/day)	Particulate matter $_{10}$ (tons/day)	NO_X (tons/day)	Carbon monoxide (tons/day)	ROG (tons/day)
No-Build Alternative	0.12	0.28	0.65	7.63	1.03
Build Alternative	0.12	0.28	0.64	7.62	1.03

Source: CDM Smith 2022

Table 2-51. Summary of Total Daily Comparative Emissions Analysis for the Horizon Year (2045)

Scenario/Analysis Year	Particulate matter $_{2.5}$ (tons/day)	Particulate matter $_{10}$ (tons/day)	NO_X (tons/day)	Carbon monoxide (tons/day)	ROG (tons/day)
No-Build Alternative	0.12	0.30	0.30	4.91	0.50
Build Alternative	0.12	0.30	0.30	4.90	0.50

Source: CDM Smith 2022

Sensitive Receptors

Sensitive Receptors located within 500 feet of the project site include residences adjacent throughout the corridor, Seacliff Village Park, Aptos Village County Park, Tennis Club of Rio del Mar, and Valencia Elementary School.

Operational Mobile Source Air Toxics

Technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent the meaningful or reliable estimates of mobile source air toxic emissions and effects for this project. However, even though reliable methods do not exist to accurately estimate the health impacts of mobile source air toxic at the project level, it is possible to assess the levels of future mobile source air toxic emissions by comparing the project alternatives. The project's potential air quality impacts related to long-term operations emissions of mobile source air toxic were evaluated in accordance with the Federal Highway Administration's (2016) *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*.

According to the Federal Highway Administration (2016), this project is classified as a category 2 project (Projects with Low Potential mobile source air toxic Effects). The Build Alternative is expected to meet this category because annual average daily traffic from 2017 indicates that the existing annual average daily traffic on State Route 1 ranges between 87,600 and 101,000, which is well below the threshold for a project to qualify as having high potential mobile source air toxic effects.

For the Build Alternative, the amount of mobile source air toxins emitted would be proportional to vehicle miles traveled. As discussed above, the Build Alternative would reduce county-wide Vehicle Miles Traveled from the No-Build Alternative. In addition, the Build Alternative would reduce vehicle delay, increase average speed, and improve level of service, reducing mobile source air toxic emissions associated with vehicle idling. Furthermore, emissions will likely be lower than present levels in the design year as a result of the U.S. Environmental Protection Agency's national control programs that are projected to reduce annual mobile source air toxic emissions by over 90% between 2010 and 2050 (FHWA 2016). Local conditions may differ from these national projections in terms of fleet mix and turnover, vehicle miles traveled growth rates, and local control measures. However, the magnitude of the U.S. Environmental Protection Agency-projected reductions is so great (even after accounting for vehicle miles traveled growth) that mobile source air toxic emissions in the study area are likely to be lower in the future in nearly all cases.

The Bus-on-Shoulder component of the Build Alternative would move buses slightly closer to freeway-adjacent land uses. The shift from the center of the outside lane to the center of the shoulder would be approximately 12 feet. Fixed route bus transit service in Santa Cruz County is provided by the Santa Cruz Metropolitan Transit District (Santa Cruz Metro). Santa Cruz Metro is continuously upgrading its transit fleet to include new hybrid buses and zero-emission electric buses. Replacing and upgrading the existing fleet is a stated top priority for Metro. Low-emission buses like the hybrid diesel-electrics and compressed natural gas buses are a near-term alternative that allow transit operators to significantly reduce fuel emissions as the bus manufacturing industry develops electric buses with maximized operating range. California Air Resources Board has set a deadline of 2040 for all transit operators to transition to zero-emission electric fleets. It is not anticipated that the Bus-on-Shoulder component of the Build Alternative would significantly increase freeway-adjacent mobile source air toxic emissions.

Construction Criteria Pollutant Emissions

Project construction activities would generate emissions of criteria air pollutants and precursors that could potentially affect regional air quality. Site preparation and roadway construction would involve clearing, cut-and-fill activities, grading, removing or improving existing roadways, and paving roadway surfaces. During construction, short-term degradation of air quality is expected from the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and other activities related to construction. Emissions from construction equipment powered by gasoline and diesel engines are also anticipated and would include Carbon monoxide, nitrogen oxides, volatile organic compounds, directly emitted Particulate matter 10 and Particulate matter 2.5, and air toxics such as diesel exhaust Particulate matter. Construction activities are expected to increase traffic congestion in

the area, resulting in increases in emissions from traffic during the delays. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Under the transportation conformity regulations (40 Code of Federal Regulations 93.123(c)(5)), construction-related activities that cause temporary increases in emissions are not required in a hot-spot analysis. These temporary increases in emissions are those that occur only during the construction phase and last 5 years or less at any individual site. They typically fall into two main categories:

- Fugitive Dust—A major emission from construction due to ground disturbance. All air districts and the California Health and Safety Code 41700–41701 prohibit visible emissions exceeding 3 minutes in 1 hour; this applies not only to dust but also to engine exhaust. In general, this is interpreted as visible emissions crossing the right-of-way line.

  Sources of fugitive dust include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site may deposit mud on local streets, which could be an additional source of airborne dust after it dries. Particulate matter 10 emissions may vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. Particulate matter 10 emissions depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.
- Construction Equipment Emissions: Diesel exhaust particulate matter is a California-identified air toxic, and localized issues may exist if diesel-powered construction equipment is operated near sensitive receptors.

Construction would occur over approximately 3 years (36 months). The Build Alternative is not located in an area that is federal nonattainment status for any criteria air pollutant. Construction emissions are not required to be estimated for transportation conformity. However, construction emissions have been estimated in accordance with CEQA requirements and for disclosure in the NEPA document. Construction emissions were estimated using the latest Roadway Construction Emissions Model (Version 9.0). While the model was developed for Sacramento conditions in terms of fleet emission factors, silt loading, and other model assumptions, it is considered adequate for estimating road construction emissions by the Monterey Bay Air Resources District.

Construction emissions were estimated using detailed equipment inventories, project construction scheduling information, and other input parameters provided by the engineering team. Daily construction-related emissions for the Build Alternative, including both the roadway and trail components, are presented in Table 2-52. The emissions presented are based on the best

information available at the time of calculations. The emissions represent the peak daily construction emissions that would be generated by the Build Alternative.

Table 2-52. Daily Construction Emissions for Roadway and Coastal Rail Trail Components (pounds/day)

Project Phases	Particulate matter $_{10}$	Particulate matter $_{2.5}$	Carbon monoxide	Nitrogen Oxides	Carbon monoxide
Land Clearing/Grubbing	31	7.3	25	39	13,844
Grading/Excavation	32	7.7	34	51	15,944
Drainage/Utilities	31	6.9	19	18	4,945
Paving	1.1	0.69	16	28	11,406
Maximum Daily	32	7.7	34	51	15,944
Project Total (Tons)	11	2.5	10	14	4,437

The following measures, some of which may also be required for other purposes such as stormwater pollution control, will reduce air quality impacts resulting from construction activities. Although these measures are anticipated to reduce construction-related emissions, these reductions cannot be quantified at this time.

- The construction contractor shall comply with Caltrans' Standard Specifications in Section 14- 9 (2018).
  - Section 14-9-02 specifically requires compliance by the contractor with all applicable laws and regulations related to air quality, including air pollution control district and air quality management district regulations and local ordinances.
  - The construction contractor must comply with Monterey Bay Air Resources District rules, ordinances, and regulations in regard to air quality restrictions.
- The construction contractor shall apply water or dust palliative to the site and equipment as frequently as necessary to control fugitive dust emissions.
- The construction contractor shall spread soil binder on any unpaved roads used for construction purposes and on all project construction parking areas.
- The construction contractor shall wash off trucks as they leave the right-of-way as necessary to control fugitive dust emissions.
- The construction contractor shall properly tune and maintain construction equipment and vehicles.

- The construction contractor shall use low-sulfur fuel in all construction equipment as provided in California Code of Regulations Title 17, Section 93114.
- The construction contractor shall develop a dust control plan documenting sprinkling, temporary paving, speed limits, and expedited revegetation of disturbed slopes as needed to minimize construction impacts to existing communities.
- The construction contractor shall locate equipment and materials storage sites as far away from residential and park uses as practical. Construction areas shall be kept clean and orderly.
- All on- and off-road diesel equipment shall not idle for more than 5 minutes. The contractor shall post signs in the designated queuing areas and or job sites to remind drivers and operators of the 5-minute idling limit. For non-diesel equipment, idling time for lane closure during construction shall be restricted to 10 minutes in each direction.
- The construction contractor shall use track-out reduction measures, such as gravel pads, at project access points to minimize dust and mud deposits on roads affected by construction traffic.
- The construction contractor shall cover all transported loads of soils and wet materials prior to transport or provide adequate freeboard (space from the top of the material to the top of the truck) to reduce Particulate matter 10 and deposition of particulate matter during transportation.
- The construction contractor shall remove dust and mud that are deposited on paved, public roads due to construction activity and traffic to decrease particulate matter
- The construction contractor shall route and schedule construction traffic to avoid peak travel times as much as possible to reduce congestion and related air quality impacts caused by idling vehicles along local roads.
- The construction contractor shall install mulch or plant vegetation as soon as practical after grading to reduce windblown particulate in the area.

Construction Asbestos and Lead

Additional construction impacts related to air quality may include impacts from the handling of asbestos and/or soils with high concentrations of aerially deposited lead during construction and demolition. As discussed above, the project is not in an area containing NOA. Adherence to applicable Monterey Bay Air Resources District rules and Caltrans' Standard Specifications would ensure that asbestos-containing materials during demolition activities would be disposed of appropriately and safely, if found. Soils would be tested at the start of ground disturbance for the presence of hazardous materials such as lead. If lead is present, the project would be required to develop a lead compliance plan to minimize exposure per Monterey Bay Air Resources District rules and regulations. Refer to Section 2.2.5, *Hazardous*

Waste/Materials, for more information on the handling and disposal of these materials.

No-Build Alternative

Under the No-Build Alternative, there would be no construction of auxiliary lanes or Bus-on-Shoulder features on State Route 1 within the project area, and Coastal Rail Trail Segment 12 would not be constructed. The existing transportation facilities within the project area would remain unchanged. The No-Build Alternative assumes the construction of other planned and programmed projects in the region, including other auxiliary lanes projects on State Route 1 and other segments of the Coastal Rail Trail. The No-Build Alternative would not directly generate any short-term construction emissions. It is anticipated that future emissions of criteria pollutants and mobile source air toxic would decrease relative to existing conditions because of improvements in engine technology and the phasing out of older, more polluting engines. Comparisons of criteria pollutant emissions of the No-Build Alternative to the Build Alternative are provided in Table 2-51.

Avoidance, Minimization, and/or Mitigation Measures

Construction (Short Term)

As stated in Chapter 1, Standard Measures AQ-1 through AQ-13 would be implemented to reduce environmental impacts. No avoidance, minimization, and/or mitigation measures have been identified as necessary to reduce emissions, though the Build Alternative would comply with Caltrans Standard Specifications and Monterey Bay Air Resources District rules and various regulations (Rules 207, 400, 402, 403, 416) to control emissions of air pollutants during construction.

Climate Change

Neither the U.S. Environmental Protection Agency nor the Federal Highway Administration has issued explicit guidance or methods to conduct project-level greenhouse gas analysis. The Federal Highway Administration emphasizes resilience and sustainability in highway planning, project development, design, operations, and maintenance. Because there have been requirements set forth in California legislation and executive orders on climate change, the issue is addressed in the CEQA chapter (chapter 3) of this document. The CEQA analysis may be used to inform the NEPA determination for the project.

References

Association of Monterey Bay Area Governments. 2018. 2040 Metropolitan Transportation Plan/Sustainable Communities Strategy. Seaside. CA. Final June.

California Air Resources Board. 2016. Ambient Air Quality Standards. Available: https://ww2.arb.ca.gov/resources/documents/ambient-air-quality-standards-0. Accessed: December 12, 2021.

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Federal Highway Administration. 2016. Updated Interim guidance update on mobile source air toxic analysis in NEPA documents. Available: https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/. Accessed: June 21, 2022.

Terry A. Hayes Associates, Inc. 2022a. *Air Quality Report, State Route 1 Auxiliary Lanes and Bus-on-Shoulder Improvements – Freedom Boulevard to State Park Drive – and Coastal Rail Trail Segment 12 Project*. Prepared for Caltrans District 5. February.

2.2.7 Noise

Regulatory Setting

CEQA and NEPA provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment. The requirements for noise analysis and consideration of noise abatement and/or mitigation, however, differ between NEPA and CEQA.

California Environmental Quality Act

CEQA requires a strictly baseline versus build analysis to assess whether a proposed project will have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless those measures are not feasible. The rest of this section will focus on the NEPA/Title 23 Part 772 of the Code of Federal Regulations (23 Code of Federal Regulations 772) noise analysis; please see Chapter 3 of this document for further information on noise analysis under CEQA.

National Environmental Policy Act and 23 Code of Federal Regulations 772

For highway transportation projects with Federal Highway Administration involvement (and the Department, as assigned), the Federal-Aid Highway Act of 1970 and its implementing regulations (23 Code of Federal Regulations 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations include noise abatement criteria that are used to determine when a noise impact would occur. The noise abatement criteria differ depending on the type of land use under analysis. For example, the noise abatement criteria for residences (67 A-weighted decibels) is lower than the noise abatement criteria for commercial areas (72 A-weighted decibels). The following table lists the noise abatement criteria for use in the NEPA/23 Code of Federal Regulations 772 analysis.

In the table below, undeveloped lands are permitted for the activity categories for B and C.

Table 2-53. Noise Abatement Criteria

Activity Category	Noise Abatement Criteria, Hourly A-Weighted Noise Level, One-Hour A-Weighted Equivalent Continuous Sound Level	Description of activity category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Residential.
C	67 (Exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A–D or F.
F	No noise abatement criteria—reporting only	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical, etc.), and warehousing.
G	No noise abatement criteria—reporting only	Undeveloped lands that are not permitted.

Figure 2-21 lists the noise levels of common activities to enable readers to compare the actual and predicted highway noise levels discussed in this section with common activities.

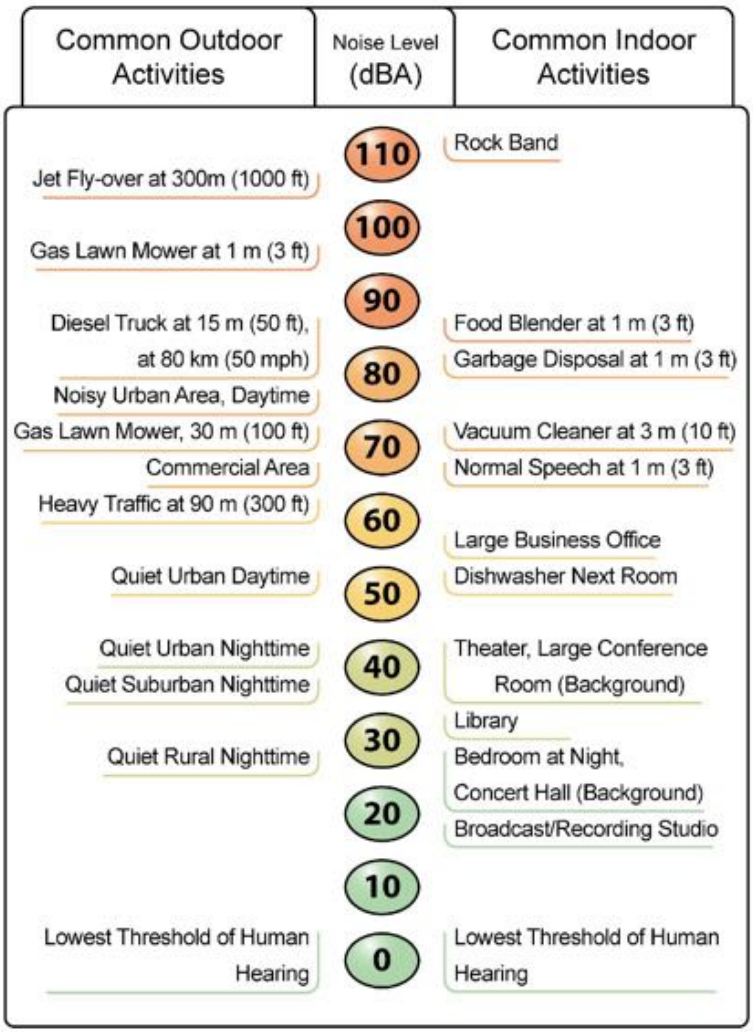

Figure 2-21. Noise Levels of Common Activities

According to Caltrans' *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects, 2020,* a noise impact occurs when the predicted future noise level with the project substantially exceeds the existing noise level (defined as a 12 A-weighted decibel or more) or when the future noise level with the project approaches or exceeds the noise abatement criteria. A noise level is considered to approach the noise abatement criteria if it is within 1 A-weighted decibel of the noise abatement criteria.

If it is determined that the project will have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications. This document discusses noise abatement measures that would likely be incorporated in the project.

Caltrans' Traffic Noise Analysis Protocol sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. Noise abatement must be predicted to reduce noise by at least 5 decibel at an impacted receptor to be considered feasible from an acoustical perspective. It must also be possible to design and construct the noise abatement measure for it to be considered feasible. Factors that affect the design and constructability of noise abatement include, but are not limited to, safety, barrier height, topography, drainage, access requirements for driveways, presence of local cross streets, underground utilities, other noise sources in the area, and maintenance of the abatement measure. The overall reasonableness of noise abatement is determined by the following three factors: 1) the noise reduction design goal of 7 decibel at one or more impacted or non-impacted receptors; 2) the cost of noise abatement; and 3) the viewpoints of benefited receptors (including property owners and residents of the benefited receptors).

Affected Environment

The following analysis was prepared using information from the Focused Noise Study Report prepared for the project in June 2022 and the Focused Noise Abatement Decision Report prepared for the project in October 2022.

This Focused Noise Study Report evaluated the project's noise impacts and abatement under the requirements of 23 Code of Federal Regulations 772. The Focused Noise Study Report included a field investigation conducted in March 2021 and 2022 to identify land uses that could be subject to traffic and construction noise impacts from the proposed project.

The project area consists of single-family and multi-family residences (Activity Category B); churches, playgrounds, recreational sport areas (Activity Category C); churches and offices (Activity Category D); and office, restaurant, and hotel uses (Activity Category E).

Land uses along the State Route 1 project corridor are predominantly residential with pockets of commercial and recreational parcels. Traffic on State Route 1 is the dominant source of noise in the area. Existing land uses in the project corridor can be divided into six segments based upon major local interchanges, similar or like topographies, and separate or unique neighborhoods. The following describes neighborhoods in the seven analysis areas relevant to this project:

- Area 1: Area 1 is located in the southwest quadrant of the State Route 1/State Park Drive interchange. A residential subdivision (Activity Category B) and a church (Activity Category C) are located in this area. This area is generally flat, and backyards face the highway. An approximate 6-foot-high perimeter wall/fence surrounds the backyard and side yard areas of the residences.

- Area 2: Area 2 is located north of State Route 1 from the northwest quadrant of the State Route 1/State Park Drive interchange to the Soquel Drive/State Route 1 Santa Cruz Branch Line railroad overcrossing. A hotel (Activity Category E) and a large commercial retail development (Activity Category E) are located in this area. In general, the commercial retail area slopes upward in a southeast-northwest direction and is elevated above State Route 1. The hotel property is roughly at grade with State Route 1 or slightly higher than State Route 1. There are no sound barriers located between the highway and the commercial retail or hotel uses. One outdoor dining area is located at the commercial retail area and an outdoor pool area is centrally located at the hotel property.
- Area 3: Area 3 is located north of State Route 1 from the Soquel Drive/State Route 1 Santa Cruz Branch Line railroad overcrossing to the State Route 1/Rio Del Mar Boulevard interchange. Multi-family and single-family residential uses (Activity Category B), outdoor dining areas (Activity Category E), and commercial/office uses are located in this area. The commercial/office uses do not have outdoor areas of frequent human use; therefore, this area focuses on the residential uses and outdoor dining areas that would benefit from a lowered noise level. This area is generally flat with intervening vegetation between State Route 1 and the receptors along Soquel Drive.
- Area 4: Area 4 is located south of State Route 1 from the State Route 1/State Park Drive interchange to the Santa Cruz Branch Line railroad overcrossing. Single-family residential uses (Activity Category B) and a church (Activity Category C) are located in this area. This area is mostly flat with some varying topography in the residential hillside area east of Spreckels Drive. Intervening mature vegetation is located along State Route 1 between the highway and the uses to the south.
- Area 5: Area 5 is located south of State Route 1 from the Santa Cruz Branch Line railroad overcrossing to the State Route 1/Rio Del Mar Boulevard interchange. Single-family residential uses (Activity Category B), a tennis club (Activity Category C), and commercial retail development with outdoor dining areas (Activity Category E) are located in this area. This area is mostly flat along State Route 1 with some varying topography in the residential hillside area to the south. Intervening mature vegetation is located along State Route 1 between the highway and the uses to the south.
- Area 6: Area 6 is located south of State Route 1 from the State Route 1/Rio Del Mar Boulevard interchange to the State Route 1/Freedom Boulevard interchange. Single-family residential uses (Activity Category B) are located in this area. This area is mostly flat with some varying topography in the residential area to the south. Intervening mature vegetation is located along State Route 1 between the highway and the uses to the south.

- Area 7: Area 7 is located north of State Route 1 from the State Route 1/Rio Del Mar Boulevard interchange to the eastern project limits east of the State Route 1/Freedom Boulevard interchange. Multi-family and single-family residential uses (Activity Category B), a church (Activity Category C), and commercial/office uses are located in this area. Most of the commercial/office uses do not have outdoor areas of frequent human use; therefore, this area focuses on residential uses, an outdoor area at the church, and an outdoor area at the pet hospital that would benefit from a lowered noise level. This area is generally flat along State Route 1 and Soquel Drive with a noticeable increase in elevation north of Soquel Drive in the hillside residential areas.

Methodology

A field investigation was conducted in March 2021 and 2022 to identify the land uses near the project area and assess potential impacts from construction and traffic noise resulting from the project. Land uses in the project area were categorized by land-use type, activity category, and frequency of human use. Abatement is considered for areas of frequent human use that would benefit from the lowered noise level, so the noise impact analysis focused on locations where frequent human use would likely occur.

Noise measurements were mainly conducted in frequent outdoor human-use areas along the project corridor, primarily in residential backyards and common use areas at multi-family residences. Both short-term and long-term measurements were taken and included in the analysis conducted for the Focused Noise Study Report.

Future noise levels were modeled using the Federal Highway Administration Traffic Noise Model Version 2.5, which considers traffic volumes, speed, and vehicle type to determine traffic noise levels.

This modeling was used to determine areas that meet the criteria for traffic noise impacts and associated abatement. Traffic noise impacts are considered to occur at receptor locations where predicted design-year noise levels are at least 12 A-weighted decibels greater than existing noise levels, or where predicted design-year noise levels approach or exceed the noise abatement criteria for the applicable activity category. Where traffic noise impacts are identified, noise abatement must be considered for reasonableness and feasibility as required by 23 Code of Federal Regulations 772 and the Caltrans Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects.

Environmental Consequences

This project is considered a Type 1 Project due to the addition of a new travel lane in each direction of State Route 1. As a Type 1 project, a noise analysis must be prepared for the project.

Build Alternative

The following analysis is based on the project's Noise Study Report and Noise Abatement Decision Report (LSA Associates, Inc. 2022a, LSA Associates, Inc.2022b) unless cited otherwise. Direct impacts associated with noise are primarily related to construction and highway operations. The noise associated with construction and operation of the highway and trail are combined in the analysis below, and, except where noted, different trail configurations are not discussed separately in this section.

Construction Noise

During construction of the project, including the trail component, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. Noise associated with construction is controlled by Caltrans Standard Specification Section 14-8.02, "Noise Control," which states the following:

> Do not exceed 86 A-weighted decibels highest time-weighted sound level at 50 feet from the job site activities from 9 p.m. to 6 a.m.
>
> Equip an internal combustion engine with the manufacturer-recommended muffler. Do not operate an internal combustion engine on the job site without the appropriate muffler.

Table 2-54 summarizes noise levels produced by construction equipment that is commonly used on roadway construction projects. The same types of equipment would be used to construct the trail components. Construction equipment is expected to generate noise levels ranging from 70 to 90 decibels at a distance of 50 feet, and noise produced by construction equipment would be reduced over distance at a rate of about 6 decibels per doubling of distance.

Table 2-54. Construction Equipment Noise

Equipment	Maximum Noise Level (A-weighted decibels at 50 feet)
Scrapers	89
Bulldozers	85
Heavy Trucks	88
Backhoe	80
Pneumatic Tools	85
Concrete Pump	82

Source: Federal Transit Administration, 2018.

No adverse noise impacts from construction are anticipated because construction would be conducted in accordance with Caltrans Standard Specifications Section 14.8-02. Consequently, noise levels would not exceed the level allowable by Caltrans Standard Specifications Section 14.8-02 during nighttime hours. Construction noise would be short-term, intermittent, and overshadowed by local traffic noise (Table 2-55).

Operational Noise

The Focused Noise Study Report studied future traffic noise impacts at receptors along the project corridor. Potential long-term noise impacts from the project are solely from traffic noise. A field investigation was conducted to identify land uses that could be subject to traffic noise impacts from the project. In the project area, single-family homes and multi-family residences are classified as Activity Category B land uses; churches, playgrounds, and recreational sport areas are classified as Activity Category C land uses; churches and offices are classified as Activity Category D land uses; and office, restaurants, and hotels are classified as Activity Category E land uses. As required by the Traffic Noise Analysis Protocol, noise abatement is only considered for areas of frequent human uses that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards and common use areas at multi-family residences. The Focused Noise Study Report evaluated traffic noise for the worst-case traffic condition, with 107 receptor locations evaluated for existing and future traffic noise.

Existing Noise Levels at Peak Traffic Hour

Table 2-55 shows the measured noise levels at each of the 107 receptor locations. Receptor locations were evaluated for the worst-case traffic scenario. In areas in which traffic becomes congested, the loudest hour is generally characterized by free-flowing traffic (i.e. level of service C or better) at the highway design speed, which is 65 miles per hour along State Route 1 within the project area (LSA Associates, Inc 2022a).

Future Noise Levels in Design Year (2045)

The Focused Noise Study Report modeled and evaluated future noise conditions to assess the project's impacts on noise. A project's design year is used for the evaluation of future impacts. The period typically used to establish a project's design year is 20 years from project completion. The Focused Noise Study Report used the year 2045 to assess noise conditions in the project's design year.

The modeled future noise levels with the project were compared to the modeled existing noise levels (after calibration) from Traffic Noise Model 2.5 to determine whether a substantial noise increase would occur as a result of the project. The modeled future noise levels were also compared to the noise abatement criteria to determine whether a traffic noise impact would occur. If

there is a substantial increase (12 A-weighted decibels) in noise with the project and/or if the noise approaches (within 1 A-weighted decibel) or exceeds the noise abatement criteria, then there is a noise impact that requires consideration of noise abatement. Table 2-55 shows the projected future noise levels at each receptor site with and without the project.

The Focused Noise Study Report found that 53 out of the 107 total receptor sites are expected to experience an increase in traffic noise that would approach or exceed the noise abatement criteria. However, none of the 107 receptor sites would experience an increase in noise that exceeds 12 A-weighted decibels or more over its corresponding modeled existing noise level.

Based on the findings of the Focused Noise Study Report, noise abatement was considered for affected receptor sites. Noise abatement would be in the form of sound barriers installed along the project corridor. Table 2-55 also includes projected future noise levels with sound barriers of five distinct heights ranging from 8 feet to 16 feet. Figures 2-22a through 2-22e show the locations of the feasible noise barriers that were analyzed in the Focused Noise Abatement Decisions report. Proposed noise abatement is discussed further in the avoidance, minimization, and/or abatement measures section below.

A total of 8 noise barriers were evaluated in the Focused Noise Study Report. However, based on the findings of the Focused Noise Abatement Decision Report, only two noise barriers were found to be reasonable and feasible and are proposed to be built as part of the project. The FHWA protocol for reasonableness considers noise abatement to be feasible if it provides a noise reduction of 5dBA or more at receptors subject to noise impacts. It is considered reasonable if a reduction of 7dBA or more is achieved at one or more benefited receptors, and if the cost does not exceed the cost allowance. These noise barriers, which range in height from 8 feet to 16 feet depending on site-specific noise impacts from the project, would provide noise reduction meeting the noise reduction design goal of at least 7 A-weighted decibels at 28 of the 53 receptors expected to experience an increase in traffic noise as a result of the project's implementation that approaches or exceeds the noise abatement criteria. The preliminary reasonableness determination is made by calculating an allowance that is considered to be a reasonable amount of money, per benefited residence, to spend on abatement. This reasonable allowance is then compared to the engineer's cost estimate for the abatement. If the engineer's cost estimate is less than the allowance, the preliminary determination is that the abatement is reasonable. If the cost estimate is higher than the allowance, the preliminary determination is that abatement is not reasonable.

The Focused Noise Study Report determined that eight of the 107 receptor sites would experience an increase in noise that exceeds the noise abatement criteria but cannot be abated reasonably and feasibly by the

installation of sound barriers. These receptors— 4-4, 4-12, 4-14, 4-17, 6-22, 6-23, 6-24, and 7-1 —represent 17 single-family and 10 multi-family residential units.

As shown in Table 2-55, noise abatement would result in a reduction of at least 5 decibels at most receptors.

Table 2-55. Noise Survey Report Results Summary

Receptor Number	Noise Barrier Number	Existing Noise Level, equivalent continuous sound level per hour in A-weighted decibels	Future Noise Level Without Project, equivalent continuous sound level per hour in A-weighted decibels	Future Noise Level With Project, equivalent continuous sound level per hour in A-weighted decibels	Noise Impact Requiring Abatement Consideration?	Predicted Noise Level with Abatement (A-weighted decibels) 8-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 10-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 12-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 14-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 16-Foot Barrier	Reasonable & Feasible?
2-1	None	52	53	54	No	None	None	None	None	None	None
2-2	None	57	58	60	No	None	None	None	None	None	None
2-3	None	60	61	63	No	None	None	None	None	None	None
2-4	None	60	60	60	No	None	None	None	None	None	None
3-1	S90	67	68	69	Yes	65	64	62	61	61	Feasible
3-2	S90	76	76	77	Yes	74	73	71	69	68	Feasible
3-3	S90	66	66	67	Yes	62	61	60	59	58	Feasible
3-4	S90	66	66	64	No	61	60	60	59	59	Feasible
3-5	S90	59	60	60	No	56	54	53	52	51	Feasible
3-6	S90	64	64	66	No	65	64	63	62	61	Feasible
3-7	S90	68	68	70	Yes	69	68	67	66	65	Feasible
3-8	S90	69	69	72	Yes	71	70	69	69	68	Feasible
3-9	S86a	73	73	75	Yes	67	67	66	66	65	Feasible
3-10	S86a	70	70	72	Yes	66	65	64	64	63	Feasible
3-11	S86a	75	75	77	Yes	67	65	64	63	63	Feasible
3-12	S86a	57	58	59	No	59	59	59	59	59	Feasible
3-12b	S86a	60	61	62	No	62	62	62	62	61	Feasible
3-13	S86b	70	70	72	Yes	69	69	69	69	69	Abatement Not Required
3-14	None	65	65	67	No	None	None	None	None	None	None
3-15	None	64	65	65	No	None	None	None	None	None	None
3-16	None	62	63	63	No	None	None	None	None	None	None
3-17	None	60	60	61	No	None	None	None	None	None	None

Receptor Number	Noise Barrier Number	Existing Noise Level, equivalent continuous sound level per hour in A-weighted decibels	Future Noise Level Without Project, equivalent continuous sound level per hour in A-weighted decibels	Future Noise Level With Project, equivalent continuous sound level per hour in A-weighted decibels	Noise Impact Requiring Abatement Consideration?	Predicted Noise Level with Abatement (A-weighted decibels) 8-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 10-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 12-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 14-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 16-Foot Barrier	Reasonable & Feasible?
3-18	None	60	60	60	No	None	None	None	None	None	None
4-1	None	56	56	57	No	None	None	None	None	None	None
4-2	None	53	54	55	No	None	None	None	None	None	None
4-3	None	55	56	57	No	None	None	None	None	None	None
4-4	S93	65	65	67	Yes	66	66	66	66	66	No Feasible Abatement
4-5	S93	50	51	52	No	51	51	50	50	50	No Feasible Abatement
4-5b	S93	55	56	57	No	56	55	55	55	55	No Feasible Abatement
4-6	S93	56	56	58	No	57	57	57	57	57	No Feasible Abatement
4-7	S93	60	61	62	No	61	61	61	60	60	No Feasible Abatement
4-8	S93	47	48	49	No	48	47	46	46	46	No Feasible Abatement
4-8b	S93	52	52	54	No	53	52	52	51	51	No Feasible Abatement
4-9	S93	48	48	50	No	49	48	47	47	47	No Feasible Abatement
4-9b	S93	53	53	55	No	53	53	52	52	52	No Feasible Abatement
4-10	S93	59	60	61	No	57	57	57	57	56	No Feasible Abatement
4-10b	S93	64	64	66	Yes	62	61	60	59	58	No Feasible Abatement
4-11	S93	63	63	65	No	62	62	62	62	61	No Feasible Abatement

Receptor Number	Noise Barrier Number	Existing Noise Level, equivalent continuous sound level per hour in A-weighted decibels	Future Noise Level Without Project, equivalent continuous sound level per hour in A-weighted decibels	Future Noise Level With Project, equivalent continuous sound level per hour in A-weighted decibels	Noise Impact Requiring Abatement Consideration?	Predicted Noise Level with Abatement (A-weighted decibels) 8-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 10-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 12-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 14-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 16-Foot Barrier	Reasonable & Feasible?
4-12	S93	65	65	66	Yes	64	63	63	63	63	No Feasible Abatement
4-13	S93	60	61	63	No	59	59	58	58	58	No Feasible Abatement
4-14	S93	64	65	67	Yes	65	65	64	64	64	No Feasible Abatement
4-15	S93	60	60	62	No	59	58	58	57	57	No Feasible Abatement
4-16	S93	47	47	48	No	46	46	45	45	45	No Feasible Abatement
4-17	S93	69	69	72	Yes	72	72	72	72	72	No Feasible Abatement
4-18	S89	66	67	67	Yes	63	62	61	61	60	Feasible
4-19	S89	61	62	62	No	57	57	56	56	55	Feasible
4-20	S89	62	63	63	No	57	56	55	55	54	Feasible
4-21	S89	64	64	65	No	58	58	57	56	56	Feasible
4-22	S89	66	67	69	Yes	59	59	58	58	57	Feasible
4-23	S89	66	66	67	Yes	60	59	58	58	57	Feasible
4-24	S87	73	73	77	Yes	77	77	77	77	77	No
4-25	S87	71	71	74	Yes	72	70	69	67	66	No
4-26	S87	76	76	78	Yes	70	68	67	66	65	No
4-27	S87	76	76	79	Yes	69	67	65	64	63	No
5-1	None	62	62	65	No	None	None	None	None	None	None
5-2	SB-1	67	67	69	Yes	64	63	63	63	63	Exceeds Cost Allowance
5-3	None	64	64	65	No	None	None	None	None	None	None

Receptor Number	Noise Barrier Number	Existing Noise Level, equivalent continuous sound level per hour in A-weighted decibels	Future Noise Level Without Project, equivalent continuous sound level per hour in A-weighted decibels	Future Noise Level With Project, equivalent continuous sound level per hour in A-weighted decibels	Noise Impact Requiring Abatement Consideration?	Predicted Noise Level with Abatement (A-weighted decibels) 8-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 10-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 12-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 14-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 16-Foot Barrier	Reasonable & Feasible?
5-4	None	62	62	64	No	None	None	None	None	None	None
5-5	None	62	62	63	No	None	None	None	None	None	None
6-1	None	54	54	54	No	54	54	54	54	54	None
6-2	None	60	60	61	No	61	60	60	60	60	None
6-3	S71	67	67	68	Yes	68	67	66	65	64	Exceeds Cost Allowance
6-4	S71	72	72	73	Yes	73	73	73	73	72	Exceeds Cost Allowance
6-5	S71	68	69	70	Yes	67	65	64	62	61	Exceeds Cost Allowance
6-6	S71	66	67	68	Yes	65	63	62	60	59	Exceeds Cost Allowance
6-7	S71	66	66	68	Yes	65	63	62	60	59	Exceeds Cost Allowance
6-8	S71	68	69	70	Yes	69	69	67	66	64	Exceeds Cost Allowance
6-9	S71	65	66	68	Yes	64	63	61	60	58	Exceeds Cost Allowance
6-10	S71	69	70	72	Yes	68	66	65	63	62	Exceeds Cost Allowance
6-11	S71	69	69	72	Yes	68	66	65	63	62	Exceeds Cost Allowance
6-12	S71	66	67	70	Yes	64	63	61	60	59	Exceeds Cost Allowance
6-13	S71	66	67	69	Yes	65	63	62	60	59	Exceeds Cost Allowance
6-14	S71	67	68	70	Yes	67	65	64	62	61	Exceeds Cost Allowance

Receptor Number	Noise Barrier Number	Existing Noise Level, equivalent continuous sound level per hour in A-weighted decibels	Future Noise Level Without Project, equivalent continuous sound level per hour in A-weighted decibels	Future Noise Level With Project, equivalent continuous sound level per hour in A-weighted decibels	Noise Impact Requiring Abatement Consideration?	Predicted Noise Level with Abatement (A-weighted decibels) 8-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 10-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 12-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 14-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 16-Foot Barrier	Reasonable & Feasible?
6-15	S71	61	62	64	No	62	60	59	58	57	Exceeds Cost Allowance
6-16	S71	68	68	70	Yes	70	69	68	66	64	Exceeds Cost Allowance
6-17	S71	59	59	61	No	60	59	57	56	56	Exceeds Cost Allowance
6-18	S71	61	61	63	No	62	61	60	59	58	Exceeds Cost Allowance
6-19	None	60	60	62	No	62	61	60	59	59	None
6-20	None	56	57	58	No	58	57	57	57	56	None
6-21	None	56	57	58	No	58	57	57	57	56	None
6-22	None	62	62	64	No	64	64	63	63	62	None
6-23	SB-2	65	66	66	Yes	66	66	66	66	66	No Feasible Abatement
6-24	SB-2	66	67	67	Yes	67	67	67	67	67	No Feasible Abatement
6-25	SB-2	71	72	73	Yes	73	73	73	73	73	No Feasible Abatement
6-26	SB-2	71	71	72	Yes	72	71	70	70	69	No Feasible Abatement
7-1	S74	73	73	74	Yes	74	73	73	72	72	No Feasible Abatement
7-2	S68	71	72	74	Yes	74	74	74	73	73	Exceeds Cost Allowance
7-3	S68	69	69	71	Yes	71	70	70	69	69	Exceeds Cost Allowance
7-4	S68	67	67	69	Yes	67	66	64	62	62	Exceeds Cost Allowance

Receptor Number	Noise Barrier Number	Existing Noise Level, equivalent continuous sound level per hour in A-weighted decibels	Future Noise Level Without Project, equivalent continuous sound level per hour in A-weighted decibels	Future Noise Level With Project, equivalent continuous sound level per hour in A-weighted decibels	Noise Impact Requiring Abatement Consideration?	Predicted Noise Level with Abatement (A-weighted decibels) 8-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 10-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 12-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 14-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 16-Foot Barrier	Reasonable & Feasible?
7-5	S68	52	53	55	No	53	52	51	49	49	Exceeds Cost Allowance
7-6	S68	65	65	67	Yes	67	67	67	66	66	Exceeds Cost Allowance
7-7	S68	52	52	54	No	53	53	52	50	50	Exceeds Cost Allowance
7-8	S68	50	50	52	No	51	51	51	50	50	Exceeds Cost Allowance
7-9	S68	64	64	67	Yes	60	59	58	57	57	Exceeds Cost Allowance
7-10	S68	68	69	70	Yes	70	69	68	68	68	Exceeds Cost Allowance
7-11	S68	70	70	71	Yes	68	66	65	64	64	Exceeds Cost Allowance
7-12	S68	68	69	70	Yes	68	66	64	64	64	Exceeds Cost Allowance
7-13	S68	68	68	69	Yes	65	64	62	61	61	Exceeds Cost Allowance
7-14	S68	66	67	68	Yes	65	63	62	61	61	Exceeds Cost Allowance
7-15	S68	70	70	71	Yes	66	64	63	62	62	Exceeds Cost Allowance
7-16	S68	70	71	71	Yes	71	71	71	70	70	Exceeds Cost Allowance
7-17	S68	66	67	67	Yes	67	67	67	66	66	Exceeds Cost Allowance
7-18	None	58	58	59	No	None	None	None	None	None	None

Receptor Number	Noise Barrier Number	Existing Noise Level, equivalent continuous sound level per hour in A-weighted decibels	Future Noise Level Without Project, equivalent continuous sound level per hour in A-weighted decibels	Future Noise Level With Project, equivalent continuous sound level per hour in A-weighted decibels	Noise Impact Requiring Abatement Consideration?	Predicted Noise Level with Abatement (A-weighted decibels) 8-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 10-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 12-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 14-Foot Barrier	Predicted Noise Level with Abatement (A-weighted decibels) 16-Foot Barrier	Reasonable & Feasible?
7-19	None	51	52	52	No	None	None	None	None	None	None
7-20	None	61	62	62	No	None	None	None	None	None	None
7-21	None	64	65	66	No	None	None	None	None	None	None
7-22	None	65	66	65	No	None	None	None	None	None	None

Optional First Phase and Ultimate Trail Configuration

The proposed trail (both the optional first phase and ultimate trail condition) is passive in nature. No motorized vehicles of noise generating sources are proposed to operate on the trail other than pedestrian activities and bicycles. Users of the proposed trail are not expected to generate excessive noise and are assumed to continuously move, and therefore, would not generate noise at a specific location for an extended period of time. Furthermore, should a user of the trail generate excessive noise, those potential impacts would be considered a nuisance noise and would be assessed and handled under the local jurisdiction's municipal code. Due to the lack of noise sources added, operations of the proposed trail are not expected to contribute to the overall noise environment of surrounding uses on a regular basis.

No-Build Alternative

No construction would take place under the No-Build Alternative; therefore, there would be no noise effects related to the project resulting from traffic or construction.

Avoidance, Minimization, and/or Abatement Measures

Construction

During construction of the Build Alternative, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. Construction noise is regulated by Caltrans' provisions in Section 14-8.02, "Noise Control," of the 2018 Standard Specifications. The provision establishes that noise not exceed 86 A-weighted decibels at a distance of 50 feet from the job site between the hours of 9:00 p.m. and 6:00 a.m. Additionally, the contractor will equip all internal combustion engines with manufacturer-recommended mufflers and will not operate internal combustion engines on the job site without the appropriate muffler. As such, no impacts are anticipated.

Operation

For modeled locations that were found to approach or exceed the representative noise abatement criteria, Traffic Noise Model 2.5 was used to model noise barriers and determine the insertion loss (noise reduction) provided. Eight noise barriers were analyzed, with heights ranging from 8 to 16 feet, to determine feasible noise abatement for the build alternatives. Of the eight barriers analyzed, two were determined to be reasonable and feasible. For all reasonable barriers that were found to meet the design goal and where the cost to construct the barrier did not exceed the reasonableness allowance, polling of the benefitted receptors would be required. Polling of the benefited receptors will occur during the permitting phase and may result in a barrier not being reasonable if the benefited

receptors decline to vote or vote against the abatement (51 percent of the owners and/or non-owner occupants voting against the proposed abatement).

Based on the studies completed to date, Caltrans considered the following noise abatement measures, and intends to incorporate noise abatement in the form of the noise barriers that were found to be both feasible and reasonable:

Area 3

Traffic noise levels at residences and restaurants in Area 3 are predicted to be in the range of 60 to 77 A-weighted decibels Leq(h) in the design-year. The change in noise between existing conditions and the design-year is predicted to range from negative 2 (a 2 decibel decrease) to 3 decibel increase. Because the predicted noise levels in the design-year approach or exceed the noise abatement criterion for residential uses (67 A-weighted decibels Leq[h], noise abatement criteria category B) at nine modeled receptors, consideration of noise abatement is required. Therefore, two barrier configurations were analyzed to determine if feasible abatement could be provided at the affected receivers.

Noise Barrier Number S86a

This barrier was evaluated in two-foot increments from eight through 16 feet in height. The calculated noise reductions and are summarized in Table 2-55 by barrier height. The analysis of Noise Barrier Number S86a found that barrier heights of 8- to 16-feet would be feasible and meet the design goal (i.e., 7 decibel insertion loss) at ten benefitted receivers. Additionally, inclusion of this barrier would require the removal of mature trees, which would require consideration of replacement planting within Caltrans right-of-way or potentially offsite.

Based on the studies completed to date, Caltrans intends to incorporate noise abatement in the form of (a) barrier(s) at: the right-of-way of State Route 1 on the northbound side, with a respective length of 606 feet and average heights 8- to 16-feet. Calculations based on preliminary design data show that the barrier(s) will reduce noise levels by 10 to 14 A-weighted decibels for 10 residences at a cost of $514,169 to $756,569. These measures may change based on input received from the public. If conditions have substantially changed during final design, noise abatement may not be constructed. The final decision on noise abatement will be made upon completion of the project design.

Area 4

Traffic noise levels at residences and religious (church) uses in Area 4 are predicted to be in the range of 48 to 79 A-weighted decibels Leq(h) in the design-year. The increase in noise between existing conditions and the design-year is predicted to be 1 to 4 decibels. Because the predicted noise

levels in the design-year approach or exceed the noise abatement criterion for residential uses (67 A-weighted decibels Leq[h], noise abatement criteria category B) at 12 modeled receptors, consideration of noise abatement is required. Therefore, three barrier configurations were analyzed to determine if feasible abatement could be provided at the affected receivers, and Barrier Number S89 was determined to be reasonable and feasible.

Noise Barrier Number S89

Noise Barrier Number S89 was evaluated in two-foot increments from eight through 16 feet in height. The calculated noise reductions and reasonable allowances are summarized in Table 2-55 by barrier height. The analysis of Noise Barrier Number S89 found that a barrier height of 8 feet would be feasible and meet the design goal (i.e., 7 decibels insertion loss) at nine benefitted receptors, and barrier heights of 10- to 16-feet would be feasible and meet the design goal at 10 benefitted receivers. Additionally, inclusion of this barrier would widen Aptos Creek Bridge, potentially changing the visual character of the freeway in this area where it crosses Aptos Creek.

Based on the studies completed to date, Caltrans intends to incorporate noise abatement in the form of (a) barrier(s) at: the shoulder of State Route 1 on the southbound side, with a respective length of 885 feet and average heights of 8- to 16-feet. Calculations based on preliminary design data show that the barrier(s) will reduce noise levels by 10 to 11 A-weighted decibels for 9 to 10 residences at a cost of $776,400 to $1,130,400. These measures may change based on input received from the public. If conditions have substantially changed during final design, noise abatement may not be constructed. The final decision on noise abatement will be made upon completion of the project design.

References

California Department of Transportation, Division of Environmental Analysis. 2020. Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects. April.

LSA Associates, Inc. 2022a. Focused Noise Study Report for the State Highway Route 1 Auxiliary Lanes and Bus-on-Shoulder Improvements—Freedom Boulevard to State Park Drive—and Coastal Rail Trail Segment 12 Project. June.

LSA Associates, Inc. 2022b. Focused Noise Abatement Decision Report for the State Highway Route 1 Auxiliary Lanes and Bus-on-Shoulder Improvements—Freedom Boulevard to State Park Drive—and Coastal Rail Trail Segment 12 Project. October.

Figure 2-22a. Noise Barrier and Receptor Locations, Sheet 1 of 5

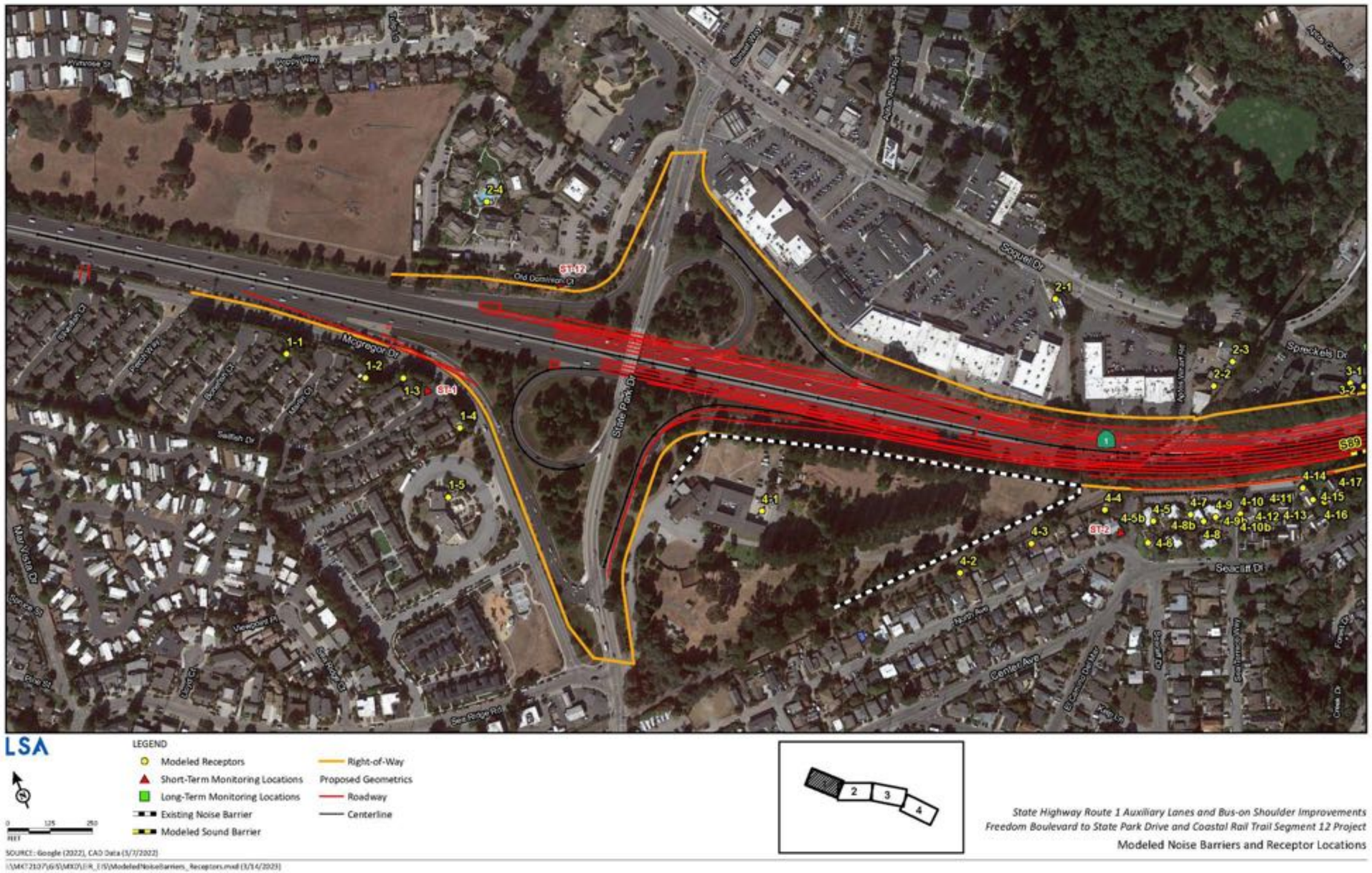

Figure 2-22b. Noise Barrier and Receptor Locations, Sheet 2 of 5

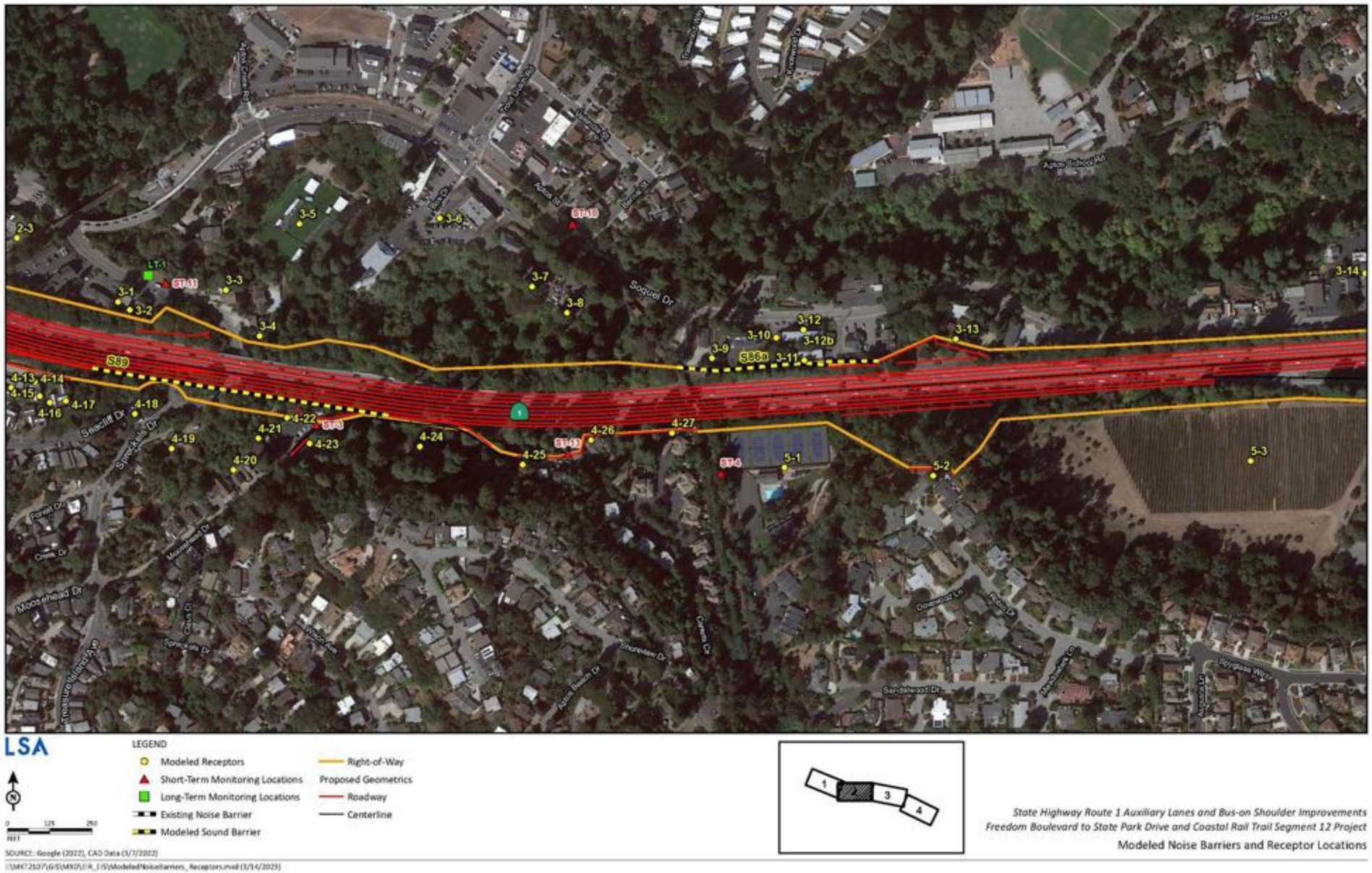

Figure 2-22c. Noise Barrier and Receptor Locations, Sheet 3 or 5

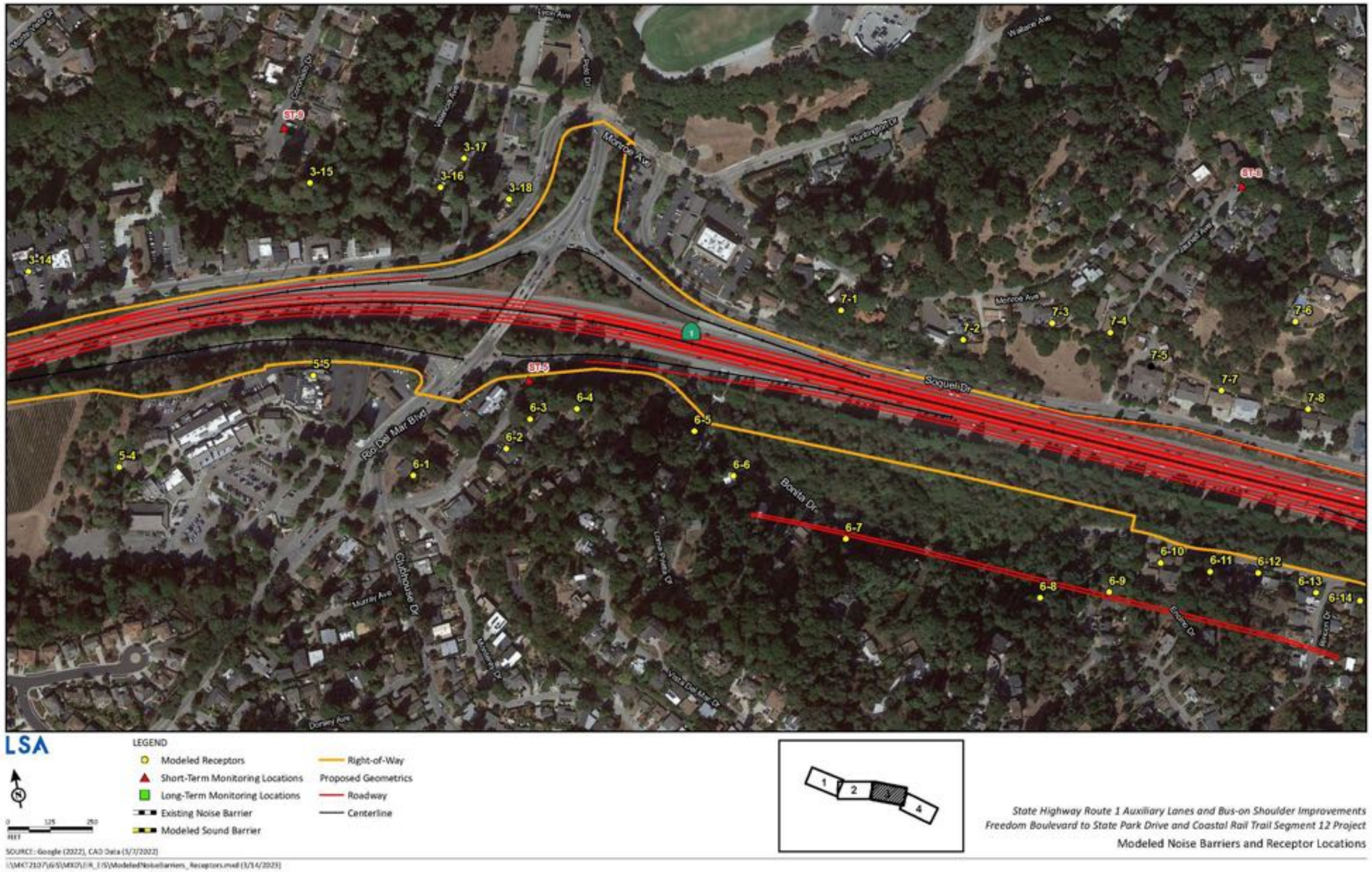

Figure 2-22d. Noise Barrier and Receptor Locations, Sheet 4 of 5

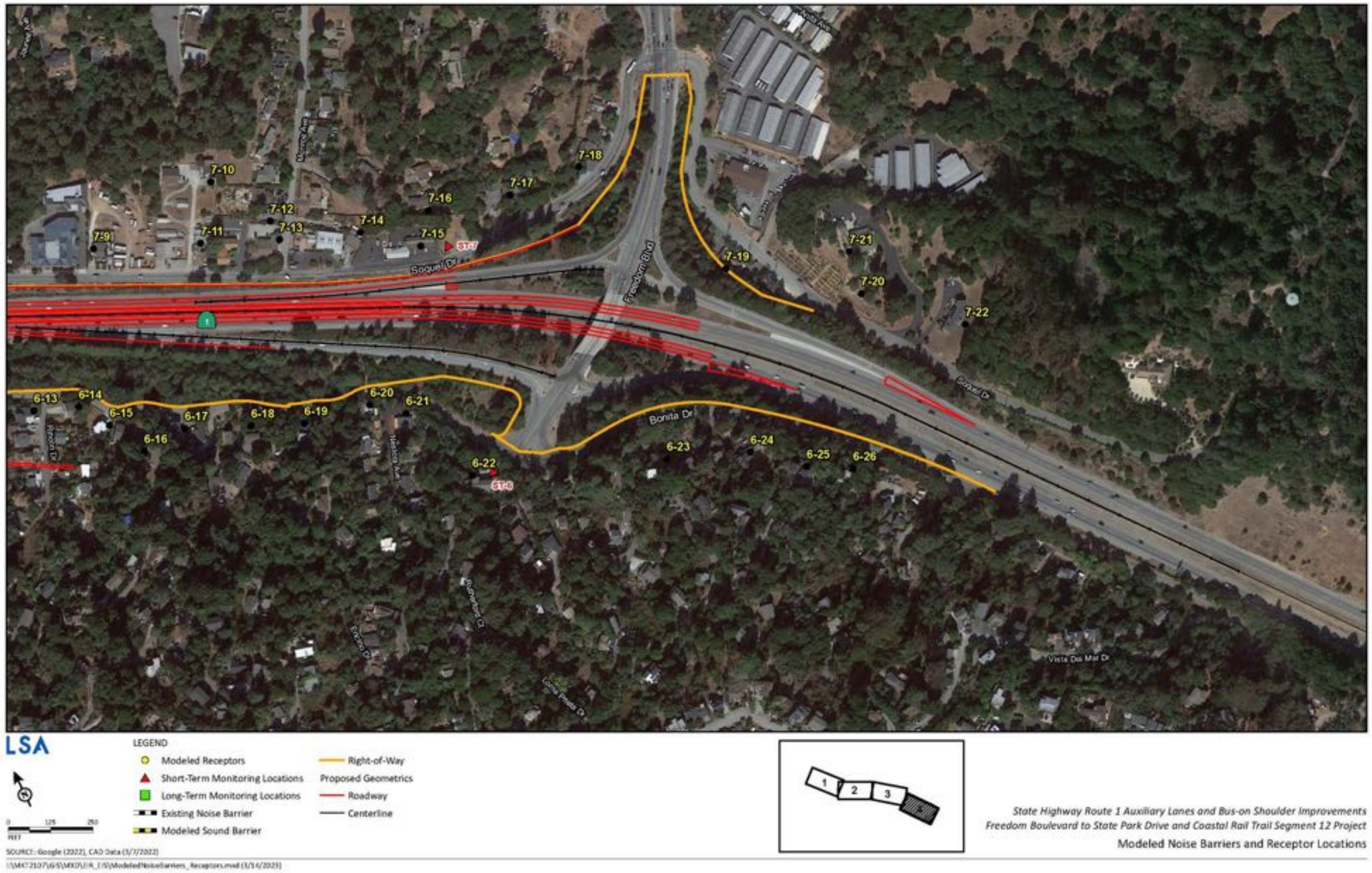

Figure 2-22e. Noise Barrier and Receptor Locations, Sheet 5 of 5

Pallid Bat, Townsend's Big-Eared Bat, and Hoary Bat

The California Department of Fish and Wildlife has regulatory authority over pallid bat, hoary bat, and Townsend's big-eared bat. Recommendations for agencies to mitigate overall cumulative impacts include supporting efforts to monitor bats in the Central Coast. For example, the Central Coast Bat Survey, the primary research project of the Pacific Coast Conservation Alliance, is seeking to investigate the relationship between Central Coast bats and viticulture and the effects of habitat enhancements on bat populations. The Central Coast Bat Survey is intended to address concerns regarding the economic impact that declines in bat populations could have on agricultural productivity, and the effectiveness of measures to improve bat survivorship, such as the installation of bat boxes, reduction of pesticide application, and creation of bat-friendly habitats (Caltrans 2018).

Cultural/Historic Resources

This resource is pending State Historic Preservation Officer concurrence. As stated above, the proposed project would not contribute to an adverse cumulative impact. No mitigation is required.

Further, SCCRTC is committed to preserving character-defining features and retaining as much rail as possible. The long-term goal is to reestablish a rail line along this corridor

References

California Department of Transportation. 2022. Cumulative Impact Analysis. State Highway Route 1 Auxiliary Lanes and Bus-on-Shoulder Improvements—Freedom Boulevard to State Park Drive—and Coastal Rail Trail Segment 12 Project. Santa Cruz County, California. November.

2.2.8 Energy

Regulatory Setting

Federal

NEPA (42 United States Code [U.S. Code] 4332) requires the identification of all potentially significant impacts on the environment, including energy impacts.

State

The CEQA Guidelines Section 15126.2(b) and Appendix F, Energy Conservation, require an analysis of a project's energy use to determine if the project may result in significant environmental effects due to wasteful, inefficient, or unnecessary use of energy, or wasteful use of energy resources.

The state has passed several bills directing state agencies and entities such as the California Energy Commission and the California Public Utilities Commission to implement renewable energy portfolio targets and energy efficiency measures to reduce energy consumption and greenhouse gas emissions. The California Energy Commission is the state's primary energy policy and planning agency. Created by the legislature in 1974, the California Energy Commission has five major responsibilities: (1) forecasting future energy needs and keeping historical energy data, (2) licensing thermal power plants 50 megawatts or larger, (3) promoting energy efficiency through appliance and building standards, (4) developing energy technologies and supporting renewable energy, and (5) planning for and directing the state's response to energy emergencies. Senate Bill 1389 (Chapter 568, Statutes of 2002) requires the California Energy Commission to prepare a biennial integrated energy policy report assessing major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors. The report also provides policy recommendations to conserve resources, protect the environment, and ensure reliable, secure, and diverse energy supplies.

The California Transportation Plan is a statewide, long-range transportation plan to meet future mobility needs. It defines performance-based goals, policies, and strategies to achieve an integrated, multimodal transportation system. The California Transportation Plan addresses how the state will achieve maximum feasible emissions reductions, taking into consideration the use of alternative fuels, new vehicle technology and tailpipe emissions reductions. Caltrans must consult and coordinate with related state agencies, air quality management districts, public transit operators, and regional transportation planning agencies.

Regional

The Association of Monterey Bay Area Governments is the designated metropolitan planning organization for Monterey, Santa Cruz, and San Benito Counties and their respective cities. The 2040 Metropolitan Transportation Plan/Sustainable Communities Strategy includes a comprehensive discussion of regional energy policies and use. Association of Monterey Bay Area Governments has taken steps to assess what regional infrastructure is needed to accommodate more alternative fuel choices across the region. In 2012, Association of Monterey Bay Area Governments adopted the Electric Vehicle Infrastructure for the Monterey Bay Area Plan. This plan presents a siting prioritization method to help identify potential charging locations and presents a framework for establishing a robust electric vehicle charging network in the region. The siting analysis in the plan provides guidance to local and regional stakeholders based on potential demand for electric vehicle charging stations.

In 2013, Association of Monterey Bay Area Governments and other regional organizations completed the Monterey Bay Plug-In Electric Vehicle Readiness Plan. The goal of this plan is to encourage the mass adoption of plug-in electric vehicles in the region and reduce greenhouse gas emissions by providing a toolbox of recommended approaches for public, private, and nonprofit organizations. These tools range from innovative approaches to plug-in electric vehicle marketing and streamlining electric vehicle supply equipment permitting, to guidelines on establishing an electric vehicle fleet. The Readiness Plan identifies specific regional targets for significantly expanding plug-in electric vehicle adoption in the Monterey Bay area by 2015, 2020, and 2025. Association of Monterey Bay Area Governments and other transportation partners continue to work with local jurisdictions and other organizations to implement charging stations and increase adoption of electric vehicles around the region.

Within the Monterey Bay area, the 21 local governments are committed to energy efficiency and climate planning and are working in collaboration with other local governments and their communities. It was through this shared vision of maximizing energy as a resource that the Association of Monterey Bay Area Governments Energy Watch program was developed in 2006. The Association of Monterey Bay Area Governments Energy Watch programs are designed in two major categories. The first category is implementation programs. These programs achieve direct and measurable energy efficiency targets through the installation of energy-efficient equipment. These programs have been developed to serve the diverse stakeholders in the region including residents, municipalities, special districts, nonprofit organizations, agriculture, school districts, and hospitality businesses. The second category of programs is in the area of climate planning support for jurisdictions. The Association of Monterey Bay Area Governments Energy Watch program worked collaboratively with staff from each of the 21 Association of Monterey Bay Area Governments jurisdictions to complete each jurisdiction’s 2005

municipal and community-wide greenhouse gas inventory, as well as their 2009 and 2010 communitywide greenhouse gas inventory updates. This data was used in the creation of a draft community-wide Energy Action Strategy developed for each of the jurisdictions, which in some cases were incorporated into their Climate Action Plans.

The County of Santa Cruz Climate Action Strategy (County of Santa Cruz 2013) identifies various strategies to reduce the impact of vehicle miles traveled, transportation greenhouse gas emissions, and energy use. These strategies include increasing traffic efficiency and encouraging the use of alternative transportation modes.

The Sustainable Santa Cruz County Plan (County of Santa Cruz 2014) describes a vision, guiding principles, and strategies for enhancing the sustainability of development patterns in Santa Cruz County, with a time horizon through 2035. The plan envisions safe, reliable, and efficient transportation choices that include transit, bicycling, walking, and carpooling; and it also proposes new development designed to minimize per capita consumption of resources such as water and energy.

Affected Environment

An Energy Analysis Report was prepared for the project by Caltrans in July 2022 (Terry A. Hayes Associates, Inc. 2022b).

The California Energy Commission reports combined nonresidential and residential energy consumption in terms of electricity and gas. The County of Santa Cruz in 2018 (the most recent year for which data are available) consumed a total of 1,212.27 gigawatt-hours—1 gigawatt-hour equals 1 million kilowatt-hours—of electricity. Countywide natural gas consumption in 2018 amounted to 51.87 million therms (California Energy Commission 2020).

Direct energy consumption by the transportation sector, however, is not included in these totals even though the majority of energy consumed is from transportation fuels. The U.S. Census Bureau estimates that the Santa Cruz County population was approximately 274,255 in 2019. The existing population is heavily dependent on automobile travel due to the suburban development throughout most of the county. The majority of energy consumed is from transportation fuels. The California Air Resources Board Mobile Source Emissions Inventory (MSEI) EMFAC2017 web database estimates that the 2019 annual vehicle miles traveled in Santa Cruz County was approximately 1,977,948,655 miles (Caltrans 2022).

In the project corridor, baseline year (2019) annual vehicle miles traveled was 250,908,760 with 96% non-trucks and 4% trucks. This results in an annual fuel consumption of approximately 9,440,052 gallons per year of gasoline and 776,551 gallons per year of diesel fuel. Existing traffic management systems include metered ramps and changeable message boards. Standard Caltrans

lighting is provided at on- and off-ramps, but there is no existing lighting between the interchanges. The Build Alternative does not include substantial light replacement or upgrades that would significantly change existing energy use. The existing pavement surface is considered to be in good condition, which contributes to energy efficiencies (Terry A. Hayes Associates, Inc. 2022b).

By 2045, the project would decrease annual gasoline and diesel fuel consumption by approximately 109,732 gallons per year and 1,932 gallons per year, respectively, relative to the No-Build Alternative. The Mobile Source Emissions Inventory estimates that Santa Cruz County vehicle travel will consume approximately 54,803,966 gallons of gasoline and 7,678,675 gallons of diesel fuel in 2045. The reduction in annual fuel consumption spurred by the project would represent decreases of approximately 0.2% for countywide gasoline consumption and 0.03% for countywide diesel consumption in the design year of 2045 (Caltrans 2022).

Energy efficiency efforts in California have dramatically reduced statewide per capita energy consumption relative to historical averages. California's per capita energy use is the third lowest in the nation, partially attributable to the state's continuous pursuit of policies to reduce energy consumption, promote renewable energy, and reduce reliance on fossil fuels. California's net taxable gasoline sales in 2016 were below 2002 levels, despite population growth of at least 15% during the same time period. Furthermore, gasoline consumption in California decreased by about 2.2% between 2005 and 2017, even as vehicle miles traveled increased by 7.5%, from 329 billion in 2005 to 354 billion in 2017. These improvements are due in large part to a more fuel-efficient vehicle fleet. It is anticipated that Corporate Average Fuel Economy regulations, renewable fuel uptake, and zero-emission vehicle regulations will gradually displace gasoline-propulsion systems in favor of more energy-efficient systems with lower greenhouse gas emissions. As of 2014, renewable fuels represented a growing fraction of transportation energy consumption at 6.2%, with ethanol representing 4.5% and other renewables representing 1.7% of total transportation energy consumption (Caltrans 2022).

Environmental Consequences

Build Alternative

The following analysis is based on the project's Energy Analysis Report (Caltrans 2022) unless cited otherwise. Direct impacts associated with energy are primarily related to construction and highway operations. The energy consumption associated with construction and operation of the highway and trail are combined in the analysis below, and, except where noted, different trail configurations are not discussed separately in this section.

Construction

Construction energy effects involve the one-time, non-recoverable energy costs associated with construction of roadways and structures. Site preparation and roadway construction typically involves clearing, cut-and-fill activities, grading, removing or improving existing roadways, building bridges, and paving roadway surfaces. Construction-related effects on energy from most highway projects would be greatest during the site preparation and concrete paving phases because the excavation, handling, and transport of materials requires equipment and truck fuels. It is unlikely that all pieces of equipment would operate every day during the phased construction work.

The fuel consumption was estimated from the equipment and vehicles that would be employed in construction activities. Diesel engines are installed in heavy-duty off-road construction equipment and on-road haul trucks. Gasoline engines are typically found in passenger vehicles that would be used for construction worker daily commutes. Table 2-56 presents the direct, one-time expenditure of fuel consumption associated with construction activities, including both the roadway and Coastal Rail Trail components. Construction would require approximately 377,602.8 gallons of diesel and 23,320.2 gallons of gasoline over a 3-year period. Annual average consumption of petroleum fuels during construction activities would be approximately 125,867.6 gallons of diesel fuel and 7,773.4 gallons of gasoline per year.

Table 2-56. Construction Fuel Consumption

Construction Phase	Duration (Months)	Diesel	Gasoline
Grubbing/Land Clearing	3.6	47,598	1,295
Grading/Excavation	14.4	214,518	11,487
Drainage/Utilities/Sub-Grade	12.6	54,727	7,174
Paving	5.4	57,987	2,572
Total	**36.0**	**374,829**	**22,528**

While construction would result in a short-term increase in energy use, construction best available control technologies would help conserve energy. Construction activities are expected to increase traffic congestion in the area during the 36-month construction period, resulting in intermittent and temporary increases in traffic delays (see Section 2.1.7, *Traffic and Transportation/Pedestrian and Bicycle Facilities*). Caltrans' Standard Specifications restrict idling time for lane closure during construction to 10 minutes in each direction. Additionally, the construction contractor must comply with the California Code of Regulations Title 13, Section 2449(d)(3), which restricts the idling of construction vehicles to no longer than 5 consecutive minutes. Furthermore, Standard Measure TR-1, which requires a Transportation Management Plan, would minimize delays during construction

that would result in inefficient energy (fuel) consumption. See Section 2.1.7 for details about the Transportation Management Plan.

Operational

In the context of transportation operations, direct energy involves all energy consumed by vehicle propulsion (e.g., automobiles, trains, airplanes). This energy consumption is a function of traffic characteristics such as vehicle miles traveled, speed, vehicle mix, and thermal value of the fuel being used.

As described in Section 2.1.7, the net change in the countywide vehicle miles traveled due to the project auxiliary lanes is expected to be zero or a small negative value. Project bus-on-shoulder and trail components would result in a mode shift from auto to transit, bicycle, and pedestrian modes of transportation, which in turn would result in a countywide net decline of 6,952 vehicle miles traveled per day in 2025 and 8,094 vehicle miles traveled per day in 2045 (CDM Smith 2023). Another important consideration is that for operation of a project over the long term, newer and more fuel-efficient vehicles will enter the fleet, resulting in an overall lower potential for an increase in energy consumption due to vehicle traffic.

Recurrent congestion contributes to inefficient energy consumption as vehicles use extra fuel while idling and accelerating in stop-and-go traffic or moving at slow speeds (FHWA and Caltrans 2018:2.2.8-1). The project proposes to build 12-foot auxiliary lanes on both northbound and southbound sides of State Route 1 between the Freedom Boulevard and Rio Del Mar Boulevard interchanges and would save energy by reducing traffic delay within the project limits. It will improve the flow of traffic entering the highway due to the installation of auxiliary lanes. As such, it is unlikely to increase direct energy consumption through increased fuel usage.

Furthermore, building two new trail overcrossings over State Route 1 would allow safer crossing of State Route 1 for pedestrians and cyclists and provide connectivity to existing bicycle facilities to encourage the use of non-automobile travel modes and reduce associated fuel consumption. As such, the project would conserve transportation energy and not result in a wasteful, inefficient, or unnecessary consumption of energy.

Indirect Energy Consumption

Periodic maintenance and landscaping activities during project operations are considered indirect energy consumption because the equipment and vehicles used to maintain the project and facilities consume fuel. This type of indirect energy consumption can only be discussed qualitatively because the exact frequency and scale of activities are unknown. Maintenance comprises energy for the day-to-day upkeep of equipment and systems, as well as the energy embedded in any replacement equipment, materials, and supplies. The energy needed to maintain the Build Alternative improvements would not

be measurably greater than the energy used to maintain the existing facility within the project limits. For example, operations would not require Caltrans to purchase additional maintenance vehicles.

No-Build Alternative

If the project is not built, traffic delay would continue to increase within the project limits as the regional population and traffic grow. Energy would continue to be used by ever-increasing idling and stop-and-go traffic. Gasoline consumption under the No-Build Alternative would be approximately 8,567,164 gallons per year in 2025 and approximately 8,129,385 gallons per year in 2045. Diesel fuel consumption would be 776,800 gallons per year in 2025 and 762,194 gallons per year in 2045 (Terry A. Hayes Associates, 2022b). Without the proposed auxiliary lanes and Bus-on-Shoulder facilities, bus operations would not become more efficient with the potential to attract new riders and reduce low-occupancy vehicle travel. Pedestrian and bicycle facility improvements and connectivity to regional trails also would not be built, potentially discouraging the increased use of nonmotorized transportation modes that reduce fuel energy consumption.

Avoidance, Minimization, and/or Mitigation Measures

The following measures would be implemented to reduce energy use.

- **AMM-EN-1**: The final design plans will provide landscaping where necessary within the corridor to provide aesthetic treatment, replacement planting, or mitigation planting. Landscaping reduces surface warming and, through photosynthesis, decreases carbon dioxide.
- **AMM-EN-2**: The final design plans will incorporate the use of energy-efficient lightings, such as light-emitting diode traffic signals and solar-powered flashing beacons during construction.
- **AMM-EN-3**: The Build Alternative will incorporate the following best available control technologies related to energy use:
  - Use cement blended with the maximum feasible amount of fly ash or other materials (i.e., limestone).
  - Recycle construction materials. Recycled products typically have lower manufacturing and transport energy costs because they do not use raw materials, which must be mined and transported to a processing facility.
  - Use lighter-colored pavement where feasible to increase albedo.
  - Use recycled water or grey water for fugitive dust control.
  - Employ energy-efficient and fuel-efficient vehicles and equipment and zero- and/or near-zero emission technologies.
  - Encourage ride-sharing and carpooling for construction crews.

These energy conservation features are consistent with state and local policies to reduce energy. Therefore, the project would not result in an inefficient, wasteful, and unnecessary consumption of energy.

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