3.12 Noise and Vibration

3.12.1 Introduction

This section describes the regulatory setting and environmental setting for noise and vibration in the vicinity of the Proposed Project [including all track variants, technology variants, and the Greenville and Mountain House interim operating segments (IOS)] and the alternatives analyzed at an equal level of analysis (Southfront Road Station Alternative, Stone Cut Alignment Alternative, West Tracy Operation and Maintenance Facility [OMF] Alternative, Mountain House Station Alternative, and Downtown Tracy Station Parking Alternatives 1 and 2). It also describes the impacts on noise and vibration that would result and mitigation measures that would reduce significant impacts, where feasible.

Noise impacts from trains evaluated included noise of train engines, wheel-rail interaction, and train horn noise relative to crossing at-grade crossings. For the purposes of this analysis, it is assumed that train horns would not be used when transiting through stations. Instead, Valley Link trains would include safety warning devices such as a horn or warning bell with similar sound levels as those used by Bay Area Rapid Transit (BART) or Altamont Corridor Express (ACE) trains for their station entry. The loudest locomotive technology variant, the diesel multiple unit (DMU), and diesel locomotive haul (DLH) were assumed for the noise calculation for the Proposed Project. The DMU and DLH technology variants are louder than the electric variants (i.e., the hybrid battery multiple unit [HBMU] and the battery-electric multiple unit [BEMU]). Therefore, impacts on noise and vibration due to the DMU and DLH technology variants would be a worst-case scenario, and discussion in this section does not discuss the HBMU and BEMU variants.

Potential impacts associated with implementation of the Proposed Project and the alternatives analyzed at an equal level of detail assume the larger environmental footprint at proposed and alternative stations associated with a potential IOS (i.e., Greenville IOS, Mountain House IOS, Southfront Road Station Alternative IOS, and Mountain House Alternative IOS) and/or the expanded parking in 2040. As such, the analysis of the Proposed Project and the alternatives analyzed at an equal level of detail below considers the potential impacts associated with a potential IOS and/or the expanded parking in 2040.

Cumulative impacts from identified projects on noise and vibration, in combination with planned, approved, and reasonably foreseeable projects, are discussed in Chapter 4, *Other CEQA-Required Analysis*.

The Federal Railroad Administrations' (FRA's) *High-Speed Ground Transportation Noise and Vibration Impact Assessment* includes more recent data on train systems including data on high-speed and very high-speed steel-wheeled electric multiple unit (EMU) trains (Federal Railroad Administration 2012). The high-speed category refers to trains traveling at less than 150 miles per hour (mph) where aerodynamic noise sources are not a significant factor. The reference noise exposure levels at 50 feet as specified in the FRA's assessment for the high-speed EMU train category are an 86 A-weighted decibels (dBA) sound exposure level (SEL) for propulsion noise and a 91 dBA SEL for wheel-rail noise. The propulsion SEL corresponds to a length of 634 feet as defined by the total length of power cars. The wheel-rail SEL corresponds to a length of 634 feet as defined

by the total train length and a speed of 90 mph. Thus, the SEL values have been adjusted for the length of cars and trains for the Proposed Project.

DMU vehicles are typically quieter than diesel locomotives and louder than EMU vehicles.

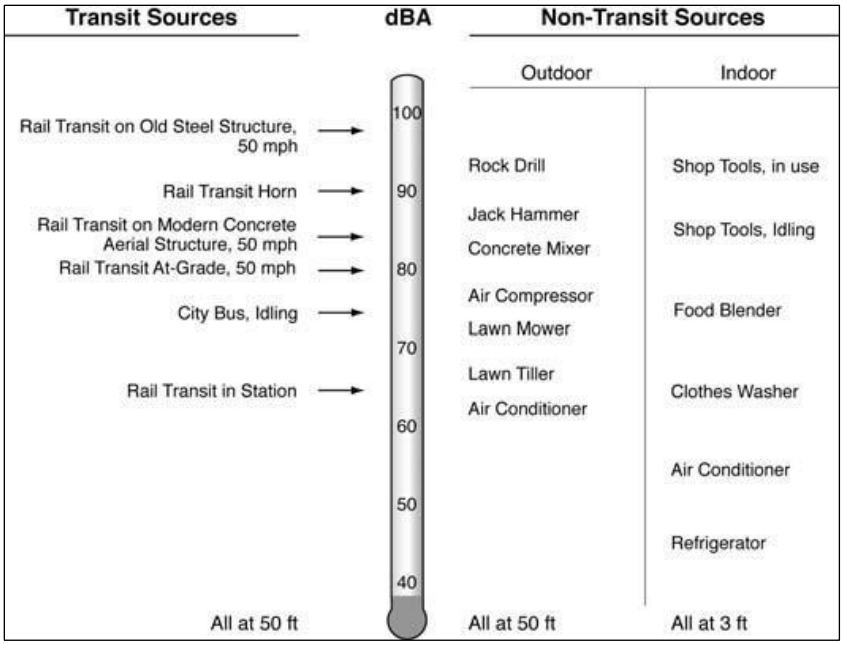
3.12.1.1 Noise Fundamentals and Descriptors

Noise from transit systems is expressed in terms of a *source-path-receiver* framework. The *source* generates noise levels that depend on the type of source (e.g., a commuter train) and its operating characteristics (e.g., speed). The *receiver* is the noise-sensitive land use (e.g., residence, hospital, or school) exposed to noise from the source. In between the source and the receiver is the *path*, where the noise is reduced by distance, intervening buildings, and topography. Environmental noise impacts are assessed at the receiver. Noise criteria are established for the various types of receivers because not all receivers have the same noise sensitivity.

Noise is unwanted sound. Sound is measured in terms of sound pressure level and is usually expressed in decibels (dB). The human ear is less sensitive to higher and lower frequencies than it is to mid-range frequencies. All noise ordinances, and this noise analysis, use the dBA system, which measures what humans hear in a more meaningful way because it reduces the sound levels of higher and lower frequency sounds—similar to what humans hear. Figure 3.12-1 shows typical maximum A-weighted sound pressure levels (Lmax) for transit and non-transit sources.

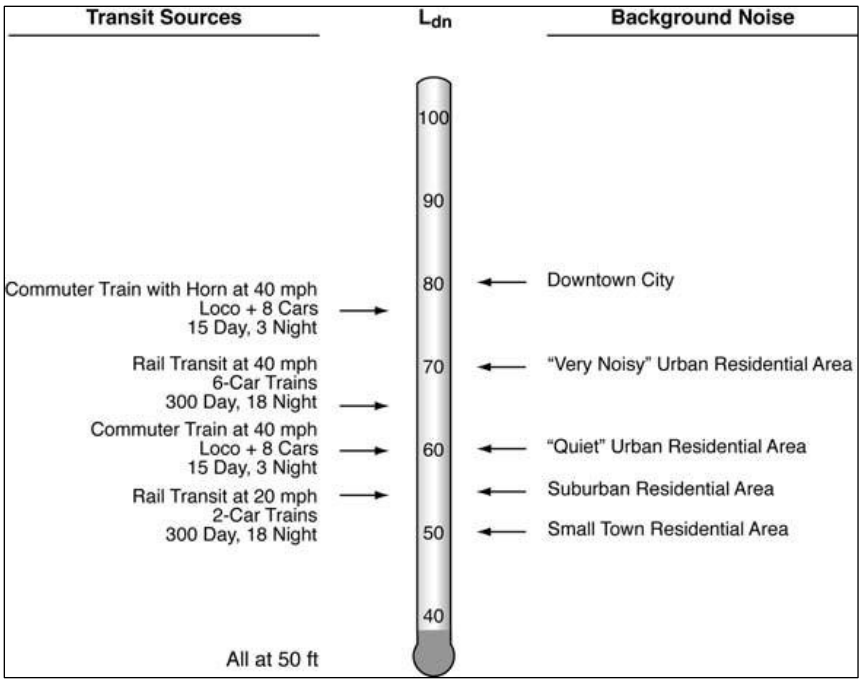
Analysts use three primary noise measurement descriptors to assess noise impacts from traffic and transit projects. They are the *equivalent sound level* (Leq), the *day-night sound level* (Ldn), and the SEL, which are defined below.

- **Leq:** The level of a constant sound for a specified period of time that has the same sound energy as an actual fluctuating noise over the same period of time. The peak-hour Leq is used for all traffic and commuter rail noise analyses at locations with daytime use, such as schools and libraries.
- **Ldn:** The Leq over a 24-hour period, with 10 dB added to nighttime sound levels (between 10 p.m. and 7 a.m.) to account for the greater sensitivity and lower background sound levels during this time. The Ldn is the primary noise-level descriptor for rail noise at residential land uses. Figure 3.12-2 shows typical Ldn noise exposure levels.
- **SEL**: The SEL is the primary descriptor of a single noise event (e.g., noise from a train passing a specific location along the track). SEL is an intermediate value in the calculation of both Leq and Ldn. It represents a receiver's cumulative noise exposure from an event and the total A-weighted sound during the event normalized to a 1-second interval.



Source: Federal Transit Administration 2018

Figure 3.12-1. Typical A-weighted Sound Levels



Source: Federal Transit Administration 2018

Figure 3.12-2. Typical Ldn Noise Exposure Levels

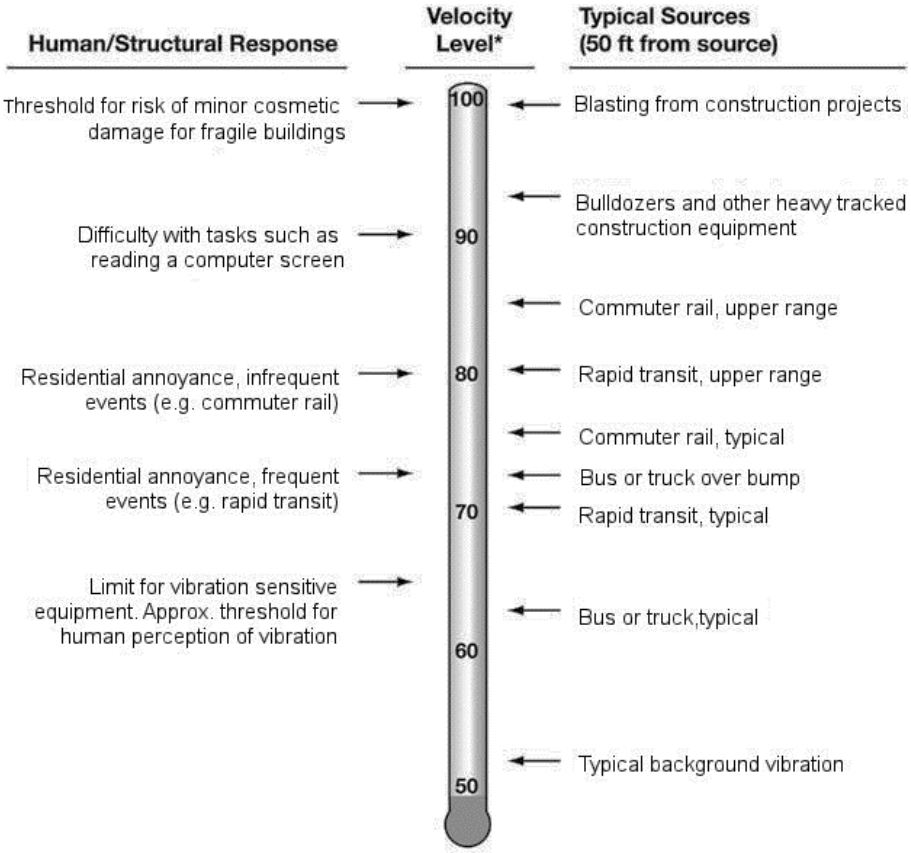
In addition to the Leq, Ldn, and SEL, another descriptor is used to describe noise. The loudest 1 second of noise over a measurement period, or Lmax, is used in many local and state ordinances for noise emitted from private land uses and for construction noise impact evaluations.

3.12.1.2 Vibration Fundamentals and Descriptors

Vibration from a transit system is also expressed in terms of a *source-path-receiver* framework. The *source* is the train rolling on the tracks, which generates vibration energy transmitted through the supporting structure under the tracks and into the ground. Once the vibration gets into the ground, it propagates through the various soil and rock strata—the *path*—to the foundations of nearby buildings—the *receivers*. Groundborne vibrations are generally reduced with distance depending on the local geological conditions. A receiver is a vibration-sensitive building (e.g., residence, hospital, or school) where the vibrations may cause perceptible shaking of the floors, walls, and ceilings and a rumbling sound inside rooms. Not all receivers have the same vibration sensitivity. Consequently, vibration criteria are established for the various types of receivers. Groundborne noise occurs as a perceptible rumble and is caused by the noise radiated from the vibration of room surfaces.

Vibration above certain levels can damage buildings, disrupt sensitive operation, and cause annoyance to humans within buildings. The response of humans, buildings, and equipment to vibration is most accurately described using velocity or acceleration. In this analysis, *vibration velocity* (VdB) is the primary measure to evaluate the effects of vibration.

Figure 3.12-3 illustrates typical groundborne vibration velocity levels for common sources and thresholds for human and structural response to groundborne vibration. As shown, the range of interest is from approximately 50 to 100 VdB in terms of vibration velocity level (i.e., from imperceptible background vibration to the threshold of damage). Although the threshold of human perception to vibration is approximately 65 VdB, annoyance does not usually occur unless the vibration exceeds 70 VdB.



Source: Federal Transit Administration 2018

Figure 3.12-3. Typical Levels of Ground-Borne Vibration

3.12.2 Regulatory Setting

This section summarizes federal, state, regional, and local regulations related to noise and vibration and applicable to the Proposed Project and alternatives analyzed at an equal level of detail.

3.12.2.1 Federal

Noise Control Act of 1972

The Noise Control Act of 1972 (Title 42 of the United States Code, Section 4910) was the first comprehensive statement of national noise policy. The Noise Control Act declared, "it is the policy of the U.S. to promote an environment for all Americans free from noise that jeopardizes their health or welfare." Although the Noise Control Act, as a funded program, was ultimately abandoned at the federal level, it served as the catalyst for comprehensive noise studies and the generation of noise assessment and mitigation policies, regulations, ordinances, standards, and guidance for many states, counties, and municipal governments. For example, the noise elements of community general plan documents and local noise ordinances considered in this analysis were largely created in response to the passage of the Noise Control Act.

Federal Railroad Administration Guidelines and Noise Emission Compliance-Regulation

As mentioned above, the FRA developed the *High-Speed Ground Transportation Noise and Vibration Impact Assessment,* which is a guidance manual for assessing noise and vibration impacts from major rail projects (Federal Railroad Administration 2012). Although not at the level of a rule or a standard, this FRA guidance is intended to satisfy environmental review requirements and assist project sponsors in addressing predicted construction and operation noise and vibration during the design process.

FRA also has a regulation governing compliance of noise emissions from interstate railroads. FRA's Railroad Noise Emission Compliance Regulation (Title 49 of the Code of Federal Regulations, Section 210) prescribes compliance requirements for enforcing railroad noise emission standards adopted by the United States Environmental Protection Agency (per Title 40 of the Code of Federal Regulations, Section 201).

Federal Transit Administration Guidelines

Similar to the FRA, the Federal Transit Administration (FTA) developed the *Transit Noise and Vibration Impact Assessment,* which is a guidance manual for assessing noise and vibration impacts from major rail projects intended to satisfy environmental review requirements and assist project sponsors in addressing predicted construction and operation noise and vibration during the design process (Federal Transit Administration 2018).

Locomotive Horn Rule

FRA regulations (49 C.F.R. Part 222) require that engineers sound their locomotive horns while approaching public at-grade crossings until the lead locomotive fully occupies the crossing. In general, the regulations require locomotive engineers to begin to sound the train horn for a minimum of 15 seconds, and a maximum of 20 seconds, in advance of public at-grade crossings. Engineers must also sound the train horn in a standardized pattern of two long, one short, and one long blast and the horn must continue to sound until the lead locomotive or train car occupies the grade crossing. Additionally, the minimum sound level for the locomotive horn is 96 dBA, while the maximum sound level (L_{max}) is 110 dBA, both measured at 100 feet forward of the locomotive.

FRA allows public authorities to establish a quiet zone, which is segment of a rail line, within which is situated one or a number of consecutive public road-rail at-grade crossings at which locomotive horns are not routinely sounded, provided sufficient safety measures are implemented at the at-grade crossing to prevent/minimize the potential for accidents to occur. Railroad authorities, including the Authority and railroad companies (such as Union Pacific Railroad [UPRR]) cannot establish quiet zones; only local cities and counties can establish them by applying to the FRA.

At a minimum, new quiet zones must be at least 0.5 mile in length and contain at least one public grade crossing (i.e., a location where a public highway, road, or street crosses one or more railroad tracks at grade). Every public grade crossing in a quiet zone must be equipped at a minimum with active grade crossing warning devices consisting of flashing lights and gates.

If a public authority wants to establish a new quiet zone, it must conduct an assessment of hazards related to the at-grade crossing(s) in the proposed zone and implement sufficient safety measures to reduce the proposed quiet zone's risk level to an acceptable level. Improvements may include

roadway medians or channelization devices to discourage motorists from driving around a lowered crossing gate; a four-quadrant gate system to block all lanes of highway traffic; converting a two-way street into a one-way street and installing crossing gates; and permanent or temporary (nighttime) closure of the crossing to highway traffic. As an alternative, communities may also choose to silence routine locomotive horn sounding through the installation of wayside horns at public at-grade crossings. Wayside horns are train-activated stationary acoustic devices at grade crossings that are directed at highway traffic as a one-for-one substitute for train horns.

3.12.2.2 State

California Noise Control Act

At the state level, the California Noise Control Act, enacted in 1973 (per California Health and Safety Code Section 46010 et seq.), requires the Office of Noise Control in the Department of Health Services to provide assistance to local communities developing local noise control programs. The Office of Noise Control also works with the Governor's Office of Planning and Research to provide guidance for preparing required noise elements in city and county general plans pursuant to California Government Code Section 65302(f). When preparing the noise element of a general plan, a city or county must identify local noise sources and analyze and quantify, to the extent practicable, current and projected noise levels for various sources, including highways and freeways; passenger and freight railroad operation; ground rapid transit systems; commercial, general, and military aviation and airport operation; and other ground stationary noise sources. These noise sources also would include commuter rail alignments. The California Noise Control Act stipulates the mapping of noise-level contours for these sources, using community noise metrics appropriate for environmental impact assessment as defined below. Cities and counties use these metrics as guides to making land use decisions to minimize the community residents' exposure to excessive noise.

3.12.2.3 Regional and Local

Appendix I, *Regional Plans and Local General Plans*, provides a list of applicable goals, policies, and objectives from regional and local plans of the jurisdictions in which Valley Link improvements are proposed. Section 15125(d) of the CEQA Guidelines requires an EIR to discuss "any inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans." These plans were considered during the preparation of this analysis and were reviewed to assess whether the Proposed Project would be consistent with the plans of relevant jurisdictions. [1]

Table 3.12-1 summarizes the county and city general plans that have been identified, reviewed, and considered for the preparation of this analysis. For a list of applicable noise and vibration goals, policies, and objectives from these county and city general plans, please see Appendix I.

Table 3.12-1. Local General Plans Regarding Noise and Vibration

Policy Title	Summary
Alameda County	
Alameda County General Plan (1994)	Follows noise standards set by the State of California. Requires projects to prevent and minimize noise impacts.

[1] An inconsistency with regional or local plans is not necessarily considered a significant impact under CEQA, unless it is related to a physical impact on the environment that is significant in its own right.

Policy Title	Summary
City of Dublin General Plan (2016)	Follows noise standards set by the State of California. Policy 1: Mitigate traffic noise levels. Normally acceptable noise level is 60 dB CNEL or less and conditionally acceptable noise level ranges from 61 dB to 70 dB CNEL.
Pleasanton General Plan 2005–2025 (2009)	Follows noise standards set by the State of California. Policy 1: Requires new projects to meet acceptable exterior noise levels. Policy 4.6: Require developers to mitigate noise impacts. Policy 8.1: Coordinate with transportation agencies to reduce noise generated outside of the City's jurisdiction.
City of Livermore General Plan 2003–2025 (2004)	Follows noise standards set by the State of California except for Policy N-1.1 P6: Downtown Area shall be subject to different noise standards than the rest of the City with daytime noise levels of up to 75 dB considered acceptable for all use.
San Joaquin County	
San Joaquin County General Plan 2010 (1992)	Follows noise standards set by the State of California. Policy 1(a): Sets the maximum noise exposure from transit noise at 65 dB for residential and noise-sensitive land use.
City of Tracy General Plan (2011)	Follows noise standards set by the State of California except for the following policies. Ob N-1.1 P9: If primary noise source is from train pass-bys, outdoor noise levels shall be limited to 70 dB Ldn. Ob N-1.2 P2: Mitigation required if Ldn increases by 3 dB and exceeds "normal acceptable" levels, Ldn increases by 5 dB and remains at "normal acceptable" levels, or exceeds noise limits. Ob N-1.3 P1: Evaluate projects for noise impacts. Ob N-1.3 P2: Mitigate significant impacts. Ob N-1.3 P6: Reduce impacts from groundborne vibration.
City of Lathrop General Plan (1991)	Follows the Noise Element from the *San Joaquin County General Plan 2010* (San Joaquin County 1992). Policies: 1: Noise impact threshold set at 60 dB CNEL at the exterior of buildings. 2a: Sets noise limit for new projects at 60 dB CNEL in outdoor activity areas.

Notes: CNEL = community noise equivalent level; dB = decibels; dBA = A-weighted decibel; FTA = Federal Transit Administration; Ldn = day-night sound level

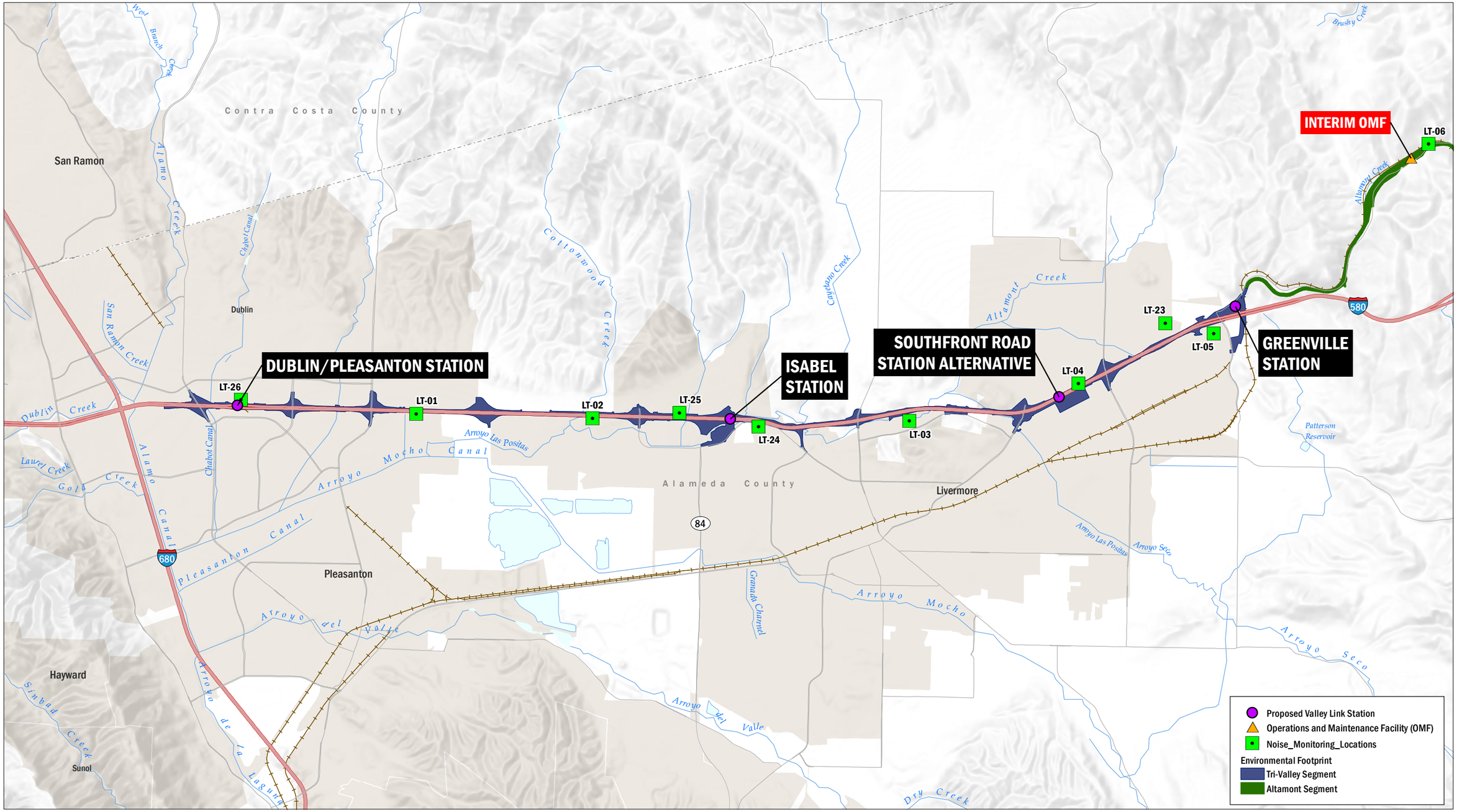
3.12.3 Environmental Setting

This section describes the environmental setting related to noise and vibration by geographic segment for the Proposed Project. For the purposes of this analysis, for noise and vibration, the nearest noise-sensitive and vibration-sensitive uses from the track centerline were evaluated. Figures 3.12-4A through 3.12-4C depict the study area and noise monitoring locations.

Information for the noise and vibration setting was obtained from the following sources.

- Available reports and data (federal and state statues, regional agency policies, and ordinances).
- Field reconnaissance throughout the study area to assess potential locations for noise measurements.
- Noise measurements at locations throughout the study area to document existing conditions at sensitive receivers.
- Available data on UPRR train volumes.
- General plan noise elements for jurisdictions along the rail alignment.

AECOM Oakland CA 8/18/2020 USER:jessica.parteno PATH: \\na.aecomnet.com\fs\AMER\Oakland-USOAK01\DCS\Projects\GIS\Projects\Valley_Link\02_Maps\02_Map_Production_and_Reports_EIR2020\Superseded\Figure_3_12-1ABC_NoiseMonitoringLocations.mxd



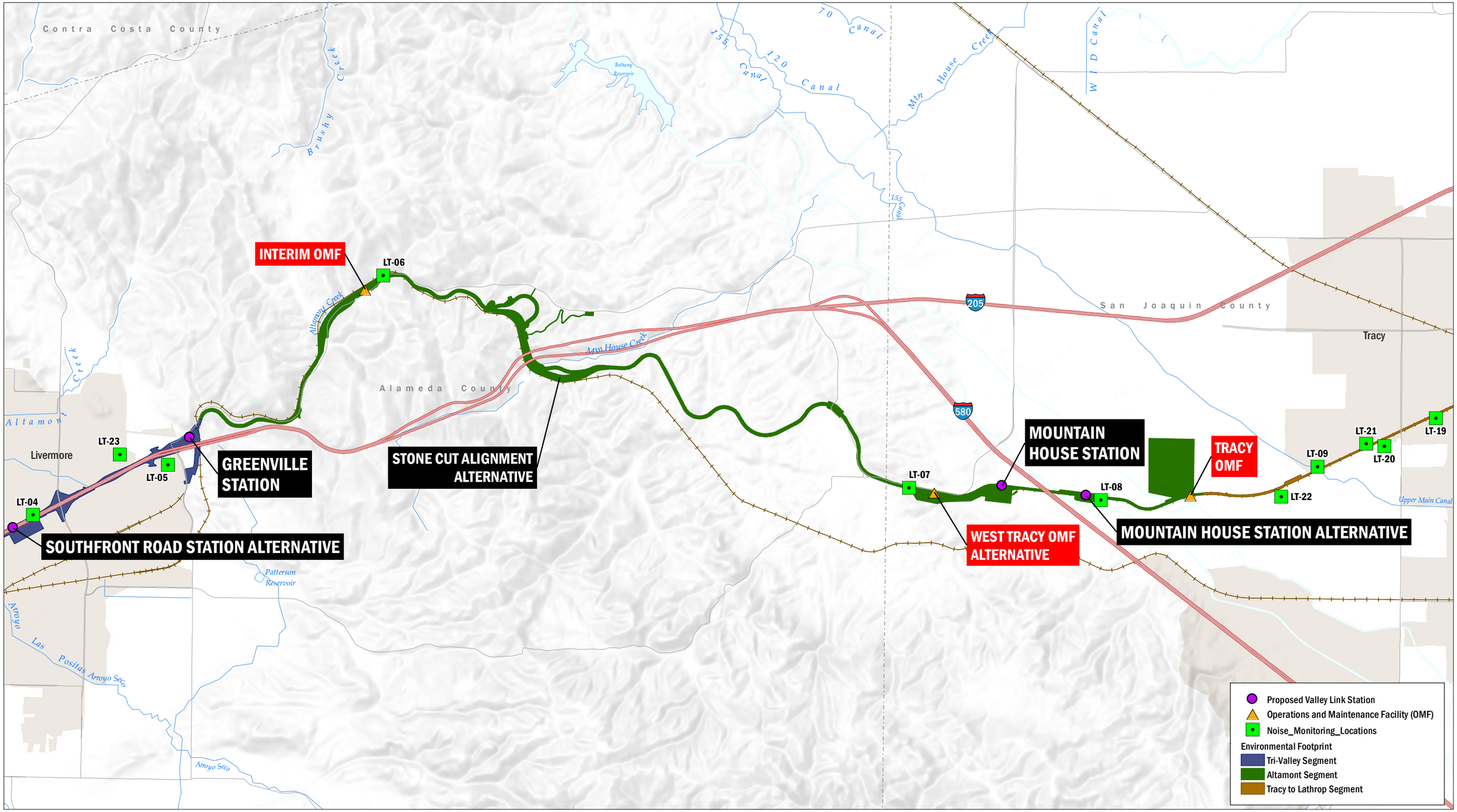
Source: AECOM 2019

Tri-Valley • San Joaquin Valley
REGIONAL RAIL AUTHORITY

AECOM
Valley Link Project

FIGURE 3.12-4A

Noise Monitoring Locations
Tri-Valley Segment



Source: AECOM 2019

Tri-Valley • San Joaquin Valley
REGIONAL RAIL AUTHORITY

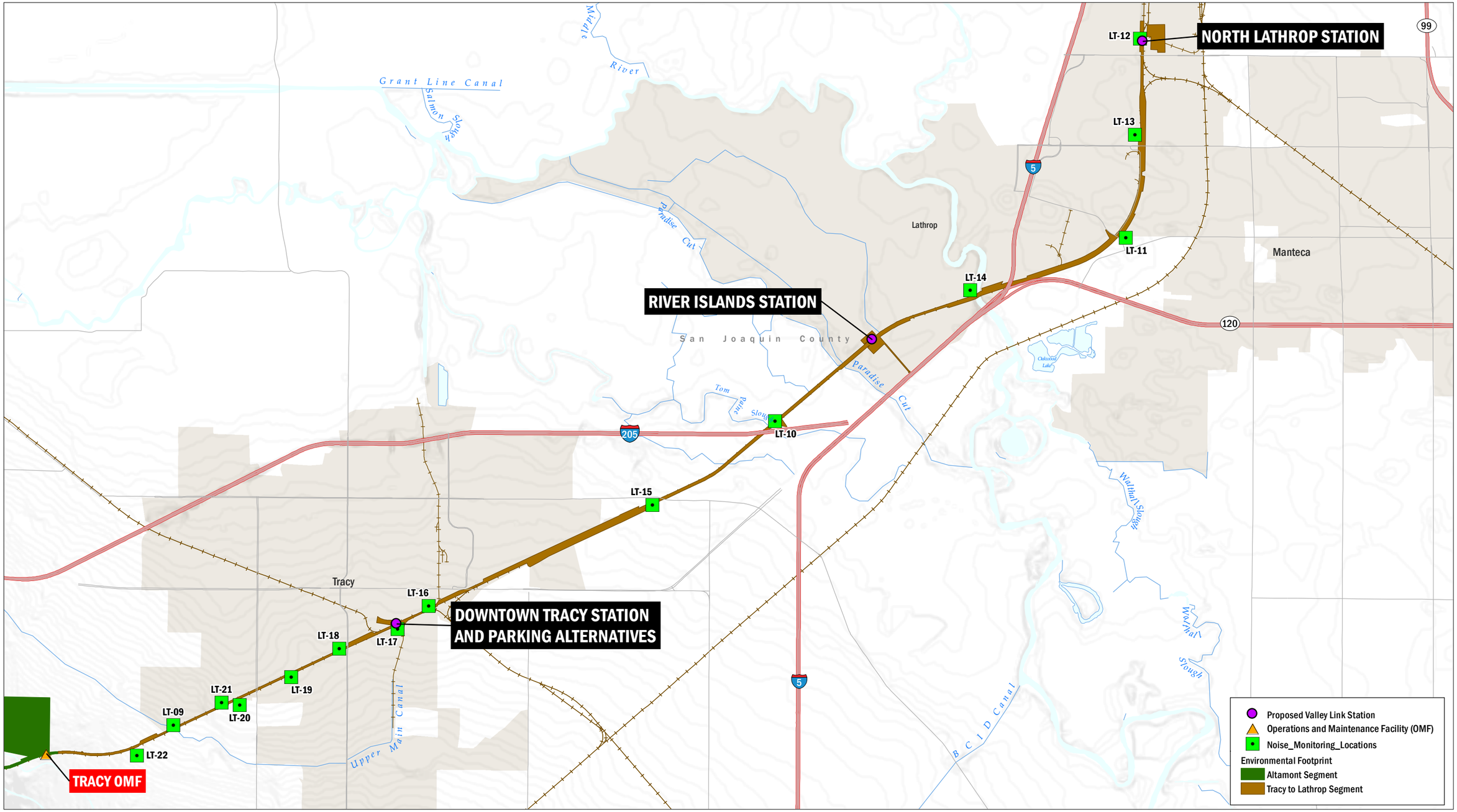
AECOM

Valley Link Project

FIGURE 3.12-4B

Noise Monitoring Locations
Altamont Segment

AECOM Oakland CA 10/27/2020 USER Ryan.Haines PATH \\na.aecomnet.com\lfs\AMER\Oakland-USOAK01\DCS\Projects\GIS\Projects\Valley_Link\02_Maps\02_Map_Production_and_Reports_EIR2020\Figure_3_12-1ABC_NoiseMonitoringLocations.mxd



Source: AECOM 2019

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REGIONAL RAIL AUTHORITY

AECOM

Valley Link Project

FIGURE 3.12-4C

Noise Monitoring Locations
Tracy to Lathrop Segment

Based on the above information, existing noise sources in the study area include commuter and freight rail operation, roadway traffic, and general community activity. The only significant sources of vibration in the study area are commuter and freight rail operation.

Because the thresholds for noise impact in both FTA and local noise criteria (defined in below in *Thresholds of Significance*) are based on the existing noise levels, measuring the existing noise and characterizing noise levels at sensitive locations in the study area is an important step in the impact assessment. The noise measurements included both long-term (i.e. 24-hour duration) of the A-weighted sound level at noise-sensitive locations in the study area.

The noise measurements were performed using Larson Davis Laboratories (LDL) 824 and 820 noise monitors that conform to American National Standard Institute standards for Type 1 (precision) sound level meters.[2] Calibrations, traceable to the U.S. National Institute of Standards and Technology, were conducted before and after each measurement. The noise monitors were set to continuously monitor and record multiple noise level metrics, as well as to obtain audio recordings during the measurement periods.

Table 3.12-2 summarizes existing noise level measurement results, and Figures 3.12-4a through 3.12-4c show the 26 long-term noise site (LT) locations. Measurements at sites LT-01 through LT-12 were taken in January 2019. Measurements at sites LT-13 through LT-26 were taken in November 2019. These long-term noise measurements were used to characterize existing noise at residential locations. Existing noise level measurements are discussed in further detail, by segment, in the subsections following Table 3.12-2.

The sensitive land use for vibration is essentially the same as for noise, except that park land is not considered vibration sensitive. Because a general vibration assessment (rather than a detailed vibration analysis) was performed, vibration measurements were not conducted for this analysis. Vibration from existing trains can be estimated using the general assessment procedures specified in Chapter 10 of the FTA's Transit Noise and Vibration Impact Assessment Manual *Transit Noise and Vibration Impact Assessment* guidelines (Federal Transit Administration 2018).

Table 3.12-2. Existing Noise Level Measurements in the Study Area

Site	City/ County	Measurement Location	Measurement Start		Noise Level (dBA)[a] Leq Day	Leq Night	Ldn
Tri-Valley Segment							
LT-26	Pleasanton	5200 Iron Horse Parkway	2019/11/14	16:00	69	68	75
LT-01	Pleasanton	3783 Pimlico Drive	2019/01/22	13:00	72	70	75
LT-02	Livermore	Las Positas Golf Course	2019/01/22	13:00	72	70	75
LT-25	Livermore	University of Phoenix, 2481 Constitution Drive	2019/11/20	15:00	65	64	71
LT-24	Livermore	Saddleback Circle and Sutter Street, Livermore	2019/11/14	16:00	65	62	69

[2] Continuous 24-hour, long-term monitoring of noise levels was taken in accordance with American National Standard Institute standards using LDL Model 824 and 820 sound-level meters. The sound-level meters were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure that the measurements were accurate. LDL equipment used meets all pertinent ANSI specifications for Type 1 sound level meters.

Site	City/ County	Measurement Location	Measurement Start		Noise Level (dBA)[a] Leq Day	Leq Night	Ldn
LT-03	Livermore	Kaiser Permanente Medical Offices	2019/01/23	15:00	63	63	69
LT-04	Livermore	715 Shoemaker Drive	2019/01/22	15:00	71	65	73
LT-23	Livermore	End of Scenic Avenue	2019/11/14	15:00	52	54	60
LT-05	Livermore	Best Western Plus Vineyard Inn	2019/01/24	16:00	61	60	66
Altamont Segment							
LT-06	Alameda County	10605 Altamont Pass Road	2019/01/22	15:00	69	68	74
LT-07	San Joaquin County	19889 W Patterson Pass Road	2019/01/23	16:00	62	64	70
LT-08	San Joaquin County	26603 Hansen Road	2019/01/24	17:00	57	57	63
Tracy to Lathrop Segment							
LT-22	Tracy	Southwest of Railway and South Lammers Road	2019/11/20	16:00	59	55	62
LT-09	Tracy	1442 Tiburon Court	2019/01/28	16:00	48	47	54
LT-21	Tracy	Sparks Park, 2428 Carol Ann Drive	2019/11/13	13:00	51	45	53
LT-20	Tracy	Vacant Land behind 25720 Ellis Road	2019/11/13	14:00	48	45	52
LT-19	Tracy	Behind 1591 Spring Court	2019/11/13	19:00	52	47	54
LT-18	Tracy	Parking Lot of In-Shape Health Clubs (101 South Tracy Boulevard), by residence at 830 Renown Drive	2019/11/13	12:00	53	48	56
LT-17	Tracy	Tracy Park and Ride by 4th Street	2019/11/13	12:00	56	45	55
LT-16	Tracy	Tracy Village Apartments (435 E 6th Street, Tracy) behind Avila Auto Repair	2019/11/11	19:00	62	52	62
LT-15	Tracy	Vacant Land west of 22563 S 7th Street	2019/11/11	18:00	70		69
LT-10	San Joaquin County	3549 Canal Boulevard	2019/01/24	12:00	62	62	68
LT-14	Lathrop	Open Space, River Islands, 301 Stewart Road	2019/11/11	17:00	61	64	70
LT-11	Lathrop	1866 Vierra Road	2019/01/24	12:00	58	54	62
LT-13	Lathrop	Vacant Land behind 1260 Snoop Court	2019/11/11	16:00	59	55	62
LT-12	Lathrop	984 Long Barn Drive	2019/01/28	17:00	59	57	64

Notes: [a] Ldn is used for Category 2 (residential) land use and Leq is used for Category 3 (institutional) land use.
dBA = A-weighted decibels; hrs. = hours; Ldn = day-night sound level**Error! Bookmark not defined.**; Leq = equivalent sound level; LT-# = longer-term noise sites

3.12.3.1 Tri-Valley Segment

The Tri-Valley segment includes the cities of Dublin, Pleasanton, and Livermore. Study area noise-sensitive receptors in Pleasanton include Pleasanton Middle School, Amador Valley High School, and single- and multifamily homes. Study area noise-sensitive receptors in Livermore include the Church of Christ, Iglesia Ni Cristo–Livermore, University of Phoenix–Livermore Learning Center, Avalon Dormitory, and single- and multifamily homes.

The noise measurement sites used to characterize the Tri-Valley segment are sites LT-01 through LT-05 and measurement sites LT-23 through LT-26 (see Table 3.12-2). Site characteristics and findings are summarized below.

- **Site LT-01, 3783 Pimlico Drive (Pleasanton):** The Ldn measured at this location was 75 dBA approximately 150 feet south of the Interstate 580 (I-580) centerline. The dominant noise sources were traffic on I-580 and Pimlico Drive. This noise site is representative of all first-row noise-sensitive land uses south of I-580 from Brockton Drive to Streamside Circle. There is an existing approximately 18-foot high soundwall adjacent to I-580.
- **Site LT-02, Las Positas Golf Course (Livermore):** The Ldn measured at this location was 75 dBA approximately 150 feet south of the I-580 centerline. The dominant noise source was traffic on I-580. This noise site is representative of all noise-sensitive land uses from El Charro Road to Airway Boulevard. There is no soundwall along the golf course.
- **Site LT-03, Kaiser Permanente Medical Offices (Livermore):** The Ldn measured at this location was 69 dBA approximately 580 feet south of the I-580 centerline. The dominant noise sources were traffic on I-580. Noise levels were measured south of I-580 and north of the commercial use. This noise site is representative of all noise-sensitive land uses from Portola Avenue to First Street. There is no soundwall along this segment.
- **Site LT-04, 715 Shoemaker Drive (Livermore):** The Ldn measured at this location was 73 dBA approximately 180 feet north of the I-580 centerline. The dominant noise sources were traffic on I-580, Sunflower Court, and Shoemaker Drive. This noise site is representative of all first-row noise-sensitive land uses north of I-580 from Springtown Boulevard to Laughlin Road. There is an existing approximately 18-foot-high soundwall between residential uses and I-580.
- **Site LT-05, Best Western Plus Vineyard Inn (Livermore):** The Ldn measured at this location was 66 dBA approximately 650 feet north of the I-580 centerline. The dominant noise sources were traffic on Southfront Road and I-580. Noise levels were measured at the pool area of the hotel. There is a soundwall along the perimeter of the pool area. This noise site is representative of all noise-sensitive land uses from South Vasco Road to Greenville Road.
- **Site LT-23, End of Scenic Avenue (Livermore):** The Ldn measured at this location was 66 dBA approximately 1,000 feet north of the I-580 centerline. The dominant noise source was traffic on I-580 and Scenic Avenue. Noise levels were measured adjacent to an existing single-family house.
- **Site LT-24, Saddleback Circle and Sutter Street (Livermore):** The Ldn measured at this location was 69 dBA approximately 350 feet south of the I-580 centerline. The dominant noise source was traffic on I-580 and Sutter Street in the residential area south of I-580. This location is partially protected from freeway noise by an existing berms within the California Ranch Park located between I-580 and the residential uses to the south.

- **Site LT-25, University of Phoenix, 2481 Constitution Drive (Livermore):** The Ldn measured at this location was 71 dBA approximately 300 feet north of the I-580 centerline. The dominant noise source was traffic on I-580. This location has direct line of sight from the freeway.
- **Site LT-26, 5200 Iron Horse Parkway (Pleasanton):** The Ldn measured at this location was 75 dBA approximately 400 feet north of the I-580 centerline. The dominant noise source was traffic on I-580,Dublin/Pleasanton BART Station located in the center of the freeway, and also the traffic and the BART parking lot on DeMarcus Boulevard.

3.12.3.2 Altamont Segment

The predominant noise-sensitive land use along the Altamont segment is scattered single-family housing. The noise measurement sites used to characterize this segment are LT-06 through LT-08. Site characteristics and findings are summarized below.

- **Site LT-06, 10605 Altamont Pass Road (Livermore):** The Ldn measured at this location was 74 dBA. The dominant noise source was traffic on Altamont Pass Road and existing railway operation. Noise levels were measured 50 feet south of the existing railway and 90 feet north of Altamont Pass Road. This noise site is representative of all noise-sensitive land uses in the Altamont segment.
- **Site LT-07, 19889 W Patterson Pass Road (Tracy):** The Ldn measured at this location was 70 dBA approximately 90 feet from the Patterson Pass Road centerline. The dominant noise source was traffic on Patterson Pass Road. This noise site is representative of all noise-sensitive land uses near the Mountain House Station.
- **Site LT-08, 26603 Hansen Road (Tracy):** The Ldn measured at this location was 63 dBA approximately 90 feet from the Hansen Road centerline. The dominant noise source was traffic on Hansen Road and distant I-580 traffic. Noise levels were measured adjacent to an existing residence and would be adjacent to the proposed Mountain House Station Alternative parking lot.

3.12.3.3 Tracy to Lathrop Segment

The Tracy to Lathrop segment extends from 0.5 mile east of the Delta Mendota Canal west of Tracy to the eastern Proposed Project limits at the proposed North Lathrop Station and includes the cities of Tracy and Lathrop as well as the communities of Banta and River Islands, and rural areas. Study area noise-sensitive receptors in Tracy include the Valley Community Baptist Church, Crossroads Baptist Church, Grace Christian Center, and a mixture of single- and multifamily homes. The noise-sensitive land uses in Banta are a mixture of single- and multifamily housing. The noise-sensitive land use in River Islands is single-family housing. Study area noise-sensitive receptors in Lathrop south of West Lathrop Road include the Lathrop Church of Christ, Living Word Ministries, Abundant Life Center, and single- and multifamily homes. The noise-sensitive land use in the rural areas consists of scattered single-family housing.

The noise measurement sites used to characterize the Tracy to Lathrop are LT-09 through LT-12 and measurements LT-13 through LT-22. Site characteristics and findings are summarized below.

- **Site LT-09, 1442 Tiburon Court (Tracy):** The Ldn measured at this location was 54 dBA approximately 625 feet from the I-205 centerline. The dominant noise source was traffic on West Schulte Road. Other noise sources include traffic on local streets and freight rail traffic.

Noise levels were measured in the side yard of the residence. There is an approximately 6-foot tall sound wall between the residential area and the railway to the south. This noise site is representative of all noise-sensitive land uses from South Lammers Road to South Corral Hollow Road in the study area.

- **Site LT-10, 3549 Canal Boulevard (Tracy):** The Ldn measured at this location was 68 dBA approximately 150 feet from the West Schulte Road centerline. The dominant noise sources were traffic on I-205 and railway activity. Noise levels were measured in the side yard of the residence. This noise measurement site is representative of all study area noise-sensitive land uses from West Grant Line Road to Cohen Road.
- **Site LT-11, 1866 Vierra Road (Lathrop):** The Ldn measured at this location was 62 dBA approximately 450 feet from the railroad tracks and 300 feet of the D'Arcy Parkway centerline. The dominant noise source was railway activities and traffic on D'Arcy Parkway. Noise levels were measured in the side yard of the residence. This noise measurement site is representative of all study area noise-sensitive land uses from West Yosemite Avenue to East Louise Avenue.
- **Site LT-12, 984 Long Barn Drive (Lathrop):** The Ldn measured at this location was 64 dBA approximately 200 feet from the railroad tracks. The dominant noise sources were traffic on local streets and railway activity. Noise levels were measured in the side yard of the residence. This noise measurement site is representative of all study area noise-sensitive land uses from River Island Parkway to North Lathrop Road.
- **Site LT-13, Vacant Land behind 1260 Snoop Court (Lathrop):** The Ldn measured at this location was 62 dBA approximately 200 feet from the Mingo Way and 400 feet from the railroad tracks. The dominant noise source was railway activity and traffic on Mingo Way and 5th Street. Noise levels were measured by the backyard of a residential property.
- **Site LT-14**, **Open Space, River Islands, 301 Stewart Road (Lathrop):** The Ldn measured at this location was 70 dBA approximately 200 feet from Lakeside Drive, 500 feet from the railroad tracks and 1,500 feet from Interstate 5 (I-5). The dominant noise source was traffic on I-5. Other noise sources include traffic on local streets including Lakeside Drive, and freight rail traffic. Noise levels were measured in River Island Park. This noise measurement site is representative of all residences to the west along Lakeside Drive in the study area.
- **Site LT-15**, **Vacant Land west of 22563 S 7th Street (Tracy):** The Ldn measured at this location was 69 dBA approximately 50 feet from the railroad tracks. The dominant noise sources were traffic on local streets and freight rail traffic. Noise levels were measured at a vacant parcel and is representative of all study area noise-sensitive land uses just north and south of the railroad tracks between 6th and 7thStreets.
- **Site LT-16, Tracy Village Apartments, 435 E 6th Street (Tracy):** The Ldn measured at this location was 62 dBA approximately 100 feet from East 6th Street and 150 feet from the railroad tracks. The dominant noise source was traffic on East 6th Street. Other noise sources include traffic on local streets and freight rail traffic. Noise levels were measured along a fence between the apartments and the Avila Auto Repair. This noise measurement site is representative of the Tracy Village Apartment complex.
- **Site LT-17, Tracy Park & Ride by 40 4th Street (Tracy):** The Ldn measured at this location was 55 dBA approximately 50 feet from 4th Street and 300 feet from the railroad tracks. The dominant noise source was traffic on local streets. Noise levels were measured at the Tracy Park

and Ride parking lot in front of the residence along 4th Street. This noise measurement site is representative of all study area noise-sensitive land uses along 4th Street just east and west of North Central Avenue.

- **Site LT-18, Parking Lot of In-Shape Health Clubs, 101 South Tracy Boulevard, by residence at 830 Renown Drive (Tracy):** The Ldn measured at this location was 56 dBA approximately 500 feet from South Tracy Boulevard and 150 feet from the railroad tracks. The dominant noise source was traffic on local streets. Noise levels were measured in the parking lot of the In-Shape Health Club along the fence by the residences to the west. This noise measurement site is representative of all study area noise-sensitive land uses north and south of the railroad tracks between West Schulte Road and South Tracy Boulevard.
- **Site LT-19, Behind 1591 Spring Court (Tracy):** The Ldn measured at this location was 54 dBA approximately 1,000 feet from the West Schulte Road centerline and 150 feet from the railroad tracks. The dominant noise source was traffic on local streets. Noise levels were measured in the backyard of the residence. This noise measurement site is representative of all study area noise-sensitive land uses along the railway between West Schulte Road and South Corral Hollow Road.
- **Site LT-20, Vacant Land behind 25720 Ellis Road (Tracy):** The Ldn measured at this location was 52 dBA approximately 1,100 feet from the South Corral Hollow Road centerline and 350 feet from the railroad tracks. The dominant noise source was traffic on local streets. Noise levels were measured in the front yard of the residence. This noise measurement site is representative of all study area noise-sensitive land uses along the railroad tracks west of South Corral Hollow Road.
- **Site LT-21, Sparks Park, 2428 Carol Ann Drive (Tracy):** The Ldn measured at this location was 53 dBA approximately 150 feet from the West Schulte Road and 200 feet from the railroad tracks. The dominant noise source was traffic on local streets. Noise levels were measured in Sparks Park by the residence to the east. This noise measurement site is representative of all study area noise-sensitive land uses along the railroad tracks west of South Corral Hollow Road and north of West Schulte Road.
- **Site LT-22, South west of Railway and South Lammers Road (Tracy):** The Ldn measured at this location was 62 dBA approximately 150 feet from South Lammers Road and 450 feet from the railroad tracks. The dominant noise source was traffic on local streets. Noise levels were measured in a vacant parcel near the residences along South Lammers Road. This noise measurement site is representative of study area noise-sensitive land uses along South Lammers Road near Valpico Road.

3.12.4 Impact Analysis

This section describes the environmental impacts of the Proposed Project and the alternatives analyzed at an equal level on noise and vibration. It describes the methods used to evaluate the impacts and the thresholds used to determine whether an impact would be significant. Measures to mitigate significant impacts are provided, where appropriate.

3.12.4.1 Methods for Analysis

The approach to evaluating noise and vibration impacts can be summarized as follows.

- Analyze direct noise and vibration impacts through quantitative and qualitative analysis.

- Assess station noise and vibration, consider train type, train schedules (number of stopping trains and number of through trains during daytime and nighttime hours), number of cars in each train, speed profiles for stopping and through trains, plans and profiles of station structures; and noise level changes associated with alterations to train service volumes.
- Assess railroad noise and vibration, consider train type, train schedules (number of through trains during daytime and nighttime hours), number of cars in each train; speed profiles, and noise level changes associated with alterations to train service volumes.
- Assess construction noise emissions, consider equipment expected to be used by contractors during construction, usage scenarios for how equipment would be operated, estimated site layouts of equipment along the right-of-way, and the location of construction operation with respect to nearby noise-sensitive receivers.
- Assess construction vibration, account for vibration from construction equipment, estimated site layout of equipment along the right-of-way, and the location of construction operation with respect to nearby sensitive receivers.

For more information, refer to the FTA's *Transit Noise and Vibration Impact Assessment* (Federal Transit Administration 2018).

Construction Noise and Vibration Impact Assessment Methodology

The construction noise impact assessment used the methodology described in the FTA's *Transit Noise and Vibration Impact Assessment* (Federal Transit Administration 2018). The Authority, UPRR, and their contractors will make decisions regarding procedures and equipment. For this analysis, construction scenarios for typical railroad construction projects are used to predict noise impacts. The construction noise methodology includes the following information.

- Noise emissions from typical equipment used by contractors
- Construction methods
- Scenarios for equipment usage
- Estimated site layouts of equipment along the right-of-way.
- Proximity of construction activities to nearby noise-sensitive receivers.
- FTA construction noise assessment criteria.

The FTA's *Transit Noise and Vibration Impact Assessment* (Federal Transit Administration 2018) also provides the methodology for the assessment of construction vibration impacts. Estimated construction scenarios have been developed for typical railroad construction projects allowing a quantitative construction vibration assessment to be conducted. Construction vibration is assessed quantitatively where a potential for blasting, pile-driving, vibratory compaction, demolition, or excavation close to vibration-sensitive structures exists. The methodology included the following information.

- Vibration source levels from equipment used by contractors.
- Estimated site layouts of equipment along the right-of-way.
- Relationship of construction activities to nearby vibration-sensitive receivers.
- FTA vibration impact criteria for annoyance and building damage.

Train Operation Noise and Vibration Impact Assessment Methodology

Train operation noise and vibration levels were projected using the conceptual operating plan described in Chapter 2, *Project Description*, distance to nearest receptor, advanced and lower train reference noise levels to reflect proposed train type, and the prediction models provided in the FTA's *Transit Noise and Vibration Impact Assessment* (Federal Transit Administration 2018). Potential impacts were evaluated in accordance with the general vibration assessment procedures outlined in the manual. The assumptions for train operation are listed in Table 3.12-3. Projected and existing ambient noise exposures were tabulated at the identified receptor locations or clusters of receptors, and the levels of noise impact (no impact, moderate impact, or severe impact) were identified by comparing the train noise exposure based on the applicable FTA noise impact criteria.

Table 3.12-3. Assumptions for Train Operation

Source Input	Tri-Valley Segment	Altamont Segment	Tracy to Lathrop Segment	Reference
Train Operation 2025				
Diesel Multiple Unit (DMU) or Diesel Locomotive Haul (DLH)*	1	1	1	Project Description
Average hourly daytime volume of trains (7:00 a.m. to 10:00 p.m.)	5.9	6.1	3.0	Project Description
Average hourly nighttime volume of trains (10:00 p.m. to 7:00 a.m.)	2.1	2.0	1.0	Project Description
Average number of cars per train during daytime (7:00 a.m. to 10:00 p.m.)	6	6	6	Project Description
Average number of cars per train during nighttime (10:00 p.m. to 7:00 a.m.)	6	6	6	Project Description
Train Operation 2040				
Diesel Multiple Unit (DMU) or Diesel Locomotive Haul (DLH)*	1	1	1	Project Description
Average hourly daytime volume of trains (7:00 a.m. to 10:00 p.m.)	7.1	7.1	5.1	Project Description
Average hourly nighttime volume of trains (10:00 p.m. to 7:00 a.m.)	2.9	2.6	1.9	Project Description
Average number of cars per train during daytime (7:00 a.m. to 10:00 p.m.)	6	6	6	Project Description
Average number of cars per train during nighttime (10:00 p.m. to 7:00 a.m.)	6	6	6	Project Description
Other Noise Sources				
Locomotive Warning Horn	Yes	Yes	Yes	Based on Google Earth Aerial Imagery
Signal Duration/Hour (seconds)	NA	120	120	Assumed (Typical)
Speed (miles per hour)				
Dublin/Pleasanton – Isabel	62			Average Speed by Route Segment
Isabel – Greenville	52			Average Speed by Route Segment

Source Input	Tri-Valley Segment	Altamont Segment	Tracy to Lathrop Segment	Reference
Greenville - Mountain House		35		Average Speed by Route Segment
Mountain House – Downtown Tracy			45	Average Speed by Route Segment
Mountain House Station Alternative			45	Average Speed by Route Segment
Downtown Tracy – River Islands			58	Average Speed by Route Segment
River Islands – North Lathrop			58	Average Speed by Route Segment
Stations	Yes	Yes	Yes	Project Description
Parking Spaces 2025				
Dublin/Pleasanton	0			Project Description
Isabel	850			Project Description
Greenville[a]	2,500			Project Description
Southfront Road Station Alternative[a]	3,310			Project Description
Mountain House[a]		2,820		Project Description
Mountain House Station Alternative[a]		2,800		Project Description
Downtown Tracy[b]			1,040	Project Description
River Islands			730	Project Description
North Lathrop			1,180	Project Description
Parking Spaces 2040				
Dublin/Pleasanton	0			Project Description
Isabel	1,520			Project Description
Greenville	910			Project Description
Southfront Road Station Alternative	1,070			Project Description
Mountain House		1,060		Project Description
Mountain House Station Alternative		1,060		Project Description
Downtown Tracy			1,550	Project Description
River Islands			1,060	Project Description
North Lathrop			3,100	Project Description

Notes:
* Both locomotive types were modeled separately and results are shown in separate tables below.
[a] Assumes maximum parking under 2025 IOS operating scenario.
[b] Assumes maximum parking under Downtown Tracy Station Parking Alternative 1.

Traffic Noise Impact Assessment Methodology

The Proposed Project would result in the minor realignment of portions of the travel lanes along I-580 within the study area. This relocation, along with the increased future traffic volumes on I-580, could result in an increase in noise levels at sensitive receptors located along I-580.

Traffic noise modeling was conducted using the Federal Highway Administration's (FHWA) traffic noise prediction model (FHWA-RD-77-108) and was used to predict traffic noise levels under existing conditions and under the project scenarios (2025 and 2040). Traffic data from California Department of Transportation (Caltrans) traffic counts and traffic growth factors were used to model existing and future (2040) traffic noise levels. Detailed noise analytical information is provided in Appendix R, *Supporting Noise Information*.

Due to Caltrans-required project approvals for construction of the Proposed Project in the I-580 corridor, the Proposed Project will be subject to further roadway noise analysis during the Caltrans Project Approval and Environmental Document process anticipated to begin in 2021. This analysis will include the completion of a Noise Study Report (NSR) in accordance with the Caltrans Traffic Noise Analysis Protocol (the Protocol). The NSR would evaluate existing and future noise levels, with and without the Proposed Project, and evaluate noise abatement alternatives in accordance with the Protocol. If traffic noise impacts are predicted by the NSR, noise abatement must be considered. A Noise Abatement Decision Report would be prepared to evaluate the feasibility and reasonableness of noise barriers in the corridor.

3.12.4.2 Thresholds of Significance

CEQA Guidelines Appendix G (i.e., Cal. Code Regs. Title 14, Section 15000 et seq.) has identified significance criteria to be considered for determining whether a project could have significant impacts on sensitive land use from noise and vibration as described below.

An impact would be considered significant if construction or operation of the project would have any of the following consequences.

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Generation of excessive groundborne vibration or groundborne noise levels.
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

FTA Noise Criteria

Construction Noise and Vibration Impact Assessment Criteria

Construction activities associated with a large transportation project often generate noise and vibration complaints even though they take place only for a limited time. For the Proposed Project, construction noise and vibration impact is assessed where the exposure of noise- and vibration-sensitive receivers to construction-related noise or vibration is expected to occur at levels exceeding standards established by FTA and established thresholds for architectural and structural building damage (Federal Transit Administration 2018).

Construction Noise Impact Criteria

Table 3.12-4 presents the FTA noise assessment criteria for construction. The last column applies to construction activities that extend over 30 days near any given receiver. Ldn is used to assess

impacts in residential areas, and 24-hour Leq is used in commercial and industrial areas. The construction noise limits are normally assessed at the noise-sensitive receiver property line.

Table 3.12-4. Federal Transit Administration Construction Noise Assessment Criteria

	8-hour Leq, dBA		Noise Exposure, Ldn, dBA
Land Use	**Day**	**Night**	**30-day Average**
Residential	80	70	75[a]
Commercial	85	85	80[b]
Industrial	90	90	85[b]

Source: Federal Transit Administration 2018.

[a] In urban areas with very high ambient noise levels (Ldn greater than 65 dB), Ldn from construction operation should not exceed existing ambient noise levels + 10 dB.

[b] 24-hour Leq, not Ldn.

dB = decibels; dBA = A-weighted decibel; Ldn = day-night sound level; Leq = equivalent sound level

Construction Vibration Impact Criteria

Guidelines in the FTA's *Transit Noise and Vibration Impact Assessment* provide the basis for the construction vibration assessment (Federal Transit Administration 2018). FTA provides construction vibration criteria designed primarily to prevent building damage, and to assess whether vibration might interfere with vibration-sensitive building activities or temporarily annoy building occupants during the construction period. The FTA criteria include two ways to express vibration levels: (1) root-mean-square (RMS) vibration velocity level (i.e., $L_{v,}$ in VdB) for annoyance and activity interference; and (2) peak particle velocity (PPV), which is the maximum instantaneous peak of a vibration signal used for assessments of damage potential.

To avoid temporary annoyance to building occupants during construction or construction interference with vibration-sensitive equipment inside special-use buildings, such as a magnetic resonance imaging machine, FTA recommends using the long-term operational vibration criteria provided in the section below.

Table 3.12-5 shows FTA building damage criteria for construction activity; the table lists PPV and approximate L_v limits for four building categories. These limits are used to estimate potential problems that should be addressed during final design.

Table 3.12-5. Construction Vibration Damage Criteria

Building Category	PPV (inch/sec)	Approximate L_v[a]
I. Reinforced concrete, steel, or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

Source: Federal Transit Administration 2018.

[a] RMS vibration velocity level in VdB relative to 1 micro-inch/second.

PPV = peak particle velocity; RMS = root-mean-square; VdB = vibration decibel

Operational Noise and Vibration Impact Assessment Criteria

Train Noise Impact Criteria

The descriptors and criteria for assessing noise impact vary according to land use categories adjacent to the track. For land uses where people live and sleep (e.g., residential neighborhoods, hospitals, and hotels), Ldn is the assessment parameter. For other land use types where there are noise-sensitive uses (e.g., outdoor concert areas, schools, and libraries) Leq for the noisiest hour of transit-related activity during hours of noise sensitivity, or Leq(h), is used as the assessment parameter. Table 3.12-6 summarizes the three land use categories.

Table 3.12-6. Federal Transit Administration Noise-Sensitive Land Uses

Land Use Category	Noise Metric (dBA)	Land Use Category
1	Outdoor Leq(h)[a]	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, such as outdoor amphitheaters, concert pavilions, and National Historic Landmarks with significant outdoor use.
2	Outdoor Ldn	Residences and buildings where people normally sleep. This category includes homes and hospitals, where nighttime sensitivity to noise is of utmost importance.
3	Outdoor Leq(h) [a]	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches, where it is important to avoid interference with such activities as speech, meditation, and concentration. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios, and concert halls fall into this category, as well as places for meditation or study associated with cemeteries, monuments, and museums. Certain historical sites, parks, and recreational facilities are also included.

Source: Federal Transit Administration 2018.

[a] Leq for the noisiest hour of transit-related activity during hours of noise sensitivity.

dBA = A-weighted decibel**Error! Bookmark not defined.**; Leq = equivalent sound level; Ldn = day-night sound level

The noise impact criteria used by FTA are ambient-based; the increase in future noise (i.e., future noise levels with the Proposed Project compared to existing noise levels) is assessed rather than the noise caused by each passing train. It is important to note that the criteria do not specify a comparison of future noise with projections of future no-action noise. This is because comparison of a noise projection with an existing noise condition is more accurate than comparison of a projection with another noise projection (Federal Railroad Administration 2012: Section 3.2.2). Because background noise is expected to increase by the time the Proposed Project starts generating noise, this approach of using existing noise conditions is conservative. Figure 3.12-5 shows FTA noise impact criteria for human annoyance.

Depending on the magnitude of the cumulative noise increases, FTA categorizes impacts as (1) no impact, (2) moderate impact, or (3) severe impact. FTA describes project-generated noise at the severe level as likely to cause a high level of community annoyance and the greatest adverse impact on the community, and strongly recommends considering mitigation. For this EIR, the FTA severe impact threshold is considered the CEQA significance criteria.

Project-generated noise in the moderate range causes impact at the threshold of measurable annoyance. Moderate impacts can alert project planners to potential adverse impacts and potential noise complaints from the community. The FTA identifies areas with moderate impact as also having potential effects on the community, and recommends and possibly adopting mitigation measures where reasonable. For this EIR, impacts occurring above the FTA moderate impact threshold level, but occurring at less than the FTA severe impact threshold, are considered less than significant under CEQA. In this EIR, mitigation is recommended for moderate impacts particularly when already addressing severe impacts in an area, but is not mandatory for the purposes of CEQA.

Project-generated noise in the no-impact range is not likely to cause community annoyance. Noise projections in this range are considered acceptable by FTA and mitigation is not required.

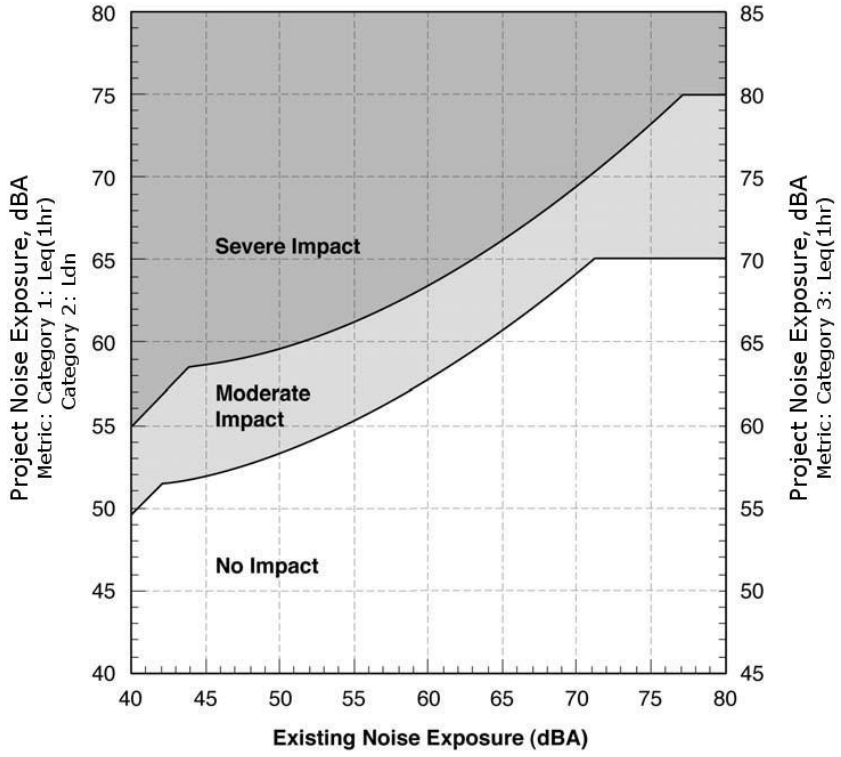

Figure 3.12-5. Noise Impact Criteria for Transit Projects

Although the curves in Figure 3.12-5 are defined in terms of the project noise exposure and the existing noise exposure, the increase in the cumulative noise—when project-generated noise is added to existing noise levels—is the basis for the criteria. To illustrate this point, Figures 3.12-6 and 3.12-7 show the noise impact criteria for Category 1 and Category 2 land uses in terms of the allowable increase in the cumulative noise exposure. Because Ldn and Leq are measures of total acoustic energy, any new noise source in a community will cause an increase, even if the new source level is lower than the existing level. In Figures 3.12-6 and 3.12-7, the criterion for a moderate impact allows a noise exposure increase of 10 dB if the existing noise exposure is 42 dBA or less, but only a 1 dB increase when the existing noise exposure is 70 dBA.

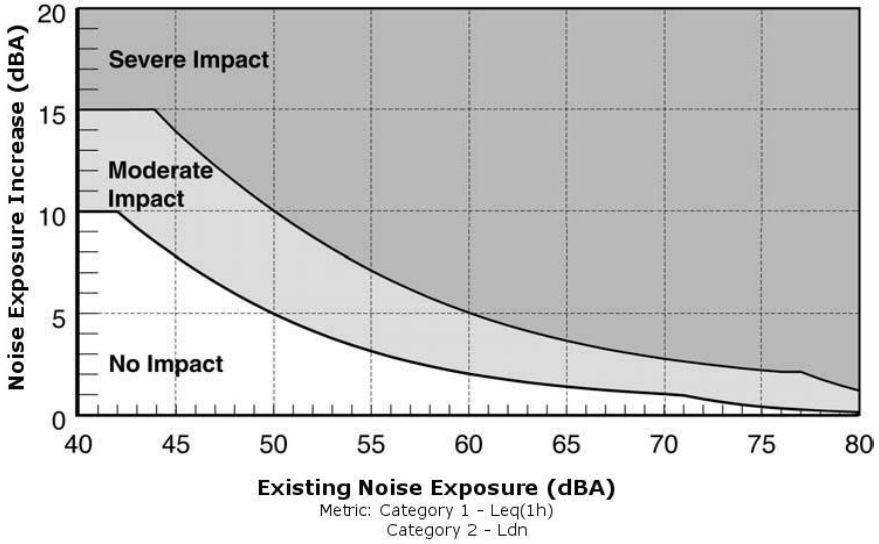

Figure 3.12-6. Increase in Cumulative Noise Levels Allowed by Criteria (Land Use Categories 1 and 2)

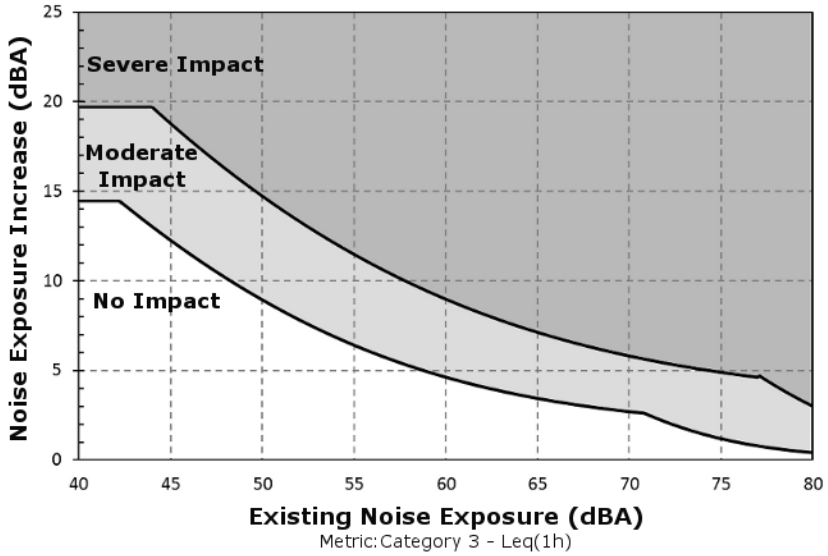

Figure 3.12-7. Increase in Cumulative Noise Levels Allowed by Criteria (Land Use Category 3)

As the existing level of ambient noise increases, the allowable level of transit noise increases, but the total amount that community noise exposure is allowed to increase is reduced. This accounts for the unexpected result that a project noise exposure that is lower than the existing noise exposure can still cause an effect.

Train Vibration Impact Criteria

FTA provides guidelines to assess the human response to different levels of groundborne noise and vibration, as presented in Table 3.12-7. These levels represent the maximum vibration level of an individual train passby. A vibration event occurs each time a train passes the building or property and causes discernible vibration. Frequent events are those with more than 70 vibration events per day, occasional events are those with 30–70 vibration events per day, and infrequent events are fewer than 30 vibration events per day. FTA guidelines also provide criteria for special buildings where there is no airborne noise path or for buildings with substantial sound insulation that are very sensitive to groundborne noise and vibration, such as concert halls, recording studios, and theaters. Table 3.12-8 shows the impact criteria for special buildings.

Groundborne vibration impacts from train operation inside vibration-sensitive buildings are defined by the vibration velocity level, expressed in terms of VdB, and the number of vibration events per day from the same kind of source. Table 3.12-7 summarizes vibration sensitivity in terms of the three land use categories and the criteria for acceptable groundborne vibrations and acceptable groundborne noise. Groundborne noise is a low-frequency rumbling sound inside buildings, caused by vibrations of floors, walls, and ceilings. Groundborne noise is generally not a problem for buildings near railroad tracks at or above grade, because the airborne noise from trains typically overshadows effects of groundborne noise. Groundborne noise becomes an issue in cases where airborne noise cannot be heard, such as for buildings near tunnels.

Tables 3.12-7 and 3.12-8 include separate FTA criteria for groundborne noise. Although the criteria are expressed in dBA, which emphasizes the more audible middle and high frequencies, the criteria are significantly lower than airborne noise criteria to account for the annoying low-frequency character of groundborne noise. Because airborne noise often masks groundborne noise for aboveground (i.e., at-grade or elevated) railroad tracks, groundborne noise criteria apply primarily to operation in a tunnel, where airborne noise is not a factor, and to buildings with sensitive interior spaces that are well insulated from exterior noise.

Table 3.12-7. Federal Transit Administration Groundborne Vibration and Groundborne Noise Impact Criteria

	Groundborne Vibration Impact Levels (VdB re 1 micro-inch/second)			Groundborne Noise Impact Levels (dBA re 20 micro Pascals)		
Land Use Category	**Frequent Events**	**Occasional Events**	**Infrequent Events**	**Frequent Events**	**Occasional Events**	**Infrequent Events**
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[a]	65 VdB[a]	65 VdB[a]	N/A[b]	N/A[b]	N/A[b]

Land Use Category	Groundborne Vibration Impact Levels (VdB re 1 micro-inch/second)			Groundborne Noise Impact Levels (dBA re 20 micro Pascals)		
	Frequent Events	Occasional Events	Infrequent Events	Frequent Events	Occasional Events	Infrequent Events
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

Source: Federal Transit Administration 2018.

[a] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. For equipment that is more sensitive, a Detailed Vibration Analysis must be performed.

[b] Vibration-sensitive equipment is generally not sensitive to groundborne noise.

VdB = vibration decibel

dBA = A-weighted decibel

N/A = not applicable

Table 3.12-8. Federal Transit Administration Groundborne Vibration and Groundborne Noise Impact Criteria for Special Buildings

Type of Building or Room	Groundborne Vibration Impact Levels (VdB re 1 micro-inch/sec)		Groundborne Noise Impact Levels (dBA re 20 micro-Pascals)	
	Frequent Events	Occasional or Infrequent Events	Frequent Events	Occasional or Infrequent Events
Concert Halls	65 VdB	65 VdB	25 dBA	25 dBA
TV Studios	65 VdB	65 VdB	25 dBA	25 dBA
Recording Studios	65 VdB	65 VdB	25 dBA	25 dBA
Auditoriums	72 VdB	80 VdB	30 dBA	38 dBA
Theaters	72 VdB	80 VdB	35 dBA	43 dBA

Source: Federal Transit Administration 2018.

VdB = vibration decibel

dBA = A-weighted decibel

One factor not incorporated in the criteria is existing vibration. In most cases, except near railroad tracks, the existing environment does not include a substantial number of perceptible groundborne vibration or noise events. However, rail projects sometimes use parts of existing rail routes. The criteria presented in Tables 3.12-7 and 3.12-8 do not indicate how to account for existing vibration, a common situation for rail projects using existing railroad right-of-way. Vibration from existing trains can be estimated using the general assessment procedures in Chapter 10 of the FTA's *Transit Noise and Vibration Impact Assessment* (Federal Transit Administration 2018). Representative scenarios for existing vibrations can be assessed using the following methods where existing vibration can be substantial, as listed below.

- **Infrequently used rail route:** Use the vibration criteria from Tables 3.12-7 and 3.12-8 when the existing rail traffic consists of four trains or fewer per day.
- **Moderately used rail route:** If the existing rail traffic consists of 5 to 12 trains per day with vibration that substantially exceeds the impact criteria, there would be no effect as long as the project vibration levels are at least 5 VdB less than the existing vibration. Vibration from existing trains can be estimated using the General Assessment procedures in Chapter 10 of the FTA guidelines (Federal Transit Administration 2018).
- **Heavily used rail route:** If the existing traffic exceeds 12 trains per day and if the Proposed Project would not substantially increase the number of vibration events (less than doubling the number of trains is usually considered not substantial), there would be no additional effect unless the project vibration, estimated using the procedures of Chapter 10 of the FTA guidelines, would be higher than the existing vibration (Federal Transit Administration 2018). In locations where the new trains would be operating at higher speeds than the existing rail traffic, the trains would likely generate substantially higher levels of groundborne vibration. When a project would cause vibration more than 5 VdB greater than the existing source, the existing source can be ignored and the vibration criteria in Tables 3.12-7 and 3.12-8 can be applied to the project.
- **Moving existing tracks:** Another scenario where existing vibration can be substantial is a new rail line within an existing railroad right-of-way that requires shifting the location of existing tracks. Where the track relocation would cause higher vibration levels at sensitive receptors, the projected vibration levels from both rail systems must be compared to the appropriate impact criterion to determine if there would be a new effect. If an effect is judged to have existed prior to moving the tracks, new effects would be assessed only if the relocation would result in more than a 3 VdB increase in vibration level. Although the impact thresholds given in Tables 3.12-7 and 3.12-8 are based on experience with vibration from rail transit systems, the thresholds can be applied to freight train vibrations as well. However, locomotive and rail car vibration should be considered separately. Because locomotive vibration only lasts for a few seconds, the infrequent-event limit is appropriate, but for a typical line haul freight train where the rail car vibration lasts for several minutes, the frequent-event limits should be applied to the rail car vibration. Some judgment must be exercised to make sure that the approach is reasonable. For example, some spur rail lines carry very little rail traffic (sometimes only one train per week) or have short trains, in which case the infrequent-event limits are appropriate.

3.12.4.3 Impacts and Mitigation Measures

Impact NOI-1a: Construction of the Proposed Project would expose sensitive receptors to substantial temporary increases in ambient noise levels.

Level of Impact Prior to Mitigation	**Potentially Significant (mitigation required)**
	Proposed Project
	Tri-Valley Alignment
	Dublin/Pleasanton Station
	Isabel Station
	Greenville Station
	Altamont Alignment
	Owens-Illinois Industrial Lead Variant 1, Single Track
	Owens-Illinois Industrial Lead Variant 2, Double Track
	Interim OMF

	Tracy OMF Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track Downtown Tracy Station North Lathrop Station <u>Alternatives Analyzed at an Equal Level of Detail</u> Southfront Road Station Alternative West Tracy OMF Alternative Mountain House Station Alternative Downtown Tracy Station Parking Alternative 1 Downtown Tracy Station Parking Alternative 2 **Less than Significant/No Impact** <u>Proposed Project</u> Mountain House Station River Islands Station <u>Alternatives Analyzed at an Equal Level of Detail</u> Stone Cut Alignment Alternative
Mitigation Measures	NOI-1.1a: Implement a construction noise control plan.
Level of Impact after Mitigation	**Significant and Unavoidable**

Impact Characterization

Construction of the Proposed Project would include three basic activities: (1) site work, (2) rail work, and (3) structures work. Site work is expected to occur over periods of 1 to 36 months, rail work is expected to occur over periods of 1 to 36 months, and structures work is expected to occur over periods of 6 to 24 months. Generally, construction of the Proposed Project could last anywhere from 8 to 48 months, depending on the element (See Chapter 2, *Project Description*). Construction work could occur during the nighttime along portions of the alignment that are on active freight rail lines. The local noise ordinances for the cities and counties along the Valley Link corridor generally limit construction noise to particular time periods during the weekday, weekend, and holiday daytime hours. Nighttime construction work is generally prohibited, but some jurisdictions allow for variance.

Table 3.12-9 summarizes the estimated construction noise levels and residential noise impact screening distances for each of the planned construction activities. The noise estimates are based on scenarios for the construction activities, using FTA methodology described in above, and FTA criteria also described above. However, to be conservative, the screening distance estimates did not assume any topography or ground effects. The results of the analysis indicate that noise impacts would be limited to residences within 135 to 270 feet from the construction site, depending on the activity. The potential for noise impact would be greatest during structures work at locations where pile driving is required for bridge construction.

Table 3.12-9. Residential Noise Impact Assessment for Construction Activities

Construction Activity and Equipment	Noise Level at 50 feet (dBA)	Equipment Usage Factor (%)	8-Hour Leq at 50 feet (dBA)		Approx. Noise Impact Distance (feet)
			Predicted Exposure	Daytime Criterion	
Site Work			**89**	**80**	**135**
Grader	85	53	82	--	--
Water Truck	84	44	80	--	--
D6 Dozer	85	61	83	--	--
D8 Dozer	85	45	82	--	--
Compactor	82	45	79	--	--
Dump Truck	84	23	78	--	--
Rail Work			**90**	**80**	**150**
Locomotive	88	25	82	--	--
D6 Dozer	85	38	81	--	--
Grader	85	38	81	--	--
Water Truck	84	38	80	--	--
Tamper	83	20	76	--	--
Aligner	85	20	78	--	--
Swinger	85	19	78	--	--
Welder	74	38	70	--	--
Flat Bed Truck	84	31	79	--	--
Pickup Truck	75	25	69	--	--
SUV	75	31	70	--	--
35 Ton RT Crane	83	38	79	--	--
Flat Bed Tractor	84	13	75	--	--
Wheel Loader	80	28	74	--	--
Structures			**95**	**80**	**270**
Impact Pile Driver	101	20	94		
Generator	82	90	82	--	--
75 T Mobile Crane	83	38	79	--	--
Water Truck	84	20	77	--	--
Flat Bed Truck	84	25	78	--	--
Pickup Truck	75	53	72	--	--
Concrete Mixer	85	13	76	--	--
Concrete Pump	82	18	75	--	--
Wheel Loader	80	20	73	--	--
Welder	74	31	69	--	--

Leq = equivalent sound level
dBA = A-weighted decibel

Impact Detail and Conclusions

Proposed Project

Construction activities would be considered to have a significant impact if they would generate noise exposure in excess of the FTA thresholds. As shown in Table 3.12-9, the operation of certain construction equipment and construction activities could generate noise exposure in excess of FTA thresholds. Nighttime construction near residential uses would have larger impacts than daytime construction would have and would also result in a potentially significant impact.

Some construction equipment and construction activities would expose sensitive receptors to substantial temporary increases in ambient noise levels. Impacts would be potentially significant.

Alternatives Analyzed at an Equal Level of Detail

Similar to the Proposed Project, construction of the alternatives analyzed at an equal level of detail would expose sensitive receptors to substantial temporary increases in ambient noise levels. Impacts would be potentially significant.

Mitigation Measures

The following mitigation measure would apply to the Proposed Project and the alternatives analyzed at an equal level of detail, for construction noise impacts.

Mitigation Measure NOI-1.1a: Implement a construction noise control plan.

A noise control plan that incorporates, at a minimum, the following best management practices into the construction scope of work and specifications to reduce the impact of temporary construction-related noise on nearby noise-sensitive receptors (if present in the construction area) will be prepared and implemented.

- Install temporary construction site sound barriers near noise sources.
- Use moveable sound barriers at the source of the construction activity.
- Avoid the use of impact pile drivers where possible near noise-sensitive areas or use quieter alternatives (e.g., drilled piles) where geological conditions permit.
- Locate stationary construction equipment as far as possible from noise-sensitive sites.
- Re-route construction-related truck traffic along roadways that will cause the least disturbance to residents.
- Use low-noise-emission equipment.
- Implement noise-deadening measures for truck loading and operation.
- Line or cover storage bins, conveyors, and chutes with sound-deadening material.
- Use acoustic enclosures, shields, or shrouds for equipment and facilities.
- Use high-grade engine exhaust silencers and engine-casing sound insulation.
- Minimize the use of generators to power equipment.
- Limit the use of public address systems.

- Grade surface irregularities on construction sites.
- Monitor and maintain equipment to meet noise limits.
- Establish an active community liaison program to keep residents informed about construction and to provide a procedure for addressing complaints.

Significance with Application of Mitigation

Although the measures specified in Mitigation Measure NOI-1.1a (Implement a construction noise control plan) would generally reduce the construction noise levels, the measures would not necessarily guarantee that all sensitive residential receptors in the vicinity of the construction area would not be exposed to noise levels exceeding the 80 dBA limit during the day or the 70 dBA limit at night. It is probable that construction near some residential areas will have to be conducted at night to avoid disruption of active freight and passenger rail operation and to complete construction on schedule. Furthermore, although a temporary sound wall may be effective in certain locations, in many cases, the nature of the construction work makes use of such sound walls infeasible.

Construction-related noise would be short-term and would cease after construction is completed. Still, even with mitigation, the impact of temporary construction-related noise on nearby noise-sensitive receptors would remain a significant and unavoidable impact of the Proposed Project and alternatives analyzed at an equal level of detail, in particular where heavy construction would occur immediately adjacent to residences and where construction would occur at night near residences.

Comparison of Alternatives

The Proposed Project impact analysis described above, provides a worst-case scenario impact analysis for the Proposed Project. Therefore, daytime construction noise impacts associated with the alternatives analyzed at an equal level of detail would be similar or less than the project impacts. Nighttime construction noise impact discussed above, would only be associated with the Southfront Road Station Alternative. Mitigation Measure Mitigation Measure NOI-1.1a would also apply to the project alternatives analyzed at and equal level. However, similar to the Proposed Project, even with mitigation, the impact of temporary construction-related noise on nearby noise-sensitive receptors would remain a significant and unavoidable for the alternatives analyzed at an equal level of detail, in particular where heavy construction would occur immediately adjacent to residences and where construction would occur at night near residences.

Impact NOI-1b: Operation of the Proposed Project would result in a substantial permanent increase in ambient noise levels.

Level of Impact Prior to Mitigation	**Potentially Significant (mitigation required)** <u>Proposed Project</u> Owens-Illinois Industrial Lead Variant 1, Single Track Owens-Illinois Industrial Lead Variant 2, Double Track Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track Downtown Tracy Station <u>Alternatives Analyzed at an Equal Level of Detail</u> Downtown Tracy Station Parking Alternative 1 Downtown Tracy Station Parking Alternative 2

	Less than Significant/No Impact Proposed Project Tri-Valley Alignment Dublin/Pleasanton Station Isabel Station Greenville Station Altamont Alignment Interim OMF Mountain House Station Tracy OMF River Islands Station North Lathrop Station Alternatives Analyzed at an Equal Level of Detail Southfront Road Station Alternative Stone Cut Alignment Alternative West Tracy OMF Alternative Mountain House Station Alternative
Mitigation Measures	NOI-1.1b: Implement a phased program to reduce train noise along the Valley Link corridor as necessary to address noise increases over FTA's severe impact thresholds.
Level of Impact after Mitigation	**Significant and Unavoidable**

Impact Characterization

Operation of the Proposed Project would extend new passenger rail service while generating both mobile and stationary source noise.

The noise impact evaluation was performed in accordance with FTA methodology. The assessment of railroad operation noise considers noise from the type of train, track and stationary noise sources at proposed station, traction power substations, and OMF locations. FTA's guidelines characterize potential noise impacts as having no impact, moderate impact, or severe impact (Federal Transit Administration 2018). The severity of the difference associated with a proposed rail project depends upon the existing noise exposure. As baseline noise levels increase, the project increment that would trigger a moderate or severe finding becomes progressively smaller. Using FTA assessment methodology, the existing noise level and the project-calculated noise level are combined to compute the noise exposure at the receiving locations (Federal Transit Administration 2018). Table 3.12-10 for DMU and Table 3.12-12 for DLH summarizes the results for Proposed Project operation in 2025 and Table 3.12-11 for DMU and Table 3.12-13 for DLH summarizes the results for Proposed Project operation in 2040. As noted above, the FTA severe impact threshold is used as the CEQA significance criteria in this EIR.

Table 3.12-10. Summary of Valley Link Operational Noise Levels - Diesel Multiple Unit (DMU) —2025

			Noise Level (Ldn/Leq[a dBA])			FTA Noise Level Criteria			CEQA	
Site	City	Land Use	Existing	Proposed Project	Existing + Proposed Project	Moderate Impact[b]	Severe Impact[b]	Impact[c]	Increase Over Existing	Impact
Tri-Valley Segment										
LT-26	Dublin	Residential	74.7	58.2	74.8	65.0	72.4	None	0.1	No
LT-01	Pleasanton	Residential	75.2	56.8	75.3	65.0	73.2	None	0.1	No
LT-02	Livermore	Golf Course	72.1	57.4	72.2	70.0	75.9	None	0.1	No
LT-25	Livermore	Office	64.5	55.9	65.0	65.2	70.6	None	0.6	No
LT-24	Livermore	Park	64.7	51.0	64.9	65.2	70.6	None	0.2	No
LT-03	Livermore	Hospital	68.5	48.4	68.5	67.9	73.1	None	0.0	No
LT-04	Livermore	Residential	72.5	57.9	72.7	65.0	70.9	None	0.1	No
LT-23	Livermore	Residential	59.8	49.3	60.1	57.2	62.9	None	0.4	No
LT-05	Livermore	Hotel (Pool)	66.2	53.5	66.4	61.5	66.8	None	0.2	No
Altamont Segment										
LT-06	Alameda County	Commercial	68.6	55.9	68.9	62.9	68.1	None	0.3	No
LT-07	San Joaquin County	Residential	69.7	69.4	72.6	63.6	68.8	Severe	2.9	Yes
LT-08	San Joaquin County	Residential	62.9	56.0	63.8	58.9	64.5	None	0.9	No
Tracy to Lathrop Segment										
LT-22	San Joaquin County	Residential	62.3	64.3	66.4	58.9	64.5	Moderate	4.1	None
LT-09	San Joaquin County	Residential	53.6	67.7	67.8	54.4	60.5	Severe	14.2	Yes
LT-21	Tracy	Park	51.1	67.1	67.2	53.7	59.8	Severe	16.1	Yes
LT-20	Tracy	Residential	51.8	64.0	64.3	53.7	59.8	Severe	12.4	Yes
LT-19	Tracy	Residential	54.3	69.2	69.3	54.9	60.8	Severe	15.1	Yes
LT-18	Tracy	Office	53.2	68.6	68.7	54.4	60.5	Severe	15.5	Yes
LT-17	Tracy	Residential	55.5	65.0	65.4	55.3	61.2	Severe	9.9	Yes
LT-16	Tracy	Residential	62.0	70.4	71.0	58.9	64.5	Severe	9.0	Yes
LT-15	Banta	Residential	68.7	70.5	72.7	62.9	68.1	Severe	4.0	Yes
LT-10	Banta	Residential	68.4	56.1	68.6	62.9	68.1	None	0.3	No

			Noise Level (Ldn/Leq[a dBA])			FTA Noise Level Criteria			CEQA	
Site	City	Land Use	Existing	Proposed Project	Existing + Proposed Project	Moderate Impact[b]	Severe Impact[b]	Impact[c]	Increase Over Existing	Impact
LT-14	Lathrop	Park	70.2	60.6	70.6	69.4	74.5	None	0.5	No
LT-11	Lathrop	Residential	61.5	62.5	65.0	58.4	63.9	Moderate	3.6	No
LT-13	Lathrop	Residential	62.4	64.1	66.3	58.9	64.5	Moderate	3.9	No
LT-12	Lathrop	Residential	63.6	55.7	67.1	59.6	65.0	Severe	3.5	Yes

[a] Ldn is used for Category 2 (residential) land use and Leq is used for Category 3 (institutional) land use.
[b] Based on Figures 3.12-6 and 3.12-7.
[d] Based on Figure 3.12-5.
FTA = Federal Transit Administration, CEQA = the California Environmental Quality Act; dBA = A-weighted decibels; Leq = equivalent sound level.

Table 3.12-11. Summary of Valley Link Operational Noise Levels - Diesel Multiple Unit (DMU) —2040

			Noise Level (Ldn/Leq[a dBA])			FTA Noise Level Criteria			CEQA	
Site	City	Land Use	Existing	Proposed Project	Existing + Proposed Project	Moderate Impact[b]	Severe Impact[b]	Impact[c]	Increase Over Existing	Impact
Tri-Valley Segment										
LT-26	Dublin	Residential	74.7	59.4	74.8	65.0	72.4	None	0.1	No
LT-01	Pleasanton	Residential	75.2	58.0	75.3	65.0	73.2	None	0.1	No
LT-02	Livermore	Golf Course	72.1	58.2	72.3	70.0	75.9	None	0.2	No
LT-25	Livermore	Office	64.5	56.7	65.1	65.2	70.6	None	0.7	No
LT-24	Livermore	Park	64.7	51.9	64.9	65.2	70.6	None	0.2	No
LT-03	Livermore	Hospital	68.5	49.2	68.5	67.9	73.1	None	0.1	No
LT-04	Livermore	Residential	72.5	59.1	72.7	65.0	70.9	None	0.2	No
LT-23	Livermore	Residential	59.8	50.5	60.2	57.2	62.9	None	0.5	No
LT-05	Livermore	Hotel (Pool)	66.2	54.7	66.5	61.5	66.8	None	0.3	No
Altamont Segment										
LT-06	Alameda County	Commercial	68.6	56.8	68.9	62.9	68.1	None	0.3	No
LT-07	San Joaquin County	Residential	69.7	70.1	72.9	63.6	68.8	Severe	3.2	No

			Noise Level (Ldn/Leq[a dBA])			FTA Noise Level Criteria			CEQA	
Site	City	Land Use	Existing	Proposed Project	Existing + Proposed Project	Moderate Impact[b]	Severe Impact[b]	Impact[c]	Increase Over Existing	Impact
LT-08	San Joaquin County	Residential	62.9	54.5	63.5	63.9	69.5	None	0.6	No
Tracy to Lathrop Segment										
LT-22	San Joaquin County	Residential	62.3	66.9	68.2	58.9	64.5	Severe	5.9	Yes
LT-09	San Joaquin County	Residential	53.6	70.3	70.4	54.4	60.5	Severe	16.8	Yes
LT-21	Tracy	Park	51.1	69.7	69.8	53.7	59.8	Severe	18.7	Yes
LT-20	Tracy	Residential	51.8	66.6	66.8	53.7	59.8	Severe	14.9	Yes
LT-19	Tracy	Residential	54.3	71.8	71.9	54.9	60.8	Severe	17.6	Yes
LT-18	Tracy	Office	53.2	71.2	71.2	54.4	60.5	Severe	18.0	Yes
LT-17	Tracy	Residential	55.5	67.6	67.8	55.3	61.2	Severe	12.3	Yes
LT-16	Tracy	Residential	62.0	73.0	73.4	58.9	64.5	Severe	11.3	Yes
LT-15	Banta	Residential	68.7	73.1	74.4	62.9	68.1	Severe	5.8	Yes
LT-10	Banta	Residential	68.4	58.2	68.8	62.9	68.1	None	0.4	No
LT-14	Lathrop	Park	70.2	61.2	70.7	64.4	69.5	None	0.5	No
LT-11	Lathrop	Residential	61.5	65.1	66.7	58.4	63.9	Severe	5.2	Yes
LT-13	Lathrop	Residential	62.4	66.7	68.1	58.9	64.5	Severe	5.6	Yes
LT-12	Lathrop	Residential	63.6	58.3	67.4	59.6	65.0	Severe	3.8	Yes

[a] Ldn is used for Category 2 (residential) land use and Leq is used for Category 3 (institutional) land use.

[b] Based on Figures 3.12-6 and 3.12-7.

[d] Based on Figure 3.12-5.FTA = Federal Transit Administration, CEQA = the California Environmental Quality Act; dBA = A-weighted decibels; Leq = equivalent sound level.

Table 3.12-12. Summary of Valley Link Operational Noise Levels - Diesel Locomotive Haul (DLH) —2025

			Noise Level (Ldn/Leq[a dBA])			FTA Noise Level Criteria			CEQA	
Site	City	Land Use	Existing	Proposed Project	Existing + Proposed Project	Moderate Impact[b]	Severe Impact[b]	Impact[c]	Increase Over Existing	Impact
Tri-Valley Segment										
LT-26	Dublin	Residential	74.7	59.3	74.8	65.0	72.4	None	0.1	No
LT-01	Pleasanton	Residential	75.2	60.3	75.4	65.0	73.2	None	0.1	No
LT-02	Livermore	Golf Course	72.1	59.3	72.3	70.0	75.9	None	0.2	No
LT-25	Livermore	Office	64.5	57.0	65.2	65.2	70.6	None	0.7	No
LT-24	Livermore	Park	64.7	52.4	64.9	65.2	70.6	None	0.3	No
LT-03	Livermore	Hospital	68.5	50.7	68.6	67.9	73.1	None	0.1	No
LT-04	Livermore	Residential	72.5	60.7	72.8	65.0	70.9	None	0.3	No
LT-23	Livermore	Residential	59.8	50.0	60.2	57.2	62.9	None	0.4	No
LT-05	Livermore	Hotel (Pool)	66.2	54.8	66.5	61.5	66.8	None	0.3	No
Altamont Segment										
LT-06	Alameda County	Commercial	68.6	57.6	69.0	62.9	68.1	None	0.4	No
LT-07	San Joaquin County	Residential	69.7	69.5	72.6	63.6	68.8	Severe	2.9	Yes
LT-08	San Joaquin County	Residential	62.9	59.3	64.5	58.9	64.5	Moderate	1.6	No
Tracy to Lathrop Segment										
LT-22	San Joaquin County	Residential	62.3	64.4	66.5	58.9	64.5	Moderate	4.2	No
LT-09	San Joaquin County	Residential	53.6	67.7	67.9	54.4	60.5	Severe	14.3	Yes
LT-21	Tracy	Park	51.1	67.3	67.4	53.7	59.8	Severe	16.3	Yes
LT-20	Tracy	Residential	51.8	64.2	64.4	53.7	59.8	Severe	12.6	Yes
LT-19	Tracy	Residential	54.3	69.4	69.5	54.9	60.8	Severe	15.2	Yes
LT-18	Tracy	Office	53.2	68.7	68.8	54.4	60.5	Severe	15.7	Yes
LT-17	Tracy	Residential	55.5	65.1	65.5	55.3	61.2	Severe	10.0	Yes
LT-16	Tracy	Residential	62.0	70.6	71.1	58.9	64.5	Severe	9.1	Yes
LT-15	Banta	Residential	68.7	70.6	72.8	62.9	68.1	Severe	4.1	Yes
LT-10	Banta	Residential	68.4	57.9	68.7	62.9	68.1	None	0.4	No

			Noise Level (Ldn/Leq[a dBA])			FTA Noise Level Criteria			CEQA	
Site	City	Land Use	Existing	Proposed Project	Existing + Proposed Project	Moderate Impact[b]	Severe Impact[b]	Impact[c]	Increase Over Existing	Impact
LT-14	Lathrop	Park	70.2	60.7	70.6	69.4	74.5	None	0.5	No
LT-11	Lathrop	Residential	61.5	62.6	65.1	58.4	63.9	Moderate	3.6	No
LT-13	Lathrop	Residential	62.4	64.2	66.4	58.9	64.5	Moderate	4.0	No
LT-12	Lathrop	Residential	63.6	57.6	67.3	59.6	65.0	Severe	3.7	Yes

[a] Ldn is used for Category 2 (residential) land use and Leq is used for Category 3 (institutional) land use.
[b] Based on Figures 3.12-6 and 3.12-7.
[d] Based on Figure 3.12-5.
FTA = Federal Transit Administration, CEQA = the California Environmental Quality Act; dBA = A-weighted decibels; Leq = equivalent sound level.

Table 3.12-13. Summary of Valley Link Operational Noise Levels - Diesel Locomotive Haul (DLH) —2040

			Noise Level (Ldn/Leq[a dBA])			FTA Noise Level Criteria			CEQA	
Site	City	Land Use	Existing	Proposed Project	Existing + Proposed Project	Moderate Impact[b]	Severe Impact[b]	Impact[c]	Increase Over Existing	Impact
Tri-Valley Segment										
LT-26	Dublin	Residential	74.7	60.5	74.9	65.0	72.4	None	0.2	No
LT-01	Pleasanton	Residential	75.2	61.5	75.4	65.0	73.2	None	0.2	No
LT-02	Livermore	Golf Course	72.1	60.1	72.3	70.0	75.9	None	0.3	No
LT-25	Livermore	Office	64.5	57.8	65.3	65.2	70.6	None	0.9	No
LT-24	Livermore	Park	64.7	53.2	65.0	65.2	70.6	None	0.3	No
LT-03	Livermore	Hospital	68.5	51.5	68.6	67.9	73.1	None	0.1	No
LT-04	Livermore	Residential	72.5	61.9	72.9	65.0	70.9	None	0.4	No
LT-23	Livermore	Residential	59.8	51.2	60.3	57.2	62.9	None	0.6	No
LT-05	Livermore	Hotel (Pool)	66.2	56.0	66.6	61.5	66.8	None	0.4	No
Altamont Segment										
LT-06	Alameda County	Commercial	68.6	58.6	69.1	62.9	68.1	None	0.4	No
LT-07	San Joaquin County	Residential	69.7	70.3	73.0	63.6	68.8	Severe	3.3	No

			Noise Level (Ldn/Leq[a dBA])			FTA Noise Level Criteria			CEQA	
Site	City	Land Use	Existing	Proposed Project	Existing + Proposed Project	Moderate Impact[b]	Severe Impact[b]	Impact[c]	Increase Over Existing	Impact
LT-08	San Joaquin County	Residential	62.9	57.6	64.1	63.9	69.5	None	1.2	No
Tracy to Lathrop Segment										
LT-22	San Joaquin County	Residential	62.3	67.0	68.3	58.9	64.5	Severe	6.0	Yes
LT-09	San Joaquin County	Residential	53.6	70.4	70.4	54.4	60.5	Severe	16.8	Yes
LT-21	Tracy	Park	51.1	69.9	69.9	53.7	59.8	Severe	18.8	Yes
LT-20	Tracy	Residential	51.8	66.8	66.9	53.7	59.8	Severe	15.1	Yes
LT-19	Tracy	Residential	54.3	72.0	72.0	54.9	60.8	Severe	17.8	Yes
LT-18	Tracy	Office	53.2	71.3	71.4	54.4	60.5	Severe	18.2	Yes
LT-17	Tracy	Residential	55.5	67.7	67.9	55.3	61.2	Severe	12.5	Yes
LT-16	Tracy	Residential	62.0	73.1	73.5	58.9	64.5	Severe	11.4	Yes
LT-15	Banta	Residential	68.7	73.2	74.5	62.9	68.1	Severe	5.9	Yes
LT-10	Banta	Residential	68.4	60.2	69.0	62.9	68.1	None	0.6	No
LT-14	Lathrop	Park	70.2	61.6	70.7	64.4	69.5	None	0.6	No
LT-11	Lathrop	Residential	61.5	65.3	66.8	58.4	63.9	Severe	5.3	Yes
LT-13	Lathrop	Residential	62.4	66.8	68.2	58.9	64.5	Severe	5.7	Yes
LT-12	Lathrop	Residential	63.6	60.2	67.7	59.6	65.0	Severe	4.1	Yes

[a] Ldn is used for Category 2 (residential) land use and Leq is used for Category 3 (institutional) land use.

[b] Based on Figures 3.12-6 and 3.12-7.

[d] Based on Figure 3.12-5.FTA = Federal Transit Administration, CEQA = the California Environmental Quality Act; dBA = A-weighted decibels; Leq = equivalent sound level.

Impact Detail and Conclusions

Proposed Project

Tri Valley Segment

Within the Tri-Valley segment, the Proposed Project would result in no impacts at existing receptors. The Tri-Valley Alignment would expose receptors to similar noise levels shown in Table 3.12-10 for DMU and Table 3.12-12 for DLH for the operational year 2025 and characterized by sites LT-02,LT-24,LT-01, LT-03 through LT-05, LT-23, and LT-25, LT-26 show no impacts.

The Tri-Valley Alignment would also expose receptors to similar noise levels shown in Table 3.12-11 for DMU and Table 3.12-13 for DLH for the operational year 2040 and characterized by sites LT-02 and LT-24, LT-01, LT-03 through LT-05, LT-23, and LT-25, LT-26 show no impacts.

Altamont Segment

The Altamont Alignment would operate within the existing Alameda County Transportation Corridor right-of-way in the Alameda County portion of the Altamont segment and in the UPRR Owens-Illinois Industrial Lead tracks in the San Joaquin County portion of the Altamont segment. Owens-Illinois Industrial Lead Variant 1, Single Track, would upgrade existing tracks within the existing UPRR Owens-Illinois Industrial Lead, and Owens-Illinois Industrial Lead Variant 2, Double Track, would be located adjacent to existing tracks within the existing right-of-way and UPRR Owens-Illinois Industrial Lead along this segment. Therefore, both Owens-Illinois Industrial Lead Variant 1, Single Track, and Owens-Illinois Industrial Lead Variant 2, Double Track, would expose receptors to similar noise levels shown in Table 3.12-10 for DMU and Table 3.12-12 for DLH (2025) and Table 3.12-11 for DMU and Table 3.12-13 for DLH (2040) and characterized by sites LT-06 through LT-08. Within the Altamont segment the Proposed Project would result in a severe impact at LT-07 due to operation of the project in 2025 as shown in Table 3.12.10, at existing rural residential receptors in the vicinity of the Interim OMF. Similarly, for the year 2040, as shown in Table 3.12-11 for DMU and Table 3.12-13 for DLH, site LT-07 shows a severe impact due to operation of the Proposed Project. This impact is related to horn noise from trains approaching at-grade crossings and the station platforms.

The Proposed Project includes one new station, Mountain House Station in the Altamont segment, as well as two OMFs (only one of which would be constructed), Interim OMF and Tracy OMF. The proposed station and OMFs are located in rural areas surrounded primarily by agricultural, industrial, and rural residential uses. FTA model calculations show that operation of the Proposed Project within the Altamont segment would result in an increase in noise levels to sensitive receptors represented by site LT-07 under 2025 and 2040 project operation, and therefore severe impacts would result.

Tracy to Lathrop Segment

Within the Tracy to Lathrop segment, the Proposed Project would result in moderate and severe impacts at existing residential receptors. Tracy to Lathrop Alignment Variant 1, Single Track, and Tracy to Lathrop Alignment Variant 2, Double Track, would operate within the existing UPRR right-of-way. Tracy to Lathrop Alignment Variant 1, Single Track, would upgrade existing UPRR tracks. Therefore, both the Tracy to Lathrop Alignment Variant 1, Single Track, and Tracy to Lathrop Alignment Variant 2, Double Track, would expose receptors to similar noise levels shown in Table

3.12-10 for DMU and Table 3.12-12 for DLH for the operational year 2025 and characterized by sites LT-09 through LT-22. As shown in Table 3.12-10 for DMU and Table 3.12-12 for DLH, site LT-22 shows moderate impacts; and sites LT-9, LT-11 through LT-13, and LT-15 through LT-21 show severe impacts. These impacts are related to horn noise from trains approaching the nearby at-grade crossings and approaching the stations.

Similarly, for the year 2040 operating plan, the Proposed Project would expose receptors to noise levels shown in Table 3.12-11 for DMU and Table 3.12-13 for DLH and characterized by sites LT-09 through LT-22. As shown in Table 3.12-11 for DMU and Table 3.12-13 for DLH, sites LT-09, LT-11 through LT-13, and LT-15 through LT-22 show severe impacts. These impacts are related to horn noise from trains approaching the nearby at-grade crossings and approaching the stations.

The Proposed Project includes three new stations in the Tracy to Lathrop segment: Downtown Tracy Station, River Islands Station, and North Lathrop Station. The Downtown Tracy Station, characterized by site LT-17 in Table 3.12-10 for DMU and Table 3.12-12 for DLH, would be constructed at the existing Tracy Transit Center at 50 East Sixth Street in downtown Tracy and adjacent to residential receptors. The River Islands Station, characterized by sites LT-10 and LT-14 in Table 3.12-10 for DMU and Table 3.12-12 for DLH, would be constructed in a rural area with no noise-sensitive receptors exposed to operational noise. The North Lathrop Station, characterized by site LT-12, would be constructed at the same site as the ACE North Lathrop station included in the ACE Extension Lathrop to Ceres/Merced project and adjacent to residential, commercial and light industrial land uses.

Significance Conclusion

As presented in Table 3.12-10 for DMU and Table 3.12-12 for DLH (2025); and Table 3.12-11 for DMU and Table 3.12-13 for DLH (2040), FTA model calculations show that operation of the Proposed Project within the Tri-Valley segment would result in no impacts. However, operation of the Proposed Project within the Altamont segment and the Tracy to Lathrop segment would result in moderate and severe impacts at existing residential receptors. These impacts would be related to horn noise from trains approaching the at-grade crossings and station platforms.

Therefore, operation of the Proposed Project would result in moderate and severe noise impacts due to the implementation of the Proposed Project or alternatives analyzed at an equal level of detail. Because Project operation would cause an increase in ambient noise levels that exceed the FTA severe impact criteria, this is considered a significant impact.

Alternatives Analyzed at an Equal Level of Detail

Similar to the Proposed Project, operation of the alternatives analyzed at an equal level of detail would cause an increase in ambient noise levels that exceed the FTA severe impact criteria. Impacts would be significant.

Mitigation Measures

The following mitigation measure would apply to proposed improvements in the Tri-Valley segment, Altamont segment, and Tracy to Lathrop segment at locations where operation of the Proposed Project and alternatives analyzed at an equal level of detail would result in noise levels that exceed the CEQA significance threshold.

Mitigation Measure NOI-1.1b: Implement a phased program to reduce train noise along the Valley Link corridor as necessary to address noise increases over FTA's severe impact thresholds.

This mitigation applies mandatorily to noise increases over FTA's severe impact thresholds. Mitigation is recommended for moderate impacts particularly when already addressing severe impacts in an area, but is not mandatory for the purposes of CEQA.

The Authority will require new rolling stock for Valley Link operation to meet FRA vehicle noise requirements and will require train horn height and noise level to be as low as possible while complying with the FRA Train Horn Rule per FRA regulations (49 C.F.R. Part 222). The Authority will also establish safety warning requirements for trains transiting through stations that minimize train horn noise, as and where feasible, while also providing adequate safety awareness for station users.

The Authority will also coordinate with other rail operators, local jurisdictions (including the cities of Tracy and Lathrop), transportation funding agencies, and state and federal agencies to implement incremental the noise-reduction measures described below at the locations of severe cumulative noise impacts (as funding becomes available), where such measures are acceptable to the local community, and where measures are determined feasible. This mitigation applies to the locations where the Proposed Project would substantially contribute to severe cumulative noise impacts. Where the Proposed Project would not contribute to severe cumulative noise impacts, the Authority is not required to participate in mitigation.

The Authority will work with local, state, and federal partners to establish priorities for noise reduction measures to be implemented as funding becomes available. The Authority will also work with other willing rail operators to seek additional funding from other parties that contribute to cumulative noise levels.

Improvements will be phased as needed to address changes in rail service over time and the associated rail noise over FTA's severe impact thresholds. If funding participation by other parties is limited, the Authority may not be able to fund all potential noise mitigation on its own, particularly where the mitigation to address cumulative noise impacts far exceeds the Authority's fair share of the impact.

Train Horn Location

The Authority will require train horns on new train equipment used for Valley Link service to be placed at the minimum height above the top of rail (ATOR) and to use the minimum noise level that is compliant with the FRA Train Horn Rule. Placement of train horns at lower heights on trains can reduce the spillover of noise in adjacent areas while meeting FRA noise warning requirements for vehicular, pedestrian and other users of at-grade crossings. For example, future trains procured for the California High-Speed Rail system would feature horns mounted at 7 feet ATOR with an Lmax of 96 dBA at 100 feet from the track. Future electric multiple unit trains procured by Caltrain as part of its electrification project would feature horns mounted at 3 feet ATOR.

Station Warning Requirements Concerning Train Horn Sounding

The FRA Train Horn Rule applies to public at-grade crossings of rail rights of way; it does not apply to trains transiting through stations. Operational safety warning requirements concerning

warnings at stations are determined by the host railroad.

For stations within the Authority's dedicated right-of-way (e.g. west of the Owens-Illinois Industrial Lead) where significant impacts to sensitive noise receptors are identified due to sounding of train horn noise, the Authority will evaluate whether safety warning procedures can provide adequate safety without full sounding of train horns. Safety warning procedures could include: reduced duration of horn sounding, use of a secondary train horn with a lower noise level than the FRA Train Horn Rule compliant horn (such as a horn with similar sound level as used by BART for their station entry), and/or wayside horns, bells, verbal announcements, visual warnings, or other means. Auditory warnings will be required (e.g. visual warnings alone will not be considered sufficient to provide adequate safety). The Authority will determine what kind of warnings will provide adequate safety for these stations as necessary to address significant noise effects.

For stations within UPRR right-of-way, the Authority will consult with UPRR to determine what auditory and visual warning will be required when transiting through stations. UPRR is the host railroad for its right-of-way and thus may mandate the sounding of FRA Horn Rule compliant horns when entering or transiting through stations and not allow the use of other safety warning methods.

Where revised warning methods at stations are inadequate to avoid significant noise impacts to sensitive receptors due to horn noise, the Authority will consider targeted noise barriers between the areas of horn sounding and sensitive receptor locations (see discussion of noise barriers below).

Wayside Horns and Residential Building Sound Insulation

The Authority, in cooperation with the other parties noted above, will evaluate the potential to reduce noise impacts through the installation of wayside horns and building sound insulation improvements at residences projected to have a sound increase greater than the FTA severe impact criteria. Building sound insulation methods may include extra wall insulation, window glazing, and sealing of exterior surfaces.

During final design, a technical study will be completed to evaluate the effectiveness of reducing impacts to less than the FTA severe impact threshold through these methods. If the study determines it is feasible to reduce the impact to less than the threshold at an affected sensitive noise receptor, then no additional mitigation at that location will be required. Building sound insulation measures will only be installed to the extent necessary to meet the impact threshold at the receptor location and will only be installed if building owners are willing to accept such measures.

Quiet Zones

The lead agency for a quiet zone designation is the local jurisdiction (typically the city or county) responsible for traffic control and law enforcement on the roads at the at-grade crossings.

The Authority, in cooperation with the other parties, noted above, and the affected local jurisdictions (i.e., the cities of Tracy and Lathrop) will implement a phased program considering the potential establishment of quiet zones along the Valley Link corridor at all locations where train noise is predicted to exceed FTA severe impact thresholds. The Authority will work closely with local jurisdictions including the cities of Tracy and Lathrop to prepare the engineering

studies and coordination agreements to design, construct, and enforce potential quiet zones.

Options for establishing quiet zones could include implementation of the following FRA pre-approved supplemental safety measures (SSMs).

- Four-quadrant gate system. This measure involves the installation of at least one gate for each direction of traffic to fully block vehicles from entering the crossing.
- Gates with medians or channelization devices. This measure keeps traffic in the proper travel lanes as it approaches the crossing, thus denying the driver the option of circumventing the gates by traveling in the opposite lane.
- One-way street with gates. This measure consists of one-way streets with gates installed so that all approaching travel lanes are completely blocked. This option may not be feasible or acceptable to local jurisdictions at all locations where the establishment of quiet zones would reduce noise impacts.
- Road closure. This measure consists of closing the road to through travel at the at-grade crossing. This option may not be feasible or acceptable to local jurisdictions at all locations where the establishment of quiet zones would reduce noise impacts.

In addition to these pre-approved SSMs, FRA also identifies a range of other measures that may be used to establish a quiet zone. These measures could be modified SSMs or non-engineering measures that might involve law enforcement or public awareness programs. Such safety measures must be approved by FRA based on the prerequisite that they provide an equivalent level of safety as the sounding of train horns.

Wayside horns can also be used as part of a quiet zone. While not avoiding the sounding of a horn, wayside horns affect a smaller area than train-mounted horn. Wayside horns can be used when the other measures above are not adequate to avoid the use of a horn.

The lead agency for a quiet zone designation is the local public authority, which is the only authority that can implement a quiet zone. The Authority or the other rail operators cannot, on their own, designate the quiet zone. However, only with the implementation of the quiet zone can the Authority, other tenant railroads, and freight operators be relieved of the requirement to sound their horns when crossing at-grade crossings. Thus, if a local city does not agree to implement the quiet zone, then even if the required SSMs are present, the Authority, freight, and other rail operators would continue to use train horns as a safety device in compliance with FRA requirements.

Noise Barriers

For noise barriers to be effective, they must be constructed to intercept the line of sight between a noise source and receptors. Noise barriers can be constructed from a range of potential materials, such as concrete, brick or masonry blocks, metals, wood, rubber, or transparent panels. The height of each noise barrier would depend on engineering design on the conditions at each specific location; typical noise barriers are 8 to 10 feet in height.

The Authority will follow the California High Speed Rail Noise and Vibration Guidelines (CHSRA 2018) as it relates to noise barriers. The Authority will take steps to reduce noise substantially through the use of noise barriers that are reasonable, physically feasible, practical, cost-effective, and locally accepted. The following criteria will be used for evaluating the reasonableness of noise barriers as mitigation for severe noise impacts.

- Calculations and computations for barrier geometry.
- Increase over existing noise levels.
- Number of noise sensitive sites affected.
- The minimum number of affected sites should be at least 10, and the length of a noise barrier should be at least 800 feet.
- A minimum outdoor noise reduction of 5 decibels (dB) using the applicable criterion for the property is considered substantial.
- Barrier heights up to a maximum of 14 feet will be considered. Mitigation options for areas that require barriers over 14 feet will be studied on a case-by-case basis.
- The "reasonable allowance" for the noise barriers is calculated using the Caltrans base cost allowance for the current year, which is published at ttp://www.dot.ca.gov/hq/env/noise/.
- The affected sensitive receptors should approve of implementation of the recommended noise barriers (75 percent of all affected parties).
- Noise mitigation measure must be designed, constructed, installed, or implemented in compliance with structural requirements related to ground conditions, wind loading, seismic risk, safety considerations, accessibility, material maintainability and longevity, and applicable engineering design practices and technology.
- Noise mitigation measures must not result in an adverse environmental impact, such as significant visual intrusions, blocked views, or adverse effects to a historical site.
- Noise mitigation measures must be designed, constructed, installed, and implemented in a manner that does not result in adverse impacts to the visual resources in the area. Sound barriers will consist of a solid barrier no more than 6 feet in height. Above 6 feet, the sound barrier will be made of transparent materials. For example, a 13-foot-high sound barrier would consist of 6 feet of solid material on the bottom topped by 7 feet of transparent material.
- Two factors are required to determine cost effectiveness of mitigation by noise barriers: the unit construction cost and the number of benefited receptors.[3] The cost for constructing a noise barrier along the at-grade portion of the alignment is estimated to be $70.00 per square foot, and the cost to construct a noise barrier along the elevated portion of the alignment is $65.00 per square foot. The total cost of mitigation cannot exceed $95,000 per benefitted receiver. This cost is determined by dividing the total cost of the mitigation measure by the number of noise-sensitive buildings that receive a substantial (i.e., 5 dBA or greater) outdoor noise reduction. This calculation will generally limit the use of mitigation in rural areas that have few and/or isolated residential buildings. If the density of residential

[3] The unit construction cost for noise barriers is based on an evaluation of the design requirements regarding noise barrier mitigation. The typical base cost for transportation noise abatement screen-wall type barriers is available from the Federal Highway Administration's national inventory of noise barriers, Caltrans, qualified barrier manufacturers, and construction cost historical databases. These sources in (2016/2017 dollars) were used to estimate probable costs per square foot for typical high-speed rail noise barriers that incorporate opaque and transparent materials. The estimate of probable costs for barriers having special requirements (e.g., special foundations, highly curved sections, higher than standard height, etc.) should be evaluated on an individual basis.

dwellings is insufficient to make the measure cost-effective, then other noise abatement measures, such as sound insulation, will be considered on a case-by-case basis. If sound insulation is identified as a mitigation measure, the treatment must provide a substantial increase in noise reduction (i.e., 5 dBA or greater) between the outside and inside noise levels for interior habitable rooms.

Potential Noise Barriers

The following is a discussion of potential noise barriers and quiet zones to reduce noise impacts within the Altamont segment and the Tracy to Lathrop segment at locations where project noise levels would exceed FTA's severe impact thresholds. The potential use of noise barriers to address noise levels that exceed FTA's moderate impact threshold is also discussed, but is not mandatory. Noise barriers would need to be meet the effectiveness and acceptability criteria noted above. In addition, these recommendations are subject to funding limitations, and the actual improvements will be determined in consultation with local cities and in consideration of public input received.

For residential uses adjacent to the alignment, creation of quiet zones at the at-grade crossings and at the station areas, in combination with noise barriers in impacted areas, could mitigate moderate and severe noise impacts as described below.

- **Altamont Segment—**There would be at-grade crossings and stations in Altamont segment. Trains approaching the at-grade crossings and the station platforms would use horns. The use of revised safety warning measures for stations (as described above) may lower the level of impacts and may avoid or reduce the need for potential noise barriers. Establishing quiet zones at the grade crossing, in combination with noise barriers in impacted areas, if meeting all of the effectiveness and acceptability criteria noted above, could mitigate all moderate and severe noise impacts in the Altamont segment.
    - Establishing quiet zones at the grade crossings between Midway Road and Hansen Road in combination with noise barriers would mitigate the severe noise impacts at the receptors represented by site LT-07 because of train horns approaching the at-grade crossings and the station platforms in the Altamont segment.
- **Tracy to Lathrop Segment—**There would be at-grade crossings from South Lammers Road to Grant Line Road, also at Canal Road, Stewart Road, D'Arcy Parkway, and East Louise Avenue. The use of revised safety warning measures for stations (as described above) may lower the level of impacts and may avoid or reduce the need for potential noise barriers. Establishing quiet zones at the at-grade crossings in combination with noise barriers in impacted areas, if meeting all of the effectiveness and acceptability criteria noted above, could mitigate all moderate and severe noise impacts in the Tracy to Lathrop segment as follows.
    - Establishing quiet zones at the at-grade crossings at South Lammers Road and Corral Hollow Road in combination with noise barriers along the properties to the north and south of the railway between South Lammers Road and Corral Hollow Road would mitigate the severe noise impacts at the receptors represented by sites LT-09, LT-21 and LT-20 because of train horns approaching the at-grade crossings in the Tracy to Lathrop segment.

- Establishing quiet zones at the at-grade crossings at Corral Hollow Road and West Schulte Road in combination with noise barriers along the properties to the north and south of the railway between Corral Hollow Road and West Schulte Road would mitigate the severe noise impacts at the receptors represented by site LT-19 because of train horns approaching the at-grade crossings in the Tracy to Lathrop segment.
- Establishing quiet zones at the at-grade crossings at West Schulte Road and South Tracy Boulevard in combination with noise barriers along the properties to the north and south of the railway between West Schulte Road and South Tracy Boulevard would mitigate the severe noise impacts at the receptors represented by site LT-18 because of train horns approaching the at-grade crossings in the Tracy to Lathrop segment.
- Establishing quiet zones at the at-grade crossings at South Tracy Boulevard, North Central Avenue, and North McArthur Drive in combination with noise barriers along the properties to the north and south of the railroad from South Tracy Boulevard to North Central Avenue, and to North McArthur Drive would mitigate the severe noise impacts at the receptors represented by sites LT-17 and LT-16 because of train horns approaching the at-grade crossings and the Downtown Tracy Station platform in the Tracy to Lathrop segment.
- Establishing quiet zones at the at-grade crossings at Banta Road and West Grant Line Road in combination with noise barriers along the properties to the north and south of the railway between Banta Road and West Grant Line Road would mitigate the severe noise impacts at the receptors represented by site LT-15 because of train horns approaching the at-grade crossings in the Tracy to Lathrop segment.
- Establishing quiet zones at the grade crossings at East Louise Avenue in combination with noise barriers along the properties to the west of the railway from East Louise Avenue to the end of the Proposed Project limits north of the North Lathrop Station would mitigate the severe noise impacts at the receptors represented by site LT-12 because of train horns approaching the at-grade crossings and the North Lathrop Station platform in the Tracy to Lathrop segment.

Significance with Application of Mitigation

There are a number of different methods to reduce the noise impacts of train operation under the Proposed Project.

- **Train Horn Location—**This mitigation is feasible for new trains and will be implemented by the Authority as part of vehicle procurement.
- **Revised Station Requirements Concerning Train Horn Sounding—**This mitigation will be evaluated by the Authority during subsequent design and feasible measures implemented, but this measure may be limited for application at stations within the UPRR right-of-way.
- **Wayside Horns and Residential Building Sound Insulation—**This mitigation is technically feasible. The Authority will work with other parties in assessing the specific feasibility and acceptability during subsequent design.
- **Quiet zones—**FRA has established a process by which a local jurisdiction can designate a specific area containing at-grade crossings as a “quiet zone,” provided that certain SSMs are

used in place of the locomotive horn to provide an equivalent level of safety at the at-grade crossing as follows (Federal Transit Administration 2018).

  - The SSMs commonly used for quiet zones include four-quadrant gates, gates with medians or channelization devices, one-way street with gates, and street closure. By adopting an approved SSM at each of the impacted at-grade crossings, a quiet zone at least 0.5 mile long can be established.
  - Only with local implementation of the quiet zone can Valley Link, freight operators, and other tenant railroad operation be relieved of the requirement to sound their horns when crossing at-grade crossings. However, following the implementation of a quiet zone, if any unsafe conditions were present at the time of train passage (such as a vehicle going around the gates or pedestrians in the crossing), train operators would still have the discretion to sound train horns. Although the quiet zone regulations are silent on the issue of liability, local jurisdictions may perceive that the implementation of a quiet zone includes acceptance of potential liability in the event of related accidents. It is possible that jurisdictions may not wish to risk the potential liability associated with implementing a quiet zone and decline to do so. In such a case, Valley Link, freight operators, and other rail operators would continue to use train horns as a safety device in compliance with FRA requirements.
  - Where quiet zones are implemented and accepted by local jurisdictions, noise levels related to the Proposed Project could be reduced to a less-than-significant level at some (but not necessarily all) affected locations.
  - Quiet zones are included as one option in Mitigation Measure NOI-1.1b Implement a phased program to reduce train noise along the Valley Link corridor as necessary to address noise increases over FTA's severe impact thresholds, described above.

- **Noise Barriers—** Noise barriers are considered feasible mitigation where technically feasible, where they meet the effectiveness criteria noted above, and where they are locally accepted. Noise barriers may not be feasible mitigation in all locations because they may not be technically feasible in certain areas, may not meet the effectiveness criteria noted above, and/or they may not be locally acceptable.
- **Grade Separation—**While grade separations are a technically feasible way to avoid the need for train horn use, it is a costly mitigation strategy. Grade separations can cost approximately $50 to $100 million per crossing (and sometimes more); thus, grade separating all existing at-grade crossings in areas of significant noise impacts would be cost-prohibitive. The Authority does not have a dedicated funding source for the Proposed Project and thus grade separations are not considered a feasible mitigation. Separate from project mitigation, the Authority can work with the cities of Tracy and Lathrop, as well as transportation funding agencies, and state and federal agencies to support grade separations over time as funding becomes available.

As to secondary environmental impacts of Mitigation Measure NOI-1.1b, Implement a phased program to reduce train noise along the Valley Link corridor as necessary to address noise increases over FTA's severe impact thresholds, the environmental effects of the different mitigation options would vary. Noise barriers may have secondary visual impacts depending on design and location. The Authority will work with local communities in design of noise barriers to address visual aesthetics and would only implement noise barriers where accepted by at least 75 percent of affected receptors which will minimize visual effects. Given the effectiveness criteria, noise barriers would be constructed in developed areas and not in remote areas with few receptors (like the

Altamont Hills) where they could otherwise result in significant visual effects in undeveloped areas. Wayside horns and building sound insulation would have limited to no secondary environmental impacts. Quiet zone improvements would require additional construction, but the likely environmental impacts of such construction are limited given the limited footprint of four-quadrant gates, active warning systems, medians, and street work. In general, construction impacts for quiet zone improvements would be similar to the impacts disclosed for construction of the Proposed Project, would occur in previously developed and disturbed areas, and would be temporary in nature. The applicable improvements mitigation described for construction impacts in this EIR, where relevant, would also be applied to quiet zone improvements.

The Authority will work with other parties when implementing this measure to apply the relevant mitigation measures identified in this EIR during implementation of future noise mitigation improvements. The Authority is only responsible for that portion of the cumulative increases caused by the improvements. Other sources of cumulative increases, including other rail and non-rail sources near the Valley Link corridor, also bear responsibility for cumulative noise increases. However, some measures discussed above may not be feasible and/or meet effectiveness or acceptability criteria. Therefore, this impact for both the Proposed Project and alternatives analyzed at an equal level of detail would remain significant and unavoidable.

Comparison of Alternatives

The impact analysis described above provides a worst-case scenario impact analysis for the Proposed Project. Therefore, impacts associated with the alternatives analyzed at an equal level of detail would be similar or less than the project impacts. Implementation of some measures included in Mitigation Measure NOI-1.1b Implement a phased program to reduce train noise along the Valley Link corridor as necessary to address noise increases over FTA's severe impact thresholds, above may not be feasible and this impact would remain significant and unavoidable.

Operational Traffic Noise

Weekday traffic noise levels along the highway segments due the relocation of portions of the I-580 lanes within the study area were estimated for this analysis using the FHWA Traffic Noise Prediction Model based on No Project Conditions and future conditions (2025 and 2040).

Predicted noise levels at these receptors reflect the peak hour conditions that have the greatest freeway volumes. The predicted future noise levels are presented in Table 3.12-12. As shown, the increase in traffic noise under both 2025 and 2040 conditions are less than one dB. Therefore, impacts would be less than significant.

Table 3.12-12. Operational Traffic Noise Due to Highway Segments Relocation

Roadway	Segment	Existing No Project Condition					Future 2025						Future 2040					
		Distance (feet)	Noise Level (Ldn, dBA)	Contour Distances			Distance (feet)	Noise Level (Ldn, dBA)	Contour Distances			Increase dB	Distance (feet)	Noise Level (Ldn, dBA)	Contour Distances			Increase dB
				70 dB	65 dB	60 dB			70 dB	65 dB	60 dB				70 dB	65 dB	60 dB	
I -580	From Greenville Road to Vasco Road	169	84	4,588	14,508	45,879	161	84	4,028	12,737	40,279	-0.4	161	84	4,443	14,051	44,434	0.1
I -580	From Vasco Road to First Street	103	87	4,661	14,741	46,614	98	87	4,092	12,941	40,925	-0.3	98	87	4,515	14,276	45,146	0.1
I -580	From First Street to Livermore Avenue	225	84	5,041	15,941	50,409	206	84	4,426	13,995	44,256	-0.2	206	84	4,882	15,439	48,821	0.2
I -580	From Livermore Avenue to Isabel Avenue	368	81	5,188	16,406	51,880	355	82	4,555	14,403	45,547	-0.4	355	82	5,025	15,889	50,245	0.0
I -580	From Isabel Avenue to El Charro Road	165	85	5,248	16,597	52,484	143	86	4,608	14,571	46,078	0.1	143	86	5,083	16,074	50,830	0.5
I -580	From El Charro Road to Tassajara Road	100	87	5,603	17,718	56,029	100	87	4,919	15,555	49,190	-0.6	100	87	5,426	17,160	54,264	-0.1
I -580	From Tassajara Road to Hacienda Drive	100	88	5,812	18,378	58,117	100	88	5,102	16,135	51,023	-0.6	100	88	5,629	17,799	56,286	-0.1
I -580	From Hacienda Drive to Hopyard Road	273	83	5,982	18,918	59,824	241	84	5,252	16,609	52,522	0.0	241	84	5,794	18,322	57,939	0.4
I -580	From Hopyard Road to I-680	100	88	5,665	17,913	56,646	100	87	4,973	15,727	49,732	-0.6	100	87	5,486	17,349	54,862	-0.1

Ldn = day-night sound level
dBA = A-weighted decibel

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Impact NOI-2a: Construction of the Proposed Project would expose sensitive receptors to substantial increases in groundborne vibration levels.

Level of Impact	**Potentially Significant (mitigation required)** Proposed Project Tri-Valley Alignment Dublin/Pleasanton Station Isabel Station Greenville Station Altamont Alignment Owens-Illinois Industrial Lead Variant 1, Single Track Owens-Illinois Industrial Lead Variant 2, Double Track Interim OMF Tracy OMF Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track Downtown Tracy Station North Lathrop Station Alternatives Analyzed at an Equal Level of Detail Southfront Road Station Alternative West Tracy OMF Alternative Mountain House Station Alternative Downtown Tracy Station Parking Alternative 1 Downtown Tracy Station Parking Alternative 2 **Less than Significant/No Impact** Proposed Project Mountain House Station River Islands Station Alternatives Analyzed at an Equal Level of Detail Stone Cut Alignment Alternative
Mitigation Measures	NOI-2.1a: Implement a construction vibration control plan.
Level of Impact after Mitigation	**Less than Significant**

Impact Characterization

Construction activities can be expected to generate vibration levels at 25 feet as high as 94 VdB from compactors during site work, 87 VdB from bulldozers during rail work, and 104 VdB from impact pile drivers during structures work. Except for pile drivers, it is unlikely that such equipment would be used close enough to sensitive structures to have any damage effects. For pile driving, it is anticipated that the potential for damage effects would be limited to structures located at distances in the range of 30 to 75 feet from construction activities, depending on the building category.

In terms of vibration annoyance effects or interference with the use of sensitive equipment, the potential extent of vibration impact from pile driving is expected to be even greater than for damage effects. Based on FTA methodology, Table 3.12-13 provides the approximate distances within which

receivers could experience construction-related vibration annoyance effects. The results of the analysis indicate that vibration impacts would extend to distances of 230 to 630 feet from pile driving operation, depending on vibration sensitivity.

Table 3.12-13. Approximate Screening Distances for Vibration Annoyance Effects from Pile Driving

Land Use Category[a]	Vibration Criterion Level (VdB)	Approximate Vibration Impact Distance (feet)
Category 1 (Sensitive Buildings)	65	630
Category 2 (Residential Buildings)	72	290
Category 3 (Institutional Buildings)	75	230

[a] See Table 3.12-6 for land use category descriptions.

VdB = vibration velocity

Impact Detail and Conclusions

Proposed Project

Construction activities would be considered to have a significant impact if they would generate vibration in excess of FTA thresholds. It is expected that groundborne vibration from construction activities would cause only intermittent localized disturbance along the Proposed Project alignment. Although processes such as earth moving with bulldozers or the use of vibratory compaction rollers can create annoying vibration, there should be only isolated cases where it is necessary to use this type of equipment in proximity to residential buildings. It is possible that construction activities involving pile drivers occurring at the edge of or slightly outside of the current right-of-way could result in vibration damage, and damage from construction vibration due to the Proposed Project would be a potentially significant impact.

Alternatives Analyzed at an Equal Level of Detail

Construction of the alternatives analyzed at an equal level of detail would entail construction similar to the Proposed Project. As such, construction vibration due to the alternatives analyzed at an equal level would be a potentially significant impact.

Mitigation Measures

The following mitigation measure would apply to the Proposed Project and the alternatives analyzed at an equal level of detail, for construction vibration impacts.

Mitigation Measure NOI-2.1a: Implement a construction vibration control plan.

A vibration control plan that incorporates, at a minimum, the following best management practices into the construction scope of work and specifications to reduce the impact of temporary construction-related vibration on nearby noise-sensitive receptors will be prepared and implemented.

- Avoid the use of impact pile drivers where possible near vibration-sensitive areas or use alternative construction methods (e.g., drilled piles) where geological conditions permit.
- Avoid vibratory compacting/rolling in close proximity to structures.

- Designate a Preservation Director and post contact information in a conspicuous location near the Proposed Project site, so that it is clearly visible to nearby receptors most likely to be disturbed. The coordinator will manage complaints and concerns resulting from vibration inducing activities. The severity of the vibration concern would be assessed by the director, and, if necessary, evaluated by a qualified vibration control engineer.
- Before construction activity begins within 45 feet of one or more residences or businesses, written notification will be provided to the potentially affected residents or business owners, identifying the type, duration, and frequency of construction activities. Notification materials will also identify a mechanism for residents or business owners to register complaints with the appropriate jurisdiction if construction vibration levels are overly intrusive.
- Before construction activity begins within 45 feet of one or more residences or businesses, the pre-existing condition of all buildings within a 45-foot radius within the immediate vicinity of proposed construction activities will be recorded in the form of a preconstruction survey. The preconstruction survey will determine conditions that exist before construction begins for use in evaluating damage caused by construction activities. Fixtures and finishes within a 45-foot radius of construction activities susceptible to damage will be documented (photographically and in writing) prior to construction. All damage will be repaired back to its pre-existing condition following the completion of construction activities and post-construction surveys of affected residences or businesses.
- The primary contractor will prepare and implement a detailed vibration control plan based on the proposed construction methods. This plan shall identify specific measures to ensure compliance with the vibration control measures specified above. The vibration control plan will be submitted to and approved by the Proposed Project proponent(s) before any vibration-generating construction activity begins.

Significance with Application of Mitigation

With implementation of Mitigation Measure NOI-2.1a, vibration impacts would be avoided or minimized; if building damage occurs due to construction then repairs would be made, or compensation provided. With implementation of Mitigation Measure NOI-2.1a, impacts resulting from construction vibration structural damage would be less than significant for the Proposed Project.

For the same reasons listed above, implementation of Mitigation Measure NOI-2.1a, would reduce potential impacts to a less- than- significant level due to the construction of the alternatives analyzed at an equal level of detail.

Comparison of Alternatives

The Proposed Project impact analysis described above provides a worst-case scenario impact analysis for the Proposed Project. Therefore, impacts associated with the alternatives analyzed at an equal level would be similar or less than the Proposed Project impacts (i.e., less than significant after mitigation).

Impact NOI-2b: Operation of the Proposed Project could expose sensitive receptors to substantial increases in groundborne vibration levels.

Level of Impact	**Less than Significant/No Impact** Proposed Project Tri-Valley Alignment Dublin/Pleasanton Station Isabel Station Greenville Station Altamont Alignment Interim OMF Owens-Illinois Industrial Lead Variant 1, Single Track Owens-Illinois Industrial Lead Variant 2, Double Track Mountain House Station Tracy OMF Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track Downtown Tracy Station River Islands Station North Lathrop Station Alternatives Analyzed at an Equal Level of Detail Southfront Road Station Alternative Stone Cut Alignment Alternative West Tracy OMF Alternative Mountain House Station Alternative Downtown Tracy Station Parking Alternative 1 Downtown Tracy Station Parking Alternative 2
Mitigation Measures	**None required**

Impact Characterization

Vibration caused by trains is the result of wheels rolling on the rails. This energy is then transmitted through the track support system into the ballast through the ground to the foundations of nearby buildings, and finally throughout the remainder of the building structure. The level of vibration received at the building is a function of the type of trains, their speeds, track system, structure, support and condition, distance from the tracks, geological condition, and the receiving structure. Groundborne vibration does not typically annoy people who are outdoors. Impacts were assessed based on a comparison of the predicted Project vibration level with the FTA impact criterion of 75 VdB for Category 2 and 78 VdB for Category 3. The vibration sensitive uses adjacent to the Proposed Project, along with the likely vibration level during train passage, are shown in Table 3.12-7. Table 3.12-14 summaries operational vibrational impacts at identified distances from the proposed Valley Link tracks.

Table 3.12-14. Summary of Valley Link Operational Vibration Impact Assessment

Segment	Distance to Near Track (feet)	Vibration Levels (VdB)		Impacts
		Proposed Project	FTA Criteria	
Railway	50	73	80	None
Tri-Valley	175	57	80	None
Altamont	100	64	80	None
Tracy to Lathrop	80	67	80	None

Impact Detail and Conclusions

Proposed Project

Based upon the above vibration significance criterion, vibration sensitive receptors along the Valley Link corridor would not be exposed to perceptible vibration and would not expose buildings to vibration levels of possible structural effects. These results indicate that the vibration criterion would be met (i.e., vibration impacts would not occur) at vibration sensitive use more than 50 feet from the centerline of the nearest rails. No vibration sensitive uses are known or expected to be within 10 feet of the Proposed Project tracks. Therefore, no residences or any buildings are expected to be impacted by transit vibration.

There are no vibration impacts related to the stations because the stations would not change the vibration levels associated with trains (e.g., changes in vibration levels are a result of alignments and service level, not stations).

Vibration impacts related to the Tracy OMF and Interim OMF would be lower than those associated with trains (e.g., changes in vibration levels are a result of alignments and operational speed). Because vibration receptors are located more than 150 feet from proposed OMF locations, and operational speeds within the OMF footprint would be far lower than when operating along the alignment, Proposed Project operation and maintenance activities at proposed OMFs would result in less-than-significant vibrational impacts.

Alternatives Analyzed at an Equal Level of Detail

The Proposed Project impact analysis described above provides a worst-case scenario impact analysis for the Proposed Project. Therefore, impacts associated with the alternatives analyzed at an equal level would be similar or less than the Proposed Project impacts (i.e., no impact/less than significant).

Impact NOI-3: The Proposed Project would be located within an airport land use plan area or, where such a plan has not been adopted, be within 2 miles of a public airport or public-use airport, but would not result in a safety hazard for people residing or working in the study area.

Level of Impact	**No Impact** Proposed Project Tri-Valley Alignment Dublin/Pleasanton Station Isabel Station Greenville Station Altamont Alignment Owens-Illinois Industrial Lead Variant 1, Single Track Owens-Illinois Industrial Lead Variant 2, Double Track Interim OMF Mountain House Station Tracy OMF Tracy to Lathrop Alignment Variant 1, Single Track Tracy to Lathrop Alignment Variant 2, Double Track Downtown Tracy Station River Islands Station North Lathrop Station Alternatives Analyzed at an Equal Level of Detail Southfront Road Station Alternative Stone Cut Alignment Alternative West Tracy OMF Alternative Mountain House Station Alternative Downtown Tracy Station Parking Alternative 1 Downtown Tracy Station Parking Alternative 2
Mitigation Measures	**None required**

Impact Characterization and Significance Conclusion

Proposed Project

There is one public use airport within 2 miles of the Proposed Project footprint,[4] the Livermore Municipal Airport. The Livermore Municipal Airport is located immediately south of I-580 between El Charro Road and Isabel Avenue. The nearest runway would be approximately 2,500 feet from the alignments of the Proposed Project and 3,000 feet from the proposed Isabel Station. Noise contours

[4] The Tracy Municipal Airport is located approximately 2 miles southeast of West Schulte Road in Tracy, west of Corral Hollow Road and south of West Linne Road. However, the nearest runway would be approximately 2.1 miles from the alignments of the Proposed Project. Noise contours contained in the *Airport Land Use Compatibility Plan* for the Tracy Municipal Airport indicate that the alignments of the Proposed Project would be outside of the 60 CNEL noise contour for airport operation. Sharpe Army Airfield is approximately 2,400 feet from the proposed Lathrop Station. However, the Sharpe Army Airfield is no longer operable. This facility was located within the Lathrop Planning Area off of West Lathrop Road. The Sharpe Army Airfield closed sometime between 1987 and 1998.

contained in the *Livermore Municipal Airport Land Use Compatibility Plan* indicate that the alignments of the Proposed Project, as well as the proposed Isabel Station, would be outside of the 60 CNEL noise contour for airport operation (Alameda County 2012). Noise exposures below 60 CNEL are considered normally acceptable for all land use types. Tracy Municipal Airport and Stockton Municipal Airport are located over 2 miles to the south and over 4 miles to the north of the Proposed Project study area, respectively.

The Camp Parks Heliport is located approximately 4,000 feet north of the existing Dublin/Pleasanton BART Station. While there is no publicly available information with regard to number of daily operation or noise contours for this heliport, previously conducted long-term noise monitoring at site OETL-1 adjacent to the Dublin/Pleasanton BART Station indicates an existing Ldn of 66 dBA, and this level of existing noise exposure is considered in the impact analysis using FTA guidance. The Proposed Project would not result in locating new or additional sensitive receptors in the area of the Camp Parks Heliport. Therefore, the Proposed Project would have no impact related to exposure of people to public or private airport noise, and there would be no impact.

Alternatives Analyzed at an Equal Level of Detail

There would be no difference in impacts related to noise and vibration among the alternatives analyzed at an equal level. The alternatives would not result in locating new or additional sensitive receptors in the area of influence of the airports/airstrips. Therefore, the alternatives analyzed at an equal level would have no impact related to exposure of people to public or private airport noise.