3.5 Noise and Vibration

This section describes effects related to noise and vibration from implementation of the proposed Project. The section describes existing environmental conditions in the affected area, identifies and analyzes environmental impacts, and recommends measures to reduce or avoid adverse impacts from the construction, operation, and maintenance of the Project. Existing laws and regulations relevant to noise and vibration are described and how they would be applied to the proposed Project. In some cases, compliance with existing laws and regulations would reduce or avoid impacts that might otherwise occur with implementation of the Project.

During the scoping period for the EIR (February 26 through March 27, 2015), written comments were received from agencies, organizations, and the public. These comments identified various substantive issues and concerns relevant to the EIR analysis. The following substantive issues related to noise and vibration were raised during scoping and are addressed in this section.

- Analysis should include construction vibration impacts on nearby structures.

3.5.1 Environmental Setting

Noise is defined as any unwanted sound that is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying (Ventura County, 2011). Because the effects of noise accumulate over time, it is necessary to address both the intensity and duration of sound. As such, the thresholds of significance for noise take both of these elements into account.

General Information on Noise

A brief background on the fundamentals of environmental acoustics is helpful in understanding how humans perceive various sound levels. Although extremely loud noises can cause temporary or permanent damage, the primary environmental impact of noise is annoyance. The objectionable characteristic of noise often refers to its loudness. Loudness represents the intensity of the sound wave, or the amplitude of the sound wave height measured in decibels (dB). Decibels are calculated on a logarithmic scale; thus, a 10-dB increase represents a 10-fold increase in acoustic energy or intensity, while a 20-dB increase represents a 100-fold increase in intensity. Decibels are the preferred measurement of environmental sound because of the direct relationship between a sound's intensity and the subjective "noisiness" of it. The A-weighted decibel system (dBA) is a convenient sound measurement technique that weights selected frequencies based on how well humans can perceive them.

Noise Effects on Humans. The range of human hearing spans from the minimal threshold of hearing (approximately 3 dBA) to that level of noise that is past the threshold of pain (approximately 120 dBA). In general, human sound perception is such that a change in sound level of 3 dB is just noticeable, while a change of 5 dB is clearly noticeable. A change of 10 dB is perceived as a doubling (or halving) of sound level. Noise levels are generally considered low when they are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Noise levels greater than 85 dBA can cause temporary or permanent hearing loss if exposure is sustained. Figure 3.5-1 illustrates typical noise levels for common sounds.

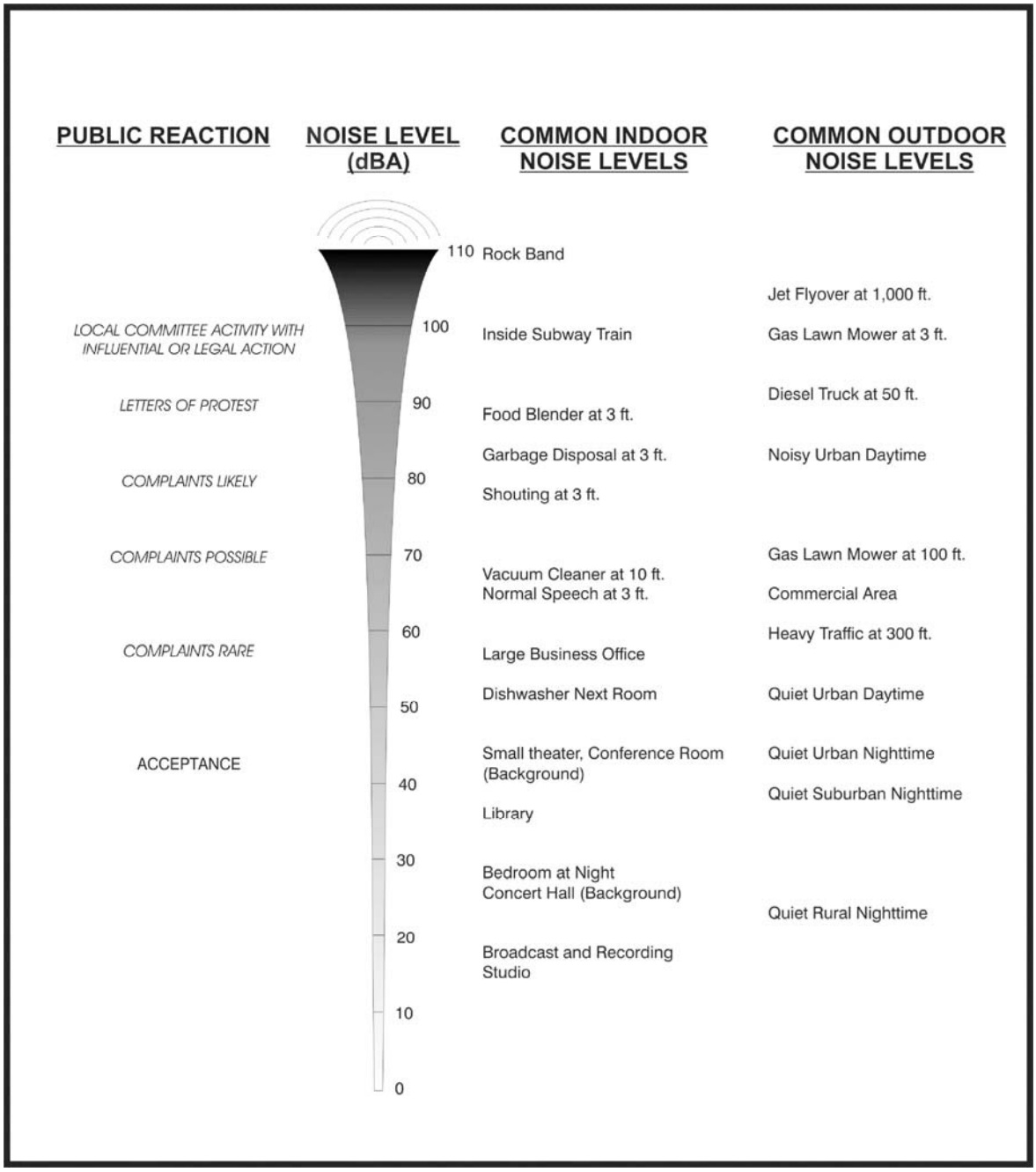

Figure 3.5-1. Noise Levels of Common Sounds

Source: Derived from USEPA, 1974 and 1978.

Ambient environmental noise levels can be characterized by several different descriptors. Energy Equivalent or Energy Average Level (Leq) describes the average or mean noise level over a specified period of time. Leq provides a useful measure of the impact of fluctuating noise levels on sensitive receptors over a period of time. Other descriptors of noise incorporate a weighting system that accounts for human's susceptibility to noise irritations at night. Community Noise Equivalent Level (CNEL) is a measure of cumulative noise exposure over a 24-hour period, where a five (5) dB penalty is

added to evening hours (7:00 p.m. to 10:00 p.m.) and a 10 dB penalty is added to night hours (10:00 p.m. to 7:00 a.m.). Day/Night Average Noise Level (Ldn) is essentially the same as CNEL, with the exception that the evening penalty is dropped.

Noise Propagation. In air, sound from a point source radiates according to inverse square laws either spherically or hemispherically from the source, depending upon whether the noise source is near a reflecting surface such as the ground. Consequently, sound will decrease at a rate of 6 dB per doubling of distance from a point source. Additional decreases will occur due to sound absorption in the air, interaction with the ground, and shielding by intervening obstacles. A noise source which is relatively long, such as a constant stream of traffic, is called a line source, and the sound spreads cylindrically, at a rate of 3 dB per doubling of distance.

General Information on Vibration

Vibration from objects in contact with the ground will propagate energy through the ground and can be perceptible by humans and animals in the form of perceptible movement or in the form of rumbling sound caused by the vibration of room surfaces. The latter is described as ground-borne noise. High levels of vibration can result in architectural damage and structural damage depending upon the amplitude of the vibration and the fragileness of the building or structure.

Vibration is an oscillatory motion through a solid medium, in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. When assessing damage potential, vibration is often measured and reported in terms of peak particle velocity (PPV). For evaluating human response, the accepted manner to measure and report vibration is in terms of the root mean square (RMS) amplitude. Like noise, vibration is normally expressed in terms of decibels (VdB) with a reference velocity of $1x10^{-6}$ inches per second (ref 1 micro-inch/second).

3.5.1.1 Existing Conditions

The dominant noise sources in the proposed project area are street traffic, specifically along the major roadways in the area, including Highway 101, N. Ventura Road, and Victoria Avenue, as well as general residential noises, such as dogs barking and household maintenance activities. Additionally, periodic increases in noise levels occur from occasional aircraft over-flights and when trains (Amtrak and Metrolink) pass along the UPRR railroad bridge paralleling Highway 101 in the eastern portion of the project area (Reach 4 abuts the UPRR bridge).

To quantify the existing noise conditions of the Project area, 24-hour noise measurements were taken starting on Thursday March 13, 2015, and ending on Friday March 14, 2015, using a Type 1 environmental noise monitor (Larson Davis Model 870) at two locations along the Project alignment. Figure 3.5-2 provides the locations where sound measurements were taken.

Table 3.5-1 provides the recorded ambient noise conditions in the Project area. As demonstrated in Table 3.5-1, the existing average ambient noise levels in the Project area range between 54 and 72 dBA Leq(1-hr), with a Ldn/CNEL between 67 and 71 dBA.

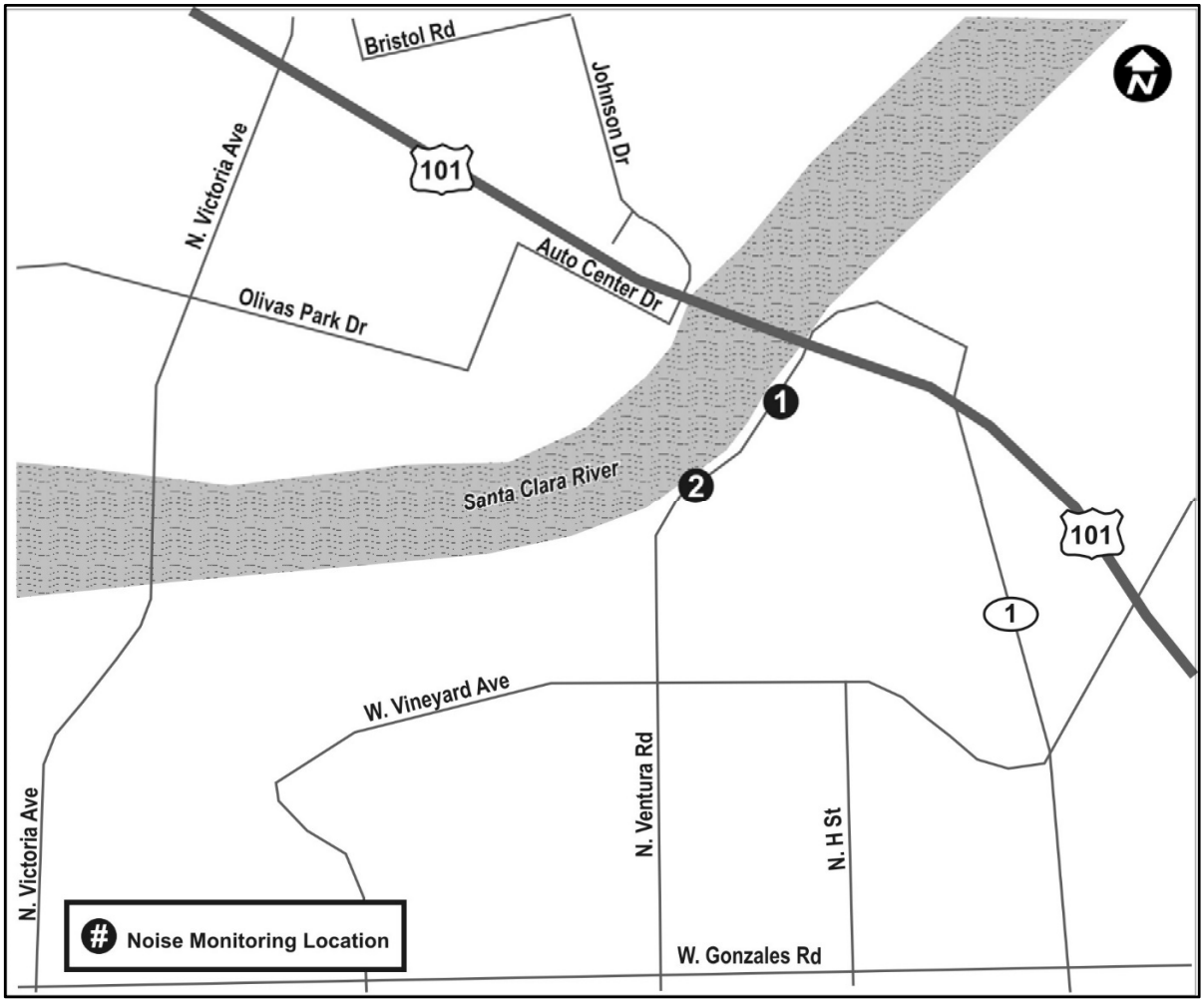

Figure 3.5-2. Sound Measurement Locations

In addition to the recorded noise measurements, the major sources of noise (surface traffic) were incorporated into a computer-aided noise model in order to show typical daytime noise contours. The model included the observed conditions, terrain elevations, locations of buildings and walls, and traffic data published by the County of Ventura (Ventura County, 2015). Traffic on S. Victoria Avenue was modeled at 38,700 vehicles per day with trucks at ten percent of the volume. Traffic on N. Ventura Road was modeled at 11,000 vehicles per day also with trucks at ten percent of the volume. Figure 3.5-3, Ambient Noise Contours along Reaches 1-3, shows the resulting noise contours due to traffic along S. Victoria Avenue and N. Ventura Road. Figure 3.5-4, Ambient Noise Contours along Reach 4, shows the resulting noise contours due to traffic on N. Ventura Road with influences from Highway 101 and the UPRR. The model was calibrated to produce the quietest daytime hour using the field measurements. Backyard locations adjacent to the measurement locations were also modeled. The results show that noise levels in the backyards near Location 1 are approximately 3 dB less (56 dBA) and the backyards near Location 2 were over 6 dB less (62 dBA). These differences are the result of shielding from traffic noise by property walls.

Table 3.5-1. Ambient Noise Levels Representative of the Project Area		
Time [1]	Hourly Leq (1-hr), dBA	
	Location 1: NW corner of Subdivision, east of N. Ventura Rd. 140 ft from center of Ventura Rd. and 1,180 ft from center of Highway 101 [2]	Location 2: SW corner of Subdivision, east of N. Ventura Rd. 73 ft from center of Ventura Rd. and 2,660 ft from center of Highway 101 [2]
15:00	60	68
16:00	60	68
17:00	58	68
18:00	60	68
19:00	59	67
20:00	66	66
21:00	57	65
22:00	54	65
23:00	56	60
0:00	57	59
1:00	57	57
2:00	59	55
3:00	61	57
4:00	65	61
5:00	64	66
6:00	61	69
7:00	59	72
8:00	58	69
9:00	60	66
10:00	58	67
11:00	57	66
12:00	60	68
13:00	58	67
14:00	61	67
15:00	61	68
16:00	---	69
Ldn	67	71
CNEL	67	71
Daytime Lmax	87	99
Average Daytime Leq(h)	59	68

Source: Acentech, 2015 – Table 9 (EIR Appendix D).

Notes: Lmax = Instantaneous maximum noise level; Leq(h) = Average or mean noise level over a period of time (1-hour).

(1) Daytime hours are shaded (Ventura County, 2015).

(2) Backyards are shielded by a six foot block wall.

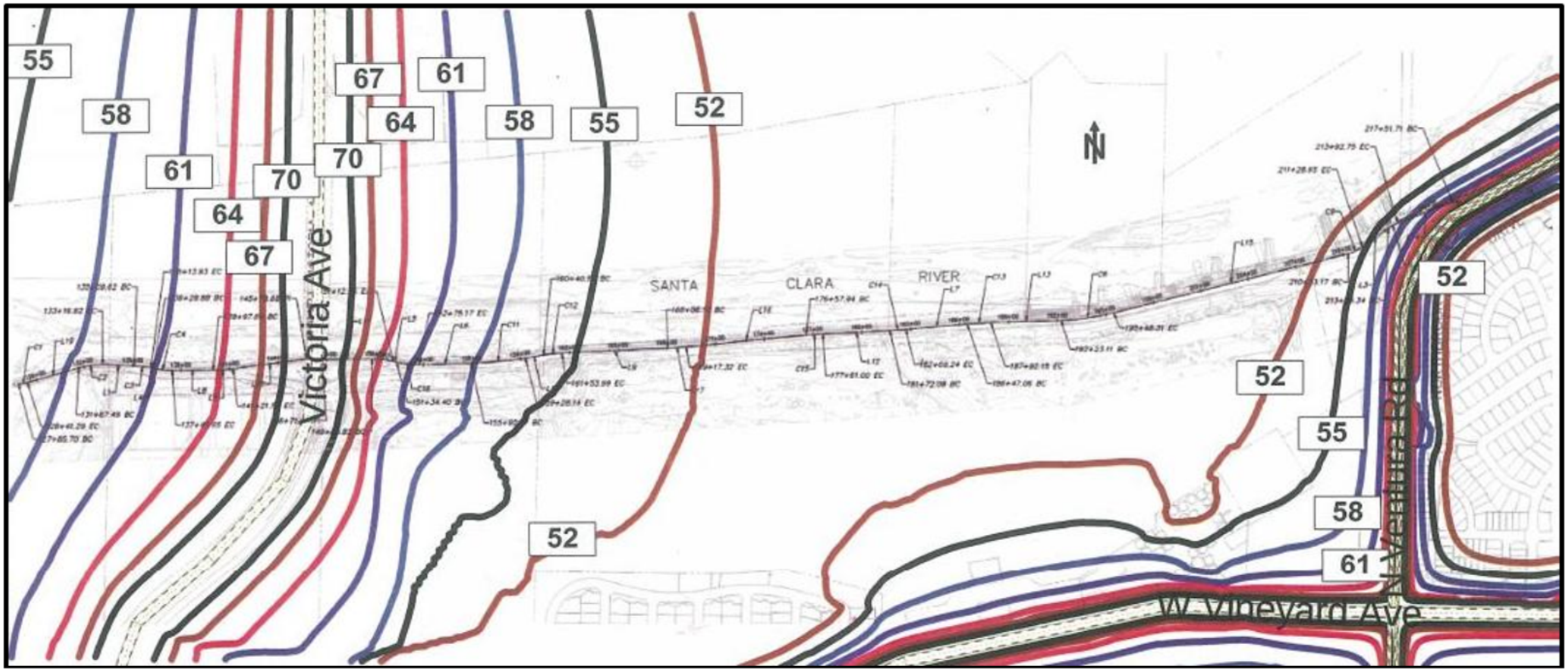

Figure 3.5-3. Ambient Noise Contours Along Reaches 1-3, Leq (1-hr)

Source: Acentech, 2015 – Figure 6 (EIR Appendix D).

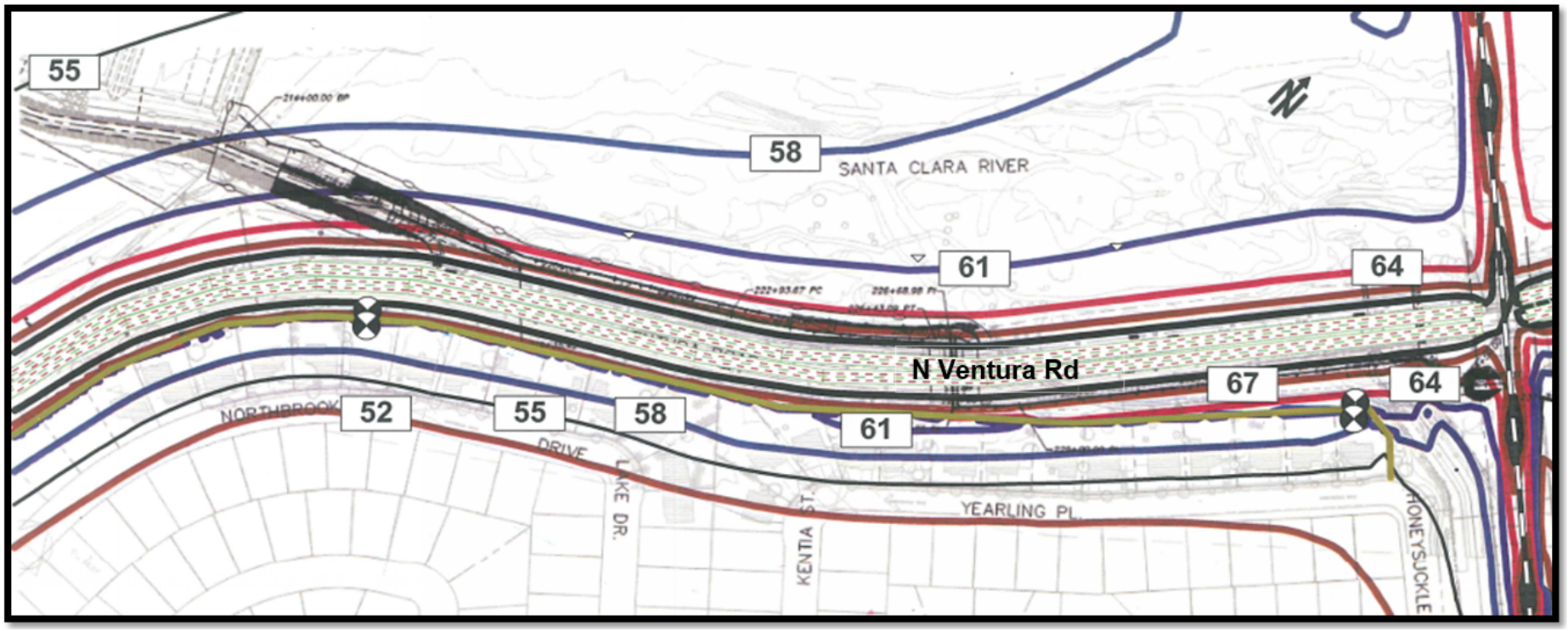

Figure 3.5-4. Ambient Noise Contours Along Reach 4, Leq (1-hr)

Source: Acentech, 2015 – Figure 7 (EIR Appendix D).

Sensitive Receptors

According to the *Ventura County General Plan* (Section 2.16 – Noise), land uses considered to be noise sensitive include residential, educational and health facilities, research institutions, certain recreational and entertainment facilities (typically, indoor theaters and parks for passive activities), and churches (Ventura County, 2015). However, it is stated in the *General Plan* (Section 2.16.2) that construction noise shall be evaluated in accordance with the County's *Construction Noise Threshold Criteria and Control Plan* (Ventura County, 2010).

Per the County's *Construction Noise Threshold Criteria and Control Plan*, noise-sensitive receptors and their periods of greatest sensitivity to construction noise are presented in Table 3.5-2. As such, noise-sensitive receptors in the Project area would include residential homes along the SCR-3 alignment (City of Oxnard), as well as the Residence Inn Oxnard River Ridge (2101 West Vineyard Avenue, Oxnard), if construction is occurring outside of daytime hours (7:00 a.m. to 7:00 p.m. Monday through Friday, and 9:00 a.m. to 7:00 p.m. Saturday, Sunday, and local holidays); and the local schools and churches, when in use, including Rio del Norte Elementary School (2500 Lobelia Drive, Oxnard), National University (1000 Town Center Drive, Suite 125, Oxnard), and the Church of Jesus Christ of Latter-Day Saints (6085 King Drive, Ventura). There are no hospitals or nursing homes near the Project work limits.

Table 3.5-2. Noise-Sensitive Receptors

Receptor Description	Typical Sensitive Time Period
Hospitals, Nursing Homes (quasi-residential)	24 hours
Single-Family and Multi-Family Dwellings (residential)	Evening/Night
Hotels/Motels (quasi-residential)	Evening/Night
Schools, Churches, Libraries (when in use)	Daytime/Evening

Source: Ventura County, 2010 – Figure 3.

3.5.1.2 Applicable Regulations, Plans, and Standards

Federal

Although no federal noise regulations exist, the USEPA has promulgated noise guidelines (USEPA, 1974). The USEPA guidelines recommend a noise level of 55 dBA CNEL to protect the public from the effect of broadband environmental noise outdoors in residential areas and farms, and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use (USEPA, 1974). Administrators of the USEPA determined in 1981 that subjective issues, such as noise, would be better addressed at lower levels of government. Consequently, in 1982, responsibilities for regulating noise control policies were transferred from the federal government to state and local governments. Noise control guidelines and regulations contained in rulings by the USEPA in prior years remain valid, but more individualized control for specific issues is allowed by designated state and local government agencies.

Under the Occupational Safety and Health Act of 1970 (29 U.S.C. §651 et seq.), the United States Department of Labor, OSHA adopted regulations (29 CFR §1910.95) designed to protect workers against the effects of occupational noise exposure. A noise exposure limit of 90 dBA over an eight-hour work period has been established (OSHA, 1970). Areas above 85 dBA need to be posted as high noise level areas and hearing protection is required (OSHA, 1970). Cal-OSHA administers these regulations in California.

State

There are no State regulations that would place environmental noise limits on the proposed project; however, there have been legislation and publications that would relate to the environmental analysis. The State has established guidelines for the development of noise elements in city and county General Plans, as discussed below. (OPR, 2003)

The State General Plan Guidelines includes the noise element guidelines, which provide a basis for comprehensive local programs to control and abate environmental noise and to protect citizens from excessive exposure. The adopted noise element is administered by the local government and serves as a guideline for compliance with the State's noise insulation standards.

The State of California Noise Insulation Standards sets a CNEL of 45 dBA in any habitable room, including multiple-family, single family and hotel and motel rooms (California, 1974).

The California Department of Transportation (Caltrans) has established guidance for assessing impacts due to architectural or structural damage from ground vibration. Caltrans has also synthesized criteria relating to human perception. Some individuals may be annoyed at barely perceptible levels of vibration, depending on the activities in which they are participating. Table 3.5-3 and Table 3.5-4 provide a summary of the Caltrans guidance.

Table 3.5-3. Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (inches/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.10
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.30
New residential structures	1.0	0.50
Modern industrial/commercial buildings	2.0	0.50

Source: Caltrans, 2004 – Table 19.

Note(s): Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Table 3.5-4. Guideline Vibration Annoyance Potential Criteria

Human Response	Maximum PPV (inches/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.40

Source: Caltrans, 2004 – Table 20.

Note(s): Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Local

Below are the *Ventura County General Plan Goals, Policies and Programs* (General Plan) goals and policies related to noise and vibration (Ventura County, 2015). Land uses considered to be noise sensitive include residential, educational, and health facilities, research institutions, certain recreational and entertainment facilities (typically, indoor theaters and parks for passive activities), and churches. Uses considered less sensitive to noise include commercial and industrial facilities and certain noise-generating recreational facilities, such as playgrounds and gymnasiums (Ventura County, 2015).

Goals

2.16.1 To protect the health, safety, and general welfare of County residents by elimination or avoidance of adverse noise impacts on existing and future noise-sensitive uses.

Policies

2.16.2-1 All discretionary development shall be reviewed for noise compatibility with surrounding uses. Noise compatibility shall be determined from a consistent set of criteria based on the standards listed below. An acoustical analysis by a qualified acoustical engineer shall be required of discretionary developments involving noise exposure or noise generation in excess of the established standards. The analysis shall provide documentation of existing and projected noise levels at on-site and off-site receptors, and shall recommend noise control measures for mitigating adverse impacts.

(4) Noise generators, proposed to be located near any noise-sensitive use, shall incorporate noise control measures so that ongoing outdoor noise levels received by the noise-sensitive receptor, measured at the exterior wall of the building, does not exceed any of the following standards:

a. Leq 1H of 55dB(A) or ambient noise level plus 3dB(A), whichever is greater, during any hour from 6:00 a.m. to 7:00 p.m.

b. Leq 1H of 50dB(A) or ambient noise level plus 3dB(A), whichever is greater, during any hour from 7:00 p.m. to 10:00 p.m.

c. Leq 1H of 45dB(A) or ambient noise level plus 3dB(A), whichever is greater, during any hour from 10:00 p.m. to 6:00 a.m.

Section 2.16.2(4) is not applicable to increased traffic noise along any of the roads identified within the 2020 Regional Roadway Network Public Facilities Appendix of the Ventura County General Plan. In addition, State and Federal highways, all railroad line operations, aircraft in flight, and public utility facilities are noise generators having Federal and State regulations that preempt local regulations.

(5) Construction noise shall be evaluated and, if necessary, mitigated in accordance with the County Construction Noise Threshold Criteria and Control Plan.

2.16.2-2 Discretionary development which would be impacted by noise, or generate project-related noise which cannot be reduced to meet the standards prescribed in Policy 2.16.2-1, shall be prohibited. This policy does not apply to noise generated during the construction phase of a project.

2.16.2-3 The priorities for noise control shall be as follows:

(1) Reduction of noise emissions at the source.

(2) Attenuation of sound transmission along its path, using barriers, landforms modification, dense plantings, and the like.

(3) Rejection of noise at the reception point via noise control building construction, hearing protection, or other means.

The *Ventura County Construction Noise Threshold Criteria and Control Plan* sets forth noise threshold criteria (NTC), which applies only to those noise-sensitive receptors that are sensitive to noise impacts during specified hours, as designated in Table 3.5-2, above. The NTC specified in the *Ventura County Construction Noise Threshold Criteria and Control Plan* are as follows (Ventura County, 2010):

Normally, no evening or nighttime construction activity is permitted in areas having noise-sensitive receptors. However, in the event such activity is deemed necessary and is permitted, reduced noise threshold criteria are provided for construction that must occur during evening and/or nighttime hours. Emergency construction work is exempt from these construction noise thresholds.

Daytime Construction - Daytime (7:00 a.m. to 7:00 p.m. Monday through Friday, and from 9:00 a.m. to 7:00 p.m. Saturday, Sunday and local holidays) generally means any time period not specifically defined as a more noise-sensitive time period. The daytime construction noise threshold criteria are given in Table [3.5-5]. Depending on project duration, the daytime noise threshold criteria shall be the greater of the fixed Leq(h) limit (which includes non-construction evening and nighttime noise) or the measured ambient Leq(h) plus 3 dB.

Table 3.5-5. Daytime Construction Activity Noise Threshold Criteria

Construction Duration	Fixed Leq(h), dBA	Hourly Equivalent, dBA
0 to 3 days	75	Ambient Leq(h) + 3 dB
4 to 7 days	70	
1 to 2 weeks	65	
2 to 8 weeks	60	
Longer than 8 weeks	55	

Source: Ventura County, 2010 – Figure 4.

Notes:

(1) The instantaneous Lmax shall not exceed the NTC by 20 dBA more than eight times per daytime hour.

(2) Local ambient Leq measurements shall be made on any mid-week day prior to project work.

Evening Construction – Evening hours (7:00 p.m. to 10:00 p.m.) are more noise-sensitive time periods. Therefore, evening construction noise threshold criteria differ from the daytime criteria. Overall project construction noise, for the noise-sensitive hours specified, shall not exceed the noise threshold criteria listed in Table [3.5-6], at the nearest noise-sensitive receptor area or 10 feet from the façade of the nearest noise-sensitive building.

Table 3.5-6. Evening Construction Activity Noise Threshold Criteria

Receptor Location	Fixed Leq(h), dBA	Hourly Equivalent, dBA
Residential	50	Ambient Leq(h) + 3 dB

Source: Ventura County, 2010 – Figure 5.

Notes:

(1) The instantaneous Lmax shall not exceed the NTC by 20 dBA more than six times per evening hour.

(2) Hourly evening local ambient noise measurements shall be made on a typical mid-week evening prior to project work.

Nighttime Construction – Nighttime hours (10:00 p.m. to 7:00 a.m. Monday through Friday, and from 10:00 p.m. to 9:00 a.m. Saturday, Sunday and local holidays) are the most noise-sensitive time periods. Therefore, nighttime and holiday construction noise threshold criteria differ from

the daytime and evening criteria. Overall project construction noise, for the noise-sensitive hours specified, shall not exceed the noise threshold criteria listed in Table [3.5-7], at the nearest noise-sensitive receptor area or 10 feet from the façade of the nearest noise-sensitive building.

Table 3.5-7. Nighttime Construction Activity Noise Threshold Criteria		
Receptor Location	Fixed Leq(h), dBA	Hourly Equivalent, dBA
Residential, Live-in Institutional	45	Ambient Leq(h) + 3 dB

Source: Ventura County, 2010 – Figure 6.

Notes:

(1) The instantaneous Lmax shall not exceed the NTC by 20 dBA more than four times per nighttime hour.

(2) Hourly nighttime local ambient noise measurements shall be made on a typical mid-week night prior to project work.

Maximum Construction Noise – In addition, the construction-related, slow response, instantaneous maximum noise (Lmax) shall not exceed the noise threshold criteria by 20 dBA more than eight times per daytime hour, more than six times per evening hour and more than four times per nighttime hour.

The County references vibration criteria used by the Federal Transit Administration (FTA) to assess potentially significant impact from construction vibration (Ventura County, 2011), as shown in Tables 3.5-8 and 3.5-9.

Table 3.5-8. Construction Vibration Damage Criteria		
Building Category	PPV (inches/sec)	Approximate Lv [1]
I. Reinforced-concrete, steel or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

Source: FTA, 2006 – Table 12-3.

Notes:

(1) RMS velocity in decibels (VdB), with reference vibration level (ref) of 1 micro-inch/second

Table 3.5-9. Construction Ground-Borne Vibration (GBV) Annoyance Criteria			
Land Use Category	GBV Impact Levels (VdB ref 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	65 VdB	65 VdB
Category 2: Residences and buildings where people normally sleep, such as hotels and hospitals.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Source: FTA, 2006 – Table 8-1.

Notes:

(1) "Frequent Events" is defined as more than 70 vibration events of the same source per day.

(2) "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day

(3) "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day.

3.5.2 Environmental Impacts and Mitigation Measures

The analysis provided herein is based on the Noise and Vibration Alternative Analysis for the SCR-3 Project completed by Acentech Incorporated (Acentech), which is provided as Appendix D of this EIR.

3.5.2.1 Criteria for Determining Impact Significance

Noise

The *Ventura County Construction Noise Threshold Criteria and Control Plan* would apply for construction during daytime hours. According to this plan, "daytime hours" are defined as 7:00 a.m. to 7:00 p.m., Monday through Friday, and 9:00 a.m. to 7:00 p.m., Saturday, Sunday and local holidays. Since construction would last longer than eight (8) weeks, and would occur only during daytime hours (7:00 a.m. to 7:00 p.m.), the following significance criteria for construction impacts have been used for sensitive noise receptors, which would be limited to residences, hospitals, nursing homes, schools, churches, and libraries (when in use):

- Leq(1-hr) of 55 dBA for construction or the measured ambient Leq(1-hr) plus 3 dB.

  The modeling results will be used to establish the ambient Leq(h). Residential areas above 52 dBA would have a criterion of ambient Leq(h) plus 3 dB and other areas would have a Leq(h) criterion of 55 dBA.

  Based upon measured ambient Leq(h) presented in Table 3.5-1 and the results of the modeling for the back yards, the ambient noise level is 56 dBA for the first four residential backyards nearest UPRR, which are further away from N. Ventura Road. For the other residential backyards along N. Ventura Road where the road is not depressed and is closer to the backyards, the ambient noise level is 62 dBA. Based upon the modeling results, residential areas that are above 52 dBA would have a criterion of ambient Leq(h) plus 3 dB. The criterion for residential backyards further from N. Ventura Road would be 55 dBA.
- Instantaneous maximum levels (Lmax) of 75 dBA or the measured ambient Leq(1-hr) plus 20 dB during construction (no more than eight times per daytime hour).

  Based upon measured ambient Leq(h) presented in Table 3.5-1, the Lmax criterion for areas where the ambient Leq(h) is above 55 dBA is the modeled results plus 20 dBA.

Based on the Ventura County General Plan (Ventura County, 2015), the significance criteria for operational noise impacts will be as follows:

- Leq(1-hr) of 55 dBA or ambient noise level plus 3 dBA, whichever is greater, during any hour from 6:00 a.m. to 7:00 p.m.

  Based upon the ambient Leq(h) presented in Table 3.5-1, the criteria is ambient noise level plus 3 dBA for all noise-sensitive areas adjacent to Reaches 1 – 4 (maintenance between the hours of 7:00 p.m. and 6:00 a.m. is not anticipated).

Vibration

As noted above, the County references vibration criteria used by the FTA in its *Transit Noise and Vibration Impact Assessment* (FTA, 2006) to assess potentially significant impact from construction vibration (Ventura County, 2011).

- Maximum PPV vibration levels of 0.2 inches/sec for structural damage to non-engineered timber and masonry buildings (see Table 3.5-8).

- RMS vibration levels of 72 VdB for annoyance in residences and buildings where people sleep, such as hotels and hospitals (see Table 3.5-9). [Referred to as "nighttime" threshold for vibration]
- RMS vibration levels of 75 VdB for annoyance in institutional land uses (see Table 3.5-9).[Referred to as "daytime" threshold for vibration]

The same vibration criteria have been used for operational impacts.

3.5.2.2 Direct and Indirect Impacts

The proposed Project involves the construction/modification and maintenance of the existing SCR-3 levee downstream of UPRR adjacent to the City of Oxnard, California. Construction of the proposed Project is anticipated to occur over a 27-month period, beginning in 2016. Construction would occur sequentially, starting within Reaches 1-3 (Phase 1) followed by Reach 4 (Phase 2), as funding is secured, with concurrent work occurring as necessary to meet schedule demands. Construction activities would occur between 7:00 a.m. and 7:00 p.m., Monday through Friday. No construction is expected on weekends or holidays. The vehicles and equipment expected to be utilized during construction are specified in Project Description Tables 2-4 and 2-5 for Reaches 1-3 and Reach 4, respectively.

Construction Noise

Impact NV-1: Project construction could result in noise levels that would disturb sensitive noise receptors, particularly near Reach 4.

Option 1B – Minimum Levee System (Preferred) with Reach 4 Floodwall

Construction noise levels would vary from hour-to-hour and day-to-day, depending on the equipment in use and the operations being performed. Grading, excavation, and construction activities related to the proposed Project would increase the ambient noise levels in the Project area on an intermittent basis. Maximum noise levels (Lmax) for each piece of construction equipment listed in Project Description Tables 2-6 and 2-7 were estimated based upon the "actual measured" noise emissions and acoustical use factors published by the U.S. Department of Transportation Federal Highway Administration Office of Environment and Planning (DOT, 2006) (See EIR Appendix D – Noise and Vibration Alternative Analysis, Appendix B). The Leq(h) was calculated assuming that all equipment listed for each task were in operation, as shown in Tables 3.5-10 and 3.5-11. Propagation assumes a reduction of 6 dB for each doubling of distance. A 5-dB decrease was taken for the shielding provided by the 6-foot-tall property walls located along the residential properties adjacent to N. Ventura Road.

Table 3.5-10. Typical Noise Levels of Construction Equipment by Task – Reaches 1-3 Option 1B

Task No.	Description	Leq(1-hr) @ 50 feet
1	Mobilization	73
2	Clearing and Grubbing	87
3	Demolition & Removals	76
4	Diversion and Control of Water	79
5	Traffic Control	70
6	Foundation Excavation	86
7	Levee Embankment Fill	84
8	Landfill Tie-In	82
9	Riprap (1/4-Ton)	81
10	Golf Course Fill	83

Table 3.5-10. Typical Noise Levels of Construction Equipment by Task – Reaches 1-3 Option 1B

Task No.	Description	Leq(1-hr) @ 50 feet
11	66-inch RC Pipe	81
12	Flap Gates	79
13	Slide Gates	79
14	Concrete Headwall	85
15	CMB Access Road	83
16	Chain Link Fence	78
17	Chain Link Gate	80
18	Hydroseeding	72
19	Vegetation Thinning	84

Source: Acentech, 2015 – EIR Appendix D, Appendix B.

Table 3.5-11. Typical Noise Levels of Construction Equipment by Task – Reach 4

Task No.	Description	Leq(1-hr) @ 50 feet
1	Mobilization	73
2	Clearing and Grubbing	86
3	Demolition & Removals	75
4	Diversion and Control of Water	81
5	Traffic Control	67
6	Floodwall Foundation Excavation	80
7	Riverside Floodwall	87
8	Landside Floodwall	86
9	Sheet Pile Wall and Scour Protection	80
10	UPRR Embankment Fill	81
11	El Rio Drain Channel Modification	80
12	Riprap Removal & Replacement	81
13	Chain Link Fence	78
14	Chain Link Gate	80
15	RC Drain Channel & Flap Gate	79
16	HP Gas Valve Relocations	75
17	Landscaping	75
18	Concrete Trail	80
19	CMB Access Road	83
20	Soil Cement Access Road	84
21	Flood Break Gate System	
21a	Utility Relocations	75
21b	Concrete Abutments	81
21c	Flood Break Gate Installation	75
21d	Street Modifications	83

Source: Acentech, 2015 – EIR Appendix D, Appendix C.

Based on the accelerated 20-month construction schedule presented in Project Description Table 2-4 (Reaches 1-3, Option 1B) and Table 2-5 (Reach 4), which maximizes the potential for overlapping activities that would result in greater noise levels for the purpose of preparing a more conservative

analysis, the total noise levels during each week of construction assuming overlapping tasks are co-located on the construction site were calculated.

Within Reaches 1-3 for Option 1B, the highest noise levels were found to occur during Month 2 (week 6), when clearing and grubbing (Task 2), demolition and removals (Task 3), diversion and control of water (Task 4), and traffic control (Task 5) activities would be occurring; however, these activities would not necessarily be co-located but instead spread out along Reaches 1-3. As such, Month 4 (weeks 15-16), when levee embankment fill (Task 7), golf course fill (Task 10), and installation of the 66-inch reinforced concrete pipe (Task 11) activities would occur in close proximity to each other and near the eastern end of Reach 3 near a residential area, was selected for modeling. The resulting noise level was calculated to be 88 dBA Leq (1-hr) at 50 feet (see EIR Appendix D, Table 11). The calculated Leq (1-hr) noise contours (lines of equal sound level) from the noisiest week(s) of construction were calculated using CadnaA, a state-of-the-art computer noise model. Location of housing and terrain were also included into the modeling. Existing sources of noise, such as industrial equipment, are not included in the model. The model considered the spatial locations and sizes of noise sources, the elevation of sources and the surrounding topography, noise reduction resulting from obstructions such as buildings and walls, and ground and air absorption. Figure 3.5-5 shows the noise contours within Reaches 1-3 for Month 4 (weeks 15-16), when noise levels are anticipated to be the greatest. The noise contours from the levee embankment fill on the eastern end of the Project alignment would be representative of all areas where this activity would occur for both Option 1B and Option 1A (discussed below).

The nearest noise-sensitive receptors to Reaches 1-3 include residences south of Arcadian Shores Trail in the Cypress Point housing development and the Residence Inn Oxnard River Ridge, both located south of the River Ridge Golf Course. Figure 3.5-5 shows the noise contours during week 15 through 16 of construction. Comparing the ambient noise contours in Figure 3.5-3 above at noise-sensitive locations (residential areas) with the construction noise contours in Figure 3.5-5, construction noise at these noise-sensitive receptors would not exceed the significance criterion of ambient plus 3 dBA.

Maximum noise levels can be estimated based upon the difference between Lmax and Leq for the construction activities during week 15 through 16 (Tasks 7, 10, and 11). The noisiest equipment are 2 dB or less greater than the Leq(h). Therefore, the Leq(h) contours near the construction sites in Figure 3.5-5 are within 2 dB of the Lmax contours and all noise-sensitive receptors remain below the instantaneous maximum significance criterion of 75 dBA.

Within Reach 4, the highest noise levels were found to occur during Month 16 (Reach 4, weeks 30-31), when both landside and riverside floodwall activities (Tasks 7 and 8) would occur, resulting in a Leq (1-hr) of 89 dBA at 50 feet (see EIR Appendix D, Table 12). As noted above, the Leq (1-hr) noise contours from the noisiest week(s) of construction were calculated using a computer noise model. Figure 3.5-6 shows the noise contours within Reach 4 for Month 16 (weeks 30-31), when noise levels are anticipated to be the greatest. As shown, modeled noise levels in the backyards of residences adjacent to the construction area exceed 70 dBA. Ambient noise levels in the backyards nearest N. Ventura Road are in the range of 61 dBA as shown in Figure 3.5-4. As such, construction noise levels would exceed the significance criteria (ambient plus 3 dBA) for the nearest seven residences located along the construction activities.

Implementation of Mitigation Measures NV-1a (*Moveable Construction Noise Barriers*) and NV-1b (*Monitor Noise Levels*) would reduce noise levels in the residential backyards along N. Ventura Road. An estimated 10-foot-high moveable barrier extending along the sidewalk approximately 30 feet in both directions from the construction activity is recommended to reduce noise levels to below the

significance criteria; however, placement of such a structure within the confined space between the construction area and the existing property walls may not be practical or possible. Monitoring would help to check if noise levels are below the significance threshold, but would not guarantee that the threshold (ambient plus 3 dBA) will be met. Therefore, noise impacts during this 2-week period would remain significant.

Maximum noise levels can be estimated based upon the difference between Lmax and Leq for construction activities in weeks 30-31. The noisiest equipment are within 1 dB of the the Leq(h). Therefore, the Leq(h) contours near the construction sites in Figure 3.5-4 are within 1 dB of the Lmax contours and all noise-sensitive receptors remain below the instantaneous maximum significance criterion of 75 dBA.

Although implementation of Mitigation Measures NV-1a and NV-1b would reduce construction noise levels, impacts would remain significant during the noisiest construction period for Reach 4 (Class I). Noise from construction activities would also disturb sensitive wildlife species that utilize habitat in the adjacent Santa Clara River channel and implementation of these mitigation measures would reduce this impact. See discussions of Impacts BIO-3, BIO-4, BIO-5, BIO-10, BIO-11, and BIO-12.

Option 1A – Full Levee System with Reach 4 Floodwall

As was done for Option 1B, maximum noise levels (Lmax) for each piece of construction equipment listed in Project Description Tables 2-4 and 2-5 were estimated based upon the "actual measured" noise emissions and acoustical use factors published by the U.S. Department of Transportation Federal Highway Administration Office of Environment and Planning (DOT, 2006) (See EIR Appendix D – Noise and Vibration Alternative Analysis, Appendix A). The Leq(h) was calculated assuming that all equipment listed for each task were in operation, as shown below in Table 3.5-12 for Reaches 1-3, Option 1A, and above in Table 3.5-11 for Reach 4, which is a common element to Option 1A and Option 1B. As previously noted, propagation assumes a reduction of 6 dB for each doubling of distance. A 5-dB decrease was assumed for the shielding provided by the 6-foot-tall property walls located along the residential properties adjacent to N. Ventura Road.

Based on the accelerated 20-month construction schedule presented in Project Description Table 2-3 (Reaches 1-3, Option 1A) and Table 2-5 (Reach 4), which maximizes the potential for overlapping activities which would result in greater noise levels to ensure a conservative analysis, the total noise levels during each week of construction assuming overlapping tasks are co-located on the construction site were calculated.

Within Reaches 1-3 for Option 1A, the highest noise levels were found to occur during Months 3-4 (Reach 3 weeks 11-13), when levee embankment fill (Task 7) and concrete retaining wall (Task 10) activities would occur, resulting in a Leq (1-hr) of 89 dBA at 50 feet (see EIR Appendix D, Table 10). The calculated Leq (1-hr) noise contours (lines of equal sound level) from the noisiest week(s) of construction were calculated using the CadnaA computer noise model. Figure 3.5-7 shows the noise contours within Reaches 1-3 for Months 3-4 (weeks 11-13), when noise levels are anticipated to be the greatest (during levee embankment fill and concrete retaining wall construction). The modeled noise levels approach 55 dBA in the front yards of houses located in the northwest corner of the Cypress Point housing development as shown in Figure 3.5-7.

Table 3.5-12. Typical Noise Levels of Construction Equipment by Task – Reaches 1-3 Option 1A

Task No.	Description	Leq(1-hr) @ 50 feet
1	Mobilization	73
2	Clearing and Grubbing	86
3	Demolition & Removals	76
4	Diversion and Control of Water	N/A
5	Traffic Control	73
6	Foundation Excavation	86
7	Levee Embankment Fill	86
8	Landfill Tie-In	81
9	Riprap (1/4-Ton)	81
10	Concrete Retaining Wall	86
11	Structural Excavation & Backfill	81
12	Flap Gates	79
13	Slide Gates	79
14	CMB Access Road	83
15	Chain Link Fence	78
16	Chain Link Gate	80
17	Hydroseeding (slopes)	72
18	Vegetation Thinning	84

Source: Acentech, 2015 – EIR Appendix D, Appendix A. N/A – Not Applicable.

Similar to Option 1B, the nearest noise-sensitive receptors include residences south of Arcadian Shores Trail in the Cypress Point housing development and the Residence Inn Oxnard River Ridge. Comparing the ambient noise contours in Figure 3.5-3 to the construction noise contours in Figure 3.5-7, construction noise at these noise-sensitive receptors would not exceed the significance criterion of ambient plus 3 dBA.

The residential community south and east of N. Ventura Road where Reach 3 and Reach 4 meet is approximately 200 feet from the nearest construction activity and is protected by a 6-foot-high property wall. Comparing the ambient noise contours in Figure 3.5-4 to the construction noise contours in Figure 3.5-6, construction noise at these noise-sensitive receptors would not exceed the significance criterion of ambient plus 3 dBA.

Maximum noise levels can be estimated based upon the difference between Lmax and Leq for these two construction activities. For levee fill, Lmax for the noisiest equipment is 1 dB less than the Leq(h). For concrete retaining wall construction, Lmax is 1 dB more than the Leq(h). Therefore, the Leq(h) contours near the construction sites in Figure 3.5-6 are within 1 dB of the Lmax contours and all noise-sensitive receptors remain below the significance criterion of 75 dBA.

Under Option 1A, noise impacts on sensitive receptors in Reach 4 would be the same as described for Option 1B. Based on the modeling results, noise levels in the backyards of residences adjacent to the construction area would exceed 70 dBA. Ambient noise levels in the backyards nearest N. Ventura Road are in the range of 61 dBA as shown in Figure 3.5-4. As such, construction noise levels would exceed the significance criteria (ambient plus 3 dBA) for the nearest seven residences located along the construction activities. Implementation of Mitigation Measures NV-1a (*Moveable Construction Noise Barriers*) and NV-1b (*Monitor Noise Levels*) would reduce noise levels, but impacts would remain significant during the noisiest construction period for Reach 4 (Class I). Noise from construction

activities would also disturb sensitive wildlife species that utilize habitat in the adjacent Santa Clara River channel and implementation of these mitigation measures would reduce this impact. See discussions of Impacts BIO-3, BIO-4, BIO-5, BIO-10, BIO-11, and BIO-12.

Mitigation Measures

NV-1a **Moveable Construction Noise Barriers.** During construction, install an approximately 10-foot-high moveable barrier along the sidewalk between the construction activity and the residential property wall, extending approximately 30 feet in both directions from the construction activity. If determined to be infeasible due to space constraints, install alternative moveable noise barriers with sound-absorptive surfaces facing the noise source between construction equipment and sensitive receptors (i.e. residences) in Reach 4. As feasible, moveable noise barriers should also be used to shield habitat areas in the Santa Clara River from construction noise.

NV-1b **Monitor Noise Levels.** Periodically monitor noise levels during floodwall construction near noise-sensitive receptors in Reach 4 to determine whether construction noise levels exceed predicted levels. If construction noise is substantially greater than predicted, investigate whether it is feasible to install additional noise barriers or reposition construction equipment to reduce noise levels at sensitive receptors.

Operational Noise

Impact NV-2: O&M activities could result in increased noise levels affecting sensitive noise receptors.

Operation and maintenance (O&M) of the proposed Project, under either Option 1A or Option 1B, would include routine inspections and repair, as needed over the lifetime of the Project (50 years). It is anticipated that the intensity of post-construction operations and maintenance activities would increase from pre-construction (existing) conditions. The VCWPD implements best management practices during routine maintenance activities. These include utilizing the minimum size/type of equipment to complete the activity and keeping equipment and engine mufflers in good working condition to minimize potential impacts. Depending upon the nature of the maintenance activity, the noise levels would be as described in Tables 3.5-10, 3.5-11, and 3.5-12 for similar tasks. Representative tasks may include levee repair (levee embankment fill, 86 dBA at 50 feet followed by placement of riprap, 81 dBA at 50 feet), vegetation thinning (84 dBA at 50 feet), or repair of fencing and gates (78 to 80 dBA at 50 feet). The majority of these activities would occur on the river side of the floodwall in Reach 4.

Based on the distance of these O&M activities from noise-sensitive receptors and the temporary duration of such activities, noise levels from operation of the proposed Project would be below significance thresholds at sensitive receptors. Noise impacts would not be significant (Class III).

A potential concern was raised that since there are existing garden/block walls on the land side of N. Ventura Road, the proposed reflective parallel floodwall on the river side could potentially reduce the acoustical performance of the existing garden/block walls. Evaluating the traffic noise in the backyard near Location 1 (see Figure 3.5-2) with and without the levee wall on the river side resulted in a 0.5 dBA increase, which is considered insignificant (see Appendix D).

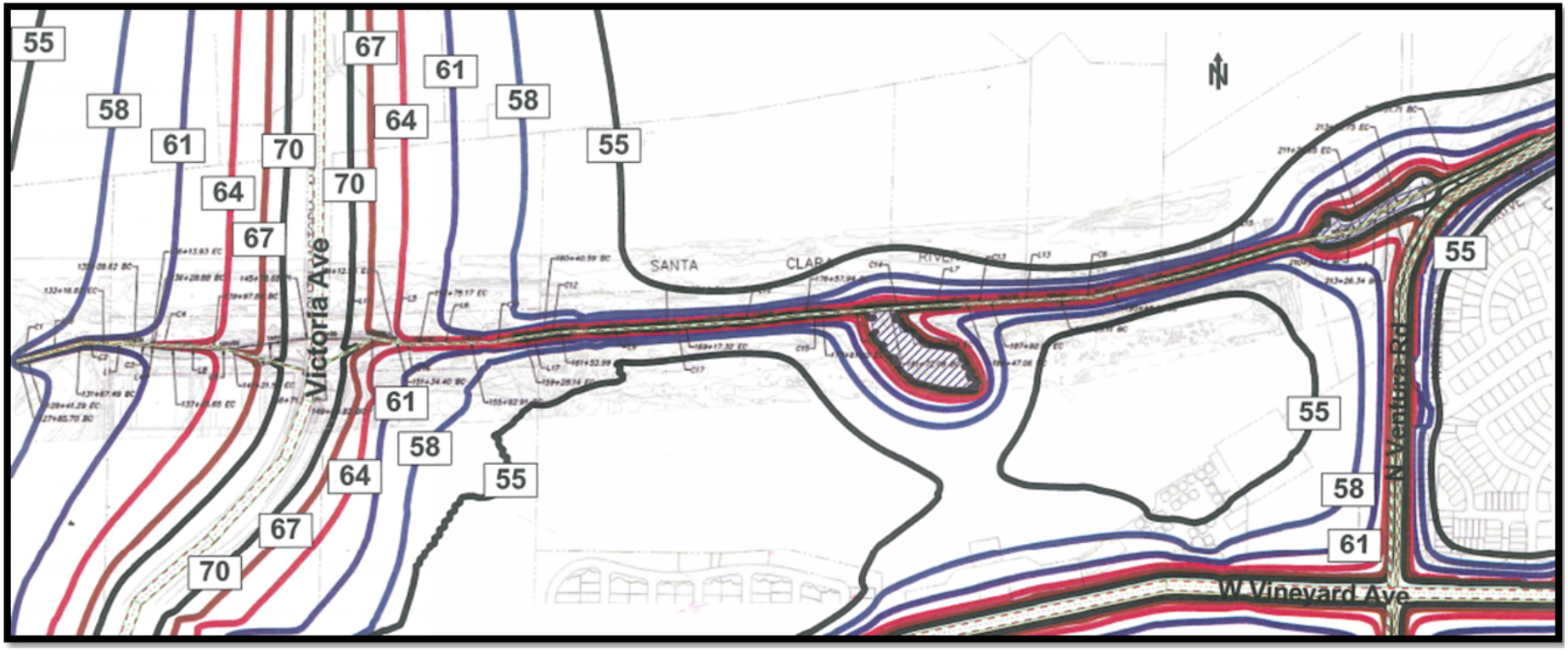

Figure 3.5-5: Construction Noise Contours for Option 1B in Reaches 1-3, Leq(h)

Source: Acentech, 2015 – Figure 9 (EIR Appendix D).

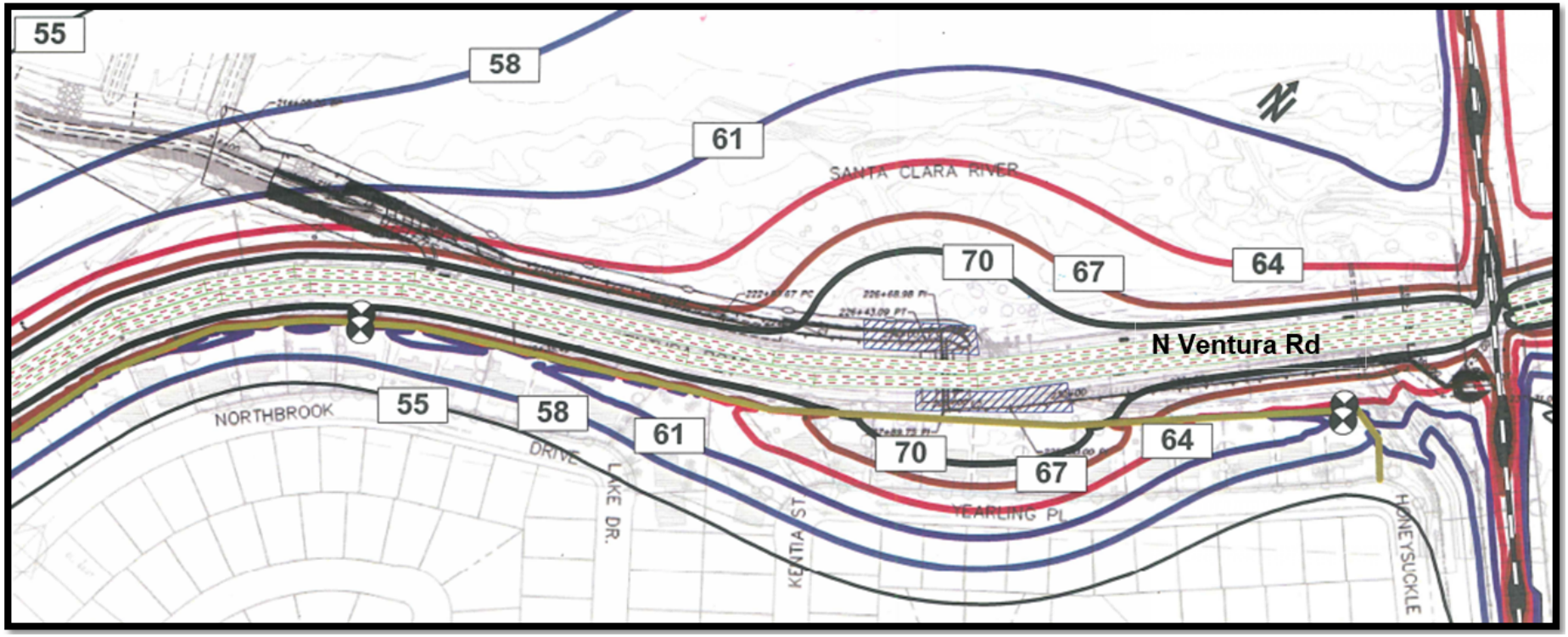

Figure 3.5-6: Construction Noise Contours for Reach 4, Leq(h)

Source: Acentech, 2015 – Figure 10 (EIR Appendix D).

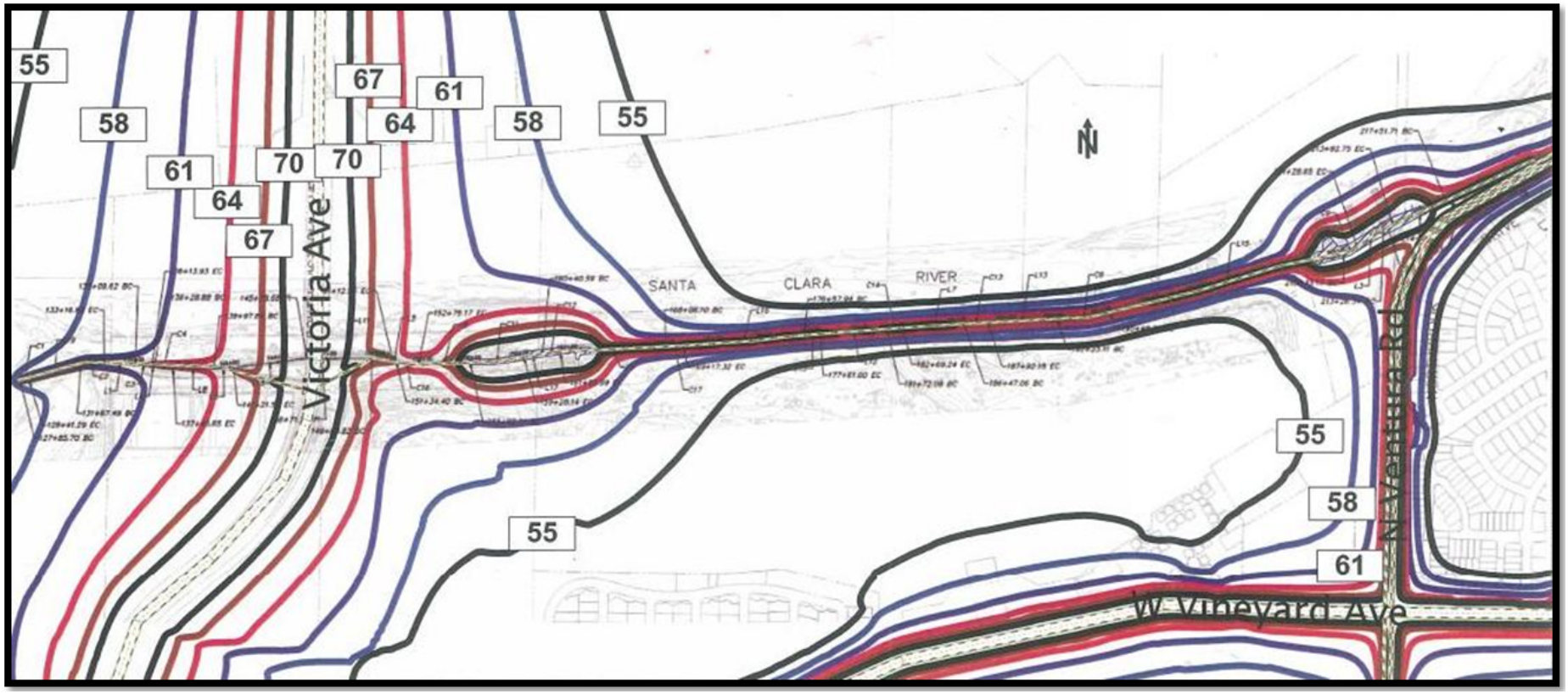

Figure 3.5-7: Construction Noise Contours for Option 1A in Reaches 1-3, Leq(h)

Source: Acentech, 2015 – Figure 8 (EIR Appendix D).

Construction Vibration

Impact NV-3: Project construction could result in vibration levels that affect nearby buildings.

Use of construction equipment has the potential to result in noise and ground-borne vibrations. As shown in Project Description Tables 2-6 and 2-7, construction tasks would include use of a vibratory pile driver, vibratory roller, concrete vibrator, dozers, and trucks, among other equipment that may result in vibrations to nearby structures. Figure 3.5-8 presents typical levels of vibration from common construction equipment known to create vibrations. The structural damage criteria of 0.2 inches/sec would be exceeded for non-engineered timber and masonry buildings within approximately 70 feet of a vibratory pile driver, within approximately 26 feet of a vibratory roller, or within approximately 15 feet of a dozer. The eastern end of Reach 3 and along the river side of Reach 4 (where vibratory pile driving would occur) are over 200 feet away from residential buildings.

As shown in Project Description Tables 2-6 and 2-7, the construction tasks when a vibratory pile driver, vibratory roller, concrete vibrator, or compactor roller is expected to be used include Concrete Retaining Wall (Task 10) and CMB Access Road (Tasks 14) for Option 1A; Concrete Headwall (Task 14) and CMB Access Road (Task 15) for Option 1B; and Sheet Pile Wall and Scour Protection (Task 9), UPRR Embankment Fill (Task 10), CMB Access Road (Task 19), and Soil Cement Access Road (Task 20) for Reach 4 (applies to both Options 1A and 1B). Option 1A and 1B construction in Reaches 1-3 would occur over 200 feet away from residences; therefore, no vibration impacts to residential structures is anticipated. In Reach 4 (common to Options 1A and 1B), the UPRR embankment fill is over 130 feet from the nearest residence, and the sheet piles and access road (located on the north side of the river side floodwall) are approximately 150 feet from the nearest residential structure. Construction activities on the land side of N. Ventura Road along Reach 4 would occur 0 to 50 feet from residential property lines. The residential structures are another 40 to 50 feet away. The use of a vibratory roller is not anticipated along the land side of the floodwall and no sheet pile would be installed along the land side floodwall. Assuming the worst-case scenario of 40 feet between construction activities and residential structures, the vibration amplitudes in Figure 3.5-8 are less than 0.2 inches/sec and no structural damage to residences would occur. Impacts would be less than significant (Class III).

Impact NV-4: Project construction could result in vibration levels that are annoying to nearby residents.

Since construction activities would occur during daytime hours, the daytime annoyance criterion of 75 VdB (0.0225 inches/sec) would apply. Vibratory pile driving occurring within 500 feet of residential structures would exceed this threshold, which includes the first three rows of houses along N. Ventura road. Similarly, the daytime vibration annoyance criterion would be exceeded within approximately 190 feet from the vibratory roller, which includes the first row of houses along N. Ventura Road, and residences within approximately 100 feet of most other construction equipment. Mitigation Measure NV-4 (*Community Notification*) is recommended to reduce annoyance impacts; however, notification alone would not reduce the vibration levels and therefore impacts remain significant and unavoidable (Class I).

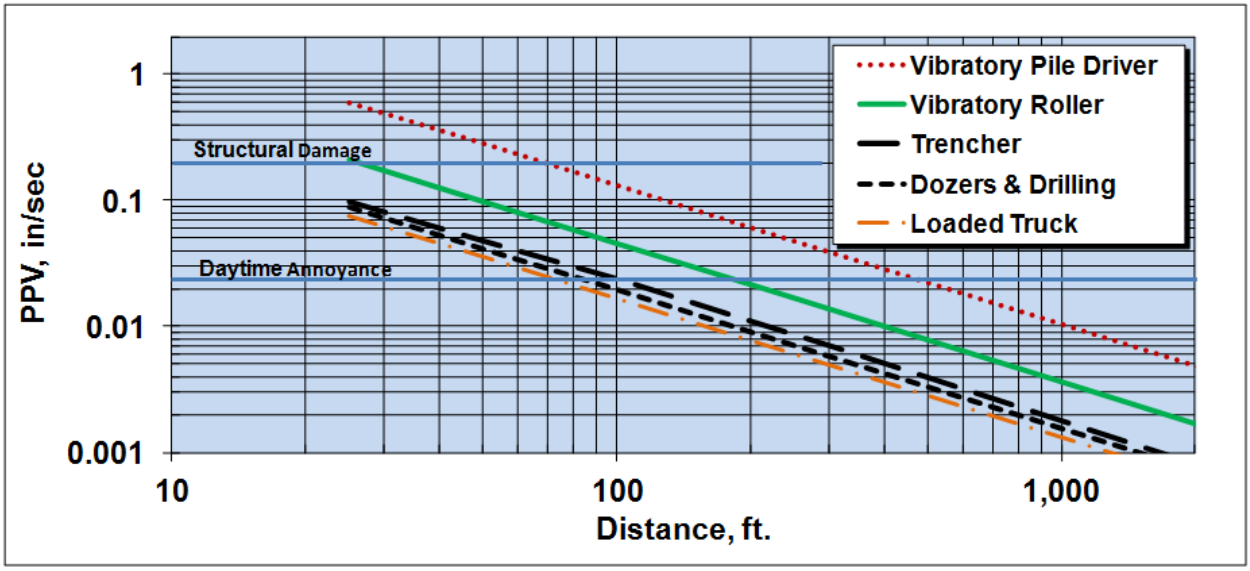

Figure 3.5-8. Construction Vibration Amplitudes
Source: Acentech, 2015 – Figure 12 (EIR Appendix D)

Mitigation Measures

NV-4 **Community Notification.** At least two weeks prior to construction, the VCWPD shall notify residences located within 500 feet of vibratory pile driving activities along Reach 4 (i.e., first three rows of houses along the south side of N. Ventura Road), and/or within 190 feet of vibratory roller activities in Reach 4 (i.e., first row of houses along the south side of N. Ventura Road). Multiple notifications may be needed if activities along the river side occur at a substantially different time from those on the land side of N. Ventura Road. The notification should provide residences the hours of construction, recommendations on ways to reduce noise levels (e.g., close windows), and contact information for vibration and noise complaints.

Operational Vibrations

Impact NV-5: O&M activities would result in temporary increases in local vibration levels.

O&M activities would mostly occur at least 170 feet from residential structures. Vibration levels from O&M activities would be less than the daytime annoyance (daytime construction) of 75 VdB (0.0225 inches/sec). Therefore, no adverse effects to residential structures nor exceedance of the annoyance threshold would occur. O&M vibration impacts would not be significant (Class III).

3.5.2.3 Cumulative Impacts

Introduction

Cumulative impacts have been assessed to determine if the Project's incremental contribution would be considerable. Table 3-1 provides a list and description of pending and recently approved projects from the City of Oxnard, the City of Ventura, and the County of Ventura. Since noise and vibration impacts are dependent on distance and timing, proximity to the Project and the potential for coinciding construction times would have the greatest potential for contributing to cumulative impacts. Of the projects listed in Table 3-1, The Village, Bailard Landfill Gas Field, and Olivas Drive Extension projects

have the greatest potential to result in cumulative impacts due to their proximity to the Project. All other projects listed in Table 3-1 are at greater distances or construction activities are not expected to overlap with the proposed construction schedule for the Project. Each of the noted cumulative projects is addressed below.

Project Contribution to Cumulative Impacts

The Village (a.k.a. Wagon Wheel Development Project). The Village development is currently under construction, with construction near the Project occurring under Phase 3 of the development. Phase 3 is expected to occur while the Project is underway. The proposed land side floodwall, UPRR embankment fill, and El Rio Drain Channel modification are activities where there may be some cumulative noise impact. These Reach 4 activities are scheduled to occur from Month 16 to 19 (week 62-74). The Village is separated from the residences along Reach 4 (located west of the El Rio Drain) by over 300 feet with two 6-foot high walls and the UPRR tracks. Cumulative vibration impacts would not occur. However, construction overlap during this 13-week period may result in cumulative noise impacts. VCWPD will work with the City of Oxnard and The Village developer to minimize conflicts with the SCR-3 Project and minimize the potential for cumulative impacts.

Construction of the Project would occur sequentially along the alignment, such that impacts in any one area would occur for a short period of time (weeks as opposed to months) and would be reduced with the implementation of mitigation. The communities on the other side of El Rio Drain are approximately 230 feet away with a 6-foot property wall, such that cumulative noise and vibration impacts are not anticipated.

Bailard Landfill Gas Field Project. The Ventura Regional Sanitation District (VRSD) is proposing a new gas pipeline on the north side of the Bailard Landfill. The VCWPD will work closely with the VRSD to ensure no conflicts with the Project, such that cumulative impacts would be avoided.

Olivas Drive Extension. It is anticipated the levee/floodwall construction for the Olivas Drive Extension Project would coincide with the construction of Reach 4. However, this construction activity would occur over 1,500 feet from the noise-sensitive receptors near the Project and therefore will not contribute to cumulative noise or vibration impacts.

3.5.2.4 Impact Significance Summary

Table 3.5-13, below, provides a summary of each identified direct and indirect impact and associated mitigation measures to reduce or avoid the impact, if warranted. Mitigation measures are required for each significant impact, but are not required for impacts that are not significant. Table 3.5-13 also indicates the significance conclusion for each identified impact. For cumulative impacts, the proposed Project's contribution to noise and vibration impacts during construction and O&M were determined not to be cumulatively considerable.

Table 3.5-13. Summary of Noise and Vibration Impacts and Mitigation Measures		
Impacts	Mitigation Measures	Significance Conclusion
Impact NV-1: Project construction could result in noise levels that would disturb sensitive noise receptors, particularly near Reach 4.	NV-1a: Movable Construction Noise Barriers. NV-1b: Monitor Noise Levels.	Class I (Reach 4 only)
Impact NV-2: O&M activities would result in increased noise levels affecting sensitive noise receptors.	No mitigation measures are required.	Class III
Impact NV-3: Project construction could result in vibration levels that affect nearby buildings.	No mitigation measures are required.	Class III
Impact NV-4: Project construction could result in vibration levels that are annoying to nearby residents.	NV-4: Community Notification.	Class I (Reach 4 only)
Impact NV-5: O&M activities would result in temporary increases in local vibration levels.	No mitigation measures are required.	Class III

Class I: **Significant impact; cannot be mitigated to a level that is not significant.** A Class I impact is a significant adverse effect that cannot be mitigated below a level of significance through the application of feasible mitigation measures. Class I impacts are significant and unavoidable.

Class II: **Significant impact; can be mitigated to a level that is not significant.** A Class II impact is a significant adverse effect that can be reduced to a less-than-significant level through the application of feasible mitigation measures presented in this EIR/EIS.

Class III: **Adverse; less than significant.** A Class III impact is a minor change or effect on the environment that does not meet or exceed the criteria established to gauge significance.

Class IV: **Beneficial impact.** A Class IV impact represents a beneficial effect that would result from project implementation.