Attachment J

Noise and Vibration Study by Veneklasen Associates 2024-07-16

Veneklasen Associates
Consultants in Acoustics | Noise | Vibration | AV | IT

July 16, 2024

Wilshire Boulevard Temple
3633 Wilshire Boulevard
Los Angeles, California 90010

Attention: Doug Lynn, Associate | Executive Director

Subject: **Camp Hess Kramer Project**
County of Ventura, California
Construction Noise and Vibration Impact Assessment
Veneklasen Project No. 8621-001

Dear Doug:

This assessment evaluates noise and vibration impacts from construction for the proposed Camp Hess Kramer Project at 11495 & 11677 Pacific Coast HWY (PCH) located in unincorporated County of Ventura, CA. This document also serves as a Construction Noise and Vibration Logistics Plan for mitigation during the four demolition and construction phases scheduled. In conducting our impact assessment, we have reviewed the following documents:

- County of Ventura -Construction Noise Threshold Criteria and Control Plan
- Federal Highway Administration Construction Noise Handbook, August 2006
- Federal Transit Administration Transit Noise and Vibration Impact Assessment Guidance Manual, September 2018

If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,
Veneklasen Associates, Inc.

Jordan L Roberts
Senior Associate

1.0 INTRODUCTION

This document details the noise and vibration impacts for the construction activity associated with the Camp Hess Kramer Project. The project is rebuilding Camp Hess Kramer (Lower, Middle, and Upper Camp). Camp Hess Kramer occurs on portions of 187 acres. The proposed rebuilding includes the restoration of damaged buildings and construction of new buildings to replace functions of destroyed structures, restoration of outdoor activity areas, landscaping fuel modification and bank stabilization, and restoration of the creek corridor, and replacement of trees and vegetation.

The project will also repair, replace, and or construct necessary infrastructure, including access roads, parking, vehicle and pedestrian bridges and walkways, water and wastewater infrastructure, electrical and communication lines, stormwater and drainage facilities, and site lighting.

New construction at Camp Hess Kramer Lower Camp includes an entry booth, surface parking with tennis court above, welcome center including infirmary and executive residences, fine art building, outdoor kitchen, dining hall, craft building, gymnasium building, as well as the renovation of and addition to the program/executive residence building, pool and pool building.

The new construction at Camp Hess Kramer Middle Camp includes 18 camper cabins, 2 staff residences, and a maintenance shop. The Upper Camp will undergo “like-for-like” replacements and will not require the use of heavy construction methods such as that used for Lower and Middle Camp. Due to the reduced construction and remote location, noise impacts of the Upper Camp are addressed separately from the Middle Camp and Lower Camp.

The project is bounded by Yerba Buena Rd to the north, northeast, and east, the Pacific Coast way to the south, and vacant land to the southwest and west.

Construction for this project has been separated into 4 phases:

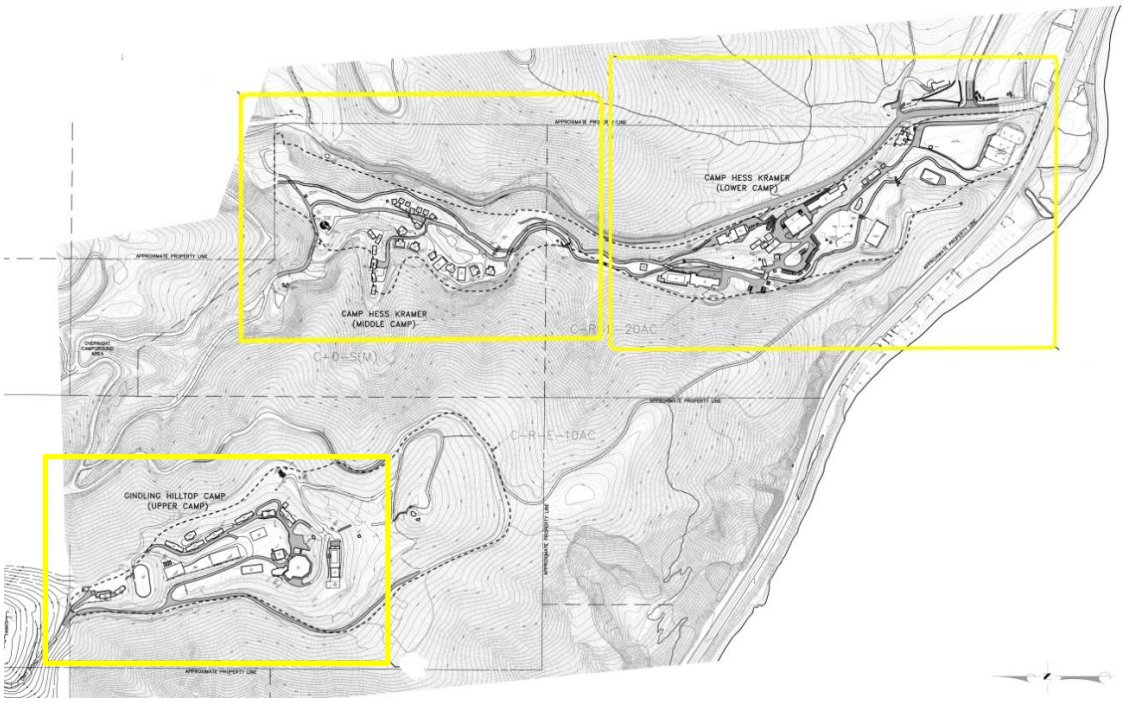
- Phase 1- Demolition
- Phase 2- Excavation, Grading & Site Utilities
- Phase 3- Concrete Walkways & Paving
- Phase 4- Exterior Encloser, Roofing & Interior Finishing

Activities in each phase have been combined since they can occur simultaneously. The construction schedule is presented in Table 1.

Table 1–Camp Hess Kramer Project Schedule

Project Phase	Project Duration
Phase 1: Demolition	3 months
Phase 2: Excavation, Grading & Site Utilities	9 months
Phase 3: Concrete Walkways & Paving	6 months
Phase 4: Exterior Encloser, Roofing & Interior Finishing	20 months

Figure 1-Project Location



2.0 PROJECT NOISE AND VIBRATION CRITERIA

2.1 Noise

County of Ventura – Construction Noise Threshold Criteria and Control Plan

According to the plan, construction work should comply with the County of Ventura's daytime construction noise threshold criteria (NTC). Normally, no evening or nighttime construction activity is permitted in areas having noise sensitive receptors. However, in the event such activity is permitted, reduced noise threshold criteria are provided for construction that might occur during evening and /or nighttime hours. Emergency work is exempt from these construction noise thresholds**.**

Daytime Construction. Daytime (7:00 am to 7:00 pm Monday through Friday and from 9:00 am to 7:00 pm 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 2. 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 2 (Figure 4) – Daytime Construction Activity Noise Threshold Criteria

Construction Duration Affecting Noise-sensitive Receptors	Noise Threshold Criteria shall be the greater of these noise levels at the nearest receptor area or 10 feet from the nearest noise-sensitive building	
	Fixed Leq(h), dBA	Hourly Equivalent Noise Level (Leq), dBA1, 2
0 to 3 days	75	Ambient Leq(h) + 3 dB
4 to 7 days	70	Ambient Leq(h) + 3 dB
1 to 2 weeks	65	Ambient Leq(h) + 3 dB
2 to 8 weeks	60	Ambient Leq(h) + 3 dB
Longer than 8 weeks	**55**	Ambient Leq(h) + 3 dB

Note 1. The instantaneous Lmax shall not exceed the NTC by 20 dBA more than 8 times per daytime hour.
Note 2. Local ambient Leq measurements shall be made on any mid-weekday 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, at the nearest noise-sensitive receptor area or 10 feet from the façade of the nearest noise-sensitive building**.**

Table 3 (Figure 5) – Evening Construction Activity Noise Threshold Criteria

Receptor Location	Evening Noise Threshold Criteria shall be the greater of these noise levels at the nearest receptor area or 10 feet from the nearest noise-sensitive building	
	Fixed Leq(h), dBA	Hourly Equivalent Noise Level (Leq), dBA1, 2
Residential	50	Ambient Leq(h) + 3 dB

Note 1. The instantaneous Lmax shall not exceed the NTC by 20 dBA more than 6 times per evening hour.
Note 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 4, at the nearest noise-sensitive receptor area or 10 feet from the façade of the nearest noise-sensitive building**.**

Table 4 (Figure 6) – Nighttime construction Activity Noise Threshold Criteria

Receptor Location	Nighttime Noise Threshold Criteria shall be the greater of these noise levels at the nearest receptor area or 10 feet from the nearest noise-sensitive building	
	Fixed Leq(h), dBA	Hourly Equivalent Noise Level (Leq), dBA1, 2
Residential, Living-in Institutional	45	Ambient Leq(h) + 3 dB

Note 1. The instantaneous Lmax shall not exceed the NTC by 20 dBA more than 4 times per nighttime hour.
Note 2. Hourly nighttime local ambient noise measurements shall be made on a typical mid-weeknight 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.

FTA Construction Noise Criteria

The U.S. Department of Transportation has developed construction noise impact assessment criteria for evaluating noise impacts associated with the construction. Table 5 shows the FTA construction Noise Criteria for long-term projects.

Table 5 FTA Construction Equipment Noise Criteria for Long-Term Projects

Land Use	Day Leq (8 hr)	Night Leq (8 hr)
Residential	80 dBA	70 dBA
Commercial	85 dBA	85 dBA
Industrial	90 dBA	90 dBA

Source: FTA Transit Noise and Vibration Impact Assessment Guidance Manual, Sep 2018

2.2 Vibration

The County of Ventura does not have specific vibration impact criteria for construction activities. Therefore, vibration impact due to the construction equipment is evaluated with reference to the guidelines of the Federal Transit Administration (FTA) to minimize vibration impact on people, residences, and business.

FTA Vibration Criteria

FTA guidelines address the impacts in terms of architectural damage in PPV in/s and VdB. Vibration levels corresponding to these responses are shown in Table 6.

Table 6 – Typical Construction Activities Limits

Criteria Description	Vibration Criteria PPV (in/s)	Maximum Vibration Velocity Level (VdB re: 1µin/s)
Residences and buildings where people normally sleep (frequent events)	--	72
Institutional land uses with primarily daytime use (frequent events)	--	75
Institutional land uses with primarily daytime use (occasional events)	--	78
Buildings extremely susceptible to vibration damage	0.12	90
Non-engineered timber and masonry buildings	0.2	94
Engineered concrete and masonry (no plaster)	0.3	98
Reinforced-concrete, steel or timber (no plaster)	0.5	102

Source: FTA Transit Noise and Vibration Impact Assessment Guidance Manual, September 2018

3.0 PROJECT CONSTRUCTION PHASING AND EQUIPMENT

The equipment for this analysis were selected from industry-standard reference databases, including the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), for equipment typical to projects of this scale. Table 7 below lists the equipment anticipated for use on the project along with associated noise levels at reference distances and anticipated equipment usage factors (the percentage of time equipment is operating at full power).

Table 7– Noise Data for Selected Construction Equipment at Wilshire Blvd Temple Camp Project

Equipment Description	Phase	General Activity	Usage Factor	Sound Level at Reference Distance (dBA at 50-feet)	Noise Data Source
Excavator	1/2	Demolition/Excavation	40	85	FHWA
Dozer	2	Excavation	40	85	FHWA
Water Truck 3,000 gallon	2/3	Excavation/ Grading / Site Utilities/Paving	40	88	FHWA
Loader	1/2	Demolition/Excavation	40	80	FHWA
84” smooth drum roller	3	Paving	20	85	FHWA
Dump truck	1/2/3	Demolishing/Excavation/ Grading/ Concrete walkway/Paving	40	84	FHWA
Backhoe	1/2/3	Demolishing/ Excavation/Grading/ Concrete walkway/Paving	40	80	FHWA

Equipment Description	Phase	General Activity	Usage Factor	Sound Level at Reference Distance (dBA at 50-feet)	Noise Data Source
8’ Paving machine	3	Site utilities/Paving	50	77	FHWA
51” smooth drum roller	3	Site utilities/Paving	20	80	FHWA
Generator	3	Site utilities	50	82	FHWA
Concrete Mixture	3	Site utilities/Paving	40	85	FHWA
Compressor	1	Exterior/Roof/ Interior rough	20	80	FHWA

In a similar manner, Table 8 below lists the heaviest equipment anticipated for use on the project along with associated vibration levels at reference distances.

Table 8– Vibration Data for Selected Construction Equipment at Wilshire Blvd Temple Camp Project

Equipment Description	Phase	General Activity	PPV Level at Reference Distance (in/s at 25-feet)	VdB Level at Reference Distance (1 µin/s at 25-feet)	Vibration Data Source
Excavator	1/2	Demolition/Excavation	0.089	87	FTA
Dozer	2	Excavation	0.089	87	FTA
Water Truck 3,000 gallon	2/3/4	Excavation/ Site Utilities/Paving	0.076	86	FTA
Loader	1/2	Demolition/Excavation	0.003	58	FTA
84” smooth drum roller	13	Paving	0.089	87	FTA
Dump truck	1	Demolition/Excavation / site utility	0.076	86	FTA
Concrete Mixture		Site utilities/Paving	0.003	58	FTA
Backhoe	1/3	Demolition/Site utilities/Paving	0.089	87	FTA
8’ Paving machine	3	Paving	0.003	58	FTA
51” smooth drum roller	3	Paving	0.003	58	FTA
Mobile Cranes	4	Exterior enclosure	0.003	58	FTA

4.0 NOISE AND VIBRATION SENSITIVE RECEPTORS

The project site and noise/vibration-sensitive receptors (NVSR) to the south, east, southeast, and southwest of the site are shown in Table 9 and Figure 2. For the purposes of this analysis, individual receptors (e.g. individual apartment units, office spaces, windows/doors, etc.) located within the same property constitute the combined receptor group as defined in Table 9. The Upper Camp is located further north, approximately 1,500 feet from the nearest sensitive receptor (NVSR-10) to the east. This remote situation is shown in the callout on Figure 2 below and is assessed separately in Section 6.2.

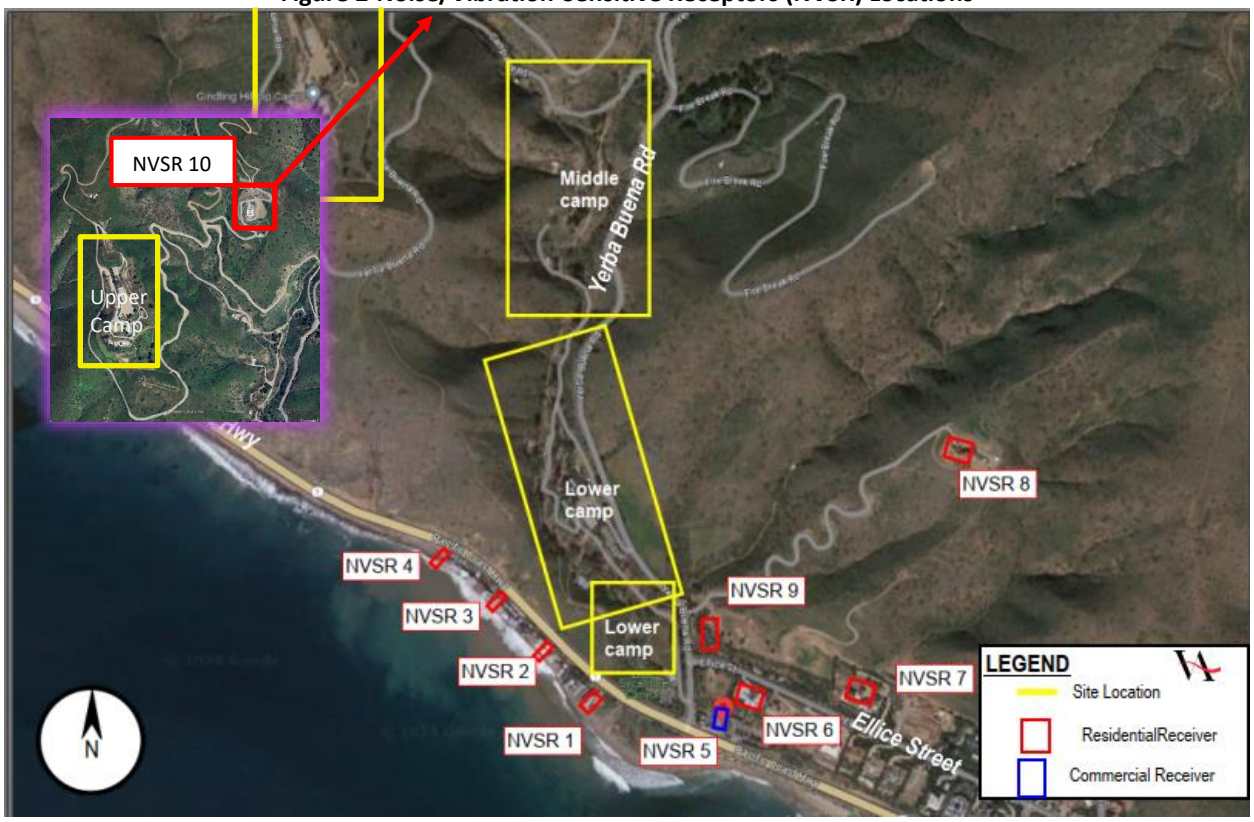
Table 9 – Noise Vibration Sensitive Receptors (NVSR)

Receptor Group for Analysis	Address	Cardinal Direction from Project Site	Type of Receptor	Distance from Project Site property line (ft)
NVSR-1	42500 Pacific Coast Hwy	South	Residential	200
NVSR-2	42590 Pacific Coast Hwy	South	Residential	349
NVSR-3	11358 Pacific Coast Hwy	South	Residential	383
NVSR-4	11124 Pacific Coast Hwy	Southwest	Residential	536
NVSR-5	42505 Pacific Coast Hwy	Southeast	Commercial	230
NVSR-6	11658 Ellice St	Southeast	Residential	305
NVSR-7	11755 Ellice St	Southeast	Residential	946
NVSR-8	11312 Yerba Buena Rd	East	Residential	1932/2309*
NVSR-9	11300 Yerba Buena Rd	Southeast	Residential	138
NVSR-10	10715 Yerba Buena Rd	East	Residential	1500**

**Note: distance from Lower Camp /Middle Camp*

*** Note: distance from Upper Camp*

Figure 2-Noise/Vibration-Sensitive Receptors (NVSR) Locations



5.0 PREDICTION AND MODELING

The list of construction equipment, sound levels attributable to that equipment, and assumed utilization factors are shown in Table 7 and Table 8 in Section 3 of this report. Sound levels of various equipment were based on the FTA Noise Guidance Manual[1] and the FHWA Construction Noise Handbook. Utilization factors were calculated using the FHWA Construction Noise Handbook.

Due to the topography of the area, specifically elevation changes between project construction and receptors, Veneklasen modeled the construction noise propagation using Predictor version 2023, 3D Noise Simulation software. Noise source octave band sound power levels were obtained from the Predictor Software database, and levels were adjusted to meet the FHWA construction equipment's predicted noise levels at a 50-foot distance. The sources are modeled as moving point sources to represent equipment moving throughout the site and to show the maximum impact on the receptor.

5.1 Noise Source Behavior

Noise exposure from specified construction equipment was modeled at each noise-sensitive receptor adjacent of the project. Noise modeling was conducted using calculation methods from industry standard construction noise guidance manuals, including the FTA Noise Guidance Manual and the FHWA Construction Noise Handbook.

To model continuous construction noise, all noise sources (per work phase) were assumed to be moving throughout the construction site. To represent a maximum instantaneous impact, the two loudest pieces of equipment were calculated as operating simultaneously and modeled at project site locations adjacent to sensitive receptors. All noise sources were modeled at the height of 5 feet above grade elevation.

Predicted noise levels from construction activity by phase, as well as the applicable construction noise limits, are presented in Table 7 above. Veneklasen used construction noise criteria published by the County of Ventura Construction Noise Threshold Criteria and Control Plan, as shown in Section 2.1, to compare the predicted noise levels in Table 10 (no mitigation) and Table 12 (with physical barriers).

5.2 Vibration Source Behavior

Vibration levels were also modeled for the construction equipment assumed to be used for this project. Vibration levels for various equipment were assumed to be equivalent to similar equipment specified in the FTA Transit Noise and Vibration Guidance Manual. The reference levels for each type of equipment assumed to generate appreciable vibration levels are shown in Table 8 of Section 3. Table 11 compares projected vibration levels to FTA Construction Criteria outlined in Section 2 of this document.

[1]FTA Noise Guidance Manual assumes that all listed construction equipment is well-maintained and fitted with effective mufflers.

6.0 RESULTS AND ANALYSIS

6.1 Comparison to Applicable Noise Thresholds

Predicted construction noise exposure to the surrounding NVSRs was modeled, and the results are shown in Table 10. The calculated continuous equipment noise levels exceed the County of Ventura Construction Noise Threshold Criteria at NVSR-1, NVSR-6, and NVSR-9 throughout different phases of the project. According to project information provided February 12, 2024, the exterior enclosure roofing and interior finishing (Phase 4) is expected to take 20 months, overlapping with the last 6 months of phases 2 and 3. Per County of Ventura criteria, if project construction activity lasts longer than 8 weeks, the construction noise level at 10 feet from the sensitive receptor should not exceed 55 dBA during the daytime hours of 7:00 am to 7:00 pm Monday through Friday and from 9:00 am to 7:00 pm Saturday, Sunday and local holidays.

Previous ambient noise measurements[2] were reviewed and it was determined that ambient noise levels at adjacent receptors are, at times, less than 52 dBA, therefore the greater noise criteria threshold of 55 dBA (Leq_{1hr}) was applied to this assessment (rather than ambient+3dB). Construction activity requiring the use of equipment listed in Table 7 will not occur during evening or nighttime hours, as defined in the County of Ventura noise threshold criteria.

6.2 Noise Impact Analysis

Middle Camp and Lower Camps. According to the predicted noise levels shown in Table 10, noise mitigation would be required at the south and southeast areas of the site to meet the County of Ventura Construction Noise Criteria. Assuming the list of construction equipment, sound levels attributable to that equipment, and utilization factors shown in Section 3 of this report, Veneklasen proposed noise mitigation options in Section 7 to meet 55 dBA (Leq_{1hr}) at residential receptors and 60 dBA (Leq_{1hr}) at commercial receptors. It has been confirmed that NVSR 9 is a residential receptor.

Mitigation options include the timing, location, and verification of construction activity (administrative mitigation) in relation to sensitive receptors and temporary noise barrier installation (physical mitigation).

Table 10 presents construction noise levels without mitigation. Table 12 presents construction noise levels with installation of temporary noise barriers in order to reduce impacts at NVSR 1, 6, and 9.

Upper Camp. The Upper Camp portion of the project is approximately 1,500 feet from the nearest sensitive receptor (NVSR-10) to the east. Additionally, the Upper Camp elevation (700 feet) is at least 150 feet higher than the elevation of NVSR 10 (550 feet), with intervening topography providing noise and vibration attenuation. While overall construction methods at the Upper Camp would be limited compared to Lower/Middle Camps construction, an impact analysis was conducted using the same methods and equipment as used for Lower/Middle Camps. Therefore the modeled results for Upper Camp represents an extreme case that is not anticipated to occur but were utilized for a conservative assessment. Construction activity generating a noise level of 88 dBA at a distance of 50 feet would result in a noise level of 45 dBA or less at NVSR-10. Upper Camp construction was calculated to meet the County of Ventura Construction Noise Criteria and would not require mitigation.

[2] Advanced Engineering Acoustics (AEA) Noise Study (dated October 3, 2022 and amended on December 22, 2022)

Table 10 - Predicted Construction Noise Levels Without Mitigation

Project Phase	Receptor	Daytime Noise Criteria (dBA Leq_{1hr})	Construction Noise Level Without Mitigation (dBA Leq_{1hr})	Compliance with County of Ventura Criteria
Phase 1: Demolition	NVSR-1	55	**57**	**No**
	NVSR-2	55	44	Yes
	NVSR-3	55	40	Yes
	NVSR-4	55	37	Yes
	NVSR-5	60	55	Yes
	NVSR-6	55	**57**	**No**
	NVSR-7	55	48	Yes
	NVSR-8	55	42	Yes
	NVSR-9	55	**62**	**No**
	NVSR-10	55	44	Yes
Phase 2: Excavation, Grading & Site Utilities	NVSR-1	55	**58**	**No**
	NVSR-2	55	45	Yes
	NVSR-3	55	41	Yes
	NVSR-4	55	37	Yes
	NVSR-5	60	56	Yes
	NVSR-6	55	**57**	**No**
	NVSR-7	55	48	Yes
	NVSR-8	55	42	Yes
	NVSR-9	55	**62**	**No**
	NVSR-10	55	44	Yes
Phase 3: Concrete walkways and Paving	NVSR-1	55	**58**	**No**
	NVSR-2	55	45	Yes
	NVSR-3	55	41	Yes
	NVSR-4	55	37	Yes
	NVSR-5	60	56	Yes
	NVSR-6	55	**58**	**No**
	NVSR-7	55	49	Yes
	NVSR-8	55	43	Yes
	NVSR-9	55	**63**	**No**
	NVSR-10	55	45	Yes
Phase 4 Exterior Enclosure, Roofing and Interior Finishing	NVSR-1	55	50	Yes
	NVSR-2	55	37	Yes
	NVSR-3	55	32	Yes
	NVSR-4	55	29	Yes
	NVSR-5	60	49	Yes
	NVSR-6	55	50	Yes
	NVSR-7	55	41	Yes
	NVSR-8	55	35	Yes
	NVSR-9	55	**56**	**No**
	NVSR-10	55	37	Yes

6.3 Vibration Impact Analysis

Vibration levels were also modeled for the construction equipment assumed to be used for this project. Vibration levels for various equipment were assumed to be equivalent to similar equipment specified in the FTA Transit Noise and Vibration Guidance Manual. The reference levels for each type of equipment assumed to generate appreciable vibration levels are shown in Table 5 of Section 3. With the absence of any other criteria, the FTA Vibration criteria for structural responses are shown in Section 2 of this report. The main

concern for vibration generated by ground-disturbing construction activities is the potential for architectural/structural damage to adjacent sensitive receptors. Table 11 and Appendix II shows the predicted vibration levels at the sensitive receptors.

Vibration limits for structures are assessed using the peak particle velocity (PPV) metric. This metric refers to the maximum speed of a particle as it oscillates about a point of equilibrium that is moved by a passing wave. Vibration limits for human perception and annoyance are assessed using the VdB metric.

For construction activities related to all phases, projected PPV levels at each sensitive receptor are anticipated to meet the FTA criteria.

Table 11 – Comparison of Predicted Continuous Construction Vibration Levels

Project Phase	Receptor	Vibration Level Criteria (PPV [in/s])	Predicted Construction Vibration Level (PPV [in/s]/VdB)	Compliance
Phase 1: Demolition	NVSR-1	0.2	0.001/62	Yes
	NVSR-2	0.2	0.0004/56	Yes
	NVSR-3	0.2	0.0004/55	Yes
	NVSR-4	0.2	0.0002/51	Yes
	NVSR-5	0.2	0.001/61	Yes
	NVSR-6	0.2	0.001/57	Yes
	NVSR-7	0.2	0.0001/44	Yes
	NVSR-8	0.2	0.00004/35	Yes
	NVSR-9	0.2	0.001/66	Yes
	NVSR-10	0.2	0.00007/38	Yes
Phase 2: Excavation, Grading & Site Utilities	NVSR-1	0.2	0.001/60	Yes
	NVSR-2	0.2	0.0003/53	Yes
	NVSR-3	0.2	0.0002/52	Yes
	NVSR-4	0.2	0.0001/48	Yes
	NVSR-5	0.2	0.0004/58	Yes
	NVSR-6	0.2	0.0003/55	Yes
	NVSR-7	0.2	0.0001/41	Yes
	NVSR-8	0.2	0.00002/32	Yes
	NVSR-9	0.2	0.001/63	Yes
	NVSR-10	0.2	0.00005/36	Yes
Phase 3: Concrete walkways and Paving	NVSR-1	0.2	0.001/60	Yes
	NVSR-2	0.2	0.0003/53	Yes
	NVSR-3	0.2	0.0002/52	Yes
	NVSR-4	0.2	0.0002/48	Yes
	NVSR-5	0.2	0.0004/58	Yes
	NVSR-6	0.2	0.0003/55	Yes
	NVSR-7	0.2	0.0001/41	Yes
	NVSR-8	0.2	0.00002/32	Yes
	NVSR-9	0.2	0.001/63	Yes
	NVSR-10	0.2	0.00005/36	Yes
Phase 4 Exterior Enclosure, Roofing and Interior Finishing	NVSR-1	0.2	0.001/60	Yes
	NVSR-2	0.2	0.0003/53	Yes
	NVSR-3	0.2	0.0002/52	Yes
	NVSR-4	0.2	0.0001/48	Yes
	NVSR-5	0.2	0.0004/58	Yes
	NVSR-6	0.2	0.0003/55	Yes
	NVSR-7	0.2	0.0001/41	Yes
	NVSR-8	0.2	0.00002/32	Yes
	NVSR-9	0.2	0.001/63	Yes
	NVSR-10	0.2	0.00005/36	Yes

7.0 CONSTRUCTION NOISE AND VIBRATION MITIGATION

Administrative mitigation such as specific procedures of a Construction Noise Monitoring Plan, as well as physical mitigation and miscellaneous best practices are provided below.

7.1 Responsibilities of the Contractor

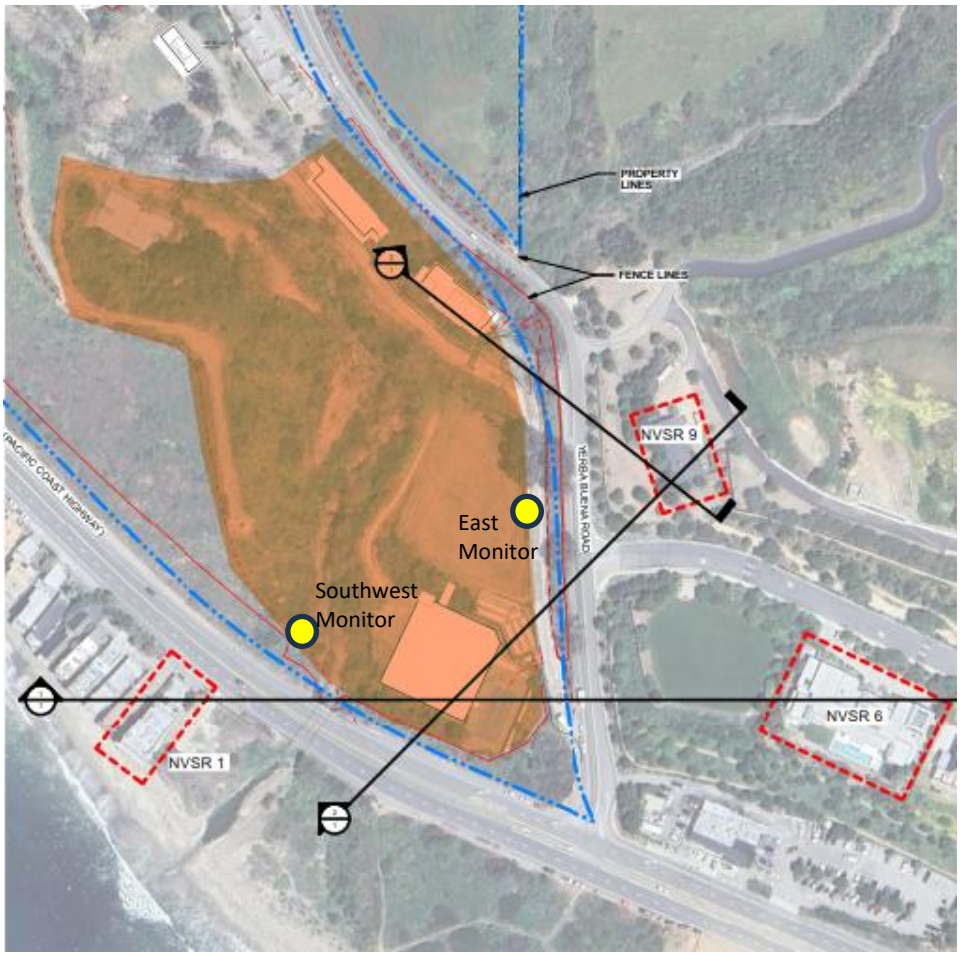
The contractor will be responsible for implementation of noise mitigation and the Construction Noise Monitoring Plan outlined in this section in order to comply with the County of Ventura Construction Noise Threshold Criteria and Control Plan, as well as Federal Transit Administration standards. Appendix C of the County Plan provides guidelines on how to monitor the construction noise, and Appendix D of the County Plan provides general guidelines to mitigate construction noise.

7.2 Operation of Equipment

Construction activity requiring the use of heavy equipment will not occur during evening and nighttime hours, as defined in the County of Ventura noise threshold criteria:

- 7:00 pm to 7:00 am Monday through Friday
- 7:00 pm to 9:00 am Saturday, Sunday and local holidays

Figure 3 - Equipment Restriction Zone



7.3 Construction Noise Monitoring Plan

Prior to the start of construction, the Contractor shall submit for approval a Construction Noise Monitoring Plan. The CNMP will include the proposed work plan, mitigation (if needed), and monitoring and reporting criteria.

- The Work Plan will identify specific equipment, schedule, and locations for construction, and re-run the noise model to determine if the County's thresholds are anticipated to be exceeded under implementation of the Work Plan. The Work Plan shall include:
    - Specific equipment (numbers and types) to be used
    - Noise-attenuating features of the selected equipment (e.g. mufflers, acoustical skirts/shields)
    - Schedule and duration for use of equipment individually and simultaneously
    - Minimization (where feasible) of multiple pieces of equipment operating simultaneously in the "equipment restriction zone" shown in orange on Figure 3.
    - Other best practices from the miscellaneous noise/vibration section (Section 7.5) to the extent feasible or necessary to reduce noise below the adopted thresholds.
- Evaluation of noise impacts based on equipment type, location, and duration of operation as identified in the work plan as compared to adopted thresholds.
- Where noise levels are found to exceed thresholds, noise barriers shall be installed as described in 7.4 below prior to implementation of the Work Plan.

At the onset of each construction phase, and continuing periodically throughout the schedule, noise monitoring shall occur as follows:

- Verify compliance with daytime criteria at sensitive receptors by monitoring noise levels in real time. This can be achieved by installing sound level meters at the off-site NVSR locations and the regular analysis of data, and/or;
- Test individual pieces of equipment to confirm that instantaneous noise levels (dBA Leq_{1sec}, slow response) do not exceed 82 dBA at a distance of 50 feet from the equipment in operation, and;
- Confirm that noise attributed to construction activity does not exceed 80 dBA (Leq_{1hr}) at eastern project boundary along Yerba Buena Road, and;
- Confirm that noise attributed to construction activity does not exceed 77 dBA (Leq_{1hr}) at southwestern project boundary adjacent to PCH and NVSR 1.
- Project boundary noise monitoring locations are shown on Figure 3 and should be between active construction areas and the nearest sensitive receptors at the perimeter of the "equipment restriction zone".
- If noise levels (without barriers) are found to exceed thresholds, the Contractor shall implement additional controls as may be necessary. These additional controls could include adding additional noise-reduction to the equipment itself, reduction in the number or type of equipment used in the equipment restriction zone, or construction of noise barriers, or other methods. Selection of additional controls shall be at the Contractor's discretion and subject to providing evidence to the County that sufficient reduction can be achieved via the proposed methods to reduce noise levels to the adopted threshold.

7.4 Physical Mitigation – Temporary Noise Barriers

To reduce noise impacts from construction activity that cannot be mitigated administratively (via carefully considered Work Plan as described above), provide temporary noise barriers. Practical placement of barriers is along the eastern project fence line adjacent to Yerba Buena Blvd (NVSR 9) and at the southwest project border adjacent to PCH (NVSR 1). The eastern barrier shall be a minimum of 12 feet high to adequately reduce noise levels at NVSR 9 to the east. The western barrier shall be a minimum of 10 feet high to adequately reduce noise levels at NVSR 1 to the southwest. Intervening topography accounts for additional noise reduction from project site to receptors and limits the effectiveness of noise barriers in some locations. Location and extent/length of barriers that would be most effective are shown in pink on Figure 4.

The noise barriers can be any solid material with a surface density of no less than 2 lb. per square foot or a system approved by the acoustical engineer, with a minimum height of 12 feet and 10 feet, as specified above. Materials meeting this requirement include 3/4-inch thick wood, 3/4-inch outdoor plywood, 16-gauge steel sheet, and any masonry units or temporary sound blankets. Chain link fence affixed with temporary sound blankets can be weighed down with sandbags to prevent light wind from compromising integrity, although temporary fence bracing is likely needed for heavier winds.

Support frames should be constructed in sections which allow overlapping between barrier panels when multiples are attached. Gaps between barrier units and between the bottom edge of barrier panels at the ground shall be covered or sealed with a material having a weight of 2 pounds per square foot. These barriers will be capable of achieving a minimal Sound Transmission Class (STC) rating of 23. Use of equivalent noise barrier systems shall be reviewed and approved by the acoustical engineer. Barriers shall be erected and in place prior to the start of grading and remain in place until site landscaping is installed.

The design details and materials for the temporary noise barriers and support will be prepared for approval and stamped by a Professional Engineer licensed in the state of California. The design and detailed engineering drawings/calculations of the barrier will be submitted for approval.

If the construction equipment utilized varies significantly from the equipment categorized in Table 7, this report must be reissued, and noise abatement measures may need to be re-evaluated. For the noise mitigation calculations, the loudest construction equipment for each construction phase was selected.

Construction noise levels at NVSR 1, 6, and 9, as shown in Table 12, can be reduced below the County's adopted threshold via installation of temporary noise barriers.

Figure 4 – Temporary Noise Barrier Locations

Table 12– Comparison of Construction Noise Levels Without Mitigation and with Physical Mitigation*

Project Phase	Receptor	Daytime Noise Criteria (dBA Leq_{1hr})	Construction Noise Level Without Mitigation (dBA Leq_{1hr})	Construction Noise Level With Physical Mitigation (dBA Leq_{1hr})	Compliance with County of Ventura Criteria
Phase 1: Demolition	NVSR-1	55	**57**	53	Yes
	NVSR-2	55	44	44	Yes
	NVSR-3	55	40	40	Yes
	NVSR-4	55	37	36	Yes
	NVSR-5	60	55	55	Yes
	NVSR-6	55	**57**	53	Yes
	NVSR-7	55	48	46	Yes
	NVSR-8	55	42	41	Yes
	NVSR-9	55	**62**	53	Yes
	NVSR-10	55	44	43	Yes
Phase 2: Excavation, Grading & Site Utilities	NVSR-1	55	**58**	54	Yes
	NVSR-2	55	45	44	Yes
	NVSR-3	55	41	41	Yes
	NVSR-4	55	37	37	Yes
	NVSR-5	60	56	55	Yes
	NVSR-6	55	**57**	53	Yes
	NVSR-7	55	48	46	Yes
	NVSR-8	55	42	42	Yes
	NVSR-9	55	**62**	53	Yes
	NVSR-10	55	44	44	Yes
Phase 3: Concrete walkways and Paving	NVSR-1	55	**58**	54	Yes
	NVSR-2	55	45	44	Yes
	NVSR-3	55	41	41	Yes
	NVSR-4	55	37	37	Yes
	NVSR-5	60	56	55	Yes
	NVSR-6	55	**58**	54	Yes
	NVSR-7	55	49	48	Yes
	NVSR-8	55	43	43	Yes
	NVSR-9	55	**63**	54	Yes
	NVSR-10	55	45	45	Yes
Phase 4 Exterior Enclosure, Roofing and Interior Finishing	NVSR-1	55	50	46	Yes
	NVSR-2	55	37	37	Yes
	NVSR-3	55	32	31	Yes
	NVSR-4	55	29	29	Yes
	NVSR-5	60	49	49	Yes
	NVSR-6	55	50	46	Yes
	NVSR-7	55	41	40	Yes
	NVSR-8	55	35	35	Yes
	NVSR-9	55	**56**	47	Yes
	NVSR-10	55	37	37	Yes

* Physical Mitigation refers to the construction of temporary noise barriers as detailed in Section 7.4.

7.5 Miscellaneous Noise/Vibration Items

The work plan as described in section 7.3 herein shall implement the following best practices to the extent feasible or necessary to reduce noise below the adopted thresholds.

1. Location of Construction Activity

Whenever possible, construction or equipment activity generating relatively high levels of noise should occur as far away from noise-sensitive receptors as possible. Sensitive locations for this project are marked in Table 9 and Figure 2.

The Equipment Restriction Zone conditions in sections 6.3 and 7.3 are applicable.

2. Ordering of Construction Activity

Whenever possible, construction or equipment activity generating relatively high levels of noise and vibration should not occur at the same time and should be spaced as far apart in time as possible from one another. In general, the loudest activities should be reserved for the middle of the day (noon). If activities must occur simultaneously, they should be performed as far away from one another as possible within the construction zone.

3. Delivery and Storage of Materials and Equipment

All deliveries of material and equipment shall occur during the hours of 07:00 a.m. to 7:00 p.m. when possible and shall not occur on weekends. The queuing of construction vehicles outside the site before 07:00 a.m. or after 7:00 p.m. should be avoided whenever possible. Vehicles delivering materials and equipment shall be operated in strict conformance with regulations established by the United States Department of Transportation and all State and Local requirements. All vehicles shall utilize mufflers and other devices to minimize noise levels. All materials and equipment shall be stored on-site and within the confines of the construction barricades.

4. Stationary and Portable Equipment

Stationary and portable construction equipment will be located at positions where the noise impact to nearby noise/vibration-sensitive receptors (NVSR) is minimal. At times where the equipment cannot be positioned at a minimal noise impacting location, noise mitigation devices may need to be implemented (e.g., noise barriers, noise blankets as described above).

5. Construction Equipment Inactivity

Construction equipment shall not remain idling and inactive for relatively long periods during construction hours. All such equipment shall be turned off until use is required.

6. Public Announcement Systems

The use of amplified public announcement systems, speakers, and similar equipment—except for a bull horn during emergency circumstances—shall not be utilized at the project.

7. Radios and Alarms

Radios, music playback equipment, musical instruments, or automobile or truck alarms shall not be utilized such that they are audible beyond the boundaries of the construction zone.

8. Vehicle Routes

Select truck routes for material delivery and spoils disposal so that noise from heavy-duty trucks will have a minimal impact on noise sensitive receptors.

9. Vehicle Horns

Except as otherwise required by law, all vehicle horns shall remain silent, except in the case of an emergency.

10. Noise and Vibration Monitoring

Noise and vibration monitors should be placed at the sensitive receptors to monitor construction activities so that either the General Contractor or a third party acoustical consultant can ensure the project thresholds are met. Real-time alerts must be sent to the Contractor in case of threshold exceedances. In case of exceedances, work must stop, and the source of the exceedance must be identified, and the required mitigation measure should be incorporated. Appendix C of the County of Ventura Construction Noise Threshold Criteria and Control Plan provide guidelines to follow during noise measurements, and Figure C-1 is a noise measurement report form (Part A and B) to be used for documenting the noise measurement. Refer to Construction Noise Monitoring Plan above for more information.

11. Construction Schedule

Notifying the neighborhood of the construction activities and construction schedule (including estimated dates of various construction phases) at least one week and no more than three weeks prior to the start of construction.

12. Noise Disturbance Coordinator

Designate a “noise disturbance coordinator” who shall be responsible for responding to any local complaints about construction noise. The disturbance coordinator shall determine the cause of noise complaint and institute responsible measures warranted to correct the problem. A telephone number for the disturbance coordinator shall be conspicuously posted at the construction site.

13. Vibration claims Investigation

Designate a person responsible for registering and investigating claims of excessive vibration. The contact information of such a person shall be clearly posted on the construction site.

7.6 Summary Conclusion

With the adoption of the Construction Noise and Vibration Impact Assessment recommendations provided within this report, the requirements set forth in the County of Ventura Construction Noise Threshold Criteria and Control Plan and FTA standards are satisfied.

END

APPENDIX I – GLOSSARY OF ACOUSTICAL TERMS

Definitions of Acoustical and Other Related Terms

Term	Definition
Construction Site	For the purpose of noise and vibration control requirements, the construction site includes property lines, construction easement boundaries, and contractor staging areas outside the defined boundary lines, used expressly for construction.
Daytime	Local – Pacific Standard Time Zone between 07:00 and 19:00.
Decibel (dB)	A unit describing the amplitude of sound in a logarithmic ratio to a reference value.
A-weighted Decibels (dBA)	A filter applied to sound pressure levels in decibel to simulate the response of the human ear at the threshold of hearing. A-weighting de-emphasizes the low frequency components of a sound similar to the human ear at these levels. This metric has been closely tied to subjective reactions of annoyance to noise, and is used as a noise metric in this and in many other environmental acoustics reports. In this report, all dBA levels reported refer to the sound pressure level, referenced to 20µPa
Sound Pressure Level (L_p)	The amplitude of sound compared to the reference value of 20µPa. Sound Pressure Level is what we perceive as audible sound. Sound Pressure Level decreases as distance from the source to the receptor increases. All sound values discussed in this report refer to Sound Pressure Levels.
Equivalent Sound Level (L_{eq})	The time-weighted average sound or vibration level for a given period of time. Use of this metric allows the observation of the overall sound level for the measurement period.
Maximum Sound Level (L_{max})	The instantaneous maximum sound or vibration level of an event. The L_{max} can occur over very short periods of time, and fluctuates much more than the L_{eq} due to the presence of short events in the environment.
Vibration Decibel (VdB)	A measure of vibration amplitude in decibels, referenced to 1µin/sec, most commonly used for assessment and prediction of annoyance due to perceptible vibration and ground-borne noise. The V is added for clarity to easily distinguish between sound and vibration decibels.

APPENDIX II – CONSTRUCTION VIBRATION PREDICTION

Project Name	**Wilshire Blvd**
Project Number	**8261-001**
Date	**2/8/2024**
	Demolition

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Recommended Values of Exponent "n" for PPV calcs

Description	
FTA Value	1.5

Soil Class	Description of Soil Material	"n"
FTA Value	Typical value for general analysis	1.5
Caltrans Category I	Weak or soft soil: loose soil, dry or partially saturated peat and muck, mud, loose beach sand, and dune sand, recently placed ground, soft spongy forest or jungle floor, organic soil, top soil. (shovel penetrates easily)	1.4
Caltrans Category II	Competent soil: most sand, sandy clay, silty clay, gravel, silty soil, weathered rock. (can dig with shovel)	1.3
Caltrans Category III	Hard soil: dense compacted sand, dry consolidated clay, consolidated glacial till, some exposed rock. (cannot dig with shovel, need pick to break up)	1.1
Caltrans Category IV	Hard, competent rock: bedrock, freshly exposed hard rock (difficult to break with hammer)	1.0

				Receptor R1			Receptor R2			Receptor R3		
				Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)
			Damage Criteria	III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2
			Annoyance Criteria	Category II: Residences and building where people normally sleep			- Category III:Institutional land uses with primarily daytime use			Category II: Residences and building where people normally sleep		
Annoyance Criteria	**Equipment type**	**PPV_{ref} at 25 ft (in**	**L_v at 25ft (VdB)**	**Distance (ft) to R1**	**PPV_{equip} at R1**	**Lv at R1**	**Distance (ft) to R2**	**PPV_{equip} at R2**	**Lv at R2**	**Distance (ft) to R3**	**PPV_{equip} at R3**	**Lv at R3**
Occasional Events: 30-70 events per d	Small bulldozer	0.003	58	240	0.000	28.5	389	0.000	22.2	423	0.000	21.1
Frequent Events: >70 events per day	Large Bulldozer	0.089	87	240	0.003	57.5	389	0.001	51.2	423	0.001	50.1
Frequent Events: >70 events per day	Loaded trucks	0.076	86	240	0.003	56.5	389	0.001	50.2	423	0.001	49.1
Frequent Events: >70 events per day	Small bulldozer	0.003	58	240	0.000	28.5	389	0.000	22.2	423	0.000	21.1
Frequent Events: >70 events per day	Small bulldozer	0.003	58	240	0.000	28.5	389	0.000	22.2	423	0.000	21.1
Infrequent Events: <30 events per day	Large Bulldozer	0.089	87	240	0.003	57.5	389	0.001	51.2	423	0.001	50.1
Infrequent Events: <30 events per day	Small bulldozer	0.003	58	240	0.000	28.5	389	0.000	22.2	423	0.000	21.1
Frequent Events: >70 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
Frequent Events: >70 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
Frequent Events: >70 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
					0.001	62.0		0.0004	55.7		0.0004	54.6

Receptor R4			Receptor R5			Receptor R6			Receptor R7		
Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)
III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2
Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep		
Distance (ft) to R4	**PPV_{equip} at R4**	**Lv at R4**	**Distance (ft) to R5**	**PPV_{equip} at R5**	**Lv at R5**	**Distance (ft) to R6**	**PPV_{equip} at R6**	**Lv at R6**	**Distance (ft) to R7**	**PPV_{equip} at R7**	**Lv at R7**
576	0.000	17.1	270	0.000	27.0	345	0.000	23.8	986	0.000	10.1
576	0.001	46.1	270	0.003	56.0	345	0.002	52.8	986	0.000	39.1
576	0.001	45.1	270	0.002	55.0	345	0.001	51.8	986	0.000	38.1
576	0.000	17.1	270	0.000	27.0	345	0.000	23.8	986	0.000	10.1
576	0.000	17.1	270	0.000	27.0	345	0.000	23.8	986	0.000	10.1
576	0.001	46.1	270	0.003	56.0	345	0.002	52.8	986	0.000	39.1
576	0.000	17.1	270	0.000	27.0	345	0.000	23.8	986	0.000	10.1
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
	0.0002	50.6		0.001	60.5		0.001	57.3		0.00011	43.6

Receptor R8			Receptor R9		
Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)
III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2
Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep		
Distance (ft) to R8	**PPV_{equip} at R8**	**Lv at R8**	**Distance (ft) to R9**	**PPV_{equip} at R9**	**Lv at R9**
1932	0.000	1.4	132	0.000	36.3
1932	0.000	30.4	132	0.007	65.3
1932	0.000	29.4	132	0.006	64.3
1932	0.000	1.4	132	0.000	36.3
1932	0.000	1.4	132	0.000	36.3
1932	0.000	30.4	132	0.007	65.3
1932	0.000	1.4	132	0.000	36.3
1932	0.000	0.0	132	0.000	0.0
1932	0.000	0.0	132	0.000	0.0
1932	0.000	0.0	132	0.000	0.0
	0.00004	34.8		0.002	69.8

Project Name	Wilshire Blvd
Project Number	8261-001
Date	2/8/2024
	Excavation

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Recommended Values of Exponent "n" for PPV calcs

Description	
FTA Value	1.5

Soil Class	Description of Soil Material	"n"
FTA Value	Typical value for general analysis	1.5
Caltrans Category I	Weak or soft soils: loose soils, dry or partually saturated peat and muck, mud, loose beach sand, and dune sand, recently plowed ground, soft spongy forest or jungle floor, organic soils, top soil. (shovel penetrates easily)	1.4
Caltrans Category II	Competent soils: most sands, sandy clays, silty clays, gravel, silts, weathered rock. (can dig with shovel)	1.3
Caltrans Category III	Hard soils: dense compacted sand, dry consolidated clay, consolidated glacial till, some exposed rock. (cannot dig with shove, need pick to break up)	1.1
Caltrans Category IV	Hard, competent rock: bedrock, freshly exposed hard rock (difficult to break with hammer)	1.0

				Receptor R1			Receptor R2			Receptor R3		
				Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)
			Damage Criteria	III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2
			Annoyance Criteria	Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep		
Annoyance Criteria	Equipment type	PPV_{ref} at 25 ft (in	L_v at 25ft (VdB)	Distance (ft) to R1	PPV_{equip} at R1	Lv at R1	Distance (ft) to R2	PPV_{equip} at R2	Lv at R2	Distance (ft) to R3	PPV_{equip} at R3	Lv at R3
Occasional Events: 30-70 events per d	Loaded trucks	0.076	86	240	0.003	56.5	389	0.001	50.2	423	0.001	49.1
Frequent Events: >70 events per day	Small bulldozer	0.003	58	240	0.000	28.5	389	0.000	22.2	423	0.000	21.1
Frequent Events: >70 events per day	Small bulldozer	0.003	58	240	0.000	28.5	389	0.000	22.2	423	0.000	21.1
Frequent Events: >70 events per day	Loaded trucks	0.076	86	240	0.003	56.5	389	0.001	50.2	423	0.001	49.1
Frequent Events: >70 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
Infrequent Events: <30 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
Infrequent Events: <30 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
Frequent Events: >70 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
Frequent Events: >70 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
Frequent Events: >70 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
					0.001	59.5		0.0003	53.3		0.0002	52.2

Receptor R4			Receptor R5			Receptor R6			Receptor R7		
Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)
III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2
Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep		
Distance (ft) to R4	PPV_{equip} at R4	Lv at R4	Distance (ft) to R5	PPV_{equip} at R5	Lv at R5	Distance (ft) to R6	PPV_{equip} at R6	Lv at R6	Distance (ft) to R7	PPV_{equip} at R7	Lv at R7
576	0.001	45.1	270	0.002	55.0	345	0.001	51.8	986	0.000	38.1
576	0.000	17.1	270	0.000	27.0	345	0.000	23.8	986	0.000	10.1
576	0.000	17.1	270	0.000	27.0	345	0.000	23.8	986	0.000	10.1
576	0.001	45.1	270	0.002	55.0	345	0.001	51.8	986	0.000	38.1
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
	0.0001	48.1		0.0004	58.0		0.0003	54.8		0.0001	41.1

Receptor R8			Receptor R9		
Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)
III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2
Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep		
Distance (ft) to R8	PPV_{equip} at R8	Lv at R8	Distance (ft) to R9	PPV_{equip} at R9	Lv at R9
1932	0.000	29.4	178	0.004	60.4
1932	0.000	1.4	178	0.000	32.4
1932	0.000	1.4	178	0.000	32.4
1932	0.000	29.4	178	0.004	60.4
1932	0.000	0.0	178	0.000	0.0
1932	0.000	0.0	178	0.000	0.0
1932	0.000	0.0	178	0.000	0.0
1932	0.000	0.0	178	0.000	0.0
1932	0.000	0.0	178	0.000	0.0
1932	0.000	0.0	178	0.000	0.0
	0.00002	32.4		0.001	63.4

Project Name	**Vilshire Blvd**
Project Number	**8261-001**
Date	**2/8/2024**
	Site Utility and Paving

Edit cells in **Yellow**

Recommended Values of Exponent "n" for PPV calcs

Description		Soil Class	Description of Soil Material	Suggested value of
		FTA Value	Typical value for general analysis	1.5
		Caltrans Category I	Weak or soft soils: loose soils, dry or partually saturated peat and muck, mud, loose beach sand, and dune sand, recently plowed ground, soft spongy forest or jungle floor, organic soils, top soil. (shovel penetrate	1.4
		Caltrans Category II	Competent soils: most sands, sandy clays, silty clays, gravel, silts, weathered rock. (can dig with shovel)	1.3
		Caltrans Category III	Hard soils: dense compacted sand, dry consolidated clay, consolidated glacial till, some exposed rock. (cannot dig with shove, need pick to break up)	1.1
FTA Value	1.5	Caltrans Category IV	Hard, competent rock: bedrock, freshly exposed hard rock (difficult to break with hammer)	1.0

Damage Criteria: III. Non-engineered timber and masonry buildings (Criteria PPV (in/sec) 0.2) — applies to all receptors R1–R9
Annoyance Criteria: Category II: Residences and building where people normally sleep — applies to all receptors R1–R9

Annoyance Criteria	Equipment type	PPV_{ref} at 25 ft (i	L_v at 25ft (VdB)
Occasional Events: 30-70 events per da	Small bulldozer	0.003	58
Frequent Events: >70 events per day	Loaded trucks	0.076	86
Frequent Events: >70 events per day	Loaded trucks	0.076	86
Frequent Events: >70 events per day	Small bulldozer	0.003	58
Frequent Events: >70 events per day	No Equipment	N/A	N/A
Infrequent Events: <30 events per day	No Equipment	N/A	N/A
Infrequent Events: <30 events per day	No Equipment	N/A	N/A
Frequent Events: >70 events per day	No Equipment	N/A	N/A
Frequent Events: >70 events per day	No Equipment	N/A	N/A
Frequent Events: >70 events per day	No Equipment	N/A	N/A

Row	Distance (ft) to R1	PPV_{equip} at R1	Lv at R1	Distance (ft) to R2	PPV_{equip} at R2	Lv at R2	Distance (ft) to R3	PPV_{equip} at R3	Lv at R3
1	240	0.000	28.5	389	0.000	22.2	423	0.000	21.1
2	240	0.003	56.5	389	0.001	50.2	423	0.001	49.1
3	240	0.003	56.5	389	0.001	50.2	423	0.001	49.1
4	240	0.000	28.5	389	0.000	22.2	423	0.000	21.1
5	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
6	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
7	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
8	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
9	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
10	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
Total		0.001	59.5		0.0003	53.3		0.0002	52.2

Row	Distance (ft) to R4	PPV_{equip} at R4	Lv at R4	Distance (ft) to R5	PPV_{equip} at R5	Lv at R5	Distance (ft) to R6	PPV_{equip} at R6	Lv at R6	Distance (ft) to R7	PPV_{equip} at R7	Lv at R7
1	576	0.000	17.1	270	0.000	27.0	345	0.000	23.8	986	0.000	10.1
2	576	0.001	45.1	270	0.002	55.0	345	0.001	51.8	986	0.000	38.1
3	576	0.001	45.1	270	0.002	55.0	345	0.001	51.8	986	0.000	38.1
4	576	0.000	17.1	270	0.000	27.0	345	0.000	23.8	986	0.000	10.1
5	576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
6	576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
7	576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
8	576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
9	576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
10	576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
Total		0.00014	48.1		0.0004	58.0		0.0003	54.8		0.00006	41.1

Row	Distance (ft) to R8	PPV_{equip} at R8	Lv at R8	Distance (ft) to R9	PPV_{equip} at R9	Lv at R9
1	1932	0.000	1.4	178	0.000	32.4
2	1932	0.000	29.4	178	0.004	60.4
3	1932	0.000	29.4	178	0.004	60.4
4	1932	0.000	1.4	178	0.000	32.4
5	1932	0.000	0.0	178	0.000	0.0
6	1932	0.000	0.0	178	0.000	0.0
7	1932	0.000	0.0	178	0.000	0.0
8	1932	0.000	0.0	178	0.000	0.0
9	1932	0.000	0.0	178	0.000	0.0
10	1932	0.000	0.0	178	0.000	0.0
Total		0.00002	32.4		0.001	63.4

Project Name	Wilshire Blvd
Project Number	8261-001
Date	2/8/2024
	Exterior Enclosure, Roofing & Interirio Finishing

Edit cells in **Yellow**

Recommended Values of Exponent "n" for PPV calcs

Description		Soil Class	Description of Soil Material	"n"
		FTA Value	Typical value for general analysis	1.5
		Caltrans Category I	Weak or soft soils: loose soils, dry or partially saturated peat and muck, mud, loose beach sand, and dune sand, recently plowed ground, soft spongy forest or jungle floor, organic soils, top soil. (shovel penetrates easily)	1.4
		Caltrans Category II	Competent soils: most sands, sandy clays, silty clays, gravel, silts, weathered rock. (can dig with shovel)	1.3
		Caltrans Category III	Hard soils: dense compacted sand, dry consolidated clay, consolidated glacial till, some exposed rock. (cannot dig with shovel, need pick to break up)	1.1
FTA Value	1.5	Caltrans Category IV	Hard, competent rock: bedrock, freshly exposed hard rock (difficult to break with hammer)	1.0

				Receptor R1			Receptor R2			Receptor R3		
				Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)
			Damage Criteria	III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2
			Annoyance Criteria	Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep		
Annoyance Criteria	**Equipment type**	**PPV_{ref} at 25 ft (in**	**L_v at 25ft (VdB)**	**Distance (ft) to R1**	**PPV_{equip} at R1**	**Lv at R1**	**Distance (ft) to R2**	**PPV_{equip} at R2**	**Lv at R2**	**Distance (ft) to R3**	**PPV_{equip} at R3**	**Lv at R3**
Occasional Events: 30-70 events per d	Loaded trucks	0.076	86	240	0.003	56.5	389	0.001	50.2	423	0.001	49.1
Frequent Events: >70 events per day	Small bulldozer	0.003	58	240	0.000	28.5	389	0.000	22.2	423	0.000	21.1
Frequent Events: >70 events per day	Loaded trucks	0.076	86	240	0.003	56.5	389	0.001	50.2	423	0.001	49.1
Frequent Events: >70 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
Frequent Events: >70 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
Infrequent Events: <30 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
Infrequent Events: <30 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
Frequent Events: >70 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
Frequent Events: >70 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
Frequent Events: >70 events per day	No Equipment	N/A	N/A	240	0.000	0.0	389	0.000	0.0	423	0.000	0.0
					0.001	59.5		0.00025	53.3		0.00022	52.2

Receptor R4			Receptor R5			Receptor R6			Receptor R7		
Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)
III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2
Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep		
Distance (ft) to R4	**PPV_{equip} at R4**	**Lv at R4**	**Distance (ft) to R5**	**PPV_{equip} at R5**	**Lv at R5**	**Distance (ft) to R6**	**PPV_{equip} at R6**	**Lv at R6**	**Distance (ft) to R7**	**PPV_{equip} at R7**	**Lv at R7**
576	0.001	45.1	270	0.002	55.0	345	0.001	51.8	986	0.000	38.1
576	0.000	17.1	270	0.000	27.0	345	0.000	23.8	986	0.000	10.1
576	0.001	45.1	270	0.002	55.0	345	0.001	51.8	986	0.000	38.1
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
576	0.000	0.0	270	0.000	0.0	345	0.000	0.0	986	0.000	0.0
	0.0001	48.1		0.0004	58.0		0.0003	54.8		0.0001	41.1

Receptor R8			Receptor R9		
Building category		Criteria PPV (in/sec)	Building category		Criteria PPV (in/sec)
III. Non-engineered timber and masonry buildings		0.2	III. Non-engineered timber and masonry buildings		0.2
Category II: Residences and building where people normally sleep			Category II: Residences and building where people normally sleep		
Distance (ft) to R8	**PPV_{equip} at R8**	**Lv at R8**	**Distance (ft) to R9**	**PPV_{equip} at R9**	**Lv at R9**
1932	0.000	29.4	178	0.004	60.4
1932	0.000	1.4	178	0.000	32.4
1932	0.000	29.4	178	0.004	60.4
1932	0.000	0.0	178	0.000	0.0
1932	0.000	0.0	178	0.000	0.0
1932	0.000	0.0	178	0.000	0.0
1932	0.000	0.0	178	0.000	0.0
1932	0.000	0.0	178	0.000	0.0
1932	0.000	0.0	178	0.000	0.0
1932	0.000	0.0	178	0.000	0.0
	0.00002	32.4		0.001	63.4