3.3 NOISE AND VIBRATION

This section identifies noise and vibration sensitive land uses along the existing Coast Corridor rail alignment and identifies potential noise and vibration impacts of both the No Build Alternative and the Build Alternative.

3.3.1 REGULATORY REQUIREMENTS

Federal

Noise Pollution and Abatement Act of 1972

This act addresses excessive noise as a potential threat to human health and welfare, including noise related to transportation, machinery, appliances, and other products in commerce. Following adoption of this act, the U.S. Environmental Protection Agency (EPA) published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA 1974). In this document, EPA provided recommendations for maximum noise exposure levels below which there would be little to no risk from any of the identified health or welfare effects of noise.

Federal Noise Emission Compliance Regulation Code

FRA's Railroad Noise Emission Compliance regulations[1] prescribe compliance requirements for enforcing railroad noise emission standards adopted by the EPA.[2] The provisions apply to the total sound emitted by moving rail cars and locomotives (including the sound produced by refrigeration and air conditioning of units that are an integral element of such equipment), and associated equipment.

Train Horn Rule and Quiet Zones

Under the Train Horn Rule[3], locomotive engineers must begin to sound train horns at least 15 seconds, and no more than 20 seconds, in advance of all public grade crossings. The maximum volume level for the train horn is 110 decibels, and the minimum sound level is 96 decibels.

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[1] 49 CFR 210

[2] 40 CFR 201

[3] 49 CFR Part 222

In a quiet zone, railroads have been directed to cease the routine sounding of their horns when approaching public highway-rail grade crossings. Localities desiring to establish a quiet zone are first required to mitigate the increased risk caused by the absence of a train-mounted horn. Measures to reduce risk include gated crossings with flashing signals, other signage, fencing, and related measures.

State

California Noise Control Act of 1973

The California Noise Control Act[4] establishes the Office of Noise Control in the Department of Health Services to assist local communities developing noise control programs and provide guidance for cities and counties developing noise elements of the General Plan in compliance with Government Code Section 65302.

California Occupational Safety and Health Administration (OSHA)

The California OSHA requires employers to provide employees with proper protection against the effects of noise exposure when sound exceeds certain level (an 8-hour time weighted average of 90 dBA).[5] The protective measures may be provided either through engineering or administrative controls. If these control measures fail to reduce the noise within the acceptable limits, personal protective equipment shall be provided and used. Additionally, whenever employee noise exposures equal or exceed an 8-hour sound level of 85 dBA, the employer shall develop and administer a Hearing Conservation Program.

California Noise Insulation Standards

California Noise Insulation Standards[6] detail requirements for new multi-family structures located within the 60 Community Noise Equivalent Level (CNEL)[7] contour adjacent to roads, railroads, rapid transit lines, airports or industrial areas. Residential buildings or structures located within exterior community noise equivalent level contours of 60 dB of an existing or adopted freeway, expressway, major street, thoroughfare, railroad or rapid-transit line shall require an acoustical analysis showing that the proposed building has been designed to limit intruding noise to the allowable interior noise levels prescribed in Section 1092 (e)(2).

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[4] Health and Safety Code Section 46010

[5] A decibel (dB) is a unit that describes the amplitude of sound. A dBA describes A-weighting in noise measurements, which accounts for the relative frequencies at which humans perceive sound.

[6] Title 25, Section 1092

[7] Community Noise Equivalent Level (CNEL) is a 24-hour average sound level that includes both an evening and nighttime weighting, as further discussed in **Subsection 3.3.2.**

California Building Standards Code

The California Buildings Standards Code[8] contains the regulations that govern the construction of buildings in California. The Code requires that for any habitable room within a multi-family residential development, interior noise levels shall not exceed a CNEL of 45 dBA for noises attributable to exterior sources. Multi-family residential uses must comply with pertinent requirements in addition to and separate from CEQA. However, the State does not regulate noise levels within single-family detached homes.

Local

Government Code Section 65302 requires cities and counties to include a noise element as part of their general plans. The Noise Element identifies the major sources of noise in the area and establishes ways to minimize exposure to sensitive receptors. A city or county must quantify the current and projected noise levels from highways and freeways, passenger and freight railroad operations, ground rapid transit systems, air travels, and other sources.

Monterey County General Plan

The main sources of noise in Monterey County include transportation facilities (highways, roads, railroads, and aircraft), several industrial and food-packing plants, mining operations, and power-generation. The Safety Element includes policies that establish acceptable limits of noise exposure. New noise-sensitive land uses may only be allowed in areas where existing and projected noise levels are deemed acceptable. Furthermore, the County requires the inclusion of standard noise protection measures into all construction contracts. These measures limit construction hours, require noise muffling equipment, and set forth other regulations to reduce potential noise effects.

City of Salinas General Plan

The Noise Element identifies existing and projected noise sources in the community and identifies ways to reduce potential impacts. The Noise Element contains policies and programs to achieve and maintain noise levels compatible with various types of land uses. Like most urbanized areas, Salinas experiences increasing noise levels associated with transportation and other sources. In addition to standard

[8] Title 24, California Code of Regulations

policies to shield sensitive receptors from noise exposure, Salinas has developed a Noise Plan that defines the City's specific programs along with an implementation plan. Programs include specific land use compatibility guidelines with maximum noise level amounts, based on the land use designation.

City of Soledad General Plan

The major source of noise in Soledad is car and truck traffic on US 101. However, other noise generators that contribute to local ambient noise levels include railroads, aircraft, farming activities, quarry activities, and industrial facilities. Policies and implementation programs outlined in the Noise Element focus on establishing noise projections for proper planning and reducing the noise impacts at sensitive receptor locations. The Soledad Downtown Specific Plan (2012) contemplated a variety of new land uses in central portion of the City, including conceptual plans for a proposed new passenger rail station (identical to the station included here as part of the Build Alternative). In its environmental review of the specific plan as a whole, the City concluded that buildout would result in temporary construction noises, but with mitigation, such noises would not result in any significant impacts.[9]

City of King City (King City) General Plan

According to the King City Noise Element, primary noise sources are US 101, the railroad, and industrial activities. King City has adopted goals and policies to encourage land use patterns that reduce the level of human noise exposure.[10] King City adopted the First Street Corridor Master Plan, in which the city contemplated a number of land use changes, including conceptual plans for a passenger rail station (identical to the station included here as part of the Build Alternative).[11]

San Luis Obispo County General Plan

The main sources of noise in San Luis Obispo County are from roadways, railroads, airports, and agricultural and commercial activities. The County General Plan includes policies and mitigation to reduce noise impacts from railroads and these other sources. The noise exposure ranges depicted on noise contour maps are used to determine the land use designation of the area and where new development may occur. Noise created by new transportation noise sources must be consistent and not exceed the levels specified within each land use designation.

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[9] City of Soledad,2012, p. 1-3 and appendix

[10] City of King, 1998, pp. 25-29

[11] City of King, 2013, p. 29, p. 82

3.3.2 METHODS OF EVALUATION

Information for the noise and vibration analysis was obtained/developed from several sources. A qualified acoustical professional, with specific subject-matter expertise as an author of FTA's *Transit Noise and Vibration Impact Assessment Manual* (2006), reviewed aerial mapping of proposed improvements as well as considerable background information (including but not limited to Appendices B, C, and D) and recommended appropriate screening distances to assess noise and vibration impacts based on relevant criteria. The acoustical professional based the screening distances on potential future train speed estimates and the type of construction work for each improvement type. Recommended noise screening distances along the corridor are shown in **Table 3.3-1** for train operations in both 2020 and 2040. Vibration screening distances are shown in **Table 3.3-2.**

Federal Transit Administration Noise and Vibration Impact Assessment

The Federal Transit Administration (FTA) guidance manual, *Transit Noise and Vibration Impact Assessment* (2006) contains methods for combining transit/rail noise sources with traffic and bus noise sources at stations using both FTA criteria (which are identical to the FRA criteria) and FHWA criteria.

The purpose of the document is to provide understanding of noise and vibration effects of mass-transit projects located in population centers and populated land use types. Furthermore, the document provides noise and vibration fundamentals for subject-matter understanding and context.

Noise Compatibility

Based on the recommended screening distances, the second component of the analysis was to inventory the surrounding land uses within the screening areas. Generally, land use categories characterize the density of people and intensity of nearby development. As a result, land use typology is a helpful gauge of the potential presence of sensitive receptors. A review of aerial maps was conducted to determine the presence of potentially sensitive land uses near the existing rail alignment and proposed improvement areas. Sensitive land uses for this analysis include residences, schools, hospitals, parks, and historic structures. Land use assumptions are as follows:

- **Agricultural**: Fields of crops, fences, farm equipment, rural dirt roads, electrical distribution lines, barns, and crop processing buildings are dominant features in an agricultural area. Agricultural areas may also include residential uses - typically farmhouses or other farmworker housing.

- **Urban/Suburban**: Urban/suburban areas include residential and commercial buildings, parking lots, and landscaping along streets and sidewalks. Generally, urban/suburban areas have many residential sensitive receptors.
- **Industrial/Institutional**: Industrial areas typically include utility lines, equipment, machinery, freight tracks, and factories. Sensitive receptors in these areas would be employees working in factories or operating machinery.
- **Open Space/Undeveloped**: Open space and undeveloped areas include rolling hills, mountain ranges, valleys, and trees and shrubs are visible on the horizon. Residential and commercial developments are not prevalent in these areas.

The analysis then compares future noise and vibration created by each alternative with the existing land use to determine the level of compatibility with each existing land use type.

- ***High compatibility*** indicates areas where the alternative would affect none or very few sensitive receptors, either because sensitive land uses are not present within the provided screening distances or that the nature of the proposed work would not produce noticeable noise and vibration effects.
- ***Medium compatibility*** indicates areas where there may be a moderate number of sensitive land uses nearby within the screening distances and would be moderately affected.
- ***Low compatibility*** indicates areas where there are many sensitive land uses nearby within the screening distances and would be highly affected.

Trains and train horns sounding at at-grade crossings are main contributor to ambient noise levels in the immediate vicinity of the existing railroad, particularly where the railroad is separated from US 101 by more than 0.25 miles.

As neither alternative would remove any existing at-grade crossings, screening distances are sized to assume the ongoing use of horns (i.e., the distances are larger than if no horns were sounding). **Table 3.3-1** below reflects the screening distances used in this analysis which reflect existing or new mainline operations as well as siding increases.

Table 3.3-1 Noise Screening Distances

Segment		2020		2040	
Start Point (Mile Post)	End Point (Mile Post)	Mainline Operations (Feet)	Siding Increase (Feet)	Mainline Operations (Feet)	Siding Increase (Feet)
MP 114.9 Salinas	MP 116.9 Salinas	100	200	200	0
MP 116.9 Firestone	MP 144.9 Soledad	500	100	600	0
MP 144.9 Harlem	MP 155.5 Harlem	500	0	700	0
MP 155.5 Detector	MP 160.3 Detector	50	100	100	100
MP 160.7 King City	MP 163.7 King City	50	200	100	100
MP 163.7 Welby	MP 185.7 San Ardo	500	100	600	0
MP 185.7 Wunpost	MP 207.6 McKay	500	100	600	0
MP 207.6 Wellsona	MP 210.7 Wellsona	600	0	700	0
MP 210.7 Detector	MP 218.4 Paso Robles	500	100	600	0
MP 218.4 Templeton	MP 226.9 Atascadero	600	0	700	0
MP 226.9 Detector	MP 229.6 Detector	50	100	50	100
MP 229.6 Santa Margarita	MP 233.1 Santa Margarita	100	200	300	0
MP 233.1 South Santa Margarita	MP 234 South Santa Margarita	300	100	500	0
MP 234 Cuesta	MP 238.8 Cuesta	500	100	700	0

Segment		2020		2040	
Start Point (Mile Post)	End Point (Mile Post)	Mainline Operations (Feet)	Siding Increase (Feet)	Mainline Operations (Feet)	Siding Increase (Feet)
MP 238.8 Serrano	MP 244.8 Chorro	600	0	900	0
MP 244.8 Detector	MP 248.4 Detector	500	100	700	0
MP 248.4 N. San Luis Obispo	MP 248.5 N. San Luis Obispo	500	0	800	0

Source: Cross-Spectrum Acoustics, 2013

Vibration Compatibility

Table 3.3-2 shows proposed screening distances for vibration. These distances were recommended in order to assess potential human annoyance and potential damage to historic and potentially historic properties. The vibration distances are for both 2020 and 2040 because there is no difference between the operating scenarios for vibration.

Table 3.3-2 Vibration Screening Distances

Segment		Vibration Screening Distance
Start Point	End Point	(Feet)
MP 114.9 Salinas	MP 116.9 Salinas	80
MP 116.9 Firestone	MP 144.9 Soledad	130
MP 144.9 Harlem	MP 155.5 Harlem	100
MP 155.5 Detector	MP 160.3 Detector	100
MP 160.7 King City	MP 163.7 King City	100
MP 163.7 Welby	MP 185.7 San Ardo	130

Segment		Vibration Screening Distance
Start Point	End Point	(Feet)
MP 185.7 Wunpost	MP 207.6 McKay	120
MP 207.6 Wellsona	MP 210.7 Wellsona	120
MP 210.7 Detector	MP 218.4 Paso Robles	120
MP 218.4 Templeton	MP 226.9 Atascadero	120
MP 226.9 Detector	MP 229.6 Detector	120
MP 229.6 Santa Margarita	MP 233.1 Santa Margarita	80
MP 233.1 South Santa Margarita	MP 234 South Santa Margarita	60
MP 234 Cuesta	MP 238.8 Cuesta	50
MP 238.8 Serrano	MP 244.8 Chorro	40
MP 244.8 Detector	MP 248.4 Detector	50
MP 248.4 N. San Luis Obispo	MP 248.5 N. San Luis Obispo	40

Source: Cross-Spectrum Acoustics, 2013

3.3.3 AFFECTED ENVIRONMENT

Noise Fundamentals

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure (frequency). Sound levels are usually measured and expressed in decibels (dB), with zero dB corresponding roughly to the threshold of hearing. A decibel is a unit that describes the amplitude of sound.

Most of the sounds heard in the environment do not consist of a single frequency, but rather a broad band of frequencies, with each frequency differing in sound level. The intensities of each frequency add together to generate a sound and form the overall ambient noise level. The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies; human hearing is less sensitive at low frequencies and extreme high frequencies than in the frequency mid-range, which is called "A" weighting and is how humans perceive noise. A-weighting de-emphasizes low-frequency and very high-frequency sound in a manner similar to human hearing. The use of A-weighting is required by most local agencies as well as other federal and state noise regulations (e.g., the California Department of Transportation, U.S. Environmental Protection Agency, U.S. Department of Labor, Occupational Safety & Health Administration and U.S. Department of Housing and Urban Development).

In practice, the level of a sound source is measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve. Typical A-weighted levels measured in the environment are shown in **Figure 3.3-1** for different types of noise.

In determining the daily level of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes very noticeable. Further, most people sleep at night and are very sensitive to noise intrusion. To account for human sensitivity to nighttime noise levels, a descriptor, L_{dn} (day/night average sound level), was developed. The L_{dn} divides the 24-hour day into the daytime of 7:00 AM to 10:00 PM and the nighttime of 10:00 PM to 7:00 AM. The nighttime noise level is weighted 10 dB higher than the daytime noise level. The CNEL is another 24-hour average that includes both an evening and nighttime weighting.

Vibration Fundamentals

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Peak Particle Velocity (PPV) is typically used to quantify vibration amplitude. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave and are used to evaluate human response to vibration. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. **Figure 3.3-2** displays the reactions of people and the effects on buildings that continuous typical ground-borne vibration levels can produce.

Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Construction activities can cause vibration that can vary in intensity. The use of pile driving and vibratory compaction equipment typically generates the highest construction related ground-borne vibration levels. Because of the impulsive nature of such activities, the use of the peak particle velocity descriptor (PPV) has been routinely used to measure and assess ground-borne vibration and almost exclusively to assess the potential of vibration to induce structural damage and the degree of annoyance for humans.

Railroad Noise and Vibration

Transit noise is generated by transit vehicles in motion, as well as from locomotive engine exhaust. Speed also plays a direct factor in noise levels; however, according to the FTA's *Transit Noise and Vibration Impact Assessment,* locomotive exhaust noise dominates at low speeds for diesel-powered trains. As speed increases, wheel-rail noise becomes dominant. Trains are also equipped with horns and bells for use in emergency situations as well as to signal to pedestrians and vehicles before traveling through an intersection or at-grade crossings. Horns and bells combined with moving vehicle noise can generate noise levels that are considered annoying to nearby residents and other sensitive receptors.[12]

Ambient vibration is usually characterized with a continuous 10- to 30-minute measurement of vibration. Passenger and freight trains usually create high levels of vibration, but intermittently and for short periods of time. Train vibration results from the type of wheel, texture of the railway tracks, and train speed. Effects upon sensitive receptors will vary based on structural components of the nearby building as well as geology of the underlying bedrock and soil.[13]

The study area encompasses a spectrum of land uses, all of which differ in ambient noise level. Rural, undeveloped areas have lower noise levels in comparison to noise levels near roadways and urban developments. Much of the study area

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[12] Federal Transit Administration (FTA), 2006, pp. 2-6 – 2-7

[13] FTA, 2006,.pp. 7-11

encompasses agricultural, open space areas as well as industrial/institutional and urban/suburban areas. US 101 and the existing Coast Corridor alignment are the largest contributors to the ambient noise levels in the study area.

According to information from the applicable county general plans, existing noise levels along the US 101 corridor - near which much of the existing railroad is located -are between 60 and 70 CNEL.[14]

3.3.4 ENVIRONMENTAL CONSEQUENCES

No Build Alternative

The No Build Alternative would involve maintaining existing physical conditions along the Coast Corridor study area. The No Build Alternative contemplates rail service improvements in Salinas and points north along the railroad tracks in Monterey County that are intended to facilitate expanded passenger rail service. According to the SDP, freight rail operations are likely to increase by the year 2040, doubling from 2 daily freight trains today to 4 daily trains in 2040. Implementation of these projects would occur regardless of whether or not any of the proposed physical improvements comprising the Build Alternative are ultimately constructed.

The No Build Alternative may thus result in result in noise and vibration impacts to sensitive land uses, but primarily north of Salinas, as these areas would see both increased passenger and freight service. The Salinas to San Luis Obispo study area would see only increased freight service. If additional freight service is proposed for late night hours, the additional service could result in somewhat more pronounced noise effects along the corridor, because people are somewhat more sensitive to nighttime noises. The Phillips 66 Company Rail Spur Extension Project is currently undergoing CEQA-only review for the proposed construction and operation of a rail spur into an existing oil refinery in southern San Luis Obispo County, CA.

Build Alternative

Construction-Period Noise and Vibration Effects

The Build Alternative contemplates a number of physical improvements throughout the Coast Corridor study area. To the extent any of these improvements are ultimately carried forward for further design leading to construction, heavy

[14] County of Monterey, 2006, figure 4.8-3; County of San Luis Obispo , 1992, Noise Element and Appendix A

equipment and vehicles could result in temporary increases in noise and vibration levels. These temporary construction impacts would be more pronounced at nighttime when overall ambient noise levels are lower. **Table 3.3-3** outlines typical construction equipment and their relative noise levels.

Proposed improvements that require extensive grading or excavation, such as curve realignments, siding extensions, and new stations would have a more noticeable noise and vibration effect owing to anticipated construction time. Additionally, some of the proposed improvements would likely require site clearing and earthmoving activities, such as excavation, grading, and vibratory rolling, toward the construction of new rail tracks.

Powered switches and other track/signal upgrades would generally not require such extensive use of heavy construction equipment and thus would not have less potential to result in significant noise or vibration effects upon sensitive receptors. However, the anticipated equipment required for construction is unclear at this time, since the Build Alternative improvements are conceptual at the programmatic level.

Table 3.3-3 Typical Construction Equipment Noise Levels

Construction Equipment	Maximum Noise Level (L_{max}) dBA at 50 feet	Maximum Noise Level (L_{max}) dBA at 300 feet
Backhoe	78	63
Compactor (ground)	83	68
Compressor (air)	78	63
Concrete Mixer Truck	79	64
Concrete Pump Truck	81	66
Crane	81	66
Dozer	82	67
Dump Truck	76	61
Excavator	81	66
Front End Loader	79	64
Generator	81	66
Paver	77	62
Pneumatic Tools	85	70
Pumps	81	66
Roller	80	65
Scraper	85	70

Source: FHWA Roadway Construction Noise Model User's Guide, 2006

Operational Noise and Vibration Effects

The Build Alternative proposes an increase of two passenger trains per day through the corridor by 2020 and two additional passenger trains per day by the year 2040. The improvements included in the Build Alternative would also provide improved efficiency in the movement of existing freight rail through the corridor. As a result, the Build Alternative has the potential to increase operational noise and vibration within the Coast Corridor study area.

For diesel-powered commuter rail trains at low speeds, locomotive exhaust is typically the greatest source of noise. This would occur primarily as trains approach and pass through urban areas. As speed increases, wheel-rail noise becomes the dominant noise source. Additionally, the railway itself can radiate noise as it vibrates in response to the dynamic loading of the moving train. Trains are also equipped with horns and bells for use in emergency situations and as a general audible warning to track workers and trespassers within the right-of-way as well as to pedestrians and motor vehicles at highway grade crossing.[15]

Noise Compatibility

Table 3.3-4 summarizes the potential for the proposed physical improvements and service expansion comprising the Build Alternative to result in operational period noise impacts. The table identifies each proposed improvement's noise compatibility within the screening distances identified in **Table 3.3-1**. **Table 3.3-4** also notes existing and proposed maximum speeds for each rail segment.

Table 3.3-4 Noise Compatibility

Build Alternative Components/Current and Future Maximum Train Speeds in the Area	Predominant Land Use Types within Screening Distance	Noise Compatibility
Salinas Powered Switch *Current Max Speed: 40-60 mph* *Future Max Speed: No Change*	N/A	N/A

[15] FTA, 2006

Build Alternative Components/Current and Future Maximum Train Speeds in the Area	Predominant Land Use Types within Screening Distance	Noise Compatibility
Upgrades to Existing Alignment Section #1 *Current Max Speed: 60-70 mph* *Future Max Speed: 90 mph*	Industrial/Institutional; Urban/Suburban; Some Agricultural	High in Agricultural areas; Low in Residential areas
Spence Siding Extension *Current Max Speed: 60-70 mph* *Future Max Speed: 90 mph*	Agricultural	N/A
Upgrades to Existing Alignment Section #2 *Current Max Speed Zones 60-70 mph; 35-40* *Future Max Speed Zones: 90 mph; 60 mph*	Mostly Agricultural; Urban/Suburban near Chualar, Gonzales, and Soledad	High in Agricultural areas; Low in Residential areas
Gonzales Powered Switch *Current Max Speed: 60-70 mph* *Future Max Speed: 90 mph*	N/A	N/A
Soledad Powered Switch *Current Max Speed: 60-70 mph* *Future Max Speed: 90 mph*	N/A	N/A
Soledad New Passenger Station *Current Max Speed: 60-70 mph* *Future Max Speed: 90 mph*	Industrial/Institutional; Urban/Suburban; Vosti Park	Medium
Harlem/Metz Curve Realignments *Current Max Speed: 35-40 mph* *Future Max Speed: 60 mph*	Agricultural; Open Space/Undeveloped; Some Residential	High in Agricultural areas; Low in Residential areas
Chalone Creek New Siding *Current Max Speed: 35-40 mph* *Future Max Speed: 60 mph*	Agricultural; Open Space/Undeveloped; Some Residential	N/A

Build Alternative Components/Current and Future Maximum Train Speeds in the Area	Predominant Land Use Types within Screening Distance	Noise Compatibility
Upgrades to Existing Alignment Section #3 *Current Max Speed Zones: 35-40 mph; 60-70 mph* *Future Max Speed Zones: 60 mph; 60-70 mph (no change)*	Agricultural; Open Space/Undeveloped; Some Industrial	High
Coburn Curve Realignments *Current Max Speed: 35-40 mph* *Future Max Speed: 60 mph*	Agricultural; Open Space/Undeveloped; Some Industrial	High in Agricultural areas; Low in Residential areas
King City Siding Extension *Current Max Speed: 60 mph* *Future Max Speed: No Change*	Some Agricultural; Urban/Suburban	N/A
King City New Passenger Station *Current Max Speed: 60 mph* *Future Max Speed: No Change*	Industrial/Institutional; Urban/Suburban	Medium
King City Powered Switch *Current Max Speed: 60 mph* *Future Max Speed: No Change*	N/A	N/A
Upgrades to Existing Alignment Section #4 *Current Max Speed: 60-70 mph* *Future Max Speed: 90 mph*	Agricultural; Some Industrial/Institutional; Some Residential	High in Agricultural areas; Low in Residential areas
MP 165 Curve Realignment *Current Max Speed: 60-70 mph* *Future Max Speed: 90 mph*	Agricultural; Some Industrial/Institutional; Some Residential	High in Agricultural areas; Low in Residential areas
San Lucas New Siding *Current Max Speed: 60-70 mph* *Future Max Speed: 90 mph*	Agricultural; Urban/Suburban	N/A

Build Alternative Components/Current and Future Maximum Train Speeds in the Area	Predominant Land Use Types within Screening Distance	Noise Compatibility
Upgrades to Existing Alignment Section #5 *Current Max Speed Zones: 60-70 mph; 40-55 mph* *Future Max Speed Zones: 90 mph; 70 mph*	Agricultural; Open Space/Undeveloped; some Industrial; some Residential	High in Agricultural areas; Low in Residential areas
MP 172 Track Realignment *Current Max Speed: 60-70 mph* *Future Max Speed: 90 mph*	Agricultural; Open Space/Undeveloped; some Industrial; some Residential	High in Agricultural areas; Low in Residential areas
San Ardo Powered Switch *Current Max Speed: 60-70 mph* *Future Max Speed: 90 mph*	N/A	N/A
Getty/Bradley Curve Realignments *Current Max Speed Zones: 60-70 mph; 40-55 mph* *Future Max Speed Zones: 90 mph; 70 mph*	Open Space/Undeveloped	High
Bradley Siding Extension *Current Max Speed: 40-55 mph* *Future Max Speed: 70 mph*	Open Space/Undeveloped; some Residential	N/A
Bradley Powered Switch *Current Max Speed: 40-55 mph* *Future Max Speed: 70 mph*	N/A	N/A
Upgrades to Existing Alignment Section #6 *Current Max Speed: 40-55 mph* *Future Max Speed: 70 mph*	Open Space/Undeveloped; some Industrial and Residential near Camp Roberts	High in Open Space/Undeveloped areas; Low in Residential areas

Build Alternative Components/Current and Future Maximum Train Speeds in the Area	Predominant Land Use Types within Screening Distance	Noise Compatibility
Upgrades to Existing Alignment Section #7 *Current Max Speed: 40-55 mph* *Future Max Speed: 70 mph*	Urban/Suburban; some Agricultural	High in Agricultural areas; Low in Residential areas
McKay/ Wellsona Curve Realignments *Current Max Speed: 40-55 mph* *Future Max Speed: 70 mph*	Open Space/Undeveloped; some Residential	High in Open Space/Undeveloped areas; Low in Residential areas
McKay East Powered Switches *Current Max Speed: 40-55 mph* *Future Max Speed: 70 mph*	N/A	N/A
Wellsona New Siding *Current Max Speed: 40-55 mph* *Future Max Speed: 70 mph*	Open Space/Undeveloped; some Residential	High in Open Space/Undeveloped areas; Medium in Residential areas
Upgrades to Existing Alignment Section #8 *Current Max Speed: 40-55 mph* *Future Max Speed: 70 mph*	Urban/Suburban; some Industrial; some Open Space/Undeveloped	High in Open Space/Undeveloped areas; Low in Residential areas
Wellsona/ Paso Robles Curve Realignments *Current Max Speed: 40-55 mph* *Future Max Speed: 70 mph*	Agricultural; Industrial; some Residential	High in Agricultural areas; Low in Residential areas
Templeton Siding *Current Max Speed: 40-55 mph* *Future Max Speed: 70 mph*	Urban/Suburban	N/A
Templeton/ Henry Curve Realignments *Current Max Speed: 40-50 mph* *Future Max Speed: 70 mph*	Urban/Suburban; Agricultural	High in Agricultural areas; Low in Residential areas

Build Alternative Components/Current and Future Maximum Train Speeds in the Area	Predominant Land Use Types within Screening Distance	Noise Compatibility
Upgrades to Existing Alignment Section #9 *Current Max Speed Zones: 40-55 mph; 35 mph* *Future Max Speed Zones: 70 mph (between mp 218.4-223.0)*	Urban/Suburban; Santa Margarita Community Park; Pine Mountain Cemetery	High in Open Space/Undeveloped areas; Low in Residential areas
Henry/Santa Margarita Curve Realignment *Current Max Speed Zones: 40-55 mph; 35 mph* *Future Max Speed: No Change*	Urban/Suburban; Open Space/ Undeveloped; some Industrial	Low
Santa Margarita Powered Switch *Current Max Speed 40-55 mph* *Future Max Speed: No Change*	N/A	N/A
Cuesta Second Main Track *Current Max Speed: 20-30 mph* *Future Max Speed: No Change*	Utilities/Open Space	High
Upgrades to Existing Alignment Section #10 *Current Max Speed: 20-30 mph* *Future Max Speed: No Change*	Urban/Suburban; Parks	Medium

Source: Circlepoint, 2013; Caltrans Division of Rail, 2013

Generally speaking, physical improvements proposed for urban/suburban areas (where residential uses are common) generally have lower noise compatibility because there are more sensitive land uses located within the noise screening distances. Less populated areas like open space/undeveloped lands have few sensitive land uses, but are considered more sensitive because increased noise levels could degrade the quality of recreational activities.

Conversely, areas that have agricultural land use types are less likely to be affected by proposed improvements because there are few people present in these areas to experience increased noise.

The noise compatibility level also depends on the type of improvement because changes to the existing rail alignment may potentially expose new sensitive land uses to operational impacts of the train.

The existing railway alignment passes through all areas potentially affected by *curve realignments*, thus the noise generated by passing trains is currently experienced at these locations. Additionally, curve realignments would serve to straighten the alignment to some degree, as such, noise associated with reduced train speeds would likely decrease.

Curve realignments are mostly proposed for agricultural and open space/ undeveloped areas, but some (particularly Wellsona/Paso Robles, Templeton/Henry, and Henry/Santa Margarita) may affect residential properties within the operative noise screening distances. The McKay/Wellsona curve realignment is proposed for lands adjacent to and within the Big Sandy Wildlife Area. These curve realignments would alter noise levels in these areas by relocating portions of the railway. However, given the land uses in this area, noise compatibility would be considered low.

The proposed King City and Soledad passenger rail stations are located in relatively densely populated areas through which existing passenger and freight rail trains pass without stopping. There are many noise sensitive uses located near the footprint of the proposed stations. Train service associated with the Build Alternative would result in trains that would potentially stop at the proposed new passenger stations. Trains coming to a stop at a passenger station would travel at lower speeds and thus result in a different noise profile than trains passing through without stopping. Locomotive exhaust noise may be more apparent at such low speeds, but wheel noise would be lower. Additionally, a train traveling through a populated area would likely sound the train's horn for standard safety purposes. As a result, existing noise levels would not drastically change. Therefore, noise compatibility in these locations would be moderate.

Proposed new *sidings or siding extensions* are generally less likely to affect sensitive land uses because the new tracks would be placed within existing right-of-way of the rail alignment. However, some proposed siding additions or new sidings (Templeton, Wellsona, Bradley, and King City) could expose populated areas to potential new noise from train idling. Noise compatibility in these populated locations would be moderate; trains currently travel along these areas, but the incremental addition of idling noise could affect sensitive receptors.

Upgrades to tracks along the *existing alignment* would allow for trains to safely travel at faster speeds, which may have additional noise impacts. Moreover, increases in noise due to increased rail service would be gradual over time and would be intermittent, rather than sudden and sustained.

Along several segments of the existing railroad (#1, #2, #4, and #6), proposed train speeds would increase from a maximum of 60 miles per hour (mph) to as high as 90 mph. Because there are some sensitive land uses in proximity to this segment, the incremental noise increase leads to a conclusion of medium compatibility.

Along existing alignment segment #3, train speeds would not substantially increase and few sensitive land uses are present. Accordingly, noise compatibility would be high.

Along existing alignment segments #7, #8, and #9, trains could increase from a maximum speed of 55 mph to 70 mph. Resultant noise compatibility would be high along portions that are in agricultural use; low in areas with residential uses. Speeds along existing alignment #10 would not substantially increase, but since this is a residential area, the resultant noise compatibility would be medium.

Vibration Compatibility

Generally, vibration effects are more localized near the proposed improvement, thus the screening distance is shorter than noise compatibility. Similarly to the noise compatibility assessment, proposed improvements within urban/suburban areas have low vibration compatibility because there are more sensitive land uses located within the vibration screening distances. Vibration impacts are not as prevalent for agricultural and open space/undeveloped areas, owing to sparse population and limited developed infrastructure in these areas.

Table 3.3-5 Vibration Compatibility

Build Alternative Components	Land Use/Probability of Sensitive Receptors	Vibration Compatibility
Salinas Powered Switch	N/A	N/A
Upgrades to Existing Alignment Section #1	Some potentially Residential buildings; Mostly Agricultural land uses	High in Agricultural portions; Low in Residential portions
Spence Siding Extension	Agricultural	High
Upgrades to Existing Alignment Section #2	Some potentially Residential buildings; Mostly Agricultural land uses	High in Agricultural portions; Low in Residential portions
Gonzales Powered Switch	N/A	N/A

Build Alternative Components	Land Use/Probability of Sensitive Receptors	Vibration Compatibility
Soledad Powered Switch	N/A	N/A
Soledad New Passenger Station	Some potentially Residential buildings; 8 potentially Historic buildings and 1 potentially Historic park resource	Medium
Harlem/Metz Curve Realignments	Mostly Agricultural and Open Space/Undeveloped; Some potentially Residential properties; 4 potentially Historic properties	High in Agricultural portions; Low in Residential portions
Chalone Creek New Siding	Mostly agricultural and open space/undeveloped; Some potentially residential properties; 1 potentially historic property	High in Agricultural portions; Low in Residential portions
Upgrades to Existing Alignment Section #3	Mostly Agricultural and Open Space/Undeveloped; Some potentially Residential properties; 2 potentially Historic properties	High in agricultural portions; Low in Residential portions
Coburn Curve Realignments	Mostly Agricultural; Some potentially Residential properties	High in agricultural portions; Low in Residential portions
King City Siding Extension	Mostly potentially Residential properties; some Agricultural; 6 potentially Historic properties	High in agricultural portions; Medium in Residential portions
King City New Passenger Station	Mostly potentially Residential properties; 3 potentially Historic properties	Medium
King City Powered Switch	N/A	N/A
Upgrades to Existing Alignment Section #4	Mostly agricultural and open space/undeveloped; Some potentially residential properties; 3 potentially historic properties	High in Agricultural portions; Low in Residential portions
MP 165 Curve Realignment	Mostly agricultural; Some potentially residential properties; 2 potentially historic properties	High in Agricultural portions; Low in Residential portions
San Lucas New Siding	Mostly agricultural; Some potentially residential properties	High in Agricultural portions; Medium in Residential portions
Upgrades to Existing Alignment Section #5	Agricultural; open space/undeveloped; some industrial; some residential	High in Agricultural portions; Low in Residential portions

Build Alternative Components	Land Use/Probability of Sensitive Receptors	Vibration Compatibility
MP 172 Track Realignment	Mostly Agricultural; some potentially Residential properties; 1 potentially Historic property	High in Agricultural portions; Low in Residential portions
San Ardo Powered Switch	N/A	N/A
Getty/Bradley Curve Realignments	Open Space/Undeveloped; 1 potentially Historic property	Medium
Bradley Siding Extension	Open Space/Undeveloped	High
Bradley Powered Switch	N/A	N/A
Upgrades to Existing Alignment Section #6	Open Space/Undeveloped; some Industrial and Residential near Camp Roberts; 3 potentially Historic properties	High in Open Space/Undeveloped portions; Low in Residential portions
Upgrades to Existing Alignment Section #7	Many potentially Residential properties; some Open Space/Undeveloped; 3 potentially Historic properties	High in Agricultural portions; Low in Residential portions
McKay/Wellsona Curve Realignments	Mostly Open Space/Undeveloped; some potentially Residential properties; 1 potentially Historic property	High in Open Space/ Undeveloped portions; Low in Residential portions
McKay East Powered Switches	N/A	N/A
Wellsona New Siding	Mostly open space/undeveloped; some potentially residential properties; 2 potentially historic properties	High in Open Space/Undeveloped portions; Medium in Residential portions
Upgrades to Existing Alignment Section #8	Many potentially residential properties; some open space/ undeveloped; 3 potentially historic properties	High in Open Space/Undeveloped portions; Low in Residential portions
Wellsona/Paso Robles Curve Realignments	Mostly Open Space/Undeveloped; some potentially Residential properties; 3 potentially Historic properties	High in Agricultural portions; Low in Residential portions
Templeton Siding	Many potentially Residential properties	Low
Templeton/Henry Curve Realignments	Many potentially Residential properties	Low

Build Alternative Components	Land Use/Probability of Sensitive Receptors	Vibration Compatibility
Upgrades to Existing Alignment Section #9	Many potentially Residential properties; some Open Space/Undeveloped; 3 potentially Historic properties	High in Open Space/Undeveloped portions; Low in Residential portions
Henry/Santa Margarita Curve Realignment	Many potentially Residential properties; 2 potentially Historic properties	Low
Santa Margarita Powered Switch	N/A	N/A
Cuesta Second Main Track	Open Space; 1 potentially Historic property	High
Upgrades to Existing Alignment Section #10	Many potentially Residential properties; some Open Space/Undeveloped; 1 potentially Historic property	High in Open Space/Undeveloped portions; Low in Residential portions

Note: Sensitive receptors reported here may differ in some instances to those reported in Table 3.3-4. This is due to different screening distances used in the noise and vibration analyses.

Source: Circlepoint, 2013; AECOM, 2013; ICF, 2013

Similar to noise compatibility, vibration compatibility is based on the potential to result in new effects upon sensitive land uses. Proposed *curve realignments* could potentially move train tracks closer to potential residential buildings as well as allow trains to travel at faster speeds, thus increasing vibration effects on sensitive land uses. The Harlem/Metz and Mile Post 165 curve realignments occur in a primarily agricultural area; however, several potentially historic structures are located within the vibration screening distances. The proposed Wellsona/Paso Robles, Templeton/Henry, and Henry/Santa Margarita curve realignments are located in relatively populated areas that also include potentially historic buildings. Vibration compatibility of these proposed improvements is therefore low.

There are several potentially historic structures surrounding the footprint of the proposed Soledad and King City *stations*. Freight and passenger train services already travel through these downtown districts. The Build Alternative would potentially result in increased passenger service but also new stations in these communities. If new stations are developed, the result would be that the new Coast Daylight passenger service would pass slowly through these communities, resulting in a lower level of vibration than if trains passed through at high speed.[16] Freight and Coast Starlight trains would continue to pass through Soledad and King City without stopping at the new stations.

Similarly to proposed curve realignments, new *sidings or siding extensions* in mostly developed areas, such as the proposed King City, San Lucas, and Wellsona sidings, could expose populated areas to potential new noise from train idling. Although trains currently travel along these areas, new sidings could result in incremental addition of idling vibration impacts. Vibration compatibility in these areas is moderate.

As with the noise compatibility assessment, track improvements to *existing alignment* areas would allow trains to safely travel at higher speeds and would accommodate a higher capacity of trains on the corridor. Both of these factors would contribute to increased vibration to sensitive receptors. Several notable historic structures and bridges occur within existing alignment areas. The Mission San Miguel and the Rios Caledonia Adobes area both within the vibration screening distance of segment #7 of the existing alignment. In this area, which includes nearby residential lands, track improvements would allow for maximum speeds to increase from 55 mph to 70 mph. The Bradley Bridge is eligible for the National Record of Historic Places (NRHP) (and discussed in **Section 3.10, Cultural Resources**) is located within existing alignment #6 where speeds would increase from a maximum of 60 mph to 90 mph. Therefore, vibration compatibility both these areas (segments #6 and #7) would be low.

3.3.5 AVOIDANCE, MINIMIZATION, AND MITIGATION STRATEGIES

Individual improvements comprising the Build Alternative should be designed to minimize noise and vibration impacts along the Corridor. Strategies have been identified at this preliminary stage to avoid, minimize, and/or mitigate any potentially significant impacts. Mitigation strategies for *construction* noise and vibration impacts can generally include noise control measures that can be applied as needed. Such strategies include the following:

A-NO-1. Avoid nighttime construction in residential neighborhoods.

MIN-NO-2. Use specially quieted equipment with enclosed engines and/or high-performance mufflers.

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[16] FTA, 2006, p. 7-10

MIN-NO-3. Locate stationary construction equipment as far as possible from noise-sensitive sites.

MIN-NO-4. Construct noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers.

MIN-NO-5. Re-route construction-related truck traffic along roadways that will cause the least disturbance to residents.

MIN-NO-6. Where construction of improvements requires deep foundations, avoid impact pile driving near noise-sensitive areas, where possible. Drilled piles or the use of a sonic or vibratory pile driver are quieter alternatives where the geological conditions permit their use. If impact pile drivers must be used, their use will be limited to the periods between 8:00 AM and 5:00 PM on weekdays.

Avoidance, minimization, and mitigation strategies for *operational* noise and vibration impacts can generally be applied to the trains and the path between the train and the receiver or property. Noise barriers are a common approach to reducing noise impacts from surface transportation sources. Noise walls constructed near the railroad right-of-way can shield sensitive receptors from train noise as well. Building sound insulation can also be an effective mitigation strategy. Sound insulation to improve the outdoor-to-indoor noise reduction has been widely applied around airports and has seen limited application for rail projects. Although this approach has no effect on noise in exterior areas, it may be the best choice for sites where noise barriers are not feasible or desirable, and for buildings where indoor sensitivity is of most concern. Substantial improvements in building sound insulation (on the order of 5 to 10 dBA) can often be achieved by adding an extra layer of glazing to the windows, by sealing any holes in exterior surfaces that act as sound leaks, and by providing forced ventilation and air-conditioning so that windows do not need to be opened.

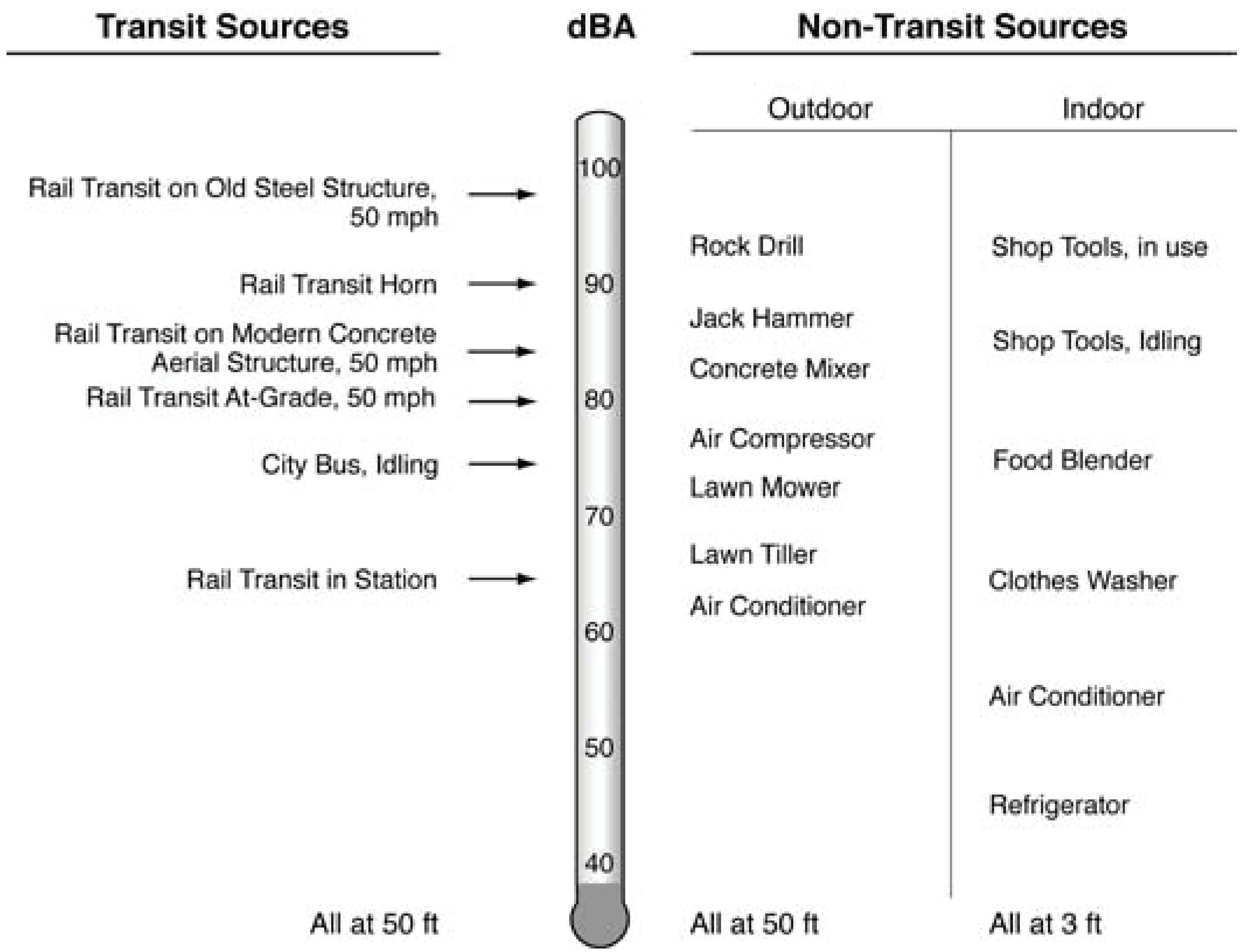
Localities wishing to reduce train horn noise may take the steps needed to establish a new quiet zone. This would cease the use of train horns at public highway-rail grade crossings. The locality would be required to mitigate the increased risk associated with the absence of a horn before receiving approval of the quiet zone.

Vibration impacts can generally be reduced by vehicle wheel and track maintenance efforts. Additional track work and materials such as rail fasteners with soft and resilient elements can provide greater vibration isolation than standard fasteners. Ballast mats made of rubber-like material can be placed on asphalt or concrete base with the normal ballast, ties, and rail on top. The reduction in ground-borne vibration provided by a ballast mat is strongly dependent on the frequency content of the vibration and design and support of the mat.

The appropriateness of these strategies would be determined upon subsequent analysis of proposed improvements and ground conditions.

3.3.6 SUBSEQUENT ANALYSIS

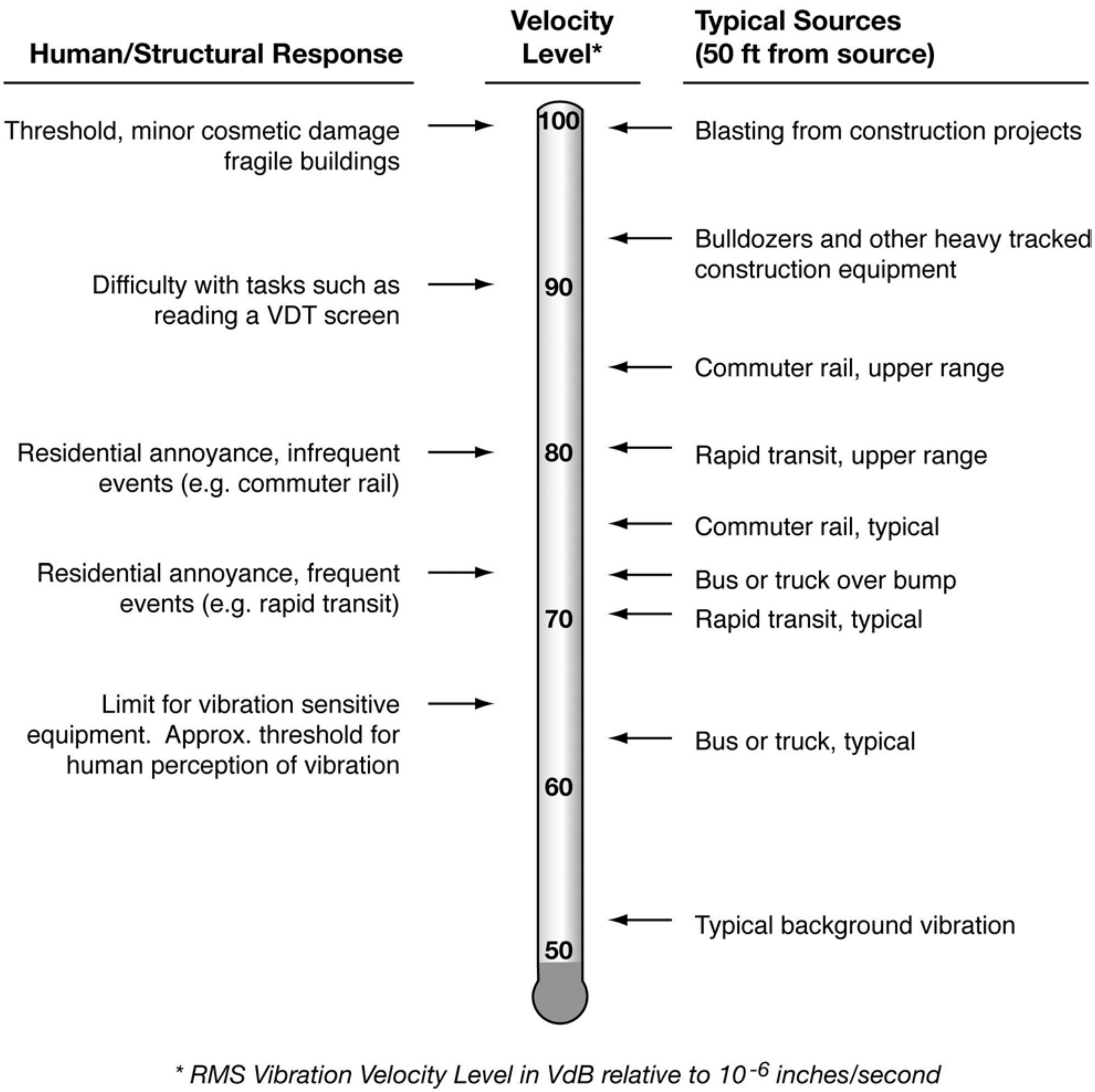
Prior to implementing specific elements of the Build Alternative, additional noise and vibration analysis could be conducted to determine existing noise and vibration levels within the areas to be specifically affected and to calculate any increases in noise levels and vibration that may result from implementing the specific improvement. If noise and vibration levels would increase substantially as a result of the proposed improvement and would affect sensitive land uses, the evaluation should identify specific mitigation measures to be applied based on those discussed above in **Subsection 3.3.5.**



Examples of Typical Outdoor Noise Exposure

Figure **3.3-1**

Source: FTA, 2006



Typical Ground-Borne Vibration Levels and Criteria

Figure **3.3-2**

Source: FTA, 2006

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