Chapter 3.9
Noise

3.9.1 Introduction

This section evaluates existing and future noise conditions at nearby sensitive locations in the City of Long Beach, City of Carson, County of Los Angeles, and the City of Los Angeles communities of San Pedro and Wilmington, and assesses potential noise and vibration impacts of the proposed Project. The following subsections provide an overview of the noise environment in the vicinity of the proposed Project, the federal, state and local regulations that are pertinent to the analysis of noise impacts associated with the construction and operation of the proposed Project, followed by analysis of those impacts and any mitigation measures that can be implemented to eliminate or reduce those impacts.

3.9.2 Environmental Setting

3.9.2.1 Noise Fundamentals

Noise is defined as unwanted and unpleasant sound. Sound is the result of vibration within a fluid medium. For humans, the fluid medium is air and the receptor is the human ear. Because all humans perceive and interpret sound differently, the types of sound which comprise noise are subjective. However, the consensus is that undesirable sound is noise. The science of noise and sound measurement and description is technically complex, having its own commonly used acoustical terminology (Table 3.9-1).

3.9.2.1.1 Decibels and Frequency

Environmental noise is measured on a logarithmic scale in decibels (dB). Decibels measure the relative magnitude of pressure fluctuations in a sound medium under the influence of a vibratory source. An increase of 10 decibels represents a 10-fold increase in acoustic energy, which is perceived by people as approximately a doubling of loudness over a wide range of amplitudes. Since decibels are logarithmic units, sound pressure levels are not added arithmetically. When two sounds of equal sound pressure level are added, the result is a sound pressure level that is 3 dB higher. For example, 60 dB plus

Table 3.9-1. Common Acoustical Terminology.

Term	Definition
Ambient Noise Level	The noise, resulting from the natural and mechanical sources and human activity, considered to be usually present in a particular area at any time.
A-Weighted Sound Level (dBA)	Weighted Sound Pressure Level which reflects the human ear's most noticed frequencies, defined in decibels. De-emphasizes sounds with frequencies lower that 1kHz and higher than 4 kHz, and emphasizes sounds in between. Most commonly used measure of environmental noise today.
Community Noise Equivalent Level (CNEL)	The average A-weighted noise level during a 24-hour day, adjusted to account for more noise sensitive time periods during the evening and nighttime. The noise level during the evening hours from 7:00 PM to 10:00 PM are increased by 5 dB and the nighttime hours from 10:00 PM to 7:00 AM are increased by 10 dB.
Day/Night Average Noise Level (L_{dn})	The average A-weighted noise level during a 24-hour day, adjusted to account for more noise sensitive time periods during the nighttime. The noise level during the nighttime hours from 10:00 PM TO 7:00 AM IS increased by 10 dB.
Decibel (dB)	Unit of sound pressure based on a logarithmic scale, computed by squaring a ratio between a given sound pressure and a reference sound pressure.
Frequency (Hz)	The number of times repeated in 1 second (i.e., cycles per second)
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location.
L_{eq}	The equivalent sound level or average A-weighted noise level during the measurement period.
L_{xx}	The statistical sound level that is exceeded xx % of the time during the measurement period.
L_{02}, L_{08}, L_{50}, L_{90}	The statistical A-weighted noise levels that are exceeded 2%, 8%, 50%, and 90% of the time during the measurement period.
L_{max} , L_{min}	The maximum and minimum noise levels during the measurement period.
Loudness	The amplitude of sound waves combined with the reception characteristics of the ear
Pitch	The height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced.
SEL	Sound Exposure Level is a measure of cumulative noise exposure for a noise event expressed as the sum of the sound energy over the duration of a noise event, normalized to a one-second duration.
Sound Pressure	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter.
Sound Pressure Level	Sound pressure level is the quantity that is directly measured by a sound level meter and is computed by squaring a ratio between a given sound pressure and a reference sound pressure: dB = (20 x log (measured sound pressure/ref. sound pressure) The reference pressure for air is 20 micro Pascals.

60 dB equals 63 dB, and 80 dB plus 80 dB equals 83 dB. However, where noise levels differ, the lower noise source may cause little change relative to the louder noise source; for example when 70 dB and 60 dB sources are added, the resulting noise level equals 70.4 dB.

The frequency of a sound wave is the number of times in one second that the sound wave is repeated (i.e., the number of cycles per second). Frequency is designated by a number, and is expressed by the unit Hertz (Hz; 1 Hz = 1 cycle per second). The frequency range over which normal adults are capable of hearing is approximately 20 Hz at the low-frequency end to 20,000 Hz at the high-frequency end.

Because the human hearing system is not equally sensitive to sound at all frequencies, the A-weighted filter system is used to express measured sound levels, in units of dBA, based on the sensitivity of the human ear. The dBA scale emphasizes mid- to high-range frequencies and de-emphasizes the low frequencies to which human hearing is less sensitive. Table 3.9-2 shows typical A-weighted exterior and interior noise levels that occur in human environments.

Because A-weighted sound levels are adjusted to the sensitivity of the human ear, they are commonly used to quantify noise events and environmental noise. However, community response also depends on the existing ambient sound level, magnitude of sound with respect to the background noise level, duration of the sound, repetitiveness, number of events, and time of day.

Table 3.9-2. Typical A-weighted Exterior and Interior Noise Levels.

COMMON OUTDOOR ACTIVITIES	NOISE LEVEL dBA	COMMON INDOOR ACTIVITIES
	---110---	Rock Band
Jet Fly-over at 300 m (1000 ft)		
	---100---	
Gas Lawn Mower at 1 m (3 ft)		
	---90---	
Diesel Truck at 15 m (50 ft),		Food Blender at 1 m (3 ft)
at 80 km/hr (50 mph)	---80---	Garbage Disposal at 1 m (3 ft)
Noisy Urban Area, Daytime		
Gas Lawn Mower, 30 m (100 ft)	---70---	Vacuum Cleaner at 3 m (10 ft)
Commercial Area		Normal Speech at 1 m (3 ft)
Heavy Traffic at 90 m (300 ft)	---60---	
		Large Business Office
Quiet Urban Daytime	---50---	Dishwasher Next Room
Quiet Urban Nighttime	---40---	Theater, Large Conference
Quiet Suburban Nighttime		Room (Background)
	---30---	Library
Quiet Rural Nighttime		Bedroom at Night, Concert
	---20---	Hall (Background)
		Broadcast/Recording Studio
	---10---	
Lowest Threshold of Human Hearing	---0---	Lowest Threshold of Human Hearing

3.9.2.1.2 Noise Descriptors

Several noise metrics have been developed to evaluate noise. Leq is the energy average noise level and corresponds to a steady-state sound level that has the same acoustical energy as the sum of all the time-varying noise events. Lmax is the maximum noise level measured during a sampling period, and Lxx are the noise levels that are exceeded xx percent of the time of the measurement.

Because environmental noise fluctuates over time, CNEL and Ldn were devised to relate noise exposure over time to human response. CNEL and Ldn are 24-hour averages of the hourly Leq, but with penalties to account for the increased sensitivity to noise events that occur during the more sensitive evening and nighttime periods. Specifically, CNEL penalizes noise by 5 dB during the evening time period (7:00 pm to 10:00 pm) and 10 dB during the nighttime time period (10:00 pm to 7:00 am), while Ldn only penalizes noise by 10 dB during the nighttime time period (10:00 pm to 7:00 am).

Leq accounts for the frequency of sounds through the A-weighting, and CNEL addresses long term noise exposure. SEL measures cumulative noise exposure for a noise event as a sum of the sound energy over the duration of the noise event. The Leq value is related to the SEL by the following equation: SEL=Leq+10log(T), where T is equal to 3600 seconds or 1 hour; equivalently, SEL=Leq+35.6 dB (Harris, 1998).

3.9.2.1.3 Human Response to Noise

Research indicates that a healthy human ear is able to discern changes in sound levels of 1 dBA within a laboratory environment. It is widely accepted that changes of 3 dBA in a community noise environment are considered just noticeable to most people. A change of 5 dBA is readily perceptible, and a change of 10 dBA is perceived as being twice as loud.

A number of studies have linked increases in noise with health effects, including hearing impairment, sleep disturbance, cardiovascular effects (hypertension, heart disease, increased blood pressure), psychophysiological effects, and potential impacts to fetal development (Babisch, 2005). Potential health effects appear to be caused by both short- and long-term exposure to very loud noises and long-term exposure to lower levels of sound. Acute sounds of LAF > 120 dB ("LAF" is the A-weighted sound level measured at a "fast" response rate) can cause mechanical damage to hair cells of the cochlea (the auditory portion of the inner ear) and hearing impairment (Babisch, 2005). As shown in Table 3.9-2, LAF > 120 dB is equivalent to a rock concert or a plane flying overhead at 300 meters. High noise levels may cause disturbance to sleep and concentration and may be linked to chronic health impacts such as hypertension and heart disease (Babisch, 2006). A number of studies have looked at the potential health effects from the sound of chronic lower noise levels, such as traffic, especially as these noise levels affect children. In a study of school children in Germany, blood pressure was found to be 10 mmHg higher in a group of students exposed to road traffic noise from high traffic transit routes (Babisch, 2006). A study by Kwanda (2004) showed that in pregnant women, exposure to airplane noise was associated with decreased fetal body weight. Research into these potential effects is still in its early stages, and there is not yet enough information to permit an evaluation of an individual project's impacts on public health. Accordingly, this summary is provided as an acknowledgement that such impacts could occur, but that the possibility cannot be evaluated for the Proposed Project. A report in the Journal of Occupational Health cited research showing that sleep disturbance was more prevalent in urban populations exposed to traffic noise above 65 Leq. This exposure to traffic noise has been linked to insomnia, poorer sleep quality, and tiredness (Kawada, 2011).

3.9.2.1.4 Sound Propagation

When sound propagates over a distance, it changes in both level and frequency content. The manner in which noise is reduced with distance depends on a number of factors. These factors are geometric spreading, ground attenuation, shielding, and atmospheric effects.

Geometric spreading occurs when sound from a small localized source (i.e., a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates or drops-off at a rate of 6 dBA for each doubling of the distance.

Ground absorption adds to the attenuation due to geometric spreading, because the path of noise between the source and the receiver is relatively close to the ground. An excess ground attenuation value of 1.5 dBA for each doubling of distance is normally assumed.

Shielding takes place when a large object (building, barrier, sound wall, terrain feature, etc.) between a noise source and a receiver can significantly attenuate noise levels at that receiver. The amount of attenuation provided by this "shielding" depends on the size and mass of the object, source and receiver geometry, and frequencies of the noise levels. Finally, research by Caltrans and others has shown that atmospheric conditions can have a profound effect on noise levels. Wind, vertical air temperature gradients, humidity and turbulence all affect noise propagation. Refer to the noise study in Appendix F1 for a detailed discussion on sound propagation.

3.9.2.2 Vibration Fundamentals

Vibration is an oscillatory motion in a solid medium that can be described in terms of displacement, velocity, and acceleration. With a vibrating floor, for example, the displacement is simply the vertical distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement, while acceleration is the rate of change of that speed. In an environmental setting, vibratory motion will most often propagate through the soil, and can potentially affect humans, structures, and equipment. The effects of ground vibration are dependent on the source and amplitude of vibration, source to receiver distance, soil conditions, and receiver characteristics. The noise study in Appendix F1 contains a detailed discussion of vibration.

3.9.2.2.1 Vibration Descriptors

Vibration amplitudes are usually expressed as either peak particle velocity (PPV), the maximum instantaneous peak of the vibration signal, or the root mean square (RMS) velocity, the average of the squared amplitude of the signal. For sources such as truck or motor vehicles, peak vibration levels are typically much higher than RMS levels -- typically a factor of 1.7 to 6 times greater, although the Federal Transit Administration (FTA) recommends a factor of 4. RMS velocity is more appropriate than PPV for evaluating human response to vibration, since it takes some time for the human body to respond to vibration signals. The RMS velocity is normally described in inches or millimeters per second.

Ground-borne vibration is quantified in terms of decibels, since that scale compresses the range of numbers required to describe the oscillations. The FTA uses vibration decibels (abbreviated as VdB) to measure and assess vibration amplitude. In the United States, vibration is referenced to 1 micro-inch/sec (25.4 micro-mm/sec) and presented in units of VdB.

Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration, and are therefore usually confined to short distances (i.e., 500 feet or less) from the source. These man-made activities include heavy rail operations (locomotives, heavily loaded freight cards, and coupling operations), highway traffic (heavy trucks on uneven pavement), and construction equipment (pile driving, pavement breaking, blasting, and demolition). Vibration-sensitive receptors include structures, people, and certain types of equipment.

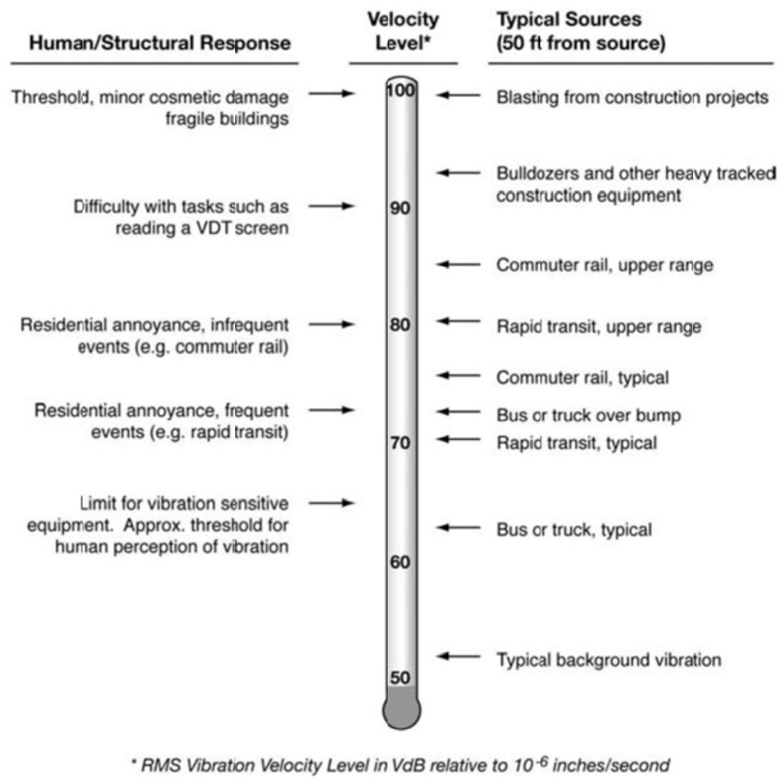
3.9.2.2.2 Human and Structural Response to Vibration

In contrast to airborne noise, ground-borne vibration is not a phenomenon that most people perceive every day because background vibration levels in residential areas are generally below the threshold of perception for humans. The effects of ground vibration are dependent on the source and amplitude of vibration, source to receiver distance, soil conditions, and receiver characteristics. Common vibration sources and the human and structural responses to ground-borne vibration are shown in Figure 3.9-1.

Although the human threshold of perception for vibration is about 65 VdB (Table 3.9-3), humans do not usually respond significantly to vibration unless it exceeds 70 VdB. Heavy locomotives typically generate vibration levels of 75 to 80 VdB or more near their tracks. Trucks rarely create vibration that exceeds 70 VdB unless there are bumps in the road. Vibration levels from these sources can be 10 VdB higher than typical if there is unusually rough road or track, wheel flats, geologic conditions that promote propagation of vibration, or vehicles with very stiff suspension systems. Hence, at 50 feet, the upper range for freight rail vibration is around 90 VdB and the high range for heavy truck traffic vibration is 75 VdB. If the vibration level in a residence reaches 85 VdB, most people will be strongly annoyed (Table 3.9-3).

Construction activity can result in varying degrees of ground vibration, depending on the construction equipment and method of operation. Buildings near the construction site respond to these vibrations variously, ranging from no perceptible effects at the lowest levels, low rumbling sounds and perceptible vibrations at moderate levels, and slight damage at the highest levels. Ground vibrations from construction activities generally do not reach the levels that can damage structures, but they can achieve the audible and perceivable ranges in buildings very close to the construction site.

Figure 3.9-1. Typical Levels of Ground-Borne Vibration.



Source: FTA Transit Noise and Vibration Impact Assessment, May 2006.

Table 3.9-3. Human Response to Different Levels of Ground-Borne Vibration.

Vibration Velocity Level	Human Response
65 VdB	Approximate threshold of perception for many humans.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying.
85 VdB	Vibration acceptable only if there are infrequent events per day.

Source: FTA Transit Noise and Vibration Impact Assessment, May 2006

3.9.2.3 Existing Noise Environment

The existing noise environment at any particular location is a function of the types of nearby noise sources, the relative distance to the sources, and the intervening topography/structures. Baseline noise levels in the vicinity of the proposed Project site, as well as in the surrounding areas that border transportation corridors to and from the site, are attributed to:

- Vehicular traffic on the local arterials
- Vehicular traffic on the freeways (Terminal Island [SR 47], 110 Harbor, and 710 Long Beach,)
- Railroad activity
- Port activity
- Existing industrial operations
- Aircraft
- Community – children playing, gardeners working, people talking, etc.
- Wildlife activity – birds chirping, insects buzzing, etc.
- Off-port trucking, commercial and industrial operations

Noise-sensitive receivers are located near the proposed Project site and along the designated truck routes and rail segments that serve the proposed Project site. These receivers are located within the jurisdiction of the City of Long Beach and City of Los Angeles communities, and are comprised of single-and multi-family residences, marina live-aboards, a small wetland reserve next to downtown Long Beach, parks, and institutional uses such as fire stations, schools, religious establishments, child development facilities, and adult education centers. There may also be residences within industrial areas along some of the haul routes. Although a portion of the proposed Project is located within the City of Carson, there are no noise sensitive receivers within the City of Carson that are directly exposed to the proposed Project.

A baseline noise survey was conducted in January 2008 with supplemental baseline noise measurements conducted in April 2011 and March 2012 to document existing noise levels at selected sensitive receivers and other points throughout the study area (Figure 3.9-2). These monitoring locations are representative of noise sensitive locations in the study area in the 2010 baseline year, since land uses and activity levels did not change substantially between 2005 and 2012. Additional noise measurements were conducted in April 2011 to document ambient noise levels along the Alameda Corridor in Wilmington and Carson. The instruments and methodology employed during the survey are described in the noise study in Appendix F1.

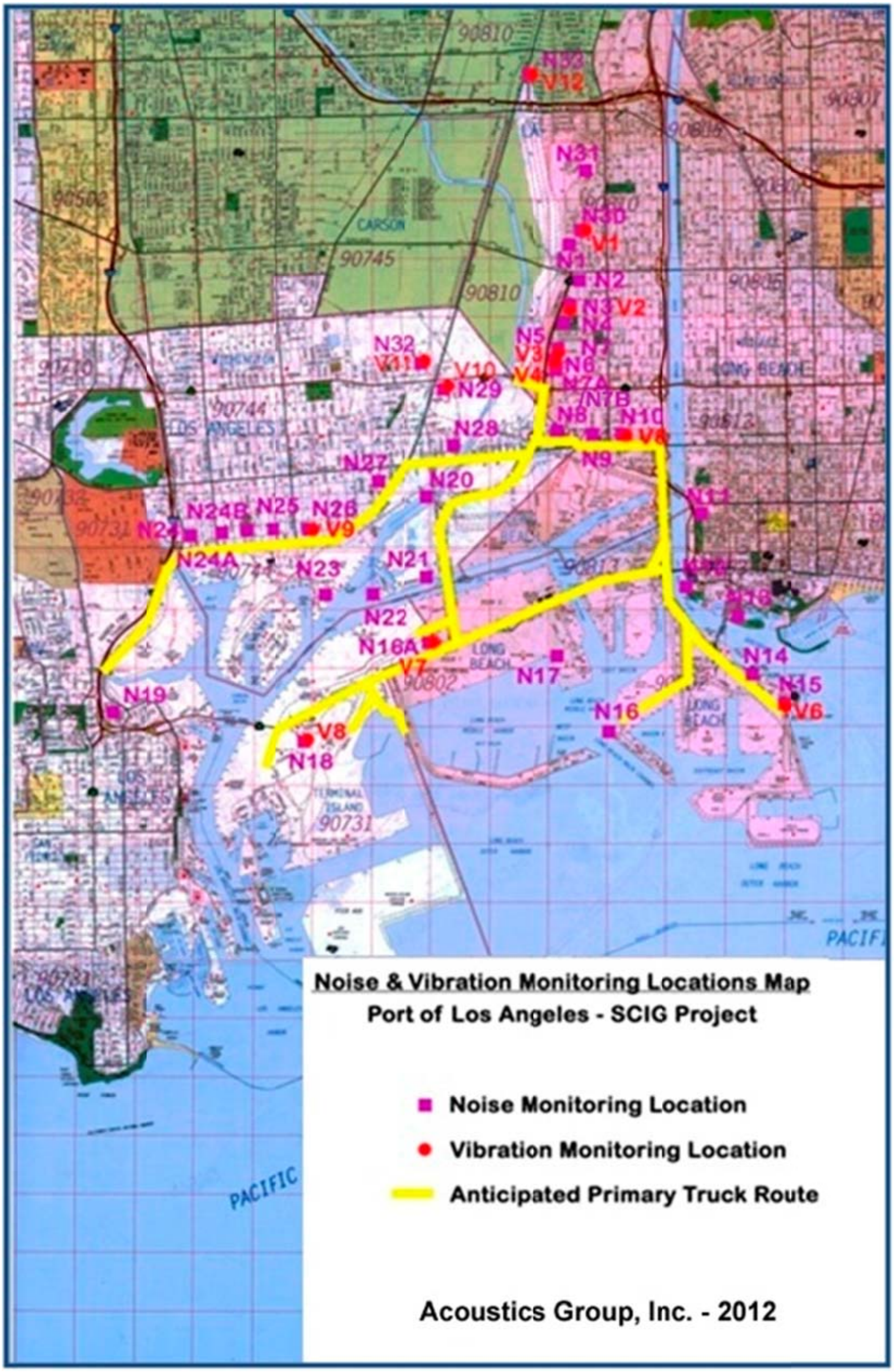
3.9.2.3.1 Sensitive Receivers in Long Beach

Sensitive receivers in Long Beach include single-family residences (Location N1 in Table 3.9-4), educational and religious establishments (N2 through N7B, N30 and N31), industrial properties with potential residential uses (N8, N9, and N10), parks/open space (N11 through N14), four fire stations (N15-N18), and one recording studio (R34). Details of the various monitoring stations are presented in Table 3.9-4 and Appendix F1. Reid High School is a second row receiver located behind Hudson School (N3), Hudson Park (N4), and Cabrillo High School (N5). Cabrillo High School's nearest classrooms to the Project site are at a similar setback distance when compared to Reid High School's location; thus, the receptor N5 is also representative of the noise level at Reid High School.

Measured short-term existing noise levels, Leq, at the residential and educational receivers north of Sepulveda Blvd ranged from 52.1to 63.2dBA, and the measured CNEL from 54.7 to 61.2dBA. Contributing noise sources included nearby industrial activity, trains, vehicular traffic, students, and children playing. Short-term noise levels, Leq, at the educational and religious receivers between Pacific Coast Highway and Sepulveda Boulevard (where the North Lead Track would be located), ranged from 55.8 to 69.0 dBA, and the measured CNEL from 62.8 to 69.9 dBA. All of these receivers are located adjacent to the Terminal Island Freeway and are exposed to vehicular and truck traffic on the freeway, as well as train operations, local traffic, industrial activity, students playing, aircraft, and wildlife.

The measured existing short-term noise levels, Leq, within the West Long Beach Industrial Redevelopment Project Area ranged from 66.4 to 73.4 dBA. All of these potential receivers are located close to or along the designated truck routes (see Section 2.4) and are exposed to traffic noise. Because of the proximity to industrial land uses, truck traffic and industrial activity are the primary contributors to the existing noise environment. The parks/open space receivers (N11 – N14) and the fire stations (N15-N18) are located further away from the proposed Project site than the previous receivers, but they are near designated truck routes. Short-term noise levels, Leq, at those receivers ranged from 59.2 to 70.4. Typical contributing noise sources included vehicular and truck traffic, aircraft, children playing, people talking, ship generators, and wildlife.

Figure 3.9-2. Location of Noise and Vibration Measurements.



3.9.2.3.2 Sensitive Receivers in San Pedro & Wilmington

Sensitive receivers in San Pedro and Wilmington include single-family residences (N19, N24, N24A, N26, N27, N29, and N32), marinas with boat live-aboards (N20, N21, and N22), community centers (N25), industrial properties with potential residential uses (N28), parks (N24B), and two fire stations (N18 and N23). Details of the various monitoring stations are presented in Table 3.9-4 and Appendix F1.

Fire station receivers (N16A and N18), which are considered sensitive receivers, are near shipping terminals and are adjacent to designated truck routes that would serve the proposed Project site. The measured short-term existing noise levels, Leq, at these receivers were 65.7 and 72.2 dBA, respectively. A CNEL of 69.5 dBA was measured at Receiver N16A. Noise sources that contributed to the ambient noise environment at Receiver N16A were trains, power plant operations and construction activity. The single family receiver (N19) overlooks the western edge of the Port of Los Angeles, specifically the China Shipping Terminal and Pacific Avenue. The measured short-term existing noise levels, Leq, were 69.4 dBA, while the CNEL was 71.2 dBA. Typical noise sources experienced at this location include vehicular and truck traffic, trains, and port operations.

The short-term noise levels, Leq, measured at the Leeward Bay Marina, Island Yacht Marina, and Peninsula Road Marina Receivers (N20, N21, and N22) were 81.7, 75.6, and 58.7 dBA, respectively. The CNEL levels measured at Receivers N20 and N21 were 80.3 and 79.3 dBA, respectively. Ambient noise levels at Receivers N20 and N21 were dominated by train operations and vehicular traffic on the Terminal Island Freeway. Receiver N22 was located further away from these sources and was exposed to noise from Port operations, local traffic, live-aboards, aircraft, and wildlife. A short-term noise level of 58.7 dBA was measured at Fire Station #49 (N23). Noise sources experienced at this location included industrial activity, local traffic, horns, public address system, and wildlife. The Wilmington Community receivers (N24, N24A, N24B, and N25) border container haul routes and the ambient noise levels in these areas are dominated by truck traffic, and to a lesser extent port operations, local traffic, and industrial activity. The measured short term noise levels, Leq, were 83.3, 64.0, 71.8, and 71.6 dBA, respectively.

Residential receivers (N26 and N27) in the Los Angeles Harbor Industrial Center Redevelopment Project Area, also known as the Wilmington Industrial Park experience vehicular and truck traffic noise, industrial noise and dog barking. The short-term noise measurements yielded Leqs of 70.5 and 69.7 dBA, respectively. Potential residential uses (N28 and N29) within the industrial-zoned properties on East I Street and Mauretania Street are exposed to noise from local auto traffic, truck traffic, wrecking yard operations, trains, and refineries. Short-term noise levels, Leq, were 63.7 and 70.4 dBA at these receivers, respectively. The CNEL measured at N29 was 71.3 dBA. Residential Receptor N32 experiences noise from local auto and truck traffic, nearby industrial operations and operations from the Alameda Corridor. The Leq was 67.2 dBA and the CNEL was 69.3 dBA at this location.

3.9.2.3.3 Sensitive Receivers in Carson

Sensitive receivers in Carson include single-family residences (Location N33 in Table 3.9-4) that are located near the Alameda Corridor. Details of the various monitoring stations are presented in Table 3.9-4 and Appendix F1. The measured short-term existing noise level, Leq, at the residential receiver east of the Alameda Corridor was 64.1 dBA, and the measured CNEL was 65.7 dBA. Noise sources that contributed to the noise measurement included vehicular traffic on Alameda Blvd, rail operations on the Alameda Corridor, birds, lawn mowers, and residential activity.

Table 3.9-4. Summary of Existing Ambient Noise Measurement Data.

Rec.	Loc.	Description	Date	Start	A-WEIGHTED SOUND LEVEL, dBA										Predominant Noise Sources
					L2	L8	L25	L50	L90	L99	L_{max}	L_{min}	L_{eq}	CNEL	
R1	N1	Residence at 2789 Webster	3-12-12 3-13-12 3-13-12	3:00 - 4:00 PM 7:00 – 8:00 AM 12:00 – 1:00 PM	62.4 67.9 60.9	56.1 63.9 54.7	53.4 53.4 51.8	50.7 46.8 49.0	47.1 42.4 44.5	45.2 41.1 42.2	75.5 71.5 70.3	44.3 40.4 41.7	53.5 58.7 52.1	54.7	Industrial Yard, Trains Industrial Yard, Trains Industrial Yard, Trains
R2	N2	Buddhist Temple at Willow and Webster	3-12-12 3-13-12 3-13-12	4:00 – 5:00 PM 7:00 – 8:00 AM 1:00 – 2:00 PM	68.2 69.2 66.5	64.3 63.5 62.1	62.1 61.4 60.5	60.2 59.7 59.0	57.6 56.7 55.8	55.8 54.0 53.1	79.3 77.2 77.4	54.4 52.3 50.5	61.7 61.2 60.0	64.0	Traffic, Trains, Temple, ICTF Traffic, Trains, Temple, ICTF Traffic, Trains, Temple, ICTF
R3	N3	Hudson Elementary School Playground	3-14-12 3-14-12 3-14-12	9:00 – 10:00 AM 12:00 – 1:00 PM 4:00 – 5:00 PM	75.8 73.3 70.9	65.9 68.6 68.5	64.0 66.1 66.8	61.7 62.9 65.0	55.9 56.1 60.4	50.7 52.9 56.9	79.6 81.1 75.3	49.0 51.7 54.8	64.5 65.2 65.7	66.6	Traffic, Children Playing, Trains Traffic, Children Playing, Trains Traffic, Children Playing, Trains
R4	N4	Hudson Park	3-22-12 3-22-12 3-22-12	11:45 – 12:05 AM 3:30 – 3:50 PM 8:39 – 8:59 AM	72.1 72.6 72.1	69.8 69.7 68.9	67.4 67.3 66.6	63.9 64.3 62.4	54.8 57.4 50.2	51.2 54.1 46.7	75.1 75.7 76.2	49.7 52.7 45.5	66.0 66.0 64.8	--	TI Freeway, Aircraft, Car Train, Train Horn, Traffic Traffic
R5	N5	Cabrillo High School	3-18-12 3-19-12 3-19-12	3:00 – 4:00 PM 9:00 – 10:00 AM 1:00 – 2:00 PM	65.7 69.6 63.7	59.4 65.8 56.8	57.9 60.9 54.8	56.5 55.7 53.3	54.2 51.7 51.0	52.8 49.7 49.5	90.8 73.1 79.9	51.4 47.0 48.6	60.1 60.9 55.8	62.8	Gardeners, Local Traffic Birds, Local Traffic, TI Freeway, Train, Distant Construction, Airplane, Tractor, Train Horn
R6/R7	N6/ N7	Cabrillo Child Dev Center/ Bethune School	3-11-12 3-11-12 3-12-12	1:00 – 2:00 PM 6:00 – 7:00 PM 8:00 – 9:00 AM	73.6 74.0 79.8	68.6 70.7 71.5	66.1 68.2 68.5	62.8 64.4 65.1	54.7 56.8 57.6	50.6 53.6 52.9	78.6 77.1 85.4	49.5 52.1 51.5	65.1 66.8 69.0	69.9	TI Freeway TI Freeway TI Freeway
R7A	N7A	Century Villages at Cabrillo	3-21-12 3-21-12 3-22-12	12:00 – 1:00 PM 4:00 – 5:00 PM 9:00 – 10:00 AM	68.4 70.5 69.9	64.2 67.0 67.1	62.2 65.2 65.2	59.9 63.2 62.8	55.8 58.3 56.3	53.4 54.6 52.5	74.3 80.7 73.6	51.9 52.4 50.1	61.3 64.3 63.8	67.3	TI Freeway, Local Traffic TI Freeway, Local Traffic TI Freeway, Local Traffic
R7B	N7B	Cabrillo Park	3-22-12 3-22-12 3-23-12	1:00 – 2:00 PM 3:00 – 4:00 PM 9:00 – 10:00 AM	71.9 72.7 72.5	68.4 69.7 69.6	65.9 67.7 67.4	62.3 64.8 64.2	53.8 58.0 54.2	50.4 52.4 49.7	77.0 90.0 75.5	49.0 50.4 47.7	64.6 66.8 65.9	69.3	TI Freeway, Local Traffic TI Freeway, Local Traffic TI Freeway, Local Traffic
R8	N8	Cervera Street	1-17-08 1-17-08 1-17-08	10:30 – 10:45 AM 1:05 – 1:20 PM 5:00 – 5:15 PM	70.8 84.1 70.4	68.8 79.1 68.1	67.3 69.7 64.8	65.2 63.6 61.4	62.2 57.3 57.2	60.3 55.3 56.5	79.9 87.6 72.5	59.7 54.9 55.9	66.4 73.4 63.8	--	Trucks, Industrial Activity Trucks Trucks, Train
R9	N9	1333 Seabright Avenue	1-17-08 1-17-08 1-17-08	10:00 – 10:15 AM 12:48 – 1:03 PM 4:42 – 4:57 PM	71.9 68.1 70.3	62.3 63.3 66.3	58.4 60.6 62.8	56.6 58.8 60.6	53.2 56.6 58.3	52.3 54.1 56.7	81.5 93.3 81.8	51.5 53.0 55.2	62.7 66.4 64.1	--	Traffic, Industrial Activity Traffic, Industrial Activity, Plane Industrial Activity, Traffic, Radio
R10	N10	1330 Canal Street	1-17-08 1-17-08 1-17-08	9:40 – 9:55 AM 12:27 – 12:42 PM 4:20 – 4:35 PM	71.7 74.6 76.6	68.2 70.6 73.2	65.6 67.4 69.9	63.2 65.2 67.3	59.2 60.0 61.6	55.4 54.7 56.3	89.2 80.0 80.2	54.5 53.5 54.2	66.5 67.1 69.4	--	Industrial Activity, Traffic Industrial Activity, Traffic Industrial Activity, Traffic
R11	N11	Ceasar Chavez Park	1-15-08 1-15-08 1-15-08	10:00 – 10:15 AM 1:25 – 1:40 PM 5:01 – 5:16 PM	67.0 67.5 69.3	65.7 65.7 67.5	63.7 64.6 66.3	62.0 62.7 65.3	57.0 59.5 63.0	53.7 57.3 60.0	69.2 70.7 78.8	52.5 56.8 58.9	62.6 63.2 65.7	--	Traffic on 710, 6th Street, Aircraft 710 Traffic, Aircraft 710 Traffic, Children Playing
R12	N12	Pocket Wetland Reserve	1-15-08 1-15-08 1-15-08	9:37 – 9:52 AM 12:55 – 1:10 PM 4:37 – 4:52 PM	59.0 59.5 66.2	57.5 58.7 60.7	55.8 57.4 58.8	54.9 56.2 57.5	53.2 54.3 56.0	52.0 53.4 54.2	61.7 61.3 72.4	51.5 52.4 53.7	55.4 56.6 59.2	--	Trucks, Birds Trucks Trucks, RV Park, Helicopter

Rec.	Loc.	Description	Date	Start	A-WEIGHTED SOUND LEVEL, dBA										Predominant Noise Sources
					L2	L8	L25	L50	L90	L99	L_{max}	L_{min}	L_{eq}	CNEL	
R13	N13	Pierpoint Landing/ Shoreline Park	1-10-08	10:25 – 10:40 AM	63.6	58.9	56.8	55.5	53.9	52.5	68.7	52.2	56.9	--	Aquarium P/A, Birds, Traffic, Helicopter, Plane
			1-10-08	1:30 – 1:45 PM	62.4	58.4	56.4	55.4	54.0	53.4	66.4	52.9	56.4		Birds, Parking Lot Vehicles, Traffic, G/A
			1-10-08	4:45 – 5:00 PM	72.1	71.3	70.6	54.9	53.3	52.5	72.5	51.7	66.3		Birds, Local Traffic, Parking Lot, Truck Idling
R14	N14	Queen Mary Park	1-15-08	9:10 – 9:25 AM	73.2	69.7	67.3	65.3	59.4	52.7	78.8	51.4	66.5	--	Trucks, Helicopter
			1-15-08	12:35 – 12:50 PM	71.4	67.7	65.2	62.4	57.7	55.2	76.1	54.2	64.3		Trucks, People Talking, Airplane
			1-15-08	4:13 – 4:28 PM	72.3	70.0	67.9	66.3	62.7	58.3	80.7	56.5	67.3		Trucks, Bus
R15	N15	Fire Station #6	1-10-08	9:30 – 9:45 AM	64.9	63.7	61.8	59.9	57.0	54.5	66.0	54.5	60.7	--	Heavy Trucks on Queens Way
			1-10-08	1:05 – 1:20 PM	73.3	65.0	62.9	61.5	58.8	54.1	77.4	53.8	63.9		Traffic, Distant Aircraft, Fire trucks
			1-10-08	4:20 – 4:35 PM	80.6	73.6	66.5	63.3	60.1	58.1	85.3	57.3	70.4		Traffic on Queens Way, Aircraft, Helicopter
R16	N16	Fire Station #15 @ Pier F Avenue	1-10-08	9:57 – 10:13 AM	64.6	62.1	59.6	57.8	55.3	54.0	70.0	53.6	59.1	--	Heavy Trucks
			1-10-08	12:38 – 12:53 PM	65.3	63.5	60.9	58.8	55.8	54.8	69.2	54.2	60.1		Heavy Trucks, Seagulls, People Talking, Boat
			1-10-08	3:55 – 4:10 PM	64.9	62.9	60.4	58.4	55.1	53.5	70.9	52.6	59.7		Heavy Trucks, Train Horn, A/C, Birds, Copter
R16A	N16A	New Fire Station #24 @ SR47	3-25-08	6:00 – 7:00 PM	68.4	66.8	65.3	63.9	62.0	60.4	77.6	59.5	64.6	69.5	Route 47, Pier Avenue
			3-26-08	8:00 – 9:00 AM	68.8	67.3	65.9	64.8	63.1	61.9	74.9	60.8	65.3		Route 47, Pier Avenue
			3-26-08	1:00 – 2:00 PM	69.7	67.9	66.4	65.1	63.1	61.5	74.4	60.6	65.7		Route 47, Pier Avenue
R17	N17	Fire Station #24	1-11-08	9:41 – 9:56 AM	66.4	62.1	59.5	58.5	57.0	56.4	76.1	55.7	60.2	--	Distant Traffic, Ship Generators, Fire truck
			1-11-08	1:05 – 1:20 PM	67.5	61.0	58.9	57.6	56.0	55.1	70.9	54.3	59.5		Ship Generators, Train, Back Up Beeper, Airplane, Traffic, Copter
			1-11-08	4:53 – 5:08 PM	64.1	61.5	60.0	58.6	56.9	56.0	66.1	55.6	59.3		Ship, Fire station, Train Horn, Distant Traffic
R18	N18	Fire Station #210 @ Ferry Street	1-11-08	9:15 – 9:30 AM	79.0	77.1	73.1	69.0	62.4	58.6	83.8	56.6	72.2	--	Traffic on Ferry, Train Locomotives and Rail/Wheel Squeak, P/A
			1-11-08	12:35 – 12:50 PM	78.4	73.7	69.9	66.0	57.7	54.1	85.4	52.8	69.0		Traffic, LAFD Siren
			1-11-08	4:28 – 4:43 PM	77.4	74.7	70.1	65.6	57.1	52.4	87.2	51.7	70.0		Traffic on Ferry
R19	N19	539 Shields Drive	1-14-08	1:00 – 2:00 PM	69.3	68.1	67.0	65.8	63.4	61.2	74.4	59.6	66.1	71.2	Traffic, Trains, Port Operations
			1-14-08	4:00 – 5:00 PM	73.0	73.0	67.6	66.4	64.2	62.2	81.0	60.9	67.3		Traffic, Trains, Port Operations
			1-15-08	7:00 – 8:00 AM	72.1	72.1	69.8	69.0	67.2	66.0	89.7	65.2	69.4		Traffic, Trains, Port Operations

Rec.	Loc.	Description	Date	Start	A-WEIGHTED SOUND LEVEL, dBA										Predominant Noise Sources
					L2	L8	L25	L50	L90	L99	L_{max}	L_{min}	L_{eq}	CNEL	
R20	N20	Leeward Bay Marina	1-17-08	1:00 – 2:00 PM	68.8	63.8	58.8	56.4	53.2	51.0	84.7	49.6	62.2	80.3	Traffic, Trains, Marina, Industrial Operations
			1-17-08	6:00 – 7:00 PM	81.7	66.7	60.6	58.4	55.6	53.6	100.1	52.5	73.2		Traffic, Trains, Marina, Industrial Operations
			1-18-08	8:00 – 9:00 AM	82.2	66.0	61.2	58.8	56.3	55.2	109.3	54.9	81.7		Traffic, Trains, Marina, Industrial Operations
R21	N21	Island Yacht Marina	1-15-08	1:00 – 2:00 PM	80.0	77.4	72.4	68.0	58.0	56.1	87.2	54.9	72.5	79.3	Traffic, Trains, Marina, Industrial Operations
			1-15-08	5:00 – 6:00 PM	85.8	77.9	70.4	66.8	60.5	56.4	98.9	55.5	75.6		Traffic, Trains, Marina, Industrial Operations
			1-15-08	8:00 – 9:00 AM	83.6	75.6	71.2	66.0	58.0	54.7	94.1	53.8	73.3		Traffic, Trains, Marina, Industrial Operations
R22	N22	Peninsula Road Marina	1-11-08	10:14 – 10:29 AM	57.5	54.6	53.2	52.2	51.1	50.6	66.3	50.2	53.1	--	Port Ops, Birds, Local Traffic
			1-11-08	1:33 – 1:48 PM	64.4	60.1	58.2	57.4	56.2	55.5	72.5	55.1	58.7		Port Ops, Live Aboard Activities
			1-11-08	4:00 – 4:15 PM	64.0	59.9	55.6	54.4	52.5	51.7	72.2	51.4	56.7		Port Ops, Local Traffic, Live Aboard Activities, Train Horn, Airplane, Bird
R23	N23	Fire Station #49 – Yacht Street	1-16-08	9:19 – 9:34 AM	68.4	60.3	56.9	55.8	52.9	51.6	77.7	51.1	58.7	--	Industrial Activity, Local Traffic, Traffic Horn
			1-16-08	12:00 – 12:15 PM	62.6	55.6	51.3	50.3	48.6	46.9	72.5	46.0	54.0		Industrial Activity, Fire P/A, Traffic, Train Horn, Birds
			1-16-08	4:01 – 4:16 PM	57.1	55.0	53.9	53.4	52.5	52.1	59.7	51.7	53.7		Industrial Activity, Train Horn, Birds, Traffic
R24	N24	1231 C Street	1-8-08	9:39 – 9:54 AM	64.4	61.7	59.9	58.9	56.9	54.7	68.4	54.1	59.5	--	Trucks on Figueroa, Harry Bridges, 110 Freeway, Birds, Trapac
			1-8-08	12:00 – 12:15 PM	69.9	64.8	61.6	60.0	57.7	56.2	83.3	54.8 AGI	63.6		Trucks, Trapac, Light Aircraft
			1-8-08	4:10 – 4:25 PM	67.0	64.5	63.1	62.1	60.4	59.0	74.1	58.5	62.7		Trucks, Trapac, Local Traffic
R24A	N24A	925 West C Street	1-8-08	10:00 – 10:15 AM	72.5	65.9	60.6	57.6	54.2	52.0	81.7	50.7	63.3	--	Local Traffic, Heavy Trucks on H. Bridges, Light Aircraft, Garbage Collection
			1-8-08	12:25 – 12:40 PM	73.4	68.4	62.5	58.9	55.5	54.0	78.9	53.2	64.0		Local Traffic, Trapac, Heavy Trucks on H. Bridges
			1-8-08	4:30 – 4:45 PM	70.4	66.9	63.2	61.1	57.6	55.4	75.8	54.1	63.2		Local Traffic, Trapac, Train
R24B	N24B	Bayview Field	1-8-08	10:23 – 10:38 AM	79.1	76.2	72.4	67.7	59.4	54.0	82.5	53.1	71.4	--	Traffic on H. Bridges
			1-8-08	12:55 – 1:10 PM	78.5	76.7	73.2	68.5	59.2	55.6	84.5	54.6	71.8		Traffic on H. Bridges, Trapac
			1-8-08	4:50 – 5:05 PM	77.6	75.4	72.2	69.7	62.4	57.6	79.4	55.5	71.2		Traffic on H. Bridges, Trapac
R25	N25	Wilmington Skills Center 217 N. Island	1-14-08	9:35 – 9:50 AM	74.7	72.0	68.3	64.9	60.0	57.4	86.7	56.6	68.0	--	Trucks, Skills Center
			1-14-08	12:25 – 12:40 PM	76.2	72.7	68.9	65.2	59.7	57.0	96.9	56.4	71.6		Trucks
			1-14-08	4:05 – 4:20 PM	76.7	73.8	70.4	67.7	63.9	58.0	86.3	57.2	70.2		Trucks
R26	N26	200 Broad Street	1-16-08	9:40 – 9:55 AM	78.0	74.9	71.3	67.0	59.1	51.4	84.2	49.7	70.5	--	Traffic, Industrial Activity
			1-16-08	12:19 – 12:34 PM	75.6	73.1	69.1	65.4	56.4	51.9	80.7	51.0	68.4		Traffic
			1-16-08	4:25 – 4:40 PM	77.4	74.3	70.4	66.9	61.1	58.4	82.3	57.0	69.9		Traffic

Rec.	Loc.	Description	Date	Start	A-WEIGHTED SOUND LEVEL, dBA										Predominant Noise Sources
					L2	L8	L25	L50	L90	L99	L_{max}	L_{min}	L_{eq}	CNEL	
R27	N27	1219 G Street	1-16-08	10:09 – 10:24 AM	73.8	66.8	59.8	57.3	52.9	50.9	83.9	50.1	63.9		Trucks, Train Horn
			1-16-08	12:43 – 12:58 PM	73.1	68.6	65.8	63.8	62.0	61.1	78.2	60.6	66.0	--	Trucks, Local Traffic
			1-16-08	4:50 – 5:05 PM	81.3	70.9	64.1	61.3	58.1	56.6	86.5	55.9	69.7		Local Traffic, Trucks, Aircraft, Dogs Barking
R28	N28	1919 East I Street	3-22-12	9:11 – 9:31 AM	72.6	64.3	62.7	61.7	60.4	59.7	81.6	59.2	63.7		Refinery, Truck Traffic, Train Horn
			3-22-12	12:25 – 12:45 PM	74.2	68.4	66.2	64.4	62.4	60.9	81.7	60.0	60.4	--	Local Traffic, Trains, Wrecking Yard
			3-22-12	4:00 – 4:20 PM	74.1	64.7	61.3	60.2	58.4	57.6	78.6	56.3	62.9		Local Traffic, Trains, Wrecking Yard
R29	N29	1710 Mauretania Street	1-14-08	10:25 – 10:40 AM	74.7	72.8	70.0	66.8	60.9	53.9	76.9	53.0	68.6		Trucks
			1-14-08	1:10 – 1:25 PM	75.3	72.3	68.2	64.7	57.3	54.2	81.0	52.6	67.6	--	Trucks
			1-14-08	5:01 – 5:16 PM	76.8	74.2	71.26	68.5	62.7	58.9	81.8	57.8	70.4		Trucks
			4-26-11	1:00 – 2:00 PM	72.2	68.1	6.7	64.7	60.7	58.0	85.5	55.4	66.2		Trucks, Trains, Site Activity
			4-26-11	4:00 – 5:00 PM	72.3	69.9	67.9	66.2	62.4	59.8	80.5	57.0	67.1	71.3	Trucks, Trains, Site Activity
			4-27-11	9:00 – 10:00 AM	72.2	68.6	66.2	63.8	58.8	55.1	94.8	53.0	67.0		Trucks, Trains, Site Activity
R30	N30	Stephens Middle School Classroom PC2	3-19-12	3:00 – 4:00 PM	62.6	56.8	55.2	53.8	51.7	50.3	71.7	49.1	55.2		Students, Traffic
			3-20-12	9:00 – 10:00 AM	67.0	65.2	64.7	64.2	47.5	43.6	72.0	42.6	63.2	61.2	Students, Traffic
			3-20-12	1:00 – 2:00 PM	69.9	62.9	58.7	55.2	50.7	48.5	77.5	47.5	59.7		Students, Traffic
R31	N31	Webster School Classroom B-1	3-13-12	7:00 – 8:00 AM	64.0	58.4	57.2	56.2	55.0	54.1	68.6	53.7	57.0		Children Playing
			3-13-12	1:00 – 2:00 PM	63.3	59.2	57.0	55.4	52.0	49.1	67.9	47.2	56.5	59.6	Traffic, Children Playing
			3-13-12	4:00 – 5:00 PM	65.7	58.2	56.6	55.3	53.9	53.0	73.5	52.4	57.0		Traffic, Children Playing
R32	N32	1619 Cruces St	4-28-11	6:00 – 7:00 PM	75.9	69.5	59.1	55.0	51.6	49.6	82.9	48.7	64.9		Traffic, Trains, Industrial Yard
			4-29-11	9:00 – 10:00 AM	77.2	72.2	62.6	56.8	52.9	51.3	89.3	50.6	67.2	69.3	Traffic, Trains, Industrial Yard
			4-29-11	2:00 – 3:00 PM	76.1	71.7	62.8	55.7	51.2	49.5	90.6	49.0	66.8		Traffic, Trains, Industrial Yard
R33	N33	21843 Salmon Ave	4-27-11	2:00 – 3:00 PM	68.6	66.2	63.3	60.3	55.7	53.4	77.1	51.2	62.4		Traffic, Trains, Birds, Gardener
			4-27-11	4:00 – 5:00 PM	68.2	66.0	63.5	61.1	56.4	53.2	77.4	50.8	64.1	65.7	Traffic, Trains, Birds
			4-28-11	8:00 – 9:00 AM	66.3	64.5	63.1	61.2	55.6	51.0	76.9	49.5	61.8		Traffic, Trains, Birds
R34	N34	Mambo Sound & Recording Studio	7-16-12	1:00 – 2:00 PM	79.2	76.2	74.0	66.6	61.3	59.4	96.1	58.8	72.2		Trucks
			7-16-12	4:00 – 5:00 PM	79.5	74.5	68.9	64.9	60.4	58.8	96.6	58.1	70.8	75.2	Trucks
			7-17-12	9:00 – 10:00 AM	79.7	74.9	69.2	64.9	60.9	59.2	89.0	58.7	70.6		Trucks

3.9.2.3.4 Baseline Exterior Lmax and SEL Noise Levels at Long-Term Receivers in Long Beach

SEL noise levels at long-term sensitive receivers were separated into daytime, evening, and nighttime time periods to further describe the existing noise environment. The ranges of the maximum noise levels (Lmax) and sound exposure levels (SEL) for each sensitive receiver in Long Beach are summarized in Table 3.9-5.

Residential, religious and educational receivers in Long Beach included locations N1 through N3, N5, N6, N7A, N7B, N30, N31 and N34. The ranges of Lmax and SEL at these locations are presented in Table 3.9-5.

3.9.2.3.5 Baseline Exterior Lmax and SEL Noise Levels at Long-Term Receivers in San Pedro & Wilmington

Residential receivers in San Pedro and Wilmington included locations N19, N29, and N32. The SELs at locations N29 and N32 were calculated using the Leq average values plus 35.6 dBA. The remaining long-term sensitive receivers in San Pedro and Wilmington were located at the Leeward Bay Marina (N20) and the Island Yacht Marina (N21). The ranges of Lmax and SEL at all these locations are presented in Table 3.9-5.

3.9.2.3.6 Baseline Exterior Lmax and SEL Noise Levels at Long-Term Receivers in Carson

A long-term noise measurement was conducted at a single family residence, 21843 Salmon Ave (N33) in Carson. The SELs at this location were calculated using the Leq average values plus 35.6 dBA. The ranges of Lmax and SEL for this receiver are presented in Table 3.9-5.

3.9.2.3.7 Estimated Baseline Interior Lmax and SEL Noise Levels at Long-Term Receivers in Long Beach

Estimated interior noise levels were calculated based on exterior baseline noise data for two scenarios, with windows closed and with windows open. An exterior to interior noise reduction of 20 dB was applied in the case of windows closed and a conservative 12 dB reduction was utilized with windows open (FHWA, 2006 and USEPA, 1974). The ranges of the estimated baseline interior Lmax and SEL with windows closed and windows open scenarios for each sensitive receiver in Long Beach are presented in Table 3.9-6.

3.9.2.3.8 Estimated Baseline Interior Lmax and SEL Noise Levels at Long Term Receivers in San Pedro & Wilmington

Residential receivers in San Pedro and Wilmington included locations N19, N29, and N32. The remaining long-term sensitive receivers in San Pedro and Wilmington were located at the Leeward Bay Marina (N20) and the Island Yacht Marina (N21). The ranges of the estimated baseline interior Lmax and SEL with windows closed and windows open scenarios for each sensitive receiver in San Pedro and Wilmington are presented in Table 3.9-6.

3.9.2.3.9 Estimated Baseline Interior Lmax and SEL Noise Levels at Long Term Receivers in Carson

A long-term noise measurement was conducted at a single family residence, 21843 Salmon Ave (N33) in Carson. The ranges of the estimated baseline interior Lmax and

SEL with windows closed and windows open scenarios for this receiver are presented in Table 3.9-6.

3.9.2.3.10 Existing Classroom Noise Reduction Measurements

Sound insulation tests were conducted at selected classrooms to determine the noise reduction provided by the existing building shell of the classroom spaces exposed to vehicular and rail noise. The measurements were conducted for a field insertion loss (FIL) test in general accordance with ASTM E336-90, *Measurement of Airborne Sound Insulation in Buildings* (the field insertion loss is the difference between the average outside noise level and the average inside noise level). Simultaneous interior and exterior noise measurements were conducted using a pink noise generator as a sound source amplified through a single loudspeaker on the outside of the exterior building wall. The noise reduction data was used to predict future interior noise levels within the classrooms and assess the noise impact within these spaces and is summarized in Table 3.9-7.

Exterior measurements were conducted at 3 meters (10 feet) from the building wall and interior measurements at the center of the room with the windows closed. Classrooms at Bethune School and Cabrillo Child Development Center are located directly adjacent to the Terminal Island Freeway and did not require a loudspeaker to conduct the noise reduction test. The noise reduction data for these two classrooms represent the ambient level without the random noise test signal used for the sound insulation test. These measurements were taken at the same interior and exterior locations as the sound insulation test, with the windows closed.

Table 3.9-5. Summary of Baseline Exterior Lmax and SEL at Long-Term Noise Receptors.

Rec.	Loc.	Description	Date	Time[1]	A-WEIGHTED SOUND LEVEL, dBA	
					L_{max}	SEL
R1	N1	Residence at 2789 Webster	3-12-12 to 3-13-12	Day	64.8 – 75.5	**85.1 – 94.3**[2]
				Evening	68.0 – 72.3	**85.2 – 88.9**[2]
				Night	46.9 – 68.2	**74.9 – 85.4**[2]
R2	N2	Buddhist Temple at Willow and Webster	3-12-12 to 3-13-12	Day	68.1 – 80.5	84.6
				Evening	78.9 – 84.6	88.4
				Night	67.5 – 78.9	**86.2 – 94.7**[2]
R3	N3	Hudson Elementary School Playground	3-13-12 to 3-15-12	Day	67.4 – 87.7	81.8 – 103.3
				Evening	73.1 –75.4	**96.7 – 99.5**[2]
				Night	66.3 – 76.6	86.0 – 88.3
R5	N5	Cabrillo High School	3-18-12 to 3-19-12	Day	66.3 – 90.8	82.5 – 91.8
				Evening	71.1 – 77.5	**93.2 – 94.1**[2]
				Night	61.9 – 81.0	**87.1 – 92.7**[2]
R6	N6	Cabrillo Child Development Center	3-11-12 to 3-12-12	Day	76.7 – 85.4	81.7 – 96.5
				Evening	76.6 – 83.9	81.6 – 89.1
				Night	74.2 – 83.3	82.6 – 90.5
R7A	N7A	Century Villages at Cabrillo	3-21-12 to 3-22-12	Day	71.3 – 85.2	84.7 – 90.0
				Evening	73.4 – 87.9	89.1 – 94.0
				Night	69.2 – 87.0	**90.2 – 97.4**[2]
R7B	N7B	Cabrillo Park	3-22-12 to 3-23-12	Day	74.5 – 90.6	81.6 – 94.0
				Evening	74.1 – 88.7	93.7
				Night	70.3 – 84.4	**90.3 – 99.4**[2]
R19	N19	539 Shields Drive	1-14-08 to 1-15-08	Day	71.1 - 89.7	99.7 - 105.0
				Evening	76.9 – 90.2	101.5 – 103.1
				Night	70.3 – 78.9	95.7 – 102.4
R20	N20	Leeward Bay Marina	1-17-08 to 1-18-08	Day	72.2 - 104.5	92.5 - 110.2
				Evening	82.9 – 86.3	97.4 – 98.0
				Night	70.1 – 100.0	94.9 – 111.7
R21	N21	Island Yacht Marina	1-15-08 to 1-16-08	Day	83.9 - 98.9	103.8 - 111.2
				Evening	85.5 – 88.1	106.9 – 109.5
				Night	84.3 – 91.9	101.2 – 110.5
R29	N29	1710 Mauretania Street	4-26-11 to 4-27-11	Day	76.8 - 85.5	**99.6 - 102.7**[2]
				Evening	79.5 – 80.9	**100.3 – 102.4**[2]
				Night	77.5 – 94.9	**96.2 – 104.6**[2]
R30	N30	Stephens Middle School Classroom PC2	3-19-12 to 3-20-12	Day	63.4 – 88.6	85.0 – 90.6
				Evening	69.5 – 72.0	**90.7 – 92.2**[2]
				Night	60.7 – 83.2	90.8
R31	N31	Webster School Classroom B-1	3-12-12 to 3-14-12	Day	66.9 – 82.5	84.3 – 91.8
				Evening	71.0 – 75.1	**90.7 – 93.1**[2]
				Night	57.2 – 71.1	**80.7 – 91.8**[2]
R32	N32	1619 Cruces St	4-28-11 to 4-29-11	Day	81.3 - 90.6	**100.1 - 102.8**[2]
				Evening	79.8 – 83.5	**97.2 – 99.2**[2]
				Night	79.5 – 86.7	**95.0 – 99.2**[2]
R33	N33	21843 Salmon Ave	4-27-11 to 4-28-11	Day	71.6 - 84.0	**95.0 - 99.7**[2]
				Evening	78.8 – 83.5	**96.3 – 98.9**[2]
				Night	68.5 – 75.4	**89.4 – 94.9**[2]
R34	N34	Mambo Sound & Recording Studio	7-16-12 to 7-17-12	Day	79.6 – 96.7	**103.4 – 107.8**
				Evening	85.2 – 86.1	**101.3 – 102.8**
				Night	79.6 – 90.6	**97.5 – 105.2**

1) Daytime hours are from 7:00 AM until 7:00 PM, Evening hours are from 7:00 PM until 10:00 PM, Nighttime hours are from 10:00 PM until 7:00 AM

2) SEL is calculated from the equation SEL=Leq+10log(T) where T=3600 sec for 1 hr; Thus, SEL=Leq+35.6 dB

Table 3.9-6. Summary of Estimated Baseline Interior Lmax and SEL at Long-Term Noise Receptors.

Rec.	Loc.	Description	Date	Time[1]	Exterior Noise Levels, dBA		Interior Noise Levels With Windows Closed, dBA[3]		Interior Noise Levels With Windows Open, dBA[4]	
					L_{max}	SEL	L_{max}	SEL	L_{max}	SEL
R1	N1	Residence at 2789 Webster	3-12-12 to 3-13-12	Night	46.9 – 68.2	**74.9 – 85.4**[2]	26.9 – 48.2	**54.9 – 65.4**[2]	34.9 – 56.2	**62.9 – 73.4**[2]
R2	N2	Buddhist Temple at Willow and Webster	3-12-12 to 3-13-12	Night	67.5 - 78.9	**86.2 – 94.7**[2]	47.5 - 58.9	**66.2 – 74.7**[2]	55.5 - 66.9	**74.2 – 82.7**[2]
R3	N3	Hudson Elementary School Playground	3-13-12 to 3-15-12	Night	66.3 - 76.6	86.0 - 88.3	46.3 - 56.6	66.0 - 68.3	54.3 - 64.6	74.0 - 76.3
R5	N5	Cabrillo High School	3-18-12 to 3-19-12	Night	61.9 - 81.0	**87.1 – 92.7**[2]	41.9 - 61.0	**67.1 – 72.7**[2]	49.9 - 69.0	**75.1 – 80.7**[2]
R6	N6	Cabrillo Child Development Center	3-11-12 to 3-12-12	Night	74.2 - 83.3	82.6 - 90.5	54.2 - 63.3	62.6 - 70.5	62.2 - 71.3	70.6 - 78.5
R7A	N7A	Century Villages at Cabrillo	3-21-12 to 3-22-12	Night	69.2 - 87.0	**90.2 – 97.4**[2]	49.2 - 67.0	**70.2 – 77.4**[2]	57.2 - 75.0	**78.2 – 85.4**[2]
R7B	N7B	Cabrillo Park	3-22-12 to 3-23-12	Night	70.3 - 84.4	**90.3 – 99.4**[2]	50.3 - 64.4	**70.3 – 79.4**[2]	58.3 - 72.4	**78.3 – 87.4**[2]
R19	N19	539 Shields Drive	1-14-08 to 1-15-08	Night	70.3 – 78.9	95.7 – 102.4	50.3 – 58.9	75.7 – 82.4	58.3 – 66.9	83.7 – 90.4
R20	N20	Leeward Bay Marina	1-17-08 to 1-18-08	Night	70.1 – 100.0	94.9 – 111.7	50.1 – 80.0	74.9 – 91.7	58.1 – 88.0	82.9 – 99.7
R21	N21	Island Yacht Marina	1-15-08 to 1-16-08	Night	84.3 – 91.9	101.2 – 110.5	64.3 – 71.9	81.2 – 90.5	72.3 – 79.9	89.2 – 98.5
R29	N29	1710 Mauretania Street	4-26-11 to 4-27-11	Night	77.5 – 94.9	**96.2 – 104.6**[2]	57.5 – 74.9	**76.2 – 84.6**[2]	65.5 – 82.9	**84.2 – 92.6**[2]
R30	N30	Stephens Middle School Classroom PC2	3-19-12 to 3-20-12	Night	60.7 - 83.2	90.8	40.7 - 63.2	70.8	48.7 - 71.2	78.8
R31	N31	Webster School Classroom B-1	3-12-12 to 3-14-12	Night	57.2 - 71.1	**80.7 – 91.8**[2]	37.2 - 51.1	**60.7 – 71.8**[2]	45.2 - 59.1	**68.7 – 79.8**[2]
R32	N32	1619 Cruces St	4-28-11 to 4-29-11	Night	79.5 – 86.7	**95.0 – 99.2**[2]	59.5 – 66.7	**75.0 – 79.2**[2]	67.5 – 74.7	**83.0 – 87.2**[2]
R33	N33	21843 Salmon Ave	4-27-11 to 4-28-11	Night	68.5 – 75.4	**89.4 – 94.9**[2]	48.5 – 55.4	**69.4 – 74.9**[2]	56.5 – 63.4	**77.4 – 82.9**[2]
R34	N34	Mambo Sound & Recording Studio	7-16-12 to 7-17-12	Night	79.6 – 90.6	**97.5 – 105.2**	59.6 – 70.6	**77.5 – 85.2**	67.6 – 78.6	**85.5 – 93.2**

1) Daytime hours are from 7:00 AM until 7:00 PM, Evening hours are from 7:00 PM until 10:00 PM, Nighttime hours are from 10:00 PM until 7:00 AM
2) SEL is calculated from Leq+35.6 dB
3) Exterior to interior noise reduction of 20 dB with windows closed (FHWA, 2011)
4) Exterior to interior noise reduction of 12 dB with windows open (USEPA, 1974)

Table 3.9-7. Summary of Classroom Noise Reduction Measurements.

Location	Description	Date	Leq, dBA	Noise Reduction, dB	Notes
Bethune School	Classroom 102	2/12/2008	64.9 - Exterior 38.8 - Interior	26.1	Traffic Noise Source
Cabrillo Child Development Center	#2 Exterior, #4 Interior	2/11/2008	72.3 - Exterior 43.7 - Interior	28.6	Traffic Noise Source
Cabrillo High School	Classroom 1128	2/19/2008	105.5 - Exterior 61.1 - Interior 32.7 - Ambient	44.4	Loudspeaker Source
Hudson School	Classroom 52	2/19/2008	103.8 - Exterior 70.8 - Interior 36.9 - Ambient	33	Loudspeaker Source
Stephens Middle School	Classroom PC2	2/19/2008	98.1 – Exterior 59.8 - Interior 31.4 - Ambient	38.3	Loudspeaker Source
Webster School	Classroom B-48	2/19/2008	105.3 - Exterior 66.7 - Interior 31.9 - Ambient	38.6	Loudspeaker Source

3.9.2.4 Existing Vibration Environment

Vibration-sensitive receivers are comprised of single- and multi-family residences, potential residences within industrial zoned properties, recording studios, and institutional uses such as fire stations, schools, child development facilities, and adult education centers. Ground-borne vibration at the sensitive receivers in the study area is generated by heavy trucks, trains, automotive traffic, and nearby industrial activity. The amount of vibration experienced at each receiver is dependent on the source type, source to receiver distance, soil characteristics, vehicle type/weight, pavement type/condition, and rail type/condition.

Ground-borne vibration levels were monitored to document existing vibration levels at sensitive receivers nearest to the proposed Project site and designated truck routes (shown as V# in Figure 3.9-2). These monitoring locations are representative of vibration-sensitive receptors in the study area. The instruments and methodology employed during the survey are described in the noise study contained in Appendix F1.

3.9.2.4.1 San Pedro & Wilmington

Short term ground-borne vibration measurements were conducted at five locations in San Pedro and Wilmington (V7 through V11 in Figure 3.9-2), representing two fire stations, a commercial/residential building and two residences (Table 3.9-8). The measured maximum vibration velocities were 67.3, 81.5, 78.2, 56.8, and 79.7 VdB respectively. The predominant source of vibration contributing to the baseline vibration environment at all three locations was truck traffic on nearby streets. At Receivers V10 and V11, Lmax ranged from 38.1 to 79.7 VdB. At each of these locations, truck traffic and rail movements on the Alameda Corridor contributed to the measurement data.

3.9.2.4.2 Long Beach

Short-term ground-borne vibration measurements were conducted at seven receiver locations in Long Beach (V1 through V6, V13 in Figure 3.9-2), representing four schools, a potential residential receiver, a fire station, and a recording studio, respectively. Measured maximum vibration velocities at receivers V1 – V6 were 64.3, 69.0, 75.5, 79.4, 80.2, and 69.2, respectively (Table 3.9-8). Maximum vibration velocity levels at receiver V13 ranged from 86.9 to 106.2 VdB. The predominant sources of vibration at these receptors was truck traffic, but site-specific sources such as trains on the San Pedro Branch, repair shop activity, worker activity, vehicles in a parking lot, fire trucks, and helicopters contributed to the baseline vibration environment.

3.9.2.4.3 Carson

A short-term ground-borne vibration measurement was conducted at receiver location V12 in Carson (Figure 3.9-2), representing a residential receiver near the Alameda Corridor. Measured maximum vibration velocities at this location ranged from 53.0 to 68.8 VdB (Table 3.9-8). The predominant sources of vibration were truck traffic, but site-specific sources such as trains on the Alameda Corridor also contributed to the baseline vibration environment.

3.9.2.5 Predicted Existing Traffic Noise Levels

Existing traffic noise levels generated by vehicular traffic in the proposed Project vicinity were calculated using the FHWA traffic noise model methodologies and traffic data from the Traffic Study (refer to Chapter 3.10). Many roadway segments experience noise levels above 70 CNEL (Table F.19 in Appendix F1). However, as Table 3.9-9 shows, only some of those segments have sensitive land uses that currently experience noise levels above 70 CNEL at a distance of 100 feet. Traffic noise levels above 70 CNEL are considered incompatible with noise guidelines. Those segments occur on Alameda Street, E. Anaheim Street, E. Harry Bridges Boulevard, E. Sepulveda Boulevard, John S. Gibson Boulevard, Long Beach Freeway, Terminal Island Freeway, Pacific Coast Highway, W. Anaheim Street, W. Harry Bridges Boulevard, W. Pacific Coast Highway, and W. Willow Street.

Table 3.9-8. Summary of the Ambient Ground-Borne Vibration Measurement Data.

Location	Description	Date	Start	Stop	Lmax – Velocity Level, VdB		Predominant Sources of Vibration
					Low	High	
V1	Stephens Middle School Classroom PC2	3-7-08	9:42 AM	4:17 PM	51.6	64.3	School Activities, Trains
V2	Hudson Elementary School Playground	3-6-08	10:06 AM	4:21 PM	55.9	69.0	Traffic on TI Freeway, Trains
V3	Cabrillo Child Development Center	3-4-08	10:02 AM	4:33 PM	58.9	75.5	Traffic on TI Freeway, Trains
V4	Bethune School	3-3-08	10:00 AM	3:43 PM	62.6	79.4	Traffic on TI Freeway, Trains
V5	Industrial Area with Potential Residential at 1332 Canal	3-24-08	3:40 PM	5:55 PM	63.7	80.2	Truck traffic, Repair Shop Activity, Worker Activity
V6	Fire Station #6 on Queensway	3-24-08	9:20 AM	10:20 AM	62.6	69.2	Traffic, Vehicles in Parking Lot, Fire Trucks, Helicopters
V7	New Fire Station #24 at Pier Avenue and Route 47	3-26-08	3:34 PM	4:53 PM	55.0	67.3	Trucks, Trains, and Power Plant
V8	Fire Station #210 on Ferry St	3-24-08	4:58 PM	5:58 PM	59.3	81.5	Trucks
V9	Commercial/ Residential Building at 200 Broad Street	3-24-08	11:30 AM	12:30 PM	55.6	78.2	Trucks on Harry Bridges and Broad St., Vehicular Traffic
V10	1710 Mauretania Street	4-26-11 to 4-27-11	2:00 PM	2:00 PM	38.1	56.8	Trucks and Trains
V11	1619 Cruces St	4-28-11 to 4-29-11	3:25 PM	3:00 PM	53.1	79.7	Trucks and Trains
V12	21843 Salmon Ave	4-27-11	4:00 PM	5:00 PM	53.0	68.8	Trucks and Trains

Table 3.9-9. Calculated Baseline Roadway Traffic Noise Levels.

ROADWAY SEGMENT	*CNEL @ 100 ft*	*DISTANCE TO CNEL CONTOURS*		
		70 dB	*65 dB*	*60 dB*
ALAMEDA ST				
n/o Anaheim St	71.9	150	341	702
w/o Eubank Ave	73.6	211	456	917
s/o PCH	73.8	222	476	954
s/o Anaheim St	74.5	257	539	1069
E ANAHEIM ST				
between Anaheim and Henry Ford	71.7	143	328	676
e/o Henry Ford Ave	73.0	186	411	832
w/o E I St	72.2	158	357	732
w/o Anaheim Way	73.0	186	411	832
E HARRY BRIDGES BLVD				
e/o Avalon Blvd	72.1	155	352	722
E SEPULVEDA BLVD				
e/o Alameda St	70.7	117	277	578
JOHN S GIBSON BLVD				
n/o I-110 Ramps	70.7	117	276	577
LONG BEACH FWY				
n/o Wardlow Rd	85.0	2326	3475	5962
s/o Wardlow Rd	85.6	2603	3823	6510
n/o Willow St	84.6	2139	3237	5584
s/o Willow St	85.4	2518	3717	6343
between off/on ramps at Willow St	85.4	2536	3739	6377
s/o PCH	84.5	2060	3135	5422
n/o Anaheim St	84.7	2177	3285	5661
s/o Anaheim St	84.5	2060	3135	5422

Table 3.9-9. Calculated Baseline Roadway Traffic Noise Levels (concluded).

ROADWAY SEGMENT	*CNEL @ 100 ft*	*DISTANCE TO CNEL CONTOUR S*	*ROADWAY SEGMENT*	*CNEL @ 100 ft*
TERMINAL ISLAND FWY				
s/o PCH	76.1	358	713	1384
n/o PCH	75.3	302	618	1213
between loop Off and On ramp at PCH	76.1	357	712	1381
s/o PCH off ramp	78.0	537	1004	1898
n/o Ocean Blvd	72.8	178	396	804
s/o Henry Ford Ave	74.2	241	511	1018
between Henry Ford Ave and Anaheim St	76.5	390	767	1480
e/o Seaside Ave	75.0	284	587	1156
s/o Willow St	71.5	137	316	653
W ANAHEIM ST				
w/o Harbor Ave	71.3	131	304	631
e/o Santa Fe Ave	73.1	191	420	849
w/o Seabright Ave	71.9	148	338	696
w/o E I St	69.8	95	233	493
between Seabright Ave and Santa Fe Ave	71.6	141	323	668
W HARRY BRIDGES BLVD				
between Wilmington Blvd and Neptune Ave	71.5	138	318	658
between Hawaiian Ave and Wilmington Blvd	72.0	152	346	711
between Neptune Ave and Fries Ave	70.9	121	285	595
between Figueroa St and Mar Vista Ave	72.0	152	345	709
between Fries Ave and Avalon Blvd	72.2	158	357	731
between Mar Vista Ave and Hawaiian Ave	72.0	152	345	709
W PACIFIC COAST HIGHWAY				
between I-710 NB and SB ramps	72.7	175	389	792
e/o San Gabriel Ave	73.9	228	487	973
between San Gabriel Ave and Santa Fe Ave	73.9	225	482	964
between Terminal Island Fwy SB and NB ramp	72.6	172	383	781
e/o Santa Fe Ave	73.7	215	464	931
e/o Harbor Ave	72.5	170	380	774
W WILLOW ST				
between NB and SB Terminal Island Fwy	71.7	142	327	674
between Terminal Island Fwy and Santa Fe	69.1	83	207	443
between Santa Fe Ave and Easy Ave	68.9	79	199	427
e/o Easy Ave	70.0	100	242	512
w/o NB I-710 on ramp	69.5	89	220	468

3.9.3 Applicable Regulations

3.9.3.1 City of Los Angeles

3.9.3.1.1 Noise

Los Angeles General Plan Noise Element. The City of Los Angeles General Plan Noise Element establishes a set of community noise exposure/land use compatibility guidelines (summarized in Table 3.9-10 and as set forth in the City of Los Angeles CEQA Thresholds Guide, 2006) that characterizes the exterior noise level as "normally acceptable," "conditionally acceptable," "normally unacceptable," or "clearly unacceptable," depending on each particular land use's sensitivity to community noise.

Los Angeles Municipal Code. The City of Los Angeles Noise Ordinance is provided in Chapter 11 of the Los Angeles Municipal Code (LAMC). Section 111.02 of the LAMC provides procedures and criteria for the measurement of the sound level of "offending" noise sources. Specifically, the procedures provide for a penalty of 5 dBA for steady high-pitched noise or repeated impulsive noises. Conversely, the procedures provide a credit of 5 dBA for noise occurring less than 15 minutes in a period of 60 consecutive minutes during the day, as short-term noise events are typically less of a nuisance than sustained noise levels. A noise event duration of 15 minutes during a one-hour period would be equivalent to L_{25}, while a noise event duration of 5 minutes during a one-hour period would be equivalent to L_{8}.

Table 3.9-10 City of Los Angeles Noise Compatibility Guidelines.

Land Use	Community Noise Exposure CNEL, dBA			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Single Family, Duplex, Mobile Homes	50 - 60	55 - 70	70 - 75	Above 70
Multi-Family Homes	50 - 65	60 - 70	70 - 75	Above 70
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 - 70	60 - 70	70 - 80	Above 80
Transient Lodging — Motels, Hotels	50 – 65	60 - 70	70 - 80	Above 80
Auditoriums, Concert Halls, Amphitheaters	-	50 - 70	-	Above 65
Sports Arena, Outdoor Spectator Sports	-	50 - 75	-	Above 70
Playgrounds, Neighborhood Parks	50 - 70	-	67 - 75	Above 72
Golf Courses, Riding Stables, Water, Recreation, Cemeteries	50 - 75	-	70 - 80	Above 80
Office Buildings, Business and Professional Commercial	50 - 70	67 - 77	Above 75	-
Industrial, Manufacturing, Utilities, Agriculture	50 - 75	70 - 80	Above 75	-

Source: City of Los Angeles CEQA Thresholds Guide, 2006.

The LAMC indicates that in cases where the actual measured ambient conditions are not known or are less than 50 dBA, the presumed daytime (7:00 A.M. to 10:00 P.M.) and nighttime (10:00 P.M. to 7:00 A.M.) minimum ambient noise levels defined in Section 111.03 of the LAMC should be used. For residential-zoned areas, the presumed ambient noise level is 50 dBA during the daytime and 40 dBA during the nighttime.

Section 112.05 of the LAMC sets a maximum noise level for powered equipment of 75 dBA at a distance of 50 feet when operated within 500 feet of a residential zone. Compliance with this standard is not required where "technically infeasible." In accordance with the City of Los Angeles Noise Ordinances, "technically infeasible" means that the established noise limitations cannot be complied with at a project site, despite the use of mufflers, shields, sound barriers, and/or other noise reduction devices or techniques employed during the operation of equipment. Section 41.40 of the LAMC prohibits construction between the hours of 9:00 P.M. and 7:00 A.M. Monday through Friday, 6:00 P.M. and 8:00 A.M. on Saturday, and at any time on Sunday. Although LAMC Section 41.40(b) provides that this restriction does not extend to construction within any district zoned for manufacturing or industrial uses, which would include the Project site, BNSF has represented that there will be no nighttime construction as part of the proposed Project except as required by Caltrans in connection with the PCH bridge. In general, the City of Los Angeles Department of Building and Safety enforces noise ordinance provisions relative to equipment and the Los Angeles Police Department enforces provisions relative to noise generated by people.

3.9.3.1.2 Vibration

There are no adopted City of Los Angeles policies or standards for ground-borne vibration.

3.9.3.2 City of Long Beach

3.9.3.2.1 Noise

Long Beach Municipal Code. Chapter 8.80 of the Long Beach Municipal Code controls unnecessary and excessive noise and vibration in the City of Long Beach. Section 8.80.150 of the Long Beach Municipal Code outlines acceptable exterior noise levels by land use that apply to operations noise. As listed in Table 3.9-11, daytime noise levels at residential areas are not to exceed 50 dBA. In addition, it is unlawful for any person to create any noise which causes the noise level when measured on residential property to exceed:

- The noise standard for that land use district as shown in Table 3.9-11 for a cumulative period of more than thirty minutes in any hour;
- The noise standard plus five dBA for more than 15 minutes in any hour;
- The noise standard plus ten dBA for a cumulative period of more than five minutes in any hour;
- The noise standard plus 15 dBA for a cumulative period of more than one minute in any hour; or
- The noise standard plus 20 dBA or the maximum measured ambient, for any period of time.

If the measured ambient level exceeds that permissible within any of the first four noise limit categories above, the allowable noise exposure standard shall be increased in 5 dBA increments in each category as appropriate to encompass or reflect the ambient noise level. In addition, Section 8.80.160 of the Long Beach Municipal Code states that, in the event an alleged offensive noise contains a steady audible tone such as a whine, screech, or hum, or is a repetitive noise such as hammering or riveting or contains music or speech conveying informational content, the standard limits should be reduced by 5 dBA.

Table 3.9-11. City of Long Beach Exterior Noise Limits by Receiving Land Use.

Receiving Land Use District	Time Period	Noise Level, dBA	Steady Audible Tone, dBA
District One – Predominantly residential with other land use types also present	Night: 10 PM – 7 AM Day: 7 AM – 10 PM	45 50	40 45
District Two – Predominantly commercial with other land use types also present	Night: 10 PM – 7 AM Day: 7 AM – 10 PM	55 60	50 55
District Three – predominantly industrial with other land use types also present	Anytime	65	60
District Four – predominantly industrial with other land use types also present	Anytime	70	65
District Five – airports, freeways, and waterways regulated by other agencies	Regulated by other Agencies and laws	-	-

Source: Long Beach Municipal Code, Section 8.80.160.

The Long Beach Municipal Code specifies interior noise standards for various land uses; as Table 3.9-12 shows, the interior daytime noise level for residences should not exceed 45 dBA for a cumulative period of more than five minutes in any hour. The interior noise standard is increased by 5 dBA for noise that occurs for a cumulative period of more than one minute in any hour and 10 dBA for the maximum measured ambient, for any period of time. If the measured ambient level exceeds that permissible for five and one minute durations, the allowable noise exposure standard shall be increased in 5 dBA increments in each category as appropriate to encompass or reflect the indoor ambient noise level. If the indoor ambient noise level exceeds the maximum standard, then the standard shall be increased to reflect the indoor ambient noise level.

Table 3.9-12. City of Long Beach Interior Noise Limits.

Receiving Land Use District	Type of Land Use	Time Interval	Allowable Interior Noise Level, dBA
All	Residential	10:00 PM – 7:00 AM 7:00 AM – 10:00 PM	35 45
All	School	7:00 AM – 10:00 PM While school is in session	45
Hospitals, designated quiet zones, and noise sensitive zones	-	Anytime	40

Source: Long Beach Municipal Code, Section 8.80.170.

Further, the City of Long Beach Municipal Code Section 8.80.202 limits the use of construction tools and equipment on weekends and holidays. Section 8.80.202 of the Long Beach Municipal Code prohibits construction between the hours of 7:00 P.M. and 7:00 A.M. Monday through Friday, 6:00 P.M. and 9:00 A.M. on Saturday, and at any time on Sunday.

3.9.3.2.2 Vibration

Section 8.80.200.G of the Long Beach Municipal Code limits operational ground-borne vibration:

> *Operating or permitting the operation of any device that creates vibration which is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property or at one hundred fifty feet (forty-six meters) from the source if on a public space or public right-of-way. For the purposes of this subsection, "vibration perception threshold" means the minimum ground or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration by such directed means as, but not limited to, sensation by touch or visual observation of moving objects. The perception threshold shall be presumed to be .001 g's in the frequency range 0-30 hertz and .003 g's in the frequency range between thirty and one hundred hertz.*

3.9.3.3 City of Carson

3.9.3.3.1 Noise

Carson General Plan. Chapter 3.2 of the General Plan Noise Element identifies land use compatible noise levels. In general, for residential land uses, an exterior CNEL between 50 to 60 dB is considered to be normally acceptable. Chapter 3.4 of the Noise Element further defines sensitive receptors and specifies a maximum exterior noise exposure of 65 dB CNEL for residences, public, and private school/preschool classrooms, churches, hospitals, and elderly care facilities.

3.9.3.3.2 Vibration

The City of Carson does not specify vibration limits for transportation sources within the City boundaries.

3.9.3.4 State Policies

3.9.3.4.1 Noise

The California Department of Health Services establishes noise compatibility guidelines for various land uses (DOHS, 2012). The guidelines indicate that an exterior noise level up to 65 dBA CNEL is "normally acceptable" for multi-family residential uses, without special noise insulation requirements. An exterior noise level up to 60 dBA CNEL is "normally acceptable" for low-density residential uses, without special noise insulation requirements. A noise level between 60 CNEL and 70 CNEL is considered "conditionally acceptable" for low-density residential uses, while a noise level of 75 dBA CNEL or more is identified as "clearly unacceptable" for all residential uses.

In addition, the California Department of Transportation (Caltrans) adopts the Federal Highway Administrations Noise Abatement Criteria (NAC) for Type 1 projects. The NAC is discussed in the following section.

3.9.3.4.2 Vibration

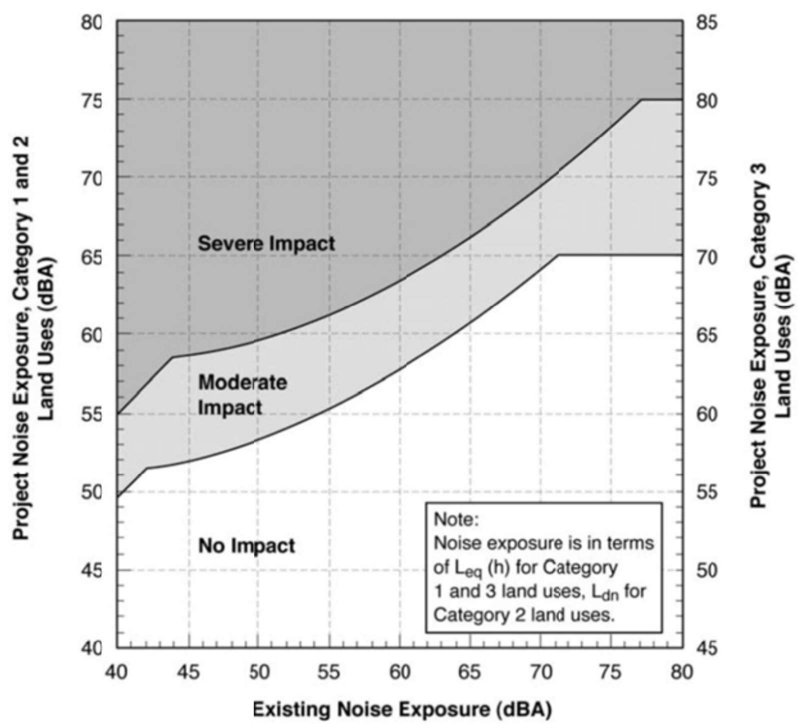
There are no adopted state policies or standards for ground-borne vibration.

3.9.3.5 Federal Policies

3.9.3.5.1 Noise

Federal Rail Administration (FRA). The FRA relies upon the Federal Transit Administration (FTA) noise impact assessment procedures for assessing improvements to conventional passenger rail lines and stationary rail facilities and horn noise assessment. The FTA noise guidelines are illustrated in Figure 3.9-3. There are three designated land use categories under the FTA guidelines (Table 3.9-13).

Figure 3.9-3. FTA Noise Impact Criteria for Transit Projects.



Source: FTA Transit Noise and Vibration Impact Assessment, May 2006

Table 3.9-13. Land Use Categories and Metrics for Transit Noise Impact Criteria.

Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor L_{eq} (h) *	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use. Also included are recording studios and concert halls.
2	Outdoor Ldn	Residences and buildings where people normally sleep. This category includes homes, hospitals and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor L_{eq} (h) *	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds and recreational facilities can also be considered to be in this category. Certain historical sites and parks are also included.

* L_{eq} (h) for the noisiest hour of transit-related activity during hours of noise sensitivity.
Source: FTA Transit Noise and Vibration Impact Assessment, May 2006

FTA guidelines specify that noise impacts occur when predicted noise levels caused by the project increase the overall noise by a specific amount, which ranges between 1 and 10 dBA, depending on the land use and existing noise level. For example, for a project located in a residential area with an average Ldn of 50 dBA, the project can generate up to 54 dBA Ldn without causing any impact and up to 59 dBA Ldn without causing a severe impact. For daytime noise sensitive areas, impacts are determined by peak hour Leq, so if the average Leq is 50 dBA, the project can generate up to 59 dBA Leq without causing any impact and up to 64 dBA Leq without causing a severe impact. Daytime noise sensitive uses include parks, school, libraries and noise sensitive commercial uses.

FRA also adopts the FTA noise impact criteria for rail horn noise and has developed additional guidance on assessment of rail horn noise. The code of federal regulations mandates that audible warning devices shall be activated in accordance with railroad rules regarding the approach to both public and private roadway grade crossings. Standard practice is to begin sounding the horn 0.25 miles before the crossing in a long-long-short-long pattern and to continue sounding until the train reaches the crossing. The FRA has developed a horn-noise assessment model to determine the distance around each grade crossing where the noise exposure from train horns would exceed the guidelines.

Federal Highway Administration (FHWA). The FHWA's noise abatement criteria (NAC) defines traffic noise impacts for Type 1 projects. Under the FHWA criteria, an impact occurs when predicted Leq(h) noise levels approach or exceed the NAC, or substantially exceed existing noise levels (23 CFR 772). These criteria are used to assess traffic noise on state and federal highways. The FHWA NAC specifies exterior Leq(h) noise levels for various land activity categories. For residences, parks, schools, recording studios, churches, and similar areas, the noise criterion is 67 dBA. For other developed lands, the noise criterion is 72 dBA. For projects that add roadway capacity or substantially change the roadway alignment (FHWA Type 1 projects), the NAC defines levels that if approached (within 1 dBA) or exceeded constitute a noise impact. Table 3.9-14 lists the FHWA Noise Abatement Criteria (NAC) for various land use categories.

Table 3.9-14. Noise Abatement Criteria (NAC).

Activity Category	Noise Abatement Criteria Leq (dBA)	Description of Activity Category
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[1]	67 Exterior	Residential
C[1]	67 Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites (publically owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites), schools, television studios, trails, and trail crossings.
D	52 Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E[1]	72Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A–D or F.
F	--	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	--	Undeveloped lands that are not permitted.

Source: 23 CFR 772, 2012
Note:
[1] Includes undeveloped lands permitted for this activity category.

3.9.3.5.2 Vibration

Federal Rail Administration. The FRA uses the FTA vibration impact assessment procedures for evaluating and assessing rail projects. The FTA criteria for environmental impact from ground-borne vibration are based on the maximum root-mean-square (rms) vibration levels for repeated events of the same source. The guidelines in Table 3.9-15 account for variation in project types as well as the frequency of events, which differ widely among transit projects. The limits are specified for the three land-use categories defined below:

- Vibration Category 1 - High Sensitivity: Included in Category 1 are buildings where vibration would interfere with operations within the building, including levels that may be well below those associated with human annoyance. Typical land uses covered by Category 1 are: vibration-sensitive research and manufacturing, hospitals with vibration-sensitive equipment, and university research operations. The degree of sensitivity to vibration will depend on the specific equipment that will be affected by the vibration. Equipment such as electron microscopes and high resolution lithographic equipment can be very sensitive to vibration, and even normal optical microscopes will sometimes be difficult to use when vibration is well below the human annoyance level. Manufacturing of computer chips is an example of a vibration-sensitive process. The vibration limits for Vibration Category 1 are based on acceptable vibration for moderately vibration-sensitive equipment such as optical microscopes and electron microscopes with vibration isolation systems.
- Vibration Category 2 - Residential: This category covers all residential land uses and any buildings where people sleep, such as hotels and hospitals. No differentiation is made between different types of residential areas. This is primarily because ground-borne vibration is experienced indoors and building occupants have practically no means to reduce their exposure. Even in a noisy urban area, the bedrooms often will be quiet in buildings that have effective noise insulation and tightly closed windows. Moreover, street traffic often abates at night when rail operations continue. Hence, an occupant of a bedroom in a noisy urban area is likely to be just as exposed to ground-borne vibration as someone in a quiet suburban area.
- Vibration Category 3 - Institutional: Vibration Category 3 includes schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment, but still have the potential for activity interference. Although it is generally appropriate to include office buildings in this category, it is not appropriate to include all buildings that have any office space. For example, most industrial buildings have office space, but it is not intended that buildings primarily for industrial use be included in this category.

Table 3.9-15. FTA Ground-borne Vibration (GBV) Impact Criteria for General Assessment.

Land Use Category	GBV Impact Levels (VdB re 1 micro-inch/sec)		
	Frequent Events 1	Occasional Events 2	Infrequent Events 3
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB [4]	65 VdB [4]	65 VdB [4]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Notes:

1 "Frequency Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

2 "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter truck lines have this many operations.

3 "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.

4 This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

Source: FTA Transit Noise and Vibration Impact Assessment, May 2006

3.9.3.6 Sleep Disturbance and Speech Intelligibility

Increased community reaction to rail noise in the vicinity of the Port of Los Angeles has prompted the need for a discussion of the potential effects of sleep disturbance and speech intelligibility on the community from the SCIG Project. The evaluation of these potential effects with thresholds of significance are provided for impact assessment of the SCIG Project and is not intended for assessment of future Port of Los Angeles, City of Long Beach, City of Carson or other CEQA projects.

3.9.3.6.1 Sleep Disturbance

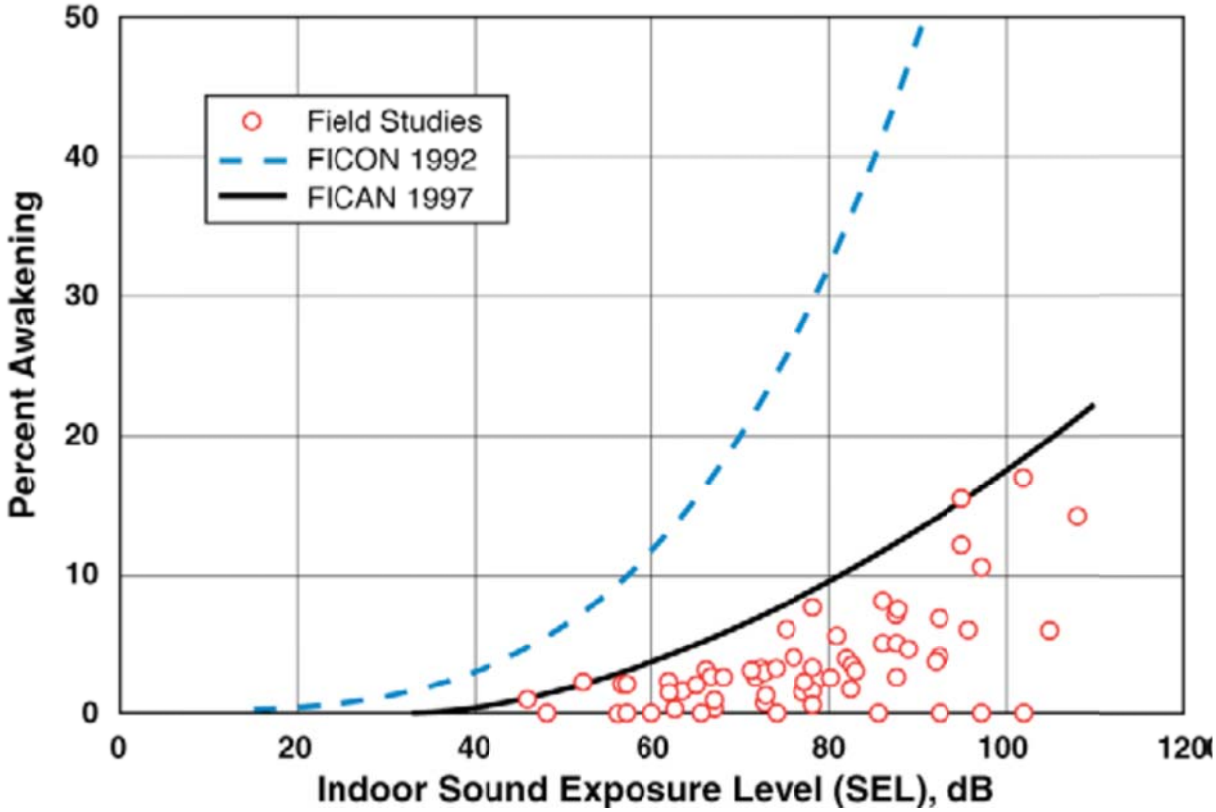
The effect of noise on sleep is a recognized concern when addressing the impacts of noise on people. Historical studies of sleep disturbance were focused mainly in laboratories, using various indicators of response (electroencephalographic recordings, verbal response, button push, etc). Field studies also were conducted, in which subjects were exposed to noise in their own homes, using real or simulated transportation noise (Lukas, 1975; Griefahn and Muzet, 1978; and Pearsons et al., 1989).

Based on a 1989 literature review by Pearsons (1989) for the U.S. Air Force, no specific adverse health effects have been clearly associated with sleep disturbance, characterized either by awakening or by sleep-state changes. Nevertheless, sleep disturbance is deemed undesirable, and may be considered an impact caused by noise exposure.

Three recent studies have added considerably to the stock of data on sleep disturbance caused by aviation noise. The first of these was conducted in the United Kingdom in 1992; the second in the U.S. near Castle Air Force Base and near Los Angeles International Airport in California in 1992; and the most recent study was conducted in communities near Stapleton International Airport and near Denver International Airport

(DIA) in Colorado, both before and after the opening of DIA in 1995. The Federal Interagency Committee on Aircraft Noise (FICAN) evaluated the data and conclusions of the three field studies and has released the FICAN 1997 sleep disturbance curve. The FICAN 1997 curve (Figure 3.9-4) represents the upper limit of the observed field data, and should be interpreted as predicting the "maximum percent of the exposed population expected to be behaviorally awakened", or the "maximum percent awakened" for a given residential population. Finally, a report in the Journal of Occupational Health cited research showing that sleep disturbance was more prevalent in urban populations exposed to traffic noise above 65 Leq. This exposure to traffic noise has been linked to insomnia, poorer sleep quality, and tiredness (Kawada, 2011).

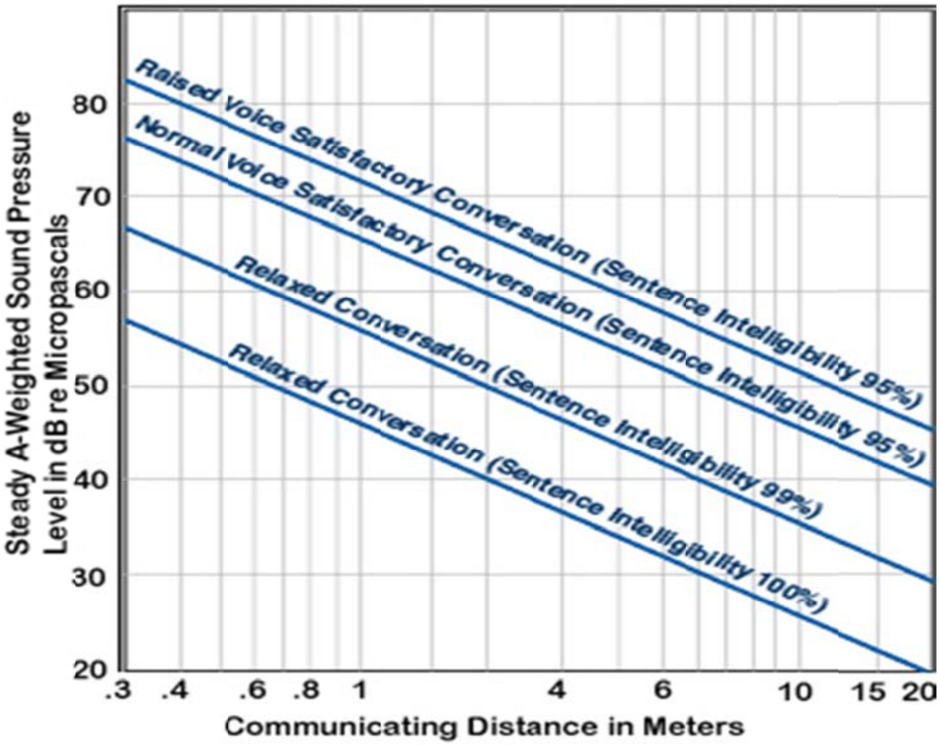
Figure 3.9-4. FICAN 1997 Recommended Sleep Disturbance Dose-Response Relationship.



3.9.3.6.2 Speech Interference

One of the primary effects of continuous noise or sustained noise events is its tendency to drown out or "mask" speech, making it difficult or impossible to carry on a normal conversation without interruption. Figure 3.9-5 presents typical distances between talker and listener for satisfactory conversations in the presence of different steady A-weighted background noise levels. As shown in the figure, satisfactory conversation does not always require hearing every word; 95 percent intelligibility is acceptable for many conversations. This is because a few unheard words can be inferred when they occur in a familiar context.

Figure 3.9-5. USEPA Speech Intelligibility Curve.



Source: USEPA, 1974. Information on Levels of Noise Requisite to Protect the Public Health and Welfare with an Adequate Margin of Safety, March 1974.

3.9.4 Impacts and Mitigation Measures

3.9.4.1 Methodology

To evaluate noise from construction activities, the methodology outlined by the Construction Engineering Research Laboratory (CERL) was used. The CERL methodology considers the type and number of construction equipment used, individual equipment noise emissions, and time-usage factors for each phase of construction. The construction sites are divided into zones of activity, and the sound levels produced in each zone are acoustically summed to compute the construction noise levels. A list of the equipment assumptions and usage factors is provided in the Noise Study included in Appendix F1.

The CNEL generated by existing and future traffic on the roadways that serve the proposed Project site has been estimated using the FHWA traffic noise prediction model and forecasted traffic data from the Transportation Chapter (Section 3.10 and Appendix G). Ambient noise levels (existing and future projected) associated with Project operations are expressed in CNEL.

The distances to noise contours presented in the tables are representative of "soft site" conditions without any barrier attenuation. Soft-site and hard-site conditions are parameters in the FHWA Highway Noise Model to account for how sound drops off as it radiates away from the roadway. For hard-site conditions, the reduction in sound over distance is solely due to the spreading of the sound energy over larger and larger area. As sound radiates from a source its energy is dispersed over a larger and larger area resulting in less energy at any one point the further it is from the source. This is the minimum rate that sound drops off over distance. Soft-site conditions include an additional effect, the fact that the sound typically travels along the ground and the ground absorbs some of the energy increasing the drop off rate from 3 dB per doubling of distance to 4.5 dB per doubling distance.

In addition to the CNEL noise analysis described above, the analysis of potential noise impacts associated with the proposed Project's mechanical equipment, truck deliveries, cranes, yard tractors, and parking facility operations were analyzed using the Cadna noise model and equipment data from the proposed Project description. The CNEL generated by future rail operations was calculated by applying existing operational data to the FRA's computational procedures for railroad operations, DOT-T-95-16.

Sleep disturbance was evaluated for two cases, with windows closed and with windows open. With windows closed, a 20 dB noise reduction was applied to exterior single event noise to estimate interior noise levels. A conservative 12 dB exterior to interior noise reduction was applied to assess interior SELs with windows open. Interior SELs were then analyzed in conjunction with the FICAN Sleep Disturbance Curve (Fig. 3.9-4) to predict the frequency of single event awakenings.

For classroom speech interference, a separation distance between a teacher and back row students was assumed to be nominally 20 feet. Students situated closer than 20 feet from the teacher would experience greater speech intelligibility

Atmospheric effects were determined to have minimal influence on the Project noise levels for the nearest receptors bordering the Project site. This is due to the fact that meteorological effects are only significant over large propagation distances, and these distances are not exhibited at the nearest receptors bordering the Project site.

The operational noise of the proposed Project was analyzed at full capacity, thus the analysis is applicable to all years during the 50-year lease period after the proposed Project reaches its full capacity.

3.9.4.2 Thresholds of Significance

Elements of the proposed Project are located within the jurisdiction of the City of Los Angeles, City of Carson, and City of Long Beach. The CEQA thresholds of significance for each jurisdiction are discussed below.

City of Los Angeles

The first three thresholds of significance for noise apply to construction and operation of those portions of the proposed Project that would affect noise sensitive receivers located within the City of Los Angeles, and are as outlined in the *Los Angeles CEQA Thresholds Guide* (City of Los Angeles, 2006). Vibration is not an issue for that portion of the proposed Project, including designated truck routes, within the City of Los Angeles because no sensitive receivers would be exposed to construction or rail activity (the sources of significant vibration). As such, the City of Los Angeles vibration threshold criteria is not used in this analysis. A site survey was conducted to determine if there were nonresidential vibration sensitive receptors (microelectronics firms, recording studios, research laboratories, etc. that employ vibration sensitive equipment) in the vicinity of the Project site and associated haul routes. It was determined that one recording studio, Mambo Sound & Recording Studio, is located at 2200 W. Esther Street, approximately 1,800 ft from the south east corner of the proposed Project site. A technology park is located approximately 1,100 feet east of the Project site and is located well enough away so that vibration generated on site would not affect those office uses. In addition, the construction haul route would be expected to be primarily on Pacific Coast Highway to and from the Project site. Truck vibration would not be expected to exceed existing vibration levels generated by existing truck traffic on Pacific Coast Highway; thus, no increase in vibration would be expected. Thresholds of significance for sleep disturbance and speech interference in classrooms are established solely for use in consideration of noise impacts for this Project under CEQA and are not meant for application to other Port of Los Angeles projects analyzed pursuant to CEQA.

NOI-1 A significant impact on noise levels from construction during the daytime would occur if construction activities lasting more than one day would exceed existing ambient exterior noise levels by 10 dBA or more at a noise sensitive use; or if construction activities lasting more than 10 days in a three-month period would exceed existing ambient exterior noise levels by 5 dBA or more at a noise sensitive use in the City of Los Angeles.

NOI-2 A significant impact on noise levels from construction during the nighttime would occur if construction activities would exceed the ambient noise level by 5 dBA at a noise sensitive use between the hours of 9:00 pm and 7:00 am Monday through Friday, before 8:00 am or after 6:00 pm on Saturday, or at any time on Sunday.

NOI-3 A project would normally have a significant impact on noise levels if its operation causes the ambient noise level measured at the property line of affected uses to increase by 3 dBA in CNEL to or within the ‘normally unacceptable’ or ‘clearly unacceptable category’, of the City of Los Angeles’ Noise Compatibility Guidelines,’ or any 5 dBA or greater noise increase.

Potential sensitive receivers affected by the proposed Project include residential land uses (single- and multi-family housing, boats used as residences) and neighborhood parks. At these land uses, a significant impact would occur if the proposed Project causes CNEL noise levels to increase by (1) 5 dBA or greater where the existing CNEL is less than 70 dBA; or (2) 3 dBA or greater where the existing CNEL exceeds 70 dBA.

NOI-4 A significant impact for sleep awakenings would occur when residences within the immediate vicinity of the Project Site in the City of Los Angeles are exposed, at an average frequency of once in 10 days, to interior nighttime SEL sufficient to awaken at least 10 percent of residents assuming windows remain open. The threshold of significance for interior nighttime noise is 80 dBA SEL.

Although there is currently no conclusive data to establish a proven statistical relationship between noise and the ability of children to learn in the classroom, a threshold of significance for speech interference is applied for CEQA analysis in this EIR.

NOI-5 A significant impact for classroom speech interference would occur when schools within the immediate vicinity of the Project Site and Project Site components within the City of Los Angeles are exposed to exterior noise level during school hours sufficient to result in an interior noise level of 52 dBA, sufficient for momentary disruption of speech intelligibility in classroom teaching situations (a separation distance between a teacher and back row students was assumed to be nominally 20 feet, students situated closer than 20 feet from the teacher would experience greater speech intelligibility).

City of Long Beach

The following threshold of significance for noise applies to portions of the proposed Project that would affect noise sensitive receivers within the City of Long Beach, and is derived from the CEQA Guidelines Appendix G Environmental Checklist. Thresholds of significance for sleep disturbance and speech interference within classrooms are established solely for use in consideration of noise impacts for this Project under CEQA and are not meant for application to other Port of Los Angeles or City of Long Beach projects analyzed pursuant to CEQA.

NOI-6 Construction and operation of the proposed Project would have a significant noise impact if ambient noise levels would be increased by three dBA or more; or maximum noise levels allowed by the Long Beach Municipal Code would be exceeded.

NOI-7 Construction and operation of the proposed Project would have a significant vibration impact if ground vibration levels for residential structures or vibration-sensitive buildings within the City of Long Beach would exceed the acceptability limits prescribed by the FTA. For residential land uses, vibration levels would exceed 72 VdB for frequent events (70+ vibration events), 75 VdB for occasional events (30-70 events), and/or 80 VdB for infrequent events (30 or fewer events). For land uses with high vibration sensitivity, vibration levels would exceed 65 VdB for infrequent, occasional and frequent events. For fixed non-transportation related sources, a significant vibration impact would occur if maximum vibration levels allowed by LBMC would be exceeded.

The vibration significance criterion for portions of the proposed Project that would affect vibration sensitive receivers in the City of Long Beach corresponds to Federal Transit Administration (FTA) Vibration Impact Criteria for General Assessment, which sets acceptability limits for vibration in buildings (including residential structures), and is consistent with the CEQA Guidelines Appendix G Environmental Checklist.

NOI-8 A significant impact for sleep disturbance would occur when residences within the immediate vicinity of the Project Site and Project Site components within the City of Long Beach are exposed, at an average frequency of once in 10 days, to interior nighttime SEL sufficient to awaken at least 10 percent of their residents assuming windows remain open. The threshold of significance for interior nighttime noise is 80 dBA SEL.

Although there is currently no conclusive data to establish a proven statistical relationship between noise and the ability of children to learn in the classroom, a threshold of significance for speech interference is applied for CEQA analysis in this EIR.

NOI-9 A significant impact for classroom speech interference would occur when schools within the immediate vicinity of the Project Site and Project Site components within the City of Long Beach are exposed to exterior noise levels during school hours sufficient to result in interior noise level of 52 dBA, sufficient for momentary disruption of speech intelligibility in classroom teaching situations (assumed to be at 20 feet).

City of Carson

The following threshold of significance for noise applies to portions of the proposed Project that would affect noise sensitive receivers within the City of Carson, and is derived from the CEQA Guidelines Appendix G Environmental Checklist. Thresholds of significance for sleep disturbance and speech interference within classrooms are established solely for use in consideration of noise impacts for this Project under CEQA and are not meant for application to other Port of Los Angeles or City of Carson projects analyzed pursuant to CEQA.

NOI-10 Construction and operation of the proposed Project would have a significant noise impact if ambient noise levels would be increased by three dBA or more; or maximum noise levels allowed by the City of Carson would be exceeded.

NOI-11 Construction and operation of the proposed Project would have a significant vibration impact if ground vibration levels for residential structures within the City of Carson would exceed the acceptability limits prescribed by the FTA. Vibration levels would exceed 72 VdB for frequent events (70+ vibration events), 75 VdB for occasional events (30-70 events), and/or 80 VdB for infrequent events (30 or fewer events).

NOI-12 A significant impact for sleep disturbance would occur when residences within the City of Carson are exposed, at an average frequency of once in 10 days, to interior nighttime SEL sufficient to awaken at least 10 percent of their residents assuming windows remain open. The threshold of significance for interior nighttime noise is 80 dBA SEL.

Although there is currently no conclusive data to establish a proven statistical relationship between noise and the ability of children to learn in the classroom, a threshold of significance for speech interference is applied for CEQA analysis in this EIR.

NOI-13 A significant impact for classroom speech interference would occur when schools within the City of Carson are exposed to interior noise levels during school hours sufficient to result in interior noise levels of 52 dBA, sufficient for momentary disruption of speech intelligibility in classroom teaching situations (assumed to be at 20 feet).

3.9.4.3 Impacts and Mitigation

Impact NOI-1 The proposed Project would not cause noise levels from daytime construction lasting more than 1 day to exceed existing ambient exterior noise levels by 10 dBA or more at a noise sensitive use or for construction activities lasting more than 10 days in a 3-month period, would not exceed existing ambient exterior noise levels by 5 dBA or more at a noise sensitive use in the City of Los Angeles.

Construction of the proposed Project would occur over approximately 36 months in the following areas:

- The railyard area including the north lead tracks and railroad bridge over Sepulveda Blvd;
- Pacific Coast Highway (PCH) grade separation and interchange;
- The south lead tracks area along the Long Beach Lead and Alameda Corridor, including the Dominguez Channel Bridge;
- Alternate business locations.

Construction would include demolition of existing structures; earthwork including excavating, repositioning, and compacting; drainage and utility construction/relocation; fine grading and sub-grade preparation; paving; construction of new buildings and warehouses; track work and signal installation; assembly of the loading cranes;

modifications to rail and road bridges; landscaping; and improvements to the Southern California Edison access road. Heavy construction equipment (e.g., excavators, graders, rollers, track-laying machines, cement mixers, cranes, and haul trucks) would be used in all parts of the proposed Project site, and some pile driving would likely occur, particularly for the new bridge abutments. Construction of all elements would occur essentially simultaneously (see Section 2.4.3 for additional details on construction activities and phasing).

Construction Noise Levels

Construction noise would be experienced by workers at industrial and commercial facilities near the proposed Project site in the City of Los Angeles. However, no noise-sensitive uses were identified within the portion of the City of Los Angeles near the proposed Project site; noise-sensitive uses within Los Angeles occur along the designated truck routes, which would be used during operations and not for construction trips. Nighttime construction would be confined to the PCH grade separation. Haul routes to and from the site would be limited to PCH to the west and east. Because the number of truck movements would be very limited, little to no increase would be expected with the overall CNEL from traffic on PCH.

Impact Determination

Because no noise-sensitive uses in the City of Los Angeles are near the proposed construction areas, daytime construction activities would have no noise-related impact. The distance from the nearest residential receptor southwest of the project site to the proposed south lead track construction area is approximately 1,800 feet. The distance to the SCIG site is approximately 3,000 to 5,000 feet. Businesses in this area are primarily industrial automobile salvage yards with a few residences. Because of the distance to the nearest construction areas, the barrier effects of intervening topography, and the high ambient background noise, construction noise is expected to be attenuated to ambient levels. Accordingly, the impact of construction on sensitive receivers in the City of Los Angeles would be less than significant.

Mitigation Measures

No mitigation is required.

Residual Impacts

Less than significant impact.

Impact NOI-2: Construction activities would not exceed the ambient noise level by 5 dBA at a noise sensitive use in the City of Los Angeles between the hours of 9:00 PM and 7:00 AM Monday through Friday, before 8:00 AM or after 6:00 PM on Saturday, or at any time on Sunday.

No on-site construction activities would occur near noise-sensitive uses in the City of Los Angeles between the hours of 9:00 PM and 7:00 AM Monday through Friday, before 8:00 AM or after 6:00 PM on Saturday, or at any time on Sunday. Nighttime construction noise from the PCH grade separation would be attenuated due to the distance to the receptors (4,000 ft), barrier effects of intervening topography and the high ambient background noise. Because the number of truck movements would be very limited, little to no increase would be expected with the overall CNEL from traffic on PCH. Further, single event noise levels would be expected to be similar to what is generated by existing heavy trucks on PCH.

Impact Determination

Because any nighttime construction that occurred would be attenuated by distance, barrier effects, and high ambient background noise, impacts of nighttime construction noise would be less than significant.

Mitigation Measures

No mitigation is required.

Residual Impacts

Less than significant impact.

Impact NOI-3: The proposed Project would not have a significant impact on noise levels within the City of Los Angeles because its operation would not cause the ambient noise level measured at the property line of affected uses to increase by 3 dBA in CNEL to or within the 'normally unacceptable' or 'clearly unacceptable category,' or any 5 dBA or greater noise increase.

On-Site Operations

Sources of on-site operational noise at the SCIG and alternate business locations facilities would include truck activity, servicing, train activity, and container loading and unloading operations. Operational noise levels for on-site activities are summarized in Table 3.9-16. Existing operations that would be relocated by the proposed Project would include less intensive trucking, warehousing, transloading and yard goats activities. Mechanical equipment associated with these operations includes heavy trucks, trailers, forklifts, yard goats, and maintenance equipment.

Trucks and hostlers would generate noise from their engines and horns. Truck activity would consist of truck traffic arriving and departing from the SCIG and alternate business sites, as well as internal circulation within the SCIG railyard and alternate business sites. An estimated 5,542 truck trips and 4,167 containers would be processed through the SCIG facility on a daily basis. Hostlers would transport containers between storage areas and the loading/unloading tracks. Crane operations would include the use of RMG cranes on the strip tracks for loading and unloading railcars and chassis, and managing container stacking. The cranes, being electrically powered, would generate little noise, but container stacking would generate noise from impacts with other containers, truck trailers, or the ground. The servicing activities would consist of hostler and crane servicing, which would be supported by an air compressor building in the northwest portion of the site. Activity on the alternate business sites would mainly consist of truck movements into and out of the sites, truck idling on-site, and the operation of cargo-handling equipment on the sites.

Train operations would account for the majority of operational noise at the proposed Project site. Railroad noise would include locomotive diesel engines, horns, and air brake systems, wheel-on-rail squealing, and concussion from railcars banging together during train breaking and building.. At full capacity, eight inbound trains and eight outbound trains would be expected to pass through the facility each day. Each train would consist of three or four diesel-electric locomotives with attached railcars, with a total length of approximately 8,000 feet. Locomotives would operate from the junction with the Alameda Corridor through the railyard and northward up the north lead tracks.

Locomotive noise would be reduced by normal operating procedures, which call for shutting down all but one of the locomotives as the train arrives or until it is ready to depart, and accomplishing all switching activities with a single locomotive. A non-audible warning system would be used on site instead of train horns, significantly reducing the potential for on-site train horn effects.

Table 3.9-16. Summary of Predicted Noise Levels From On-Site Sources.

On-Site Source	Predicted Noise Level at 100 ft, dBA
Train Horn (off site)	107
Trains	70 - 95
Air Compressor Building	68
RMG cranes	70
Servicing Facilities	72
Parking Lots	67
Hostler w/ Trailer	69
Hostlers	59
Heavy Trucks	66
Container Impact	70

Rail Corridor Noise

The proposed eight roundtrip trains to and from the SCIG facility each day would result in increased train traffic on local corridors compared to baseline conditions. These corridors include the Alameda Corridor, South Lead Tracks and San Pedro Branch Line. Increased rail activity from the SCIG facility on the Alameda Corridor is analyzed considering the volume of train trips on the Alameda Corridor in the 2010 baseline year and the project-generated train volume in the 2035 future year (eight inbound and eight outbound trains per day). The baseline data for 2010 provided by ACTA cites an average volume of 39 trains per day on the Alameda Corridor (ACTA communication, 2011). Considering the Project-generated trains, the increase in CNEL from the Project's trains on the Alameda Corridor would be 1.5 dB at the nearest residential receptors R28, R29 and R32.

Train horn sounding can produce maximum sound levels as high as 107 dBA at a distance of 100 ft and 90 dBA at a distance of 500 feet. The project's eight daily inbound and outbound trains would not regularly generate train horn soundings, although there may be occasional train horn soundings associated with the Project. For the purposes of this analysis, it assumed that the project's eight daily inbound and outbound trains would generate approximately 16 train horn soundings per day, occurring near the intersection of the Alameda Corridor and Pacific Coast Highway. These soundings are not expected to occur more than once in any one hour period. When compared to the number of existing train operations, horn soundings, and ambient background noise, future locomotive horn noise from SCIG train traffic, although still discernible, would not be expected to result in a CNEL increase greater than 3 dB at the nearest residential receptors R28, R29, and R32.

Future rail movements along the San Pedro Branch line would include diesel engine noise, train horns, and railcar noises, as described above. According to BNSF, train horn soundings are not expected to occur on the San Pedro Branch line due to the Project's design features. Future noise levels from the Project's rail movements on the San Pedro Branch line from all these sources are summarized in Table 3.9-17.

Table 3.9-17. Summary of Project-related Operational Train Noise Levels for San Pedro Branch Line.

Receptor Number[1]	Measured Ambient Noise Level, L50, dBA [2]	Measured Ambient CNEL, dBA	Predicted Future CNEL for San Pedro Branch Line, dBA
R1	Day: 45.2 - 51.6 Night: 37.7 - 46.3	54.7	55.1
R2	Day: 58.6 - 60.2 Night: 46.1 - 57.4	64.0	48.3
R3	Day: 56.3 - 64.1	66.6	56.0
R4	Day: 62.4 – 64.3	--	57.3
R5	Day: 52.6 - 58.1	62.8	48.8
R6	Day: 61.5 – 65.3	69.9	57.1
R7	Day: 61.5 – 65.3	69.9	56.6
R7A	Day: 59.2 – 63.2 Night: 51.1 - 58.6	67.3	53.9
R30	Day: 52.0 – 64.2	61.2	52.9
R31	Day: 48.3 – 58.0	59.6	50.3

1) For receptor locations refer to Figure 3.9-2 (where N is equivalent to R).
2) Refer to Table 3.9-4, Summary of Ambient Noise Measurement Data.

Existing Plus Project Traffic Noise Levels

Table 3.9-18 shows the roadway traffic noise levels once the proposed Project is in full operation. Portions of the following roadways in the City of Los Angeles include noise-sensitive land uses that would be expected to experience future traffic noise levels above 70 CNEL: Alameda Street, E. Anaheim St., E. Harry Bridges Boulevard, E. Sepulveda Boulevard, John S. Gibson Boulevard, and W. Harry Bridges Boulevard. Traffic noise levels above 70 CNEL are considered incompatible with noise guidelines.

Table 3.9-19 shows the predicted noise level increase over existing levels – the Project's traffic noise contribution. Roadways in Los Angeles would not experience a Project increase in traffic noise level exceeding 1 dB. The majority of roadways within the City would experience a traffic noise decrease as a result of the Project.

Table 3.9-20 shows the predicted future noise level increase over existing levels and the Project's contribution upon build out (i.e., in 2035). Portions of the following roadways in Los Angeles would experience a cumulative noise level increase over existing noise levels of 3 dBA or greater: Navy Way, New Dock Street, and S. Fries Avenue.

Table 3.9-18. Calculated Existing Plus Project Roadway Traffic Noise Levels.

ROADWAY SEGMENT	*CNEL @ 100 ft*	*DISTANCE TO CNEL CONTOURS*		
		70 dB	*65 dB*	*60 dB*
ALAMEDA ST				
n/o Anaheim St	70.3	107	257	541
w/o Eubank Ave	73.2	196	428	864
s/o PCH	72.6	171	382	778
s/o Anaheim St	74.1	237	502	1002
E ANAHEIM ST				
between Anaheim and Henry Ford	72.3	161	362	741
e/o Henry Ford Ave	73.6	211	455	916
w/o E I St	72.8	181	401	814
w/o Anaheim Way	73.6	211	455	916
E HARRY BRIDGES BLVD				
e/o Avalon Blvd	71.8	146	334	687
E SEPULVEDA BLVD				
e/o Alameda St	70.7	116	274	574
JOHN S GIBSON BLVD				
n/o I-110 Ramps	70.2	105	253	532
LONG BEACH FWY				
n/o Wardlow Rd	83.3	1628	2569	4513
s/o Wardlow Rd	84.1	1926	2963	5147
n/o Willow St	84.4	2046	3118	5394
s/o Willow St	83.9	1841	2851	4967
between off/on ramps at Willow St	84.0	1858	2873	5003
s/o PCH	83.3	1634	2577	4525
s/o Anahiem St	83.3	1634	2577	4525
n/o Anaheim St	83.3	1635	2579	4529

Table 3.9-18. Calculated Existing Plus Project Roadway Traffic Noise Levels (concluded).

ROADWAY SEGMENT	*CNEL @ 100 ft*	*DISTANCE TO CNEL CONTOURS*		
		70 dB	*65 dB*	*60 dB*
TERMINAL ISLAND FWY				
s/o PCH	74.4	250	526	1045
n/o PCH	73.7	217	468	938
between Off and loop On ramp at PCH	76.2	363	722	1400
s/o PCH off ramp	78.4	582	1077	2024
n/o Ocean Blvd	72.7	174	388	790
s/o Henry Ford Ave	73.9	228	486	972
between Henry Ford Ave and Anaheim St	76.8	418	814	1564
e/o Seaside Ave	74.7	270	562	1110
s/o Willow St	69.8	97	235	498
W ANAHEIM ST				
w/o Harbor Ave	71.4	134	311	644
e/o Santa Fe Ave	72.8	178	396	804
w/o Seabright Ave	71.5	137	317	656
w/o E I St	70.5	111	265	555
between Seabright Ave and Santa Fe Ave	71.4	135	313	647
W HARRY BRIDGES BLVD				
between Wilmington Blvd and Neptune Ave	71.5	136	314	650
between Hawaiian Ave and Wilmington Blvd	71.9	148	337	694
between Neptune Ave and Fries Ave	70.8	119	281	586
between Figueroa St and Mar Vista Ave	71.8	147	336	692
between Fries Ave and Avalon Blvd	71.8	146	334	688
between Mar Vista Ave and Hawaiian Ave	71.8	117	336	692
W PACIFIC COAST HIGHWAY				
between I-710 NB and SB ramps	71.6	141	324	669
e/o San Gabriel Ave	72.1	154	350	719
between San Gabriel Ave and Santa Fe Ave	72.0	153	347	712
between Terminal Island Fwy SB and NB ramps	72.1	157	354	726
e/o Santa Fe Ave	72.0	151	344	707
e/o Harbor Ave	71.4	135	313	649
W WILLOW ST				
between NB and SB Terminal Island Fwy	70.9	122	286	596
between Terminal Island Fwy and Santa Fe	69.0	82	204	437
between Santa Fe Ave and Easy Ave	68.8	78	196	421
e/o Easy Ave	69.9	99	239	506
w/o NB I-710 on ramp	69.4	88	218	464

Table 3.9-19. Project Roadway Traffic Noise Level Increase.

OADWAY SEGMENT	*Existing CNEL @ 100 ft*	*Existing Plus Project CNEL @ 100 ft*	*Project Increment in Traffic Noise Level, dB*
ALAMEDA ST			
n/o Anaheim St	71.9	70.3	-1.6
w/o Eubank Ave	73.6	73.2	-0.4
s/o PCH	73.8	72.6	-1.2
s/o Anaheim St	74.5	74.1	-0.4
E ANAHEIM ST			
between Anaheim and Henry Ford	71.7	72.3	0.6
e/o Henry Ford Ave	73.0	73.6	0.6
w/o E I St	72.2	72.8	0.6
w/o Anaheim Way	73.0	73.6	0.6
E HARRY BRIDGES BLVD			
e/o Avalon Blvd	72.1	71.8	-0.3
E SEPULVEDA BLVD			
e/o Alameda St	70.7	70.7	0.0
JOHN S GIBSON BLVD			
n/o I-110 Ramps	70.7	70.2	-0.5
LONG BEACH FWY			
n/o Wardlow Rd	85.0	83.3	-1.7
s/o Wardlow Rd	85.6	84.1	-1.5
n/o Willow St	84.6	84.4	-0.2
s/o Willow St	85.4	83.9	-1.5
between off/of ramps at Willow St	85.4	84.0	-1.4
s/o PCH	84.5	83.3	-1.2
s/o Anaheim St	84.5	83.3	-1.2
n/o Anaheim St	84.7	83.3	-1.4

Table 3.9-19. Project Roadway Traffic Noise Level Increase (concluded).

ROADWAY SEGMENT	*Existing CNEL @ 100 ft*	*Existing Plus Project CNEL @ 100 ft*	*Project Increment in Traffic Noise Level, dB*
TERMINAL ISLAND FWY			
s/o PCH	76.1	74.4	-1.7
n/o PCH	75.3	73.7	-1.6
between Off and loop On ramp at PCH	76.1	76.2	0.1
s/o PCH off ramp	78.0	78.4	0.4
n/o Ocean Blvd	72.8	72.7	-0.1
s/o Henry Ford Ave	74.2	73.9	-0.3
between Henry Ford Ave and Anaheim St	76.5	76.8	0.3
e/o Seaside Ave	75.0	74.7	-0.3
s/o Willow St	71.5	69.8	-1.7
W ANAHEIM ST			
w/o Harbor Ave	71.3	71.4	0.1
e/o Santa Fe Ave	73.1	72.8	-0.3
w/o Seabright Ave	71.9	71.5	-0.4
w/o E I St	69.8	70.5	0.7
between Seabright Ave and Santa Fe Ave	71.6	71.4	-0.2
W HARRY BRIDGES BLVD			
between Wilmington Blvd and Neptune Ave	71.5	71.5	0
between Hawaiian Ave and Wilmington Blvd	72.0	71.9	-0.1
between Neptune Ave and Fries Ave	70.9	70.8	-0.1
between Figueroa St and Mar Vista Ave	72.0	71.8	-0.2
between Fries Ave and Avalon Blvd	72.2	71.8	-0.4
between Mar Vista Ave and Hawaiian Ave	72.0	71.8	-0.2
W PACIFIC COAST HIGHWAY			
between I-710 NB and SB ramps	72.7	71.6	-1.1
e/o San Gabriel Ave	73.9	72.1	-1.8
between San Gabriel Ave and Santa Fe Ave	73.9	72.0	-1.9
between Terminal Island Fwy SB and NB ramp	72.6	72.1	-0.5
e/o Santa Fe Ave	73.7	72.0	-1.7
e/o Harbor Ave	72.5	71.4	-1.1
W WILLOW ST			
between NB and SB Terminal Island Fwy	70.9	70.9	-0
between Terminal Island Fwy and Santa Fe	67.7	69.0	1.3
between Santa Fe Ave and Easy Ave	67.7	68.8	1.1
e/o Easy Ave	69.7	69.9	0.1
w/o NB I-710 on ramp	67.6	69.4	1.8

Table 3.9-20. Project Roadway Traffic Noise Level, CNEL, Increase.

Roadway Segment	Existing Noise Level, CNEL, dBA	Future w/o Project Noise Level, CNEL, dBA	Future w/ Project Noise Level, CNEL, dBA	Future Increase Above Existing, dB	Project Incremental Contri-bution, dB (3rd-2nd)
ACCESS RD					
e/o Ferry St	67.8	65.9	70.2	2.4	4.3
ALAMEDA ST					
s/o Anaheim St	74.5	75.8	75.9	1.4	0.1
E ANAHEIM ST					
between Anaheim and Henry Ford	71.7	72.9	73.3	1.6	0.4
e/o Henry Ford Ave	73.0	74.3	74.8	1.8	0.5
w/o Anaheim Way	73.0	74.3	74.8	1.8	0.5
between Henry Ford Ave and Terminal Island	73.0	74.3	74.8	1.8	0.5
E HARRY BRIDGES BLVD					
e/o Avalon Blvd	72.1	73.5	73.6	1.5	0.1
E SEPULVEDA BLVD					
e/o Alameda St	70.7	69.8	69.8	-0.9	0.0
FERRY ST					
between Seaside Ave and Access Rd	68.1	-	69.7	1.6	-
between Terminal Way and Pilchard St	70.7	-	72.7	2.0	-
HARBOR FWY					
n/o 220th ST	83.4	84.8	84.9	1.5	0.1
JOHN S GIBSON BLVD					
n/o I-110 Ramps	70.7	71.8	71.8	1.1	0.0
N SEASIDE AVE					
w/o Navy Way	78.9	81.7	81.7	2.8	0.0
e/o Navy Way	79.6	82.0	81.9	2.3	-0.1
e/o Ferry St	72.8	74.9	74.4	1.6	-0.5
NAVY WAY					
s/o Reeves Ave	71.4	77.8	77.7	6.3	-0.1
s/o Terminal Way	73.4	78.8	78.4	5.0	-0.4
NEW DOCK ST					
w/o Henry Ford Ave	69.4	74.1	74.0	4.6	-0.1
e/o Henry Ford Ave	71.7	76.8	76.5	4.8	-0.3
w/o SB off ramp Terminal Island Fwy	71.7	76.8	76.5	4.8	-0.3
w/o NB on ramp Terminal Island Fwy	69.0	75.7	75.8	6.8	0.1
between Terminal Island Fwy SB and NB Ramp	69.0	75.7	75.8	6.8	0.1
PACIFIC COAST HIGHWAY					
w/o East Rd	72.2	72.1	71.9	-0.3	-0.2
S FRIES AVE					
s/o Water St	68.7	72.5	72.6	3.9	0.1

Table 3.9-20. Project Roadway Traffic Noise Level Increase (concluded).

Roadway Segment	Existing Noise Level, CNEL, dBA	Future w/o Project Noise Level, CNEL, dBA	Future w/ Project Noise Level, CNEL, dBA	Future Increase Above Existing, dB	Project Increase Contri-bution, dB
between Harry Bridges Blvd and Water St	67.0	70.9	71.2	4.2	0.3
SAN DIEGO FWY					
e/o Wilmington Blvd	84.4	85.2	85.5	1.1	0.3
SAN GABRIEL AV					
n/o PCH	65.0	69.6	64.5	-0.5	-5.1
TERMINAL ISLAND FWY					
between Off and loop On ramp at PCH	76.1	75.7	75.7	-0.4	0.0
s/o PCH off ramp	78.0	79.6	79.7	1.7	0.1
between Henry Ford Ave and Anaheim St	76.5	78.8	78.4	1.9	-0.4
Terminal Island n/o Ocean Blvd	72.8	76.6	75.0	2.2	-1.6
TERMINAL WAY					
w/o Ferry St	72.4	75.0	74.7	2.3	-0.3
w/o Earle St	71.9	74.5	74.4	2.5	-0.1
W HARRY BRIDGES BLVD					
between Wilmington Blvd and Neptune Ave	71.5	72.4	72.6	1.1	0.2
between Hawaiian Ave and Wilmington Blvd	72.0	72.5	72.7	0.7	0.2
between Neptune Ave and Fries Ave	70.9	71.0	71.2	0.3	0.2
between Figueroa St and Mar Vista Ave	72.0	72.4	72.6	0.6	0.2
between Fries Ave and Avalon Blvd	72.2	73.3	73.4	1.2	0.1
between Mar Vista Ave and Hawaiian Ave	72.0	72.5	72.6	0.6	0.1

Roadways with noise-sensitive receptors experiencing Existing Plus Project increase contributions greater than 3 dBA would be categorized as having significant noise impacts. None of those roadways are located in the City of Los Angeles.

Impact Determination

None of the noise-sensitive uses that would be affected by operation of the proposed Project are in the City of Los Angeles. Roadways in the City of Los Angeles would not experience project-related increases in noise exceeding 3 dBA. Consequently, operational noise impacts would be less than significant. Future cumulative traffic noise levels would result in noise exceeding 3 dBA, however, none of the increases would occur within the City of Los Angeles.

Mitigation Measures

No mitigation is required.

Residual Impacts

With no mitigation required, there would be no residual impacts.

Impact NOI-4: Operation of the proposed Project would not result in exposure of residences within the immediate vicinity of the Project Site, within the City of Los Angeles, at an average frequency of once in 10 days, to interior nighttime SELs sufficient to awaken at least 10 percent of residents assuming windows remain open. The threshold of significance for interior nighttime noise is 80 dBA SEL.

Table 3.9-21 summarizes the operational Project train horn SEL at nearby residences and an assessment of sleep disturbance. Interior SELs with windows closed with the train horn would be as high as 64.0, 65.9, and 64.0 dB at the East I St, Mauretania St, and Cruces St residences, respectively. Based on the FICAN 1997 curve, approximately 5 percent of the exposed population at the residences at 1919 East I Street, 1710 Mauretania Street, and 1619 Cruces Street would be expected to be awakened by train horn soundings associated with the proposed Project. Interior SELs with windows open from train horn soundings would be as high as 72.0, 73.9 and 72.0 dB at the East I St, Mauretania St, and Cruces St residences, respectively. When compared with the FICAN curve, approximately 7 percent, 8 percent, and 7 percent of the exposed population at the residences at 1919 East I Street, 1710 Mauretania Street, and 1619 Cruces Street, respectively, would be expected to be awakened by train horn soundings associated with the proposed Project. Single-event awakenings would occur at a frequency below 10 percent; thus, the operational project train horn SEL at nearby residences would be considered less than significant.

Table 3.9-21. Summary of the Predicted SCIG Train Horn SEL at Nearby Residences and Sleep Disturbance Assessment.

Receptor Number	Receptor Location	Measured Ambient Exterior Leq, dBA	Ambient Interior Leq, dBA[1]	Predicted SCIG Train Horn Exterior SEL, dBA	Predicted SCIG Train Horn Interior SEL w/ Windows Closed, dBA[1]	Approximate Percentage of Exposed Population Expected to be Awakened[2]	Predicted SCIG Train Horn Interior SEL w/ Windows Open, dBA[3]	Approximate Percentage of Exposed Population Expected to be Awakened[2]
R28	Residence at 1919 East I St	Day: 58.6 – 81.1	Day: 38.6 – 61.1	84.0	64.0	5%	72.0	7%
R29	Residence at 1710 Mauretania St	Day: 66.2 – 70.4 Lowest Night: 60.6	Day: 46.2 – 50.4 Lowest Night: 40.6	85.9	65.9	5%	73.9	8%
R32	Residence at 1619 Cruces St	Day: 64.9 – 67.2 Lowest Night: 59.4	Day: 44.9 – 47.2 Lowest Night: 39.4	84.0	64.0	5%	72.0	7%

1) Assumes a 20 dB Exterior to Interior Noise Reduction for Residential and Institutional Receptors with Windows Closed.
2) Based on FICAN 1997 Sleep Disturbance Curve.
3) Assumes a 12 dB Exterior to Interior Noise Reduction for Residential and Institutional Receptors with Windows Open.

Impact NOI-5: Exposure to exterior noise levels from the proposed Project during school hours at schools within the City of Los Angeles would not result in interior noise levels of 52 dBA, sufficient for momentary disruption of speech intelligibility in classroom teaching situations (assumed to be at 20 feet).

There are no schools located in the City of Los Angeles within the immediate vicinity of the Project Site, thus Project-related train horns would have no impact on speech intelligibility in classrooms.

Impact NOI-6: Construction and operation of the proposed Project would cause ambient noise levels to be increased by three dBA or more, or maximum noise levels allowed by the Long Beach Municipal Code would be exceeded.

Construction

The analysis of construction-related noise levels in the City of Long Beach included data from twelve different receptor locations: the back yard of a residence at 2789 Webster Street, the Buddhist temple at Willow and Webster streets, the playground of the Hudson Elementary School, Hudson Park, the building setback of Cabrillo High School, the Cabrillo Child Development Center, Bethune School, the Century Villages at Cabrillo, Cabrillo Park, the playground of Stephens Middle School, Webster School, and the Mambo Sound & Recording Studio. The predicted construction noise levels are presented in Table 3.9-22. This data represents the worst-case daytime construction noise levels expected, assuming all construction elements occur simultaneously.

Exterior daytime construction noise levels (L50) from the proposed Project would be expected to be as high as 63.5, 65.8, 70.2, 70.4, 57.8, 70.9, 68.8, 62.9, 66.1 and 57.5 dBA at the Webster residence, Buddhist Temple, Hudson School, Hudson Park, Cabrillo High School, Cabrillo Child Development Center, Bethune School, the Century Villages at Cabrillo, Cabrillo Park, and Stephens Middle School, respectively. The construction noise levels would exceed ambient noise levels by more than 3 dB at each of these receptor locations. The future daytime construction noise at the Webster School and at Mambo Sound & Recording Studio would be 47.0 dBA, and 55.2 dBA, respectively. Construction noise levels at these receivers would be below ambient noise levels and maximum noise levels allowed by the Long Beach Municipal Code.

Nighttime construction noise levels from the PCH grade separation would be expected to be as high as 33.3, 36.3, 50.7, and 47.6 dBA at the Webster residence, Buddhist Temple, Century Villages at Cabrillo, and Mambo Sound & Recording Studio, respectively. Table 3.9-23 summarizes the nighttime construction noise levels. The increase in noise would not be expected to be more than 3 dB above ambient levels at any of the receptors. Nighttime construction noise was not evaluated for the nearby school and park uses because they are not expected to be operating during the nighttime hours.

Table 3.9-22. Summary of the Predicted Daytime Construction Noise Levels for SCIG Construction.

Receptor Number	Receptor Location	Measured Ambient Noise Level L50, dBA	Approximate Distance to Nearest Construction Area, feet	Predicted Daytime Construction Noise Level – Worst Case April 2013, dBA	Predicted Daytime Construction Noise Level – Worst Case Month 2013, dBA	City of Long Beach Daytime Noise Ordinance, Exterior Standard, L50, dBA[1]
R1	Residence at 2789 Webster – rear yard	Day: 45.2 - 51.6 Night: 37.7 - 46.3	275	61.5	63.5	50
R2	Buddhist Temple at Willow and Webster	Day: 58.6 - 60.2 Night: 46.1 - 57.4	375	65.7	65.8	50
R3	Hudson Elementary School - playground	Day: 56.3 - 64.1	300	65.4 – 70.1	65.5 - 70.2	50
R4	Hudson Park	Day: 62.4 – 64.3	300	70.3	70.4	50
R5	Cabrillo High School – building setback	Day: 52.6 - 58.1	1,700	57.0	57.8	50
R6	Cabrillo Child Development Center	Day: 61.5 – 65.3	300	70.0	70.9	50
R7	Bethune School	Day: 61.5 – 65.3	300	68.8	68.8	50
R7A	Century Villages at Cabrillo	Day: 59.2 – 63.2 Night: 51.1 - 58.6	500	62.9	62.9	50
R7B	Cabrillo Park	Day: 60.2 – 65.2	400	66.1	66.1	50
R30	Stephens Middle School - playground	Day: 52.0 – 64.2	600	57.5	57.5	50
R31	Webster School	Day: 48.3 – 58.0	2,750	47.0	47.0	50
R34	Mambo Sound & Recording Studio	Day: 62.8 – 68.4 Night: 58.0 – 63.4	1,500	55.2	55.2	50

1) Noise standard for a cumulative period of 30 minutes in a 60-minute period. Higher noise levels are permitted for shorter time periods. If ambient noise level exceeds standard, standard shall be increased by 5 dB increments to encompass or reflect ambient level.

Table 3.9-23. Summary of the Predicted Nighttime Construction Noise Levels for SCIG Construction.

Receptor Number	Receptor Location	Predicted Nighttime Exterior Construction Noise Level – Worst Case 2013, dBA	Measured Nighttime Ambient Noise Level, dBA[1]	Predicted Increase in Ambient Noise Level with Nighttime Construction, dB	City of Long Beach Noise Ordinance, Nighttime Exterior Standard, L50, dBA[2]
R1	Residence at 2789 Webster – rear yard	33.3	37.7	+1.3	45
R2	Buddhist Temple at Willow and Webster	36.3	46.1	+0.4	45
R7A	Century Villages at Cabrillo	50.7	51.1	+2.8	45

1) Lowest Nighttime Ambient Noise Level, L50.
2) Nighttime noise standard for a cumulative period of 30 minutes in a 60 minute period. Higher noise levels are permitted for shorter time periods.

Classroom Interior Construction Noise levels

Future interior noise levels within classrooms were analyzed to assess the impact of Project construction on school facilities. Future interior construction noise levels were calculated by subtracting the measured noise reduction from the predicted exterior construction noise levels from the Project. As summarized in Table 3.9-24, the future interior classroom construction noise would be 42.7 dBA at Bethune School, 42.3 dBA at Cabrillo Child Development Center, and 13.4 dBA at Cabrillo High School. At Hudson School, the future interior construction noise would be 32.5 dBA, while at Stephens Middle School, the interior construction noise level would be 19.2 dBA. Lastly, at Webster School, the interior construction noise level would be 8.4 dBA. Interior construction noise levels with ambient noise would be below the LBMC allowable daytime interior noise standard of 45 dBA at all educational receivers, except for at the Cabrillo Child Development Center. The future interior construction noise level at the Cabrillo Child Development Center would be 46.1 dBA, which would exceed the LBMC interior threshold of 45 dBA and thus would be considered a significant impact. When compared to existing ambient noise levels, future interior construction noise levels would be below existing ambient noise levels within the classrooms with the exception of Bethune School. At this location, a greater than 5 dB increase would be experienced during the heaviest periods of construction activity (although noise levels would not exceed the LBMC 45 dBA noise standard) and would be considered significant.

Table 3.9-24. Summary of the Project's Construction Noise Levels within Classrooms.

Receiver Number	Location	Description	Future Exterior Construction Noise Level, L50, dBA	Noise Reduction, dB	Future Interior Construction Noise Level, L50, dBA	Ambient Interior Noise Level, L50, dBA	Future Interior Construction Noise Level with Ambient, L50, dBA	Predicted Increase in Ambient Noise Level with Construction Noise, dB
R3	Hudson School	Classroom 52	65.5	33	32.5	36.9	38.2	1.3
R5	Cabrillo High School	Classroom 1128	57.8	44.4	13.4	32.7	32.8	0.1
R6	Cabrillo Child Development Center	#2 Exterior, #4 Interior	70.9	28.6	42.3	43.7	46.1	2.4
R7	Bethune School	Classroom 102	68.8	26.1	42.7	38.8	44.2	5.4
R30	Stephens Middle School	Classroom PC2	57.5	38.3	19.2	31.4	31.7	0.3
R31	Webster School	Classroom B-48	47.0	38.6	8.4	31.9	31.9	0.0

On-Site and Rail Corridor Operations

As previously discussed in NOI-3 and summarized in Table 3.9-16, on-site operational noise at the proposed Project and alternate business location facilities would consist of truck activity, servicing, train activity, and container loading and unloading operations. On-site SCIG operations would generate noise levels ranging from 59 to 95 dBA at a distance of 100 feet from the source. Future rail movements along the San Pedro Branch line would include diesel engine noise, train horns, and railcar noises. According to BNSF, train horn soundings are not expected to occur on the San Pedro Branch line due to the Project's design features. As previously summarized in Table 3.9-17, the Predicted Future CNEL for San Pedro Branch Line operations would range from 48.3 to 57.3 dBA at the nearest sensitive receptor locations.

Predicted daytime Project on-site and rail corridor operational noise levels at sensitive receivers (Table 3.9-25) would result in an increase of 3 dB or greater over existing measured ambient noise levels at the residence at 2789 Webster (R1)and at Cabrillo High School (R5). At the residence on Webster, the predicted noise level of 54.8 dBA would consistently exceed the existing ambient noise levels by 3 dBA or greater. Project operations noise at Cabrillo High School would reach 52.6 dBA and lead to an increase in ambient noise levels of 3 dBA during the quietest daytime periods. The remaining ten receiver locations would experience predicted daytime operational noise levels either lower than the existing ambient levels or within the 3 dBA increase threshold.

Nighttime on-site and rail corridor operational noise levels would result in an increase of 3 dB or greater over existing measured ambient noise levels at the residence at 2789 Webster (R1), at the Buddhist Temple (R2) and at the Century Villages at Cabrillo (R7A). At the residence on Webster, the predicted noise level of 54.8 dBA would consistently exceed the nighttime ambient noise level range of 37.7 to 46.3 dBA by 3 dB or more. The nighttime operational noise level at the Buddhist Temple would result in an increase of at least 3 dB over the ambient noise levels during quieter nighttime periods. At the Century Villages at Cabrillo, future nighttime operational noise levels would reach 56.0 dBA and would occasionally result in an ambient level increase above the 3 dBA threshold. The nighttime noise increases that would be experienced at the Webster residence, Buddhist Temple and Century Villages at Cabrillo would occur when maximum possible operations coincide with the low background noise. This condition is not expected to occur on a daily basis and for more than one hour in any given 24-hour period. The remaining nine receiver locations would experience predicted operational noise levels either lower than the existing nighttime ambient levels or within the 3 dBA increase threshold.

Table 3.9-25. Predicted Operational Noise Levels for the Proposed Project.

Receptor Number	Receptor Location	Predicted Operational Noise Level, L50, dBA[1]	Measured Ambient Noise Level, L50, dBA[2]	Predicted Largest Increase in Ambient Noise Level with Operations Noise, dB	City of Long Beach Noise Ordinance, Exterior Standard, L50, Daytime/Nighttime dBA[3]	Impact Assessment
R1	Residence at 2789 Webster – rear yard	54.8	Day: 45.2 - 51.6 Night: 37.7 - 46.3	Day +10.1 Night +17.2	Day 50 Night 45	Daytime Nighttime
R2	Buddhist Temple at Willow and Webster	49.5	Day: 58.6 - 60.2 Night: 46.1 - 57.4	Day +0.5 Night +5.0	Day 50 Night 45	Nighttime
R3	Hudson Elementary School - playground	54.3	Day: 56.3 - 64.1	Day +2.1	Day 50	None
R4	Hudson Park	55.4	Day: 62.4 – 64.3	Day +0.8	Day 50	None
R5	Cabrillo High School – building setback	52.6	Day: 52.6 - 58.1	Day +3.0	Day 50	Daytime
R6	Cabrillo Child Development Center	55.7	Day: 61.5 – 65.3	Day +1.0	Day 50	None
R7	Bethune School	55.8	Day: 61.5 – 65.3	Day +1.0	Day 50	None
R7A	Century Villages at Cabrillo	56.0	Day: 59.2 – 63.2 Night: 51.1 - 58.6	Day +1.7 Night +6.1	Day 50 Night 45	Nighttime
R7B	Cabrillo Park	56.1	Day: 60.2 – 65.2	Day +1.4	Day 50	None
R30	Stephens Middle School - playground	51.3	Day: 52.0 – 64.2	Day +2.7	Day 50	None
R31	Webster School	46.4	Day: 48.3 – 58.0	Day +2.2	Day 50	None
R34	Mambo Sound & Recording Studio	49.4	Day: 62.8 – 68.4 Night: 58.0 – 63.4	Day +0.2 Night +0.6	Day 50 Night 45	None

1) Includes alternate business locations
2) Refer to Table 3.9-4, Summary of Ambient Noise Measurement Data
3) Noise standard for a cumulative period of 30 minutes in a 60 minute period. Higher noise levels are permitted for shorter time periods. If ambient noise level exceeds standard, standard shall be increased by 5 dB increments to encompass or reflect ambient level.

Existing Plus Project Traffic Noise Levels

Table 3.9-18 summarizes the predicted roadway traffic noise levels once the proposed Project is in full operation. Portions of the following roadways in the City of Long Beach include noise-sensitive land uses that would be expected to experience future traffic noise levels above 70 CNEL: E. Anaheim St., W. Pacific Coast Highway, Long Beach Freeway and the Terminal Island Freeway.

The Project's predicted noise level increase over existing levels is summarized in Table 3.9-19. Roadways in Long Beach would not experience a Project-related increase in traffic noise level exceeding 1 dB except at segments of W Willow St. The majority of roadways within the City would experience a traffic noise decrease as a result of the Project because the Project would reduce truck traffic on roadways north of the Project site.

Table 3.9-20 shows the predicted cumulative noise level increase over existing levels and the Project's contribution upon build out (i.e., in 2035). Roadways in Long Beach would not experience a cumulative noise level increase over existing noise levels of 3 dBA or greater.

Classroom Interior Operational Noise Levels

Interior noise levels within classrooms were analyzed to assess the effect of the proposed Project's on-site and rail corridor operational noise on school facilities. Future interior noise levels were calculated by subtracting the measured noise reduction from the predicted exterior operations noise levels from the proposed Project. As summarized in Table 3.9-26, the interior classroom noise levels with proposed project operations would be 29.7 dBA at Bethune School, 27.1 dBA at Cabrillo Child Development Center, and 8.2 dBA at Cabrillo High School. At Hudson School, the future interior operational noise would be as high as 21.3 dBA, while at Stephens Middle School, the interior operational noise level would be 13.0 dBA. Finally, at Webster School, the interior operations noise level would be 7.8 dBA. Future operations noise levels would be below the LBMC allowable interior noise standard of 45 dBA. When compared to existing ambient noise levels, future interior operations noise levels would be below existing noise levels within the classrooms.

Table 3.9-26. Summary of the Proposed Project's (Including Alternate Business Locations) Operational Noise Levels within Classrooms.

Receiver Number	Location	Description	Future Exterior Operations Noise Level, dBA[1]	Noise Reduction, dB	Future Interior Operations Noise Level, dBA[1]	Measured Ambient Interior Noise Level, dBA	Existing Ambient Plus Project Interior Noise Levels, dBA	Increase in Ambient Interior Noise Level with Project Contribution, dBA	City of Long Beach Noise Ordinance Interior Noise Level for Schools, L8, dBA[2]
R3	Hudson School	Classroom 52	54.3	33	21.3	36.9	36.9	0	45
R5	Cabrillo High School	Classroom 1128	52.6	44.4	8.2	32.7	32.7	0	45
R6	Cabrillo Child Development Center	#2 Exterior, #4 Interior	55.7	28.6	27.1	43.7	43.7	0	45
R7	Bethune School	Classroom 102	55.8	26.1	29.7	38.8	39.3	0.5	45
R30	Stephens Middle School	Classroom PC2	51.3	38.3	13.0	31.4	31.4	0	45
R31	Webster School	Classroom B-48	46.4	38.6	7.8	31.9	31.9	0	45

1) Includes alternate business locations tenants
2) Noise standard for a cumulative period of 5 minutes in a 60 minute period. Higher noise levels are permitted for shorter time periods. If ambient noise level exceeds standard, standard shall be increased to reflect ambient level.

Impact Determination

At the maximum levels of construction activity, increases in construction noise at sensitive receivers R1 through R7B and R30 would be more than 5 dB over existing ambient levels. The increase in construction noise would be temporary and during periods of reduced construction activity, noise levels would be lower. However, because the increase would exceed the threshold, the proposed Project would have a significant impact associated with construction noise.

Portions of East Anaheim Street, West PCH, the Long Beach Freeway and the Terminal Island Freeway would be expected to experience future traffic noise levels above 70 CNEL. Traffic noise levels above 70 CNEL are considered incompatible with noise guidelines and represent a significant impact. No roadways in Long Beach with noise-sensitive receptors would experience Project-related increases in operational noise exceeding the 3 dBA threshold

Predicted daytime operational noise levels from the proposed Project site would exceed existing measured ambient noise levels by 3 dBA or greater at the residence at 2789 Webster (R1) and at Cabrillo High School (R5). Predicted nighttime operational noise levels would exceed existing ambient noise levels by greater than 3 dB at the residence at 2789 Webster (R1), at the Buddhist Temple (R2), and at the Century Villages at Cabrillo (R7A). These increases represent a significant impact.

Interior noise levels from Project operations would not be expected to exceed municipal code standards for classroom interior spaces. Further, interior operational noise levels would not be expected to approach or exceed existing ambient interior noise levels within active classrooms. Interior construction noise levels would exceed LBMC standards at the Cabrillo Child Development Center (R6) and future noise levels would exceed existing ambient noise levels by greater than 3 dB at the Bethune School (R7); therefore, classroom noise impacts would be significant.

Mitigation Measures

The following mitigation measures would address significant impacts from construction and operational noise at nearby noise sensitive receptors.

MM NOI-1: Prior to the start of construction of the proposed Project, BNSF shall construct a permanent, 12-foot-high soundwall along the easterly right-of-way of the Terminal Island Freeway, from West 20th Street to Sepulveda Boulevard, as shown in Figure 3.9-6, to reduce construction noise The final height and location of the soundwall shall be verified by an acoustical consultant as part of the final engineering design of the soundwall. After construction of the soundwall, BNSF shall install landscaping along the length of the soundwall that would serve as additional screening and a buffer. The final landscaping plan with selected native plant species and irrigation shall be determined as part of the final engineering design. Upon completion, BNSF will be responsible for long-term maintenance. Right-of-way acquisition necessary for the soundwall and landscaping shall be the responsibility of BNSF.

MM NOI-2: The following noise control measures shall be implemented during construction of the proposed Project. This mitigation measure applies to BNSF and the businesses that move to the alternate sites. These measures were not quantitatively evaluated.

a) Construction Hours. Limit construction to the hours of 7:00 am to 9:00 pm on weekdays, between 8:00 am and 6:00 pm on Saturdays, and prohibit construction equipment noise anytime on Sundays and holidays as prescribed in the City of Los Angeles Noise Ordinance, except where nighttime construction is necessary on the PCH grade separation. For construction activities that occur within the City of Long Beach (e.g. the North Lead Track construction and sound wall construction), limit construction to the hours of 7:00 am and 7:00 pm on weekdays and between 9:00 am and 6:00 pm on Saturdays, as prescribed in the City of Long Beach Noise Ordinance.

b) Construction Days. Do not conduct noise-generating construction activities on weekends or holidays unless critical to a particular activity (e.g., concrete work).

c) Temporary Noise Barriers. When construction is occurring within 500 feet of a residence or park, temporary noise barriers (solid fences or curtains) shall be located between noise-generating construction activities and sensitive receptors unless and until the soundwall provided in MM NOI-1 has been built or the construction noise management plan (see (l) below) demonstrates that temporary barriers are not necessary.

d) Construction Equipment. Properly muffle and maintain all construction equipment powered by internal combustion engines.

e) Idling Prohibitions. Prohibit unnecessary idling of internal combustion engines near noise sensitive areas.

f) Equipment Location. Locate all stationary noise-generating construction equipment, such as air compressors and portable power generators, as far as is practical from existing noise sensitive land uses.

g) Quiet Equipment Selection. Select quiet construction equipment whenever possible.

h) Notification. Notify residents near the proposed Project site of the construction schedule in writing (in both English and Spanish).

i) Portable Generators. Avoid the use of portable generators if electricity can be obtained from the local power grid.

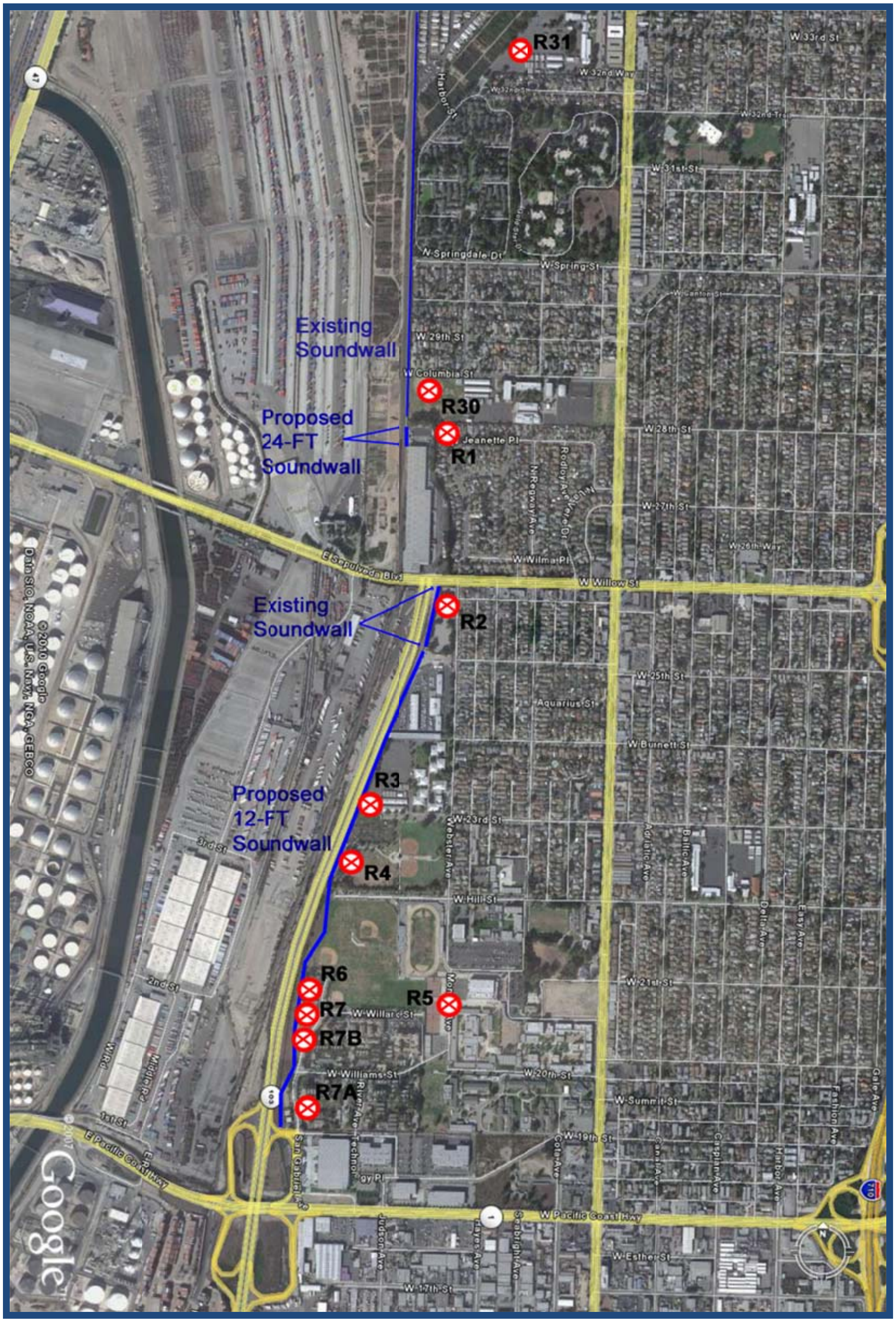
j) Noise Complaints. Assign a construction liaison to respond to noise complaints. Post contact information at the construction site.

k) Pile Driving Hours. Restrict pile driving to the hours between 9 AM and 5 PM, Monday through Friday, and from 10 AM to 4 PM on Saturdays.

l) A Construction Noise Monitoring and Management Plan for the SCIG facility will be required prior to the commencement. of any construction activity. The plan should evaluate each piece of construction equipment and the need for administrative and engineering noise control for each type of construction equipment. A noise monitoring plan should be prepared to document construction noise levels during the process.

MM NOI-3: Prior to the start of construction, BNSF shall first construct a permanent 24-foot high sound barrier as an extension to the existing 24-ft high sound barrier along the easterly right-of-way of the Terminal Island Freeway north of Sepulveda Blvd, as shown in Figure 3.9-6. The barrier would close the present gap between the existing barrier and a warehouse to the south, removing line-of-sight from the Project site to receiver R1 (the residence at 2789 Webster) and receiver R30 (Stephens Middle School). The final height and location of the soundwall shall be verified by an acoustical consultant as part of the final engineering design of the soundwall Right-of-way acquisition necessary for the soundwall shall be the responsibility of BNSF.

Figure 3.9-6. Location of the Recommended Sound Walls for Mitigation.



Residual Impacts

With implementation of **MM NOI-1**, **MM NOI-2,** and **MM NOI-3**, construction equipment noise and daytime operations noise generated by the proposed Project would be reduced to the point that impacts would be less than significant after mitigation. However, nighttime operations noise with mitigation would remain significant and unavoidable when "high activity" operations (haul trucks, yard tractors, container loading and unloading, train building, and servicing activities) coincide with extremely low nighttime ambient noise levels. Table 3.9-27 lists the reduced construction noise with 12-ft and 24-ft permanent soundwalls in place. Full implementation of **MM NOI-1, MM NOI-2,** and **MM NOI-3** would reduce the construction noise levels to comply with the Long Beach Noise Ordinance standard and CEQA increase thresholds. Table 3.9-28 lists the reduced operational noise with 12-ft and 24-ft permanent soundwalls in place.

Table 3.9-27. Summary of the Predicted Daytime Construction Noise Levels for SCIG Construction with Mitigation.

Receptor Number	Receptor Location	Measured Ambient Noise Level L50, dBA	Approximate Distance to Nearest Construction Area, feet	Predicted Daytime Construction Noise Level – Worst Case April 2013, dBA	Predicted Daytime Construction Noise Level – Worst Case Month 2013, dBA	Predicted Daytime Construction Noise Level w/ 24-ft and 12-ft Soundwalls, dBA[2]
R1*	Residence at 2789 Webster – rear yard	Day: 45.2 - 51.6 Night: 37.7 - 46.3	275	61.5	63.5	62.2
R2*	Buddhist Temple at Willow and Webster	Day: 58.6 - 60.2 Night: 46.1 - 57.4	375	65.7	65.8	65.8
R3*	Hudson Elementary School - playground	Day: 56.3 - 64.1	300	65.4 – 70.1	65.5 - 70.2	65.5 – 66.2
R4*	Hudson Park	Day: 62.4 – 64.3	300	70.3	70.4	70.3
R5*	Cabrillo High School – building setback	Day: 52.6 - 58.1	1,700	57.0	57.8	57.8
R6*	Cabrillo Child Development Center	Day: 61.5 – 65.3	300	70.0	70.9	68.1
R7*	Bethune School	Day: 61.5 – 65.3	300	68.8	68.8	65.0
R7A*	Century Villages at Cabrillo	Day: 59.2 – 63.2 Night: 51.1 - 58.6	500	62.9	62.9	60.3
R7B*	Cabrillo Park	Day: 60.2 – 65.2	400	66.1	66.1	64.3
R30*	Stephens Middle School - playground	Day: 52.0 – 64.2	600	57.5	57.5	57.5
R31	Webster School	Day: 48.3 – 58.0	2,750	47.0	47.0	47.0
R34	Mambo Sound & Recording Studio	Day: 62.8 – 68.4 Night: 58.0 – 63.4	1,500	55.2	55.2	55.2

Notes:

1) Noise standard for a cumulative period of 30 minutes in a 60 minute period. Higher noise levels are permitted for shorter time periods. If ambient noise level exceeds standard, standard shall be increased by 5 dB increments to encompass or reflect ambient level.

* These are the receivers for which the significant impact was identified in the unmitigated proposed Project.

2) Worst-case Month 2013

Table 3.9-28. Predicted Operational Noise Levels for the Proposed Project with Mitigation.

Receptor Number	Receptor Location	Predicted Operational Noise Level, L50, dBA[1]	Measured Ambient Noise Level, L50, dBA[2]	Predicted Largest Increase in Ambient Noise Level with Operations Noise, dB	Predicted Operational Noise Level w/ 24-ft and 12-ft Soundwalls, dBA
R1*	Residence at 2789 Webster – rear yard	54.8	Day: 45.2 - 51.6 Night: 37.7 - 46.3	Day +10.1 Night +17.2	49.6
R2*	Buddhist Temple at Willow and Webster	49.5	Day: 58.6 - 60.2 Night: 46.1 - 57.4	Day +0.5 Night +5.0	49.5
R3	Hudson Elementary School - playground	54.3	Day: 56.3 - 64.1	Day +2.1	52.3
R4	Hudson Park	55.4	Day: 62.4 – 64.3	Day +0.8	51.4
R5*	Cabrillo High School – building setback	52.6	Day: 52.6 - 58.1	Day +3.0	51.5
R6	Cabrillo Child Development Center	55.7	Day: 61.5 – 65.3	Day +1.0	49.9
R7	Bethune School	55.8	Day: 61.5 – 65.3	Day +1.0	49.8
R7A*	Century Villages at Cabrillo	56.0	Day: 59.2 – 63.2 Night: 51.1 - 58.6	Day +1.7 Night +6.1	53.8
R7B	Cabrillo Park	56.1	Day: 60.2 – 65.2	Day +1.4	50.4
R30	Stephens Middle School - playground	51.3	Day: 52.0 – 64.2	Day +2.7	49.2
R31	Webster School	46.4	Day: 48.3 – 58.0	Day +2.2	45.8
R34	Mambo Sound & Recording Studio	49.4	Day: 62.8 – 68.4 Night: 58.0 – 63.4	Day +0.2 Night +0.6	49.4

1) Includes alternate business locations
2) Refer to Table 3.9-4, Summary of Ambient Noise Measurement Data
* These are the receivers for which the significant impact was identified in the unmitigated proposed Project.

Impact NOI-7: Construction and operation of the proposed Project would not have a significant vibration impact on ground vibration levels for residential structures within the City of Long Beach that would exceed the acceptability limits prescribed by the FTA.

Construction Vibration

Construction operations involving heavy equipment can generate high vibration levels that can affect sensitive receptors such as the nearby schools and residences. A site survey was conducted to determine if there were nonresidential vibration sensitive receptors (microelectronics firms, recording studios, research laboratories, etc. that employ vibration sensitive equipment) in the vicinity of the Project site and associated haul routes. Mambo Sound & Recording Studio, located southeast of the Project site at 2200 W Esther St., was identified as a vibration sensitive receptor. A technology park was identified approximately 1,100 feet east of the Project site and is located well enough away so that on site generated vibration would not affect these office uses. In addition, the construction haul route would be expected to be primarily on Pacific Coast Highway to and from the Project site. Truck vibration would not be expected to exceed existing vibration generated by truck traffic on Pacific Coast Highway; thus, no increase in vibration would be expected. Table 3.9-29 summarizes typical construction vibration levels as reported by the FTA. Construction vibration can range between 58 to 112 VdB when measured at a distance of 25 feet from the source. Table 3.9-30 summarizes the future construction vibration. The future maximum vibration level at Stephens Middle School, designated location V1, would be as high as 63 VdB, while existing ambient levels are 51.6 to 64.3 VdB. The predicted vibration level at location V2, Hudson Elementary School, would be as high as 72 VdB and above the existing ambient levels of 55.9 to 69.0 VdB. Future vibration levels at the Cabrillo Child Development Center and Bethune School would be 72 VdB, respectively. Their respective existing ambient levels are 58.9 to 75.5 VdB and 62.6 to 79.4 VdB. Predicted vibration levels from Project construction would occasionally exceed existing ambient vibration measurements at Receivers V1 to V4 but would be clearly below the FTA vibration impact criteria of 75 VdB. At Mambo Sound and Recording Studio (V13), the predicted construction vibration level would reach upwards of 49 VdB; however, this would be well below the FTA impact criteria of 65 VdB for sensitive buildings and would not exceed the existing ambient velocity levels ranging from 86.9 to 106.2 VdB.

Locations V5 through V9 are situated away from the Project Site (4,200-17,500 feet); thus, future vibration levels from construction, ranging from 19 VdB to 37 VdB, would be significantly lower than the existing ambient vibration levels. The predominant source of existing vibration, as identified in the existing conditions sections, is heavy truck movement on existing roadways and haul routes. Although the number of vibration events would increase accordingly with Project truck movements, future vibration levels from Project construction operations would not be expected to exceed existing levels.

Table 3.9-29. Vibration Source Levels for Construction Equipment.

Equipment	Approximate Velocity Level @ 25 ft, VdB Re: 1 micro inch/sec
Pile Driver Impact typical range	112
Pile Driver Sonic typical range	93
Clam Shovel Drop	94
Hydromill in Soil	66
Vibratory Roller	94
Hoe Ram	87
Large Bulldozer	87
Caisson Drilling	87
Loaded Trucks	86
Jackhammer	79
Small Bulldozer	58

Source: FTA, 2006

Table 3.9-30. Predicted Construction Vibration Levels.

Location	Description	Distance to Nearest Construction Area, ft	Range of Predicted Construction Vibration Levels, VdB	Existing Ambient Velocity Level, VdB Lmax, VdB		FTA Impact Criteria, VdB
				Low	High	
V1	Stephens Middle School Classroom PC2	600	17 - 63	51.6	64.3	75
V2	Hudson Elementary School Playground	300	26 - 72	55.9	69.0	75
V3	Cabrillo Child Development Center	300	26 - 72	58.9	75.5	75
V4	Bethune School	300	26 - 72	62.6	79.4	75
V13	Mambo Sound & Recording Studio	1,500	9 - 49	86.9	106.2	65

Operational Vibration

Trains from the proposed Project would use a portion of the San Pedro Branch Line during daily operations. Future vibration levels from Project rail operations are summarized in Table 3.9-31.

Receiver locations V1 through V4 are in close proximity with the San Pedro Branch line (approximately 300 to 600 feet), and could be affected by ground-borne vibration from future train movements. The future maximum vibration level at Stephens Middle School, designated location V1, would be 54.8 VdB, while existing ambient levels are 51.6 to 64.3 VdB. The predicted vibration level at location V2, Hudson Elementary School, would be 55.4 VdB and below the existing ambient levels of 55.9 to 69.0 VdB. Future vibration levels at the Cabrillo Child Development Center and Bethune School would be 58.2 VdB and 59.2 VdB, respectively, and their respective existing ambient levels would be 58.9 to 75.5 VdB and 62.6 to 79.4 VdB. At the Mambo Sound & Recording Studio, the predicted velocity level from Project trains would be 58.3 VdB, well below the existing maximum vibration levels ranging from 86.9 to 106.2 VdB. Overall, predicted vibration levels from Project train movements would not exceed existing ambient vibration measurements at Receivers V1 to V4 and V13 and would be clearly below the FTA vibration impact criteria of 75 VdB.

Locations V5 through V9 are situated away from the San Pedro Branch line (4,200-17,500 feet); thus, future vibration levels from Project train movements, ranging from 24 VdB to 36 VdB, would be significantly lower than the existing ambient vibration levels. The predominant source of existing vibration, as identified in the existing conditions sections, is heavy truck movement on existing roadways and haul routes. Although the number of vibration events would increase accordingly with Project truck movements, future vibration levels from Project operations would not be expected to exceed existing levels.

Table 3.9-31. Predicted Future Train Vibration on the San Pedro Branch Line.

Receiver Location	Description	Predicted Velocity Level from Project Train Movements, VdB	Existing Ambient Velocity Level, Lmax, VdB		FTA Impact Criteria, VdB
			Low	High	
V1	Stephens Middle School Classroom	54.8	51.6	64.3	75
V2	Hudson Elementary School Playground	55.4	55.9	69.0	75
V3	Cabrillo Child Development Center	58.2	58.9	75.5	75
V4	Bethune School	59.2	62.6	79.4	75
V13	Mambo Sound & Recording Studio	58.3	86.9	106.2	65

Impact Determination

Predicted vibration levels from Project train movements within Long Beach would not exceed existing ambient vibration measurements. Likewise, predicted operational vibration levels would not exceed the FTA Impact Criteria for ground-borne vibration of 75 VdB for schools and 65 VdB for special buildings (such as recording studios). Accordingly, the vibration-related impacts of Project operation at receiver locations V1 through V4 and V13 would be considered less than significant.

Mitigation Measures

No mitigation is required.

Residual Impacts

Residual impacts would be less than significant.

Impact NOI-8: Operation and construction of the proposed Project would not result in interior nighttime SELs sufficient to awaken at least 10 percent of their residents assuming windows remain open at residences within the City of Long Beach, at an average frequency of once in 10 days, The threshold of significance for interior nighttime noise is 80 dBA SEL.

Nighttime construction activity has the potential to cause sleep disturbances at the nearest residential/sensitive receptors. Nighttime construction noise was analyzed by assuming the worst case hour during the nighttime. The potential for sleep disturbance was assessed by comparing the construction related nighttime interior noise levels with the FICAN 1997 sleep disturbance curves. Interior SELs with windows closed from nighttime construction activity would be as high as 48.9, 51.9 and 66.3 dB at the Webster residence, Buddhist Temple and Century Villages at Cabrillo, respectively. When assessed with the FICAN curve, approximately 2 percent, 3 percent and 7 percent of exposed population at the Webster residence, Buddhist Temple and Century Villages at Cabrillo, respectively, would be expected to be awakened due to the highest levels of construction activity. Interior SELs with windows open from nighttime construction activity would be as high as 56.9, 59.9 and 74.3 dB at the Webster residence, Buddhist Temple and Century Villages at Cabrillo, respectively. When assessed with the FICAN curve, approximately 3 percent, 4 percent and 8 percent of exposed population at the Webster residence, Buddhist Temple and Century Villages at Cabrillo, respectively, would be expected to be awakened due to the highest levels of construction activity. For periods of less intensive construction activity, the percentage of awakenings would be lower. Table 3.9-32 summarizes the nighttime construction noise SEL and sleep disturbance for these receptors. Single-event awakenings would occur at a frequency below 10 percent; thus, the impact from night time construction activity at nearby residences would be considered less than significant.

Table 3.9-33 summarizes the predicted Project train horn SEL at nearby residences and an assessment of sleep disturbance. Interior SELs with windows closed from the SCIG train horns would be 25.1, 27.2 and 32.5 dB at the Webster residence, Buddhist Temple and Century Villages at Cabrillo, respectively. Based on the FICAN 1997 curve, no one at these residences would be expected to be awakened by train horn soundings associated with the project. Interior SELs with windows open from Project-related train horns would be 33.1, 35.2 and 40.5 dB at the Webster residence, Buddhist Temple and Century Villages at Cabrillo, respectively. When assessed with the FICAN curve, approximately 0 percent, 0 percent and 1 percent of exposed population at each respective location would be expected to be awakened due to Project-related train horns. Single event awakenings would occur at a frequency below 10 percent; thus, the impact of the predicted SCIG train horn SEL at nearby residences would be considered less than significant.

Table 3.9-32. Summary of the Predicted Nighttime Construction Noise SEL for SCIG Construction and Sleep Disturbance Assessment.

Receptor Number	Receptor Location	Predicted Nighttime Exterior Construction Noise Level – Worst Case 2013, dBA	Predicted Nighttime Exterior SEL – Worst Case 2013, dB [1]	Predicted Nighttime Interior SEL w/ Windows Closed – Worst Case 2013, dB [2]	Approximate Percentage of Exposed Population Expected to be Awakened [3]	Predicted Nighttime Interior SEL w/ Windows Open – Worst Case 2013, dB [4]	Approximate Percentage of Exposed Population Expected to be Awakened [3]
R1	Residence at 2789 Webster – rear yard	33.3	68.9	48.9	2%	56.9	3%
R2	Buddhist Temple at Willow and Webster	36.3	71.9	51.9	3%	59.9	4%
R7A	Century Villages at Cabrillo	50.7	86.3	66.3	7%	74.3	8%

1) SEL is calculated from Leq+35.6, dB.
2) Assumes a 20 dB Exterior to Interior Noise Reduction for Residential and Institutional Receptors with Windows Closed.
3) Based on FICAN 1997 Sleep Disturbance Curve.
4) Assumes a 12 dB Exterior to Interior Noise Reduction for Residential and Institutional Receptors with Windows Open.

Table 3.9-33. Summary of the Predicted SCIG Train Horn SEL at Nearby Residences and Sleep Disturbance Assessment.

Receptor Number	Receptor Location	Predicted SCIG Train Horn Exterior SEL, dB	Predicted SCIG Train Horn Interior SEL w/ Windows Closed, dB[1]	Approximate Percentage of Exposed Population Expected to be Awakened[2]	Predicted SCIG Train Horn Interior SEL w/ Windows Open, dB[3]	Approximate Percentage of Exposed Population Expected to be Awakened[2]
R1	Residence at 2789 Webster – rear yard	45.1	25.1	0%	33.1	0%
R2	Buddhist Temple at Willow and Webster	47.2	27.2	0%	35.2	0%
R7A	Century Villages at Cabrillo	52.5	32.5	0%	40.5	1%

1) Assumes a 20 dB Exterior to Interior Noise Reduction for Residential and Institutional Receptors with Windows Closed.
2) Based on FICAN 1997 Sleep Disturbance Curve.
3) Assumes a 12 dB Exterior to Interior Noise Reduction for Residential and Institutional Receptors with Windows Open.

Impact NOI-9: Exposure to exterior noise levels from the proposed Project during school hours at schools within the City of Long Beach would not result in interior noise levels of 52 dBA or greater, sufficient for momentary disruption of speech intelligibility in classroom teaching situations (assumed to be at 20 feet).

Construction noise experienced within the classrooms has the potential to interfere with speech intelligibility between the teacher and the student. Table 3.9-34 summarizes the interior construction noise within classrooms and the speech intelligibility between a teacher and student separated by 20 feet. The analysis and assessment considers both a normal and raised voice speech level between a teacher and student. Future interior construction noise would be as high as 38.2, 32.8, 46.1, 44.2, 31.7 and 31.9 dBA at Hudson School, Cabrillo High School, Cabrillo Child Development Center, Bethune School, Stephens Middle School, and Webster School, respectively. When compared with the USEPA curve for speech intelligibility, there would be greater than 95 percent normal voice satisfactory conversation speech intelligibility at all locations. Similarly, there would be greater than 95 percent raised voice satisfactory conversation speech intelligibility at all locations. When the distance between the teacher and student is less than 20 feet, speech intelligibility would be expected to be even greater. As a result, the impact of construction noise on speech intelligibility in classrooms would be considered less than significant.

Table 3.9-34. Summary of the Predicted Daytime Construction Noise within Classrooms and Speech Intelligibility Assessment.

Receiver Number	Location	Description	Ambient Interior Noise Level, L50, dBA	Predicted Future Interior Construction Noise Level with Ambient, L50, dBA[1]	Normal Voice Satisfactory Conversation Speech Intelligibility at 20 feet between Speaker and Listener[2]	Raised Voice Satisfactory Conversation Speech Intelligibility at 20 feet between Speaker and Listener[2]
R3	Hudson School	Classroom 52	36.9	38.2	Greater than 95%	Greater than 95%
R5	Cabrillo High School	Classroom 1128	32.7	32.8	Greater than 95%	Greater than 95%
R6	Cabrillo Child Development Center	#2 Exterior, #4 Interior	43.7	46.1	Greater than 95%	Greater than 95%
R7	Bethune School	Classroom 102	38.8	44.2	Greater than 95%	Greater than 95%
R30	Stephens Middle School	Classroom PC2	31.4	31.7	Greater than 95%	Greater than 95%
R31	Webster School	Classroom B-48	31.9	31.9	Greater than 95%	Greater than 95%

1) Data from Table 3.9-23.
2) Based on FICAN – USEPA Speech Intelligibility Curve, 1974.

The Project's on-site and rail corridor operational noise experienced within the classrooms has the potential to interfere with speech intelligibility between the teacher and the student. Table 3.9-35 summarizes the interior operations noise levels within classrooms and the speech intelligibility between a teacher and student separated by 20 feet. The analysis and assessment considers both a normal and raised voice speech level between a teacher and student. Future interior operations noise levels would be as high as 36.9, 32.7, 43.7, 39.3, 31.4 and 31.9 dBA at Hudson School, Cabrillo High School, Cabrillo Child Development Center, Bethune School, Stephens Middle School, and Webster School, respectively. When compared with the USEPA curve for speech intelligibility, there would be greater than 95 percent normal voice satisfactory conversation speech intelligibility at all locations. Likewise, there would be greater than 95 percent raised voice satisfactory conversation speech intelligibility at all locations. When the distance between the teacher and student is less than 20 feet, speech intelligibility would be expected to be even greater. As a result, the impact of on-site and rail corridor operational noise on speech intelligibility in classrooms would be considered less than significant.

Table 3.9-35. Summary of the Project's Operational Noise within Classrooms and Speech Intelligibility Assessment.

Receiver Number	Location	Description	Ambient Interior Noise Level, dBA	Existing Ambient Plus Project Interior Noise Levels, dBA[1]	Normal Voice Satisfactory Conversation Speech Intelligibility at 20 feet between Speaker and Listener[2]	Raised Voice Satisfactory Conversation Speech Intelligibility at 20 feet between Speaker and Listener[2]
R3	Hudson School	Classroom 52	36.9	36.9	Greater than 95%	Greater than 95%
R5	Cabrillo High School	Classroom 1128	32.7	32.7	Greater than 95%	Greater than 95%
R6	Cabrillo Child Development Center	#2 Exterior, #4 Interior	43.7	43.7	Greater than 95%	Greater than 95%
R7	Bethune School	Classroom 102	38.8	39.3	Greater than 95%	Greater than 95%
R30	Stephens Middle School	Classroom PC2	31.4	31.4	Greater than 95%	Greater than 95%
R31	Webster School	Classroom B-48	31.9	31.9	Greater than 95%	Greater than 95%

Notes:
1) Data from Table 3.9-27.
2) Based on FICAN – USEPA Speech Intelligibility Curve, 1974.
Noise standard for a cumulative period of 5 minutes in a 60 minute period. Higher noise levels are permitted for shorter time periods. If ambient noise level exceeds standard, standard shall be increased to reflect ambient level.
* Includes alternate business locations

Project train horn soundings near the intersection of the Alameda Corridor and Pacific Coast Highway also have the potential to affect speech intelligibility within classrooms. Table 3-9-36 summarizes the interior train horn noise levels within classrooms and the speech intelligibility between a teacher and student separated by 20 feet. The analysis and assessment considers both a normal and raised voice speech level between a teacher and student. Future interior train horn noise levels would be as high as 17.1, 5.4, 23.9, 26.6, 7.3 and 1.5 dB at Hudson School, Cabrillo High School, Cabrillo Child Development Center, Bethune School, Stephens Middle School, and Webster School, respectively. When compared with the USEPA curve for speech intelligibility, there would be greater than 95 percent normal and raised voice satisfactory conversation speech intelligibility at Hudson School, Cabrillo Child Development Center, and Bethune School, respectively. As a result, the impact of the project train horn soundings on speech intelligibility in classrooms would be considered less than significant.

Table 3.9-36. Predicted SCIG Train Horn SEL within Classrooms and Speech Intelligibility Assessment.

Receiver Number	Location	Description	Predicted SCIG Train Horn Exterior Noise Level, dB	Measured Exterior to Interior Noise Reduction, dB	Predicted SCIG Train Horn Interior Noise Level, dB [1]	Normal Voice Satisfactory Conversation Speech Intelligibility at 20 feet between Speaker and Listener [2]	Raised Voice Satisfactory Conversation Speech Intelligibility at 20 feet between Speaker and Listener [2]
R3	Hudson School	Classroom 52	50.1	33	17.1	Greater than 95%	Greater than 95%
R5	Cabrillo High School	Classroom 1128	49.8	44.4	5.4	Greater than 95%	Greater than 95%
R6	Cabrillo Child Development Center	#2 Exterior, #4 Interior	52.5	28.6	23.9	Greater than 95%	Greater than 95%
R7	Bethune School	Classroom 102	52.7	26.1	26.6	Greater than 95%	Greater than 95%
R30	Stephens Middle School	Classroom PC2	45.6	38.3	7.3	Greater than 95%	Greater than 95%
R31	Webster School	Classroom B-48	40.1	38.6	1.5	Greater than 95%	Greater than 95%

1) Assumes a 20 dB Exterior to Interior Noise Reduction for Residential and Institutional Receptors.
2) Based on FICAN – USEPA Speech Intelligibility Curve, 1974.

Impact NOI-10: Construction and operation of the proposed Project would not have a significant noise impact because ambient noise levels would not be increased by three dBA or more; nor would maximum noise levels allowed by the City of Carson be exceeded.

Noise impacts along the Alameda Corridor in the City of Carson have been previously analyzed and accounted for in the Alameda Corridor EIR. The analysis included the Proposed Project by incorporating future growth in train traffic. Truck trips traveling to the Port and leaving the Port at the end of the day have also been accounted for in the background traffic study.

The nearest residential receptor in the City of Carson (R33, at 21843 Salmon Avenue) is located over 7,000 ft from the SCIG site. Because of the distance to the nearest construction areas, barrier effects of intervening topography, and the high ambient background noise, construction noise is expected to be attenuated to ambient levels.

Receptor R33 is located approximately 200 feet east of the Alameda Corridor and directly east of Alameda Street. This location is exposed to substantial noise from train movements, automobile traffic, and heavy truck operations. Considering that the project would generate eight inbound and outbound trains per day, the increase in CNEL from the Project's trains on the Alameda Corridor and at the Salmon Avenue residence (R33) would be less than 1 dB.

Train horn sounding, though infrequent, can produce maximum sound levels as high as 107 dBA at a distance of 100 ft and 90 dBA at a distance of 500 feet. The project would not generate regular train horn soundings, although it is assumed there would be eight daily inbound and outbound trains with approximately 16 train horn soundings associated with the Project per day occurring near the intersection of the Alameda Corridor and Pacific Coast Highway. This location is approximately 11,000 ft south of the Salmon Avenue residence. Train horn soundings from the project are not expected to occur more than once in any one hour period.To the extent it occurs, train horn soundings are estimated to be approximately 63 dBA at the residence at 21843 Salmon Avenue. When compared to the number of existing trains, horn soundings, and ambient background noise, future locomotive horn noise from SCIG train traffic, although still discernible, would not be expected to result in a CNEL increase greater than 3 dB.

Impact Determination

Construction noise would have no impact on the sensitive receptor at 21843 Salmon Avenue in the City of Carson. Train activity would increase ambient noise levels by less than 1 dB, and would therefore have a less than significant impact at the Salmon Avenue residence. Since train horn soundings, if any, would increase noise levels at the Salmon Avenue residence by less than 3 dB, impacts would be less than significant.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

Impact NOI-11: Construction and operation of the proposed Project would not have a significant vibration impact because ground vibration levels for residential structures within the City of Carson would not exceed the acceptability limits prescribed by the FTA. Vibration levels would not exceed 72 VdB for frequent events (70+ vibration events), 75 VdB for occasional events (30-70 events), and/or 80 VdB for infrequent events (30 or fewer events).

Because the Project site is located over 7,000 ft south of the Salmon Avenue residence (R33), daytime and nighttime construction vibration would not be expected to approach ambient levels. A site survey was conducted to determine if there were nonresidential vibration sensitive receptors (microelectronics firms, recording studios, research laboratories, etc. that employ vibration sensitive equipment) in the vicinity of the Project site and rail line. It was determined that no such receptors were present. In addition, the construction haul route would be expected to be primarily on Pacific Coast Highway outside of the City of Carson. Truck vibration would not be expected to exceed existing vibration generated by existing trucks on Pacific Coast Highway; thus, no increase in vibration would be expected.

Project train movements on the Alameda Corridor would pass within approximately 200 feet the Salmon Avenue residence's property boundary. Existing vibration levels range from 53 to 68.8 VdB at this location. Future train vibration would not be expected to exceed existing vibration levels from the Alameda Corridor and Alameda St. Future Project-related train vibration at the Salmon Avenue residence would be less than the FTA criteria of 75 VdB.

Impact Determination

Since construction and project-related train vibration would not exceed ambient levels or the FTA criterion level at the Salmon Avenue residence, impacts would be less than significant.

Mitigation Measures

No mitigation is required.

Residual Impacts

Residual impacts would be less than significant.

Impact NOI-12: Operation of the proposed Project would not result in interior nighttime SELs sufficient to awaken at least 10 percent of their residents assuming windows remain open at residences within the City of Carson, at an average frequency of once in 10 days. The threshold of significance for interior nighttime noise is 80 dBA SEL.

Table 3.9-37 summarizes the predicted Project train horn SEL at the nearby residence and an assessment of sleep disturbance. Based on the FICAN 1997 curve, no residents at 21843 Salmon Avenue would be expected to be awakened by train horn soundings associated with the project. Interior SELs with windows closed from the train horn noise experienced at 21843 Salmon Avenue would be as high as 43.0. When assessed with the FICAN curve, approximately 1 percent of exposed population at the residence would be expected to be awakened due to the highest levels of construction activity. Interior train horn SELs with windows open at 21843 Salmon Avenue would be as high as 51.0. When assessed with the FICAN curve, approximately 2 percent of exposed population at the residence would be expected to be awakened due to the highest levels of construction activity. Single event awakenings would occur at a frequency below 10 percent; thus, the predicted project train horn SEL at nearby residences would be considered less than significant

Impact NOI-13: Exposure to exterior noise levels from the proposed Project during school hours at schools within the City of Carson would not result in interior noise levels of 52 dBA, sufficient for momentary disruption of speech intelligibility in classroom teaching situations (assumed to be at 20 feet).

There are no schools located in the City of Carson within the immediate vicinity of the Project Site, thus impact of SCIG train horns on speech intelligibility in classrooms would be considered less than significant.

Table 3.9-37. Summary of the Predicted SCIG Train Horn SEL at Nearby Carson Residences and Sleep Disturbance Assessment.

Receptor Number	Receptor Location	Predicted SCIG Train Horn Exterior SEL, dB	Predicted SCIG Train Horn Interior SEL w/ Windows Closed, dB [1]	Approximate Percentage of Exposed Population Expected to be Awakened [2]	Predicted SCIG Train Horn Interior SEL w/ Windows Open, dB [3]	Approximate Percentage of Exposed Population Expected to be Awakened [2]
R33	Residence at 21843 Salmon Avenue	63.0	43.0	1%	51.0	2%

1) Assumes a 20 dB Exterior to Interior Noise Reduction for Residential and Institutional Receptors with Windows Closed.
2) Based on FICAN 1997 Sleep Disturbance Curve.
3) Assumes a 12 dB Exterior to Interior Noise Reduction for Residential and Institutional Receptors with Windows Open.

3.9.4.4 Summary of Impact Determinations

Table 3.9-38 provides a summary of the impact determinations of the proposed Project related to Noise, as described in the detailed discussion in Sections 3.9.4.3. This table allows easy comparison of the potential impacts of the proposed Project with respect to land use resources.

For each type of potential impact, the table provides a description of the impact, the impact determination, any applicable mitigation measures, and residual impacts (that is, the impact remaining after mitigation). All impacts, whether significant or not, are included in this table.

Table 3.9-38. Summary Matrix of Impacts and Mitigation Measures for Noise Associated with the Proposed Project.

Environmental Impacts	Impact Determination	Mitigation Measures	Impacts after Mitigation
NOI-1: The proposed Project would not cause noise levels from daytime construction lasting more than 1 day to exceed existing ambient exterior noise levels by 10 dBA or more at a noise sensitive use; or for construction activities lasting more than 10 days in a 3-month period would exceed existing ambient exterior noise levels by 5 dBA or more at a noise sensitive use in the City of Los Angeles.	Less than significant impact.	Mitigation not required.	No residual impact.
NOI-2: Construction activities would not exceed the ambient noise level by 5 dBA at a noise sensitive use in the City of Los Angeles between the hours of 9:00 PM and 7:00 AM Monday through Friday, before 8:00 AM or after 6:00 PM on Saturday, or at any time on Sunday.	Less than significant impact.	Mitigation not required.	No residual impact.
NOI-3: The proposed Project would not have a significant impact on noise levels within the City of Los Angeles because its operation would not cause the ambient noise level measured at the property line of affected uses to increase by 3 dBA in CNEL to or within the 'normally unacceptable' or 'clearly unacceptable category,' or any 5 dBA or greater noise increase.	Less than significant impact.	Mitigation not required.	No residual impact.
NOI-4: Operation of the proposed Project would not result in interior nighttime SELs sufficient to awaken at least 10 percent of their residents assuming windows remain open at residences within the City of Los Angeles, at an average frequency of once in 10 days, The threshold of significance for interior nighttime noise is 80 dBA SEL.	Less than significant impact.	Mitigation not required.	No residual impact.
NOI-5: Exposure to exterior noise levels from the proposed Project during school hours at schools within the City of Los Angeles would not result in interior noise levels of 52 dBA, sufficient for momentary disruption of speech intelligibility in classroom teaching situations (assumed to be at 20 feet).	No impact.	Mitigation not required.	No impact.

Environmental Impacts	Impact Determination	Mitigation Measures	Impacts after Mitigation
NOI-6: Construction and operation of the proposed Project would cause ambient noise levels to be increased by three dBA or more, or maximum noise levels allowed by the Long Beach Municipal Code would be exceeded.	**Significant impact.**	**MM NOI-1**: Construction of a 12-foot high soundwall along the easterly right-of-way of the Terminal Island Freeway. **MM NOI-2**: Various construction noise mitigation measures (described above) **MM NOI-3**: Construction of a 24-ft high sound barrier along the easterly right-of-way of the Terminal Island Freeway north of Sepulveda Blvd, as shown in Figure 3.9-6.	Less than significant for construction and for daytime operations, **significant and unavoidable** for nighttime operations.
NOI-7: Construction and operation of the proposed Project would not have a significant vibration impact on ground vibration levels for residential structures within the City of Long Beach that would exceed the acceptability limits prescribed by the FTA.	Less than significant impact.	Mitigation not required.	Less than significant impact.
NOI-8: Operation and construction of the proposed Project would not result in interior nighttime SELs sufficient to awaken at least 10 percent of their residents assuming windows remain open at residences within the City of Long Beach, at an average frequency of once in 10 days, The threshold of significance for interior nighttime noise is 80 dBA SEL.	Less than significant impact.	Mitigation not required.	Less than significant impact.
NOI-9: Exposure to exterior noise levels from the proposed Project during school hours at schools within the City of Long Beach would not result in interior noise levels of 52 dBA or greater, sufficient for momentary disruption of speech intelligibility in classroom teaching situations (assumed to be at 20 feet).	Less than significant impact.	Mitigation not required.	Less than significant impact.
NOI-10: Construction and operation of the proposed Project would not have a significant noise impact because ambient noise levels would not be increased by three dBA or more; nor would maximum noise levels allowed by the City of Carson be exceeded.	Less than significant impact.	Mitigation not required.	Less than significant impact.

Environmental Impacts	Impact Determination	Mitigation Measures	Impacts after Mitigation
NOI-11: Construction and operation of the proposed Project would not have a significant vibration impact because ground vibration levels for residential structures within the City of Carson would not exceed the acceptability limits prescribed by the FTA.	Less than significant impact.	Mitigation not required.	Less than significant impact.
NOI-12: Operation of the proposed Project would not result in interior nighttime SELs sufficient to awaken at least 10 percent of their residents assuming windows remain open at residences within the City of Carson, at an average frequency of once in 10 days, The threshold of significance for interior nighttime noise is 80 dBA SEL.	Less than significant impact.	Mitigation not required.	Less than significant impact.
NOI-13: Exposure to exterior noise levels from the proposed Project during school hours at schools within the City of Carson would not result in interior noise levels of 52 dBA or greater, sufficient for momentary disruption of speech intelligibility in classroom teaching situations (assumed to be at 20 feet).	No impact.	Mitigation not required.	No impact.

3.9.4.5 Mitigation Monitoring

Table 3.9-39 presents the mitigation monitoring for noise impacts.

Table 3.9-39. Mitigation Monitoring for Noise.

NOI-6: Construction and operation of the proposed Project would cause ambient noise levels to be increased by three dBA or more, or maximum noise levels allowed by the Long Beach Municipal Code would be exceeded.	
Mitigation Measure	**MM NOI-1: Construction of 12-Foot Sound Wall.** Prior to the start of construction of the proposed Project, BNSF shall first construct a permanent 12-foot high soundwall along the easterly right-of-way of the Terminal Island Freeway, from West 20th Street to Sepulveda Boulevard, as shown in Figure 3.9-6, to reduce construction noise. The final height and location of the soundwall shall be verified by an acoustical consultant as part of the final engineering design of the soundwall, prior to construction. Right-of-way acquisition necessary for the soundwall and landscaping shall be the responsibility of BNSF. **MM NOI-2: Construction Noise Measures.** The contractor shall implement the following control measures during construction of the proposed Project: a) Construction Hours. Limit construction to the hours of 7:00 am to 9:00 pm on weekdays, between 8:00 am and 6:00 pm on Saturdays, and prohibit construction equipment noise anytime on Sundays and holidays as prescribed in the City of Los Angeles Noise Ordinance, except where nighttime construction is necessary on the PCH grade separation. For construction activities that occur within the City of Long Beach (e.g. the North Lead Track construction and sound wall construction), limit

NOI-6: Construction and operation of the proposed Project would cause ambient noise levels to be increased by three dBA or more, or maximum noise levels allowed by the Long Beach Municipal Code would be exceeded.	
	construction to the hours of 7:00 am and 7:00 pm on weekdays and between 9:00 am and 6:00 pm on Saturdays, as prescribed in the City of Long Beach Noise Ordinance. b) Construction Days. Do not conduct noise-generating construction activities on weekends or holidays unless critical to a particular activity (e.g., concrete work). c) Temporary Noise Barriers. When construction is occurring within 500 feet of a residence or park, temporary noise barriers (solid fences or curtains) shall be located between noise-generating construction activities and sensitive receptors unless and until the soundwall provided in MM NOI-1 has been built or the construction noise management plan (see (l) below) demonstrates that temporary barriers are not necessary. d) Construction Equipment. Properly muffle and maintain all construction equipment powered by internal combustion engines. e) Idling Prohibitions. Prohibit unnecessary idling of internal combustion engines near noise sensitive areas. f) Equipment Location. Locate all stationary noise-generating construction equipment, such as air compressors and portable power generators, as far as is practical from existing noise sensitive land uses. g) Quiet Equipment Selection. Select quiet construction equipment whenever possible. h) Notification. Notify residents near the proposed Project site of the construction schedule in writing (in both English and Spanish). i) Portable Generators. Avoid the use of portable generators if electricity can be obtained from the local power grid. j) Noise Complaints. Assign a construction liaison to respond to noise complaints. Post contact information at the construction site. k) Pile Driving Hours. Restrict pile driving to the hours between 9 AM and 5 PM, Monday through Friday, and from 10 AM to 4 PM on Saturdays. l) A Construction Noise Monitoring and Management Plan for the SCIG facility will be required prior to the commencement. The plan should evaluate each piece of construction equipment and the need for administrative and engineering noise control for each type of construction equipment. A noise monitoring plan should be prepared to document construction noise levels during the process. **MM NOI-3: Construction of 24-Foot Sound Wall.** Prior to the start of construction of the proposed Project, BNSF shall first construct or cause to be constructed a 24-ft high sound barrier as an extension to the existing 24-ft high sound barrier along the easterly right-of-way of the Terminal Island Freeway north of Sepulveda Blvd, as shown in Figure 3.9-6. The barrier would close the present gap between the existing barrier and a warehouse to the south, removing line-of-sight from the Project site to receiver R1 (the residence at 2789 Webster) and receiver R30 (Stephens Middle School). The final height and location of the soundwall shall be verified by an acoustical consultant as part of the final engineering design of the proposed Project, prior to construction. Right-of-way acquisition necessary for the soundwall and landscaping shall be the responsibility of BNSF.
Timing	During construction.
Methodology	BNSF will perform MM NOI-1 and NOI-3 and will include MM NOI-2 in the contract specifications for construction. LAHD will monitor implementation of all three mitigation measures during construction.
Responsible Parties	BNSF construction contractor(s) for SCIG and construction contractor(s) for Tenants on alternate sites will be responsible for implementing the mitigation measures in the contract specifications reviewed and approved by LAHD Environmental Management Division.
Residual Impacts	Significant after mitigation for nighttime operational noise.

3.9.5 Significant Unavoidable Impacts

Significant unavoidable impacts related to Noise would occur under Impact NOI-6 as a result of Project operation during nighttime.