ALDER TAYLOR RETAIL CENTER NOISE IMPACT ANALYSIS

County of San Bernardino

August 11, 2023

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Traffic Engineering ● Transportation Planning ● Parking ● Noise & Vibration
Air Quality ● Global Climate Change ● Health Risk Assessment

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Project No. 19617

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EXECUTIVE SUMMARY

The 3.6-acre project site is located at 17783 Taylor Avenue, Bloomington in the County of San Bernardino, California. The project site is located within a County Special Development (SD) zone for Valley Corridor Specific Plan/Bloomington Enterprise (VC/BE) and is currently developed with three residential buildings.

The proposed project involves removal of the existing residential structures for the construction and operation of an approximately 54,779 square foot multi-tenant building consisting of 13,140 square feet of office/sales use, 272 square feet of electrical/sprinkler room use, and 41,639 square feet of warehouse/wholesale use. Vehicular access is proposed by two driveways on Taylor Avenue.

Existing Noise Environment

Sensitive receptors that may be affected by project generated noise include the existing single-family residential uses located adjacent to the eastern and western project site property lines and to the northeast (across Taylor Avenue) and northwest (across Taylor Avenue).

Measured short-term ambient noise levels in the project vicinity ranged between 64 and 65.8 dBA L_{eq}. The dominant noise source in the project vicinity was vehicle traffic associated with Taylor Avenue, Alder Avenue, Valley Boulevard, and the Interstate 10 Freeway as well as truck movement and auto repair and machinery noise associated with surrounding commercial uses.

Construction Noise Impacts

Project construction will not occur outside of the hours outlined in the County of San Bernardino Development Code Section 83.01.080(g)(3). Therefore, the project would not exceed County-established standards relating to construction noise. The project impact is less than significant; no mitigation is required.

Notwithstanding the above, best management practices (BMPs) are provided in the Project Description and should be added to project plans and in contract specifications to minimize construction noise emanating from the proposed project.

Stationary Source Noise Impacts

The SoundPLAN noise model was utilized to model project peak hour operation. Noise levels associated with the proposed project would range between 32.6 and 39.7 dBA L_{eq} and will not exceed the County's day or nighttime noise criteria at the adjacent land uses (residential 55 dBA L_{eq} day/45 dBA L_{eq} night and commercial 60 dBA L_{eq} for both day and nighttime). No mitigation is required.

Mobile Source Noise Impacts

The addition of project trips is not expected to change noise levels more than the applicable threshold at any of the study roadway segments. The project impact is less than significant; no mitigation is required.

Groundborne Vibration Impacts

The project would not exceed County-established standards nor guidance thresholds for potential architectural damage to nearby buildings with implementation of Mitigation Measure NOI-1. The project impact is less than significant with mitigation incorporated.

Mitigation Measure NOI-1: The use of vibratory rollers, or other similar vibratory equipment, shall be prohibited within 20 feet and the use of large bulldozers within 12 feet of residential structures surrounding the project site.

Air Traffic Impacts

The project site is located well outside both the airport compatibility zones and the 55 dBA CNEL noise contour for the Flabob Airport. Therefore, the project would not expose people residing or working in the project area to excessive noise levels associated with airports. The project would have no impact.

1. INTRODUCTION

This section describes the purpose of this study and introduces the proposed project.

PURPOSE AND OBJECTIVES

The purpose of this report is to provide an assessment of the noise impacts resulting from development of the proposed project and to identify mitigation measures that may be necessary to reduce those impacts. The noise issues related to the proposed land use and development have been evaluated in light of applicable federal, state and local policies, including those of the County of San Bernardino, in the context of the California Environmental Quality Act (CEQA).

Although this is a technical report, effort has been made to write the report clearly and concisely. A list of acronyms and glossary are provided in Appendix A and Appendix B of this report to assist the reader with technical terms.

PROJECT LOCATION

The 3.6-acre project site is located at 17783 Taylor Avenue, Bloomington in the County of San Bernardino, California. The project site is located within a County Special Development (SD) zone for Valley Corridor Specific Plan/Bloomington Enterprise (VC/BE) and is currently developed with three residential buildings. Figure 1 shows the project location map.

PROJECT DESCRIPTION

The proposed project involves removal of the existing residential structures for the construction and operation of an approximately 54,779 square foot multi-tenant building consisting of 13,140 square feet of office/sales use, 272 square feet of electrical/sprinkler room use, and 41,639 square feet of warehouse/wholesale use. Vehicular access is proposed by two driveways on Taylor Avenue. Figure 2 illustrates the project site plan.

The following Best Management Practices (BMPs) should be provided on project plans and in contract specifications to minimize construction noise emanating from the proposed project, however, implementation is not required for compliance with applicable sections of the County of San Bernardino Development Code:

1. All construction equipment, whether fixed or mobile, will be equipped with properly operating and maintained mufflers, consistent with manufacturer standards.
2. All stationary construction equipment will be placed so that emitted noise is directed away from the noise sensitive receptors nearest the project site.
3. As applicable, all equipment shall be shut off when not in use.
4. To the degree possible, equipment staging will be located in acres that create the greatest distance between construction-related noise and vibration sources and existing sensitive receptors.
5. Jackhammers, pneumatic equipment, and all other portable stationary noise sources will be directed away and shielded from existing residences in the vicinity of the project site. Either one-inch plywood or sound blankets can be utilized for this purpose. They should reach up from the ground and block the line of sight between equipment and existing residences. The shielding should be without holes and cracks.
6. No amplified music and/or voice will be allowed on the project site.
7. Haul truck deliveries will not occur outside of the hours presented as exempt for construction per County of San Bernardino Development Code within Section 83.01.080(g)(3).

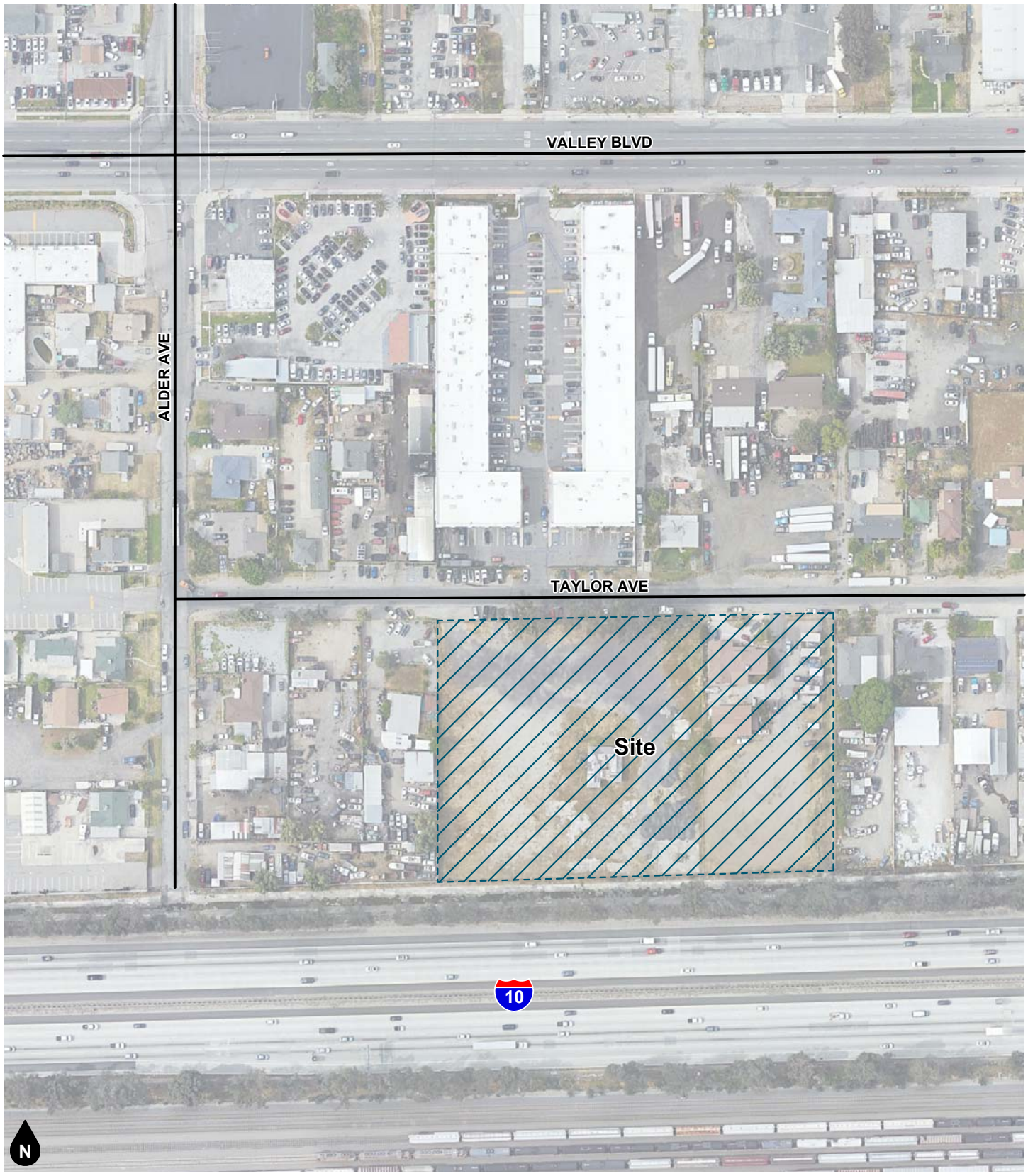


Figure 1
Project Location Map

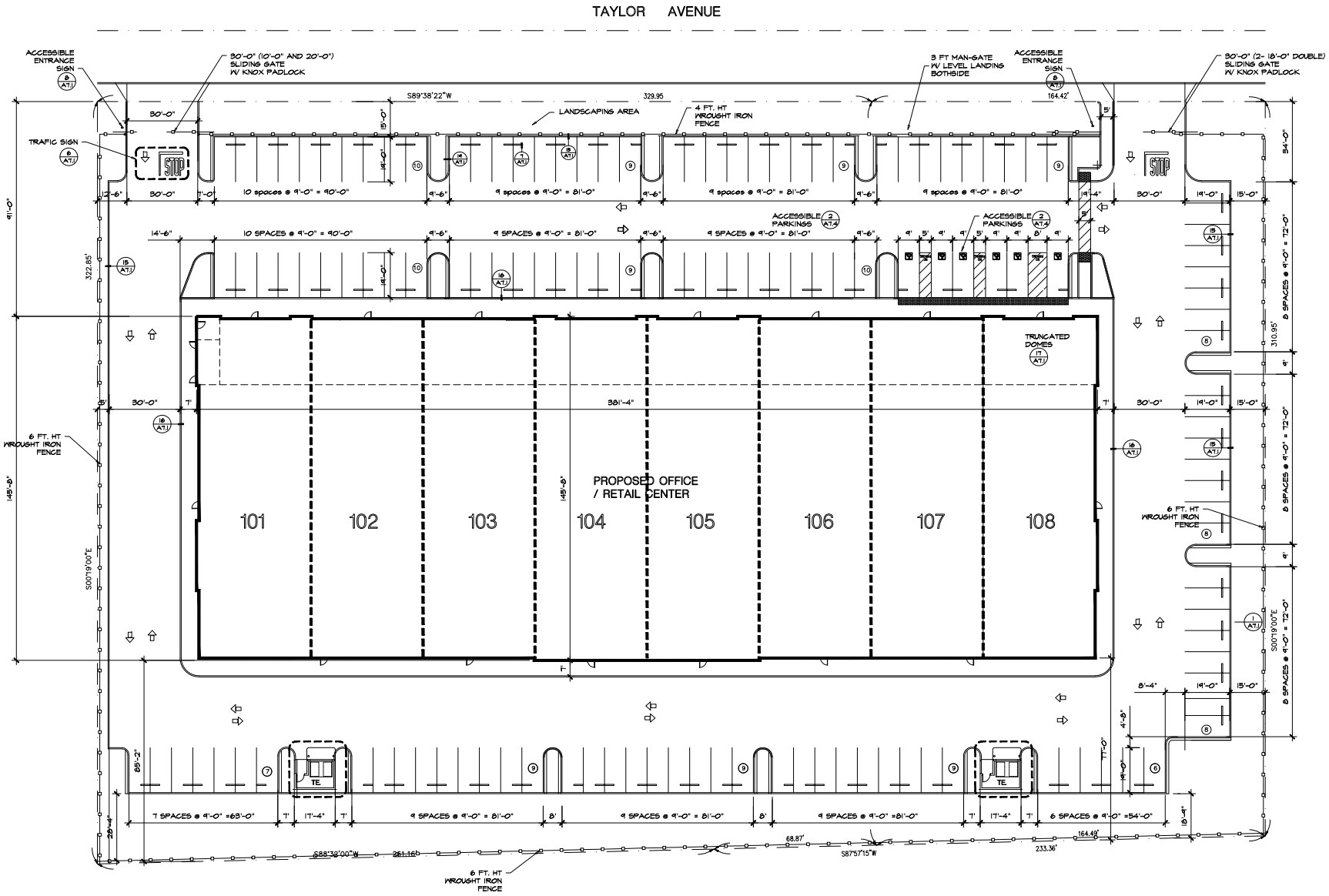


Figure 2
Site Plan

2. NOISE AND VIBRATION FUNDAMENTALS

This section provides an overview of key noise and vibration concepts.

NOISE FUNDAMENTALS

Sound is a pressure wave created by a moving or vibrating source that travels through an elastic medium such as air. Noise is defined as unwanted or objectionable sound. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and in extreme circumstances, hearing impairment.

Commonly used noise terms are presented in Appendix B. The unit of measurement used to describe a noise level is the decibel (dB). The human ear is not equally sensitive to all frequencies within the sound spectrum. Therefore, the "A-weighted" noise scale, which weights the frequencies to which humans are sensitive, is used for measurements. Noise levels using A-weighted measurements are written dB(A) or dBA.

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound from point sources, such as air conditioning condensers, radiates uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

Decibels are measured on a logarithmic scale, which quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as a doubled traffic volume, would increase the noise levels by 3 dBA; halving of the energy would result in a 3 dBA decrease. Figure 3 shows the relationship of various noise levels to commonly experienced noise events.

Average noise levels over a period of minutes or hours are usually expressed as dBA L_{eq}, or the equivalent noise level for that period of time. For example, $L_{eq(3\text{-}hr)}$ would represent a 3-hour average. When no period is specified, a one-hour average is assumed.

Noise standards for land use compatibility are stated in terms of the Community Noise Equivalent Level (CNEL) and the Day-Night Average Noise Level (DNL). CNEL is a 24-hour weighted average measure of community noise. CNEL is obtained by adding five decibels to sound levels in the evening (7:00 PM to 10:00 PM), and by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the evening and nighttime hours. DNL is a very similar 24-hour average measure that weighs only the nighttime hours.

It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA; that a change of 5 dBA is readily perceptible, and that an increase (decrease) of 10 dBA sounds twice (half) as loud. This definition is recommended by the California Department of Transportation's Technical Noise Supplement to the Traffic Noise Analysis Protocol (2013).

VIBRATION FUNDAMENTALS

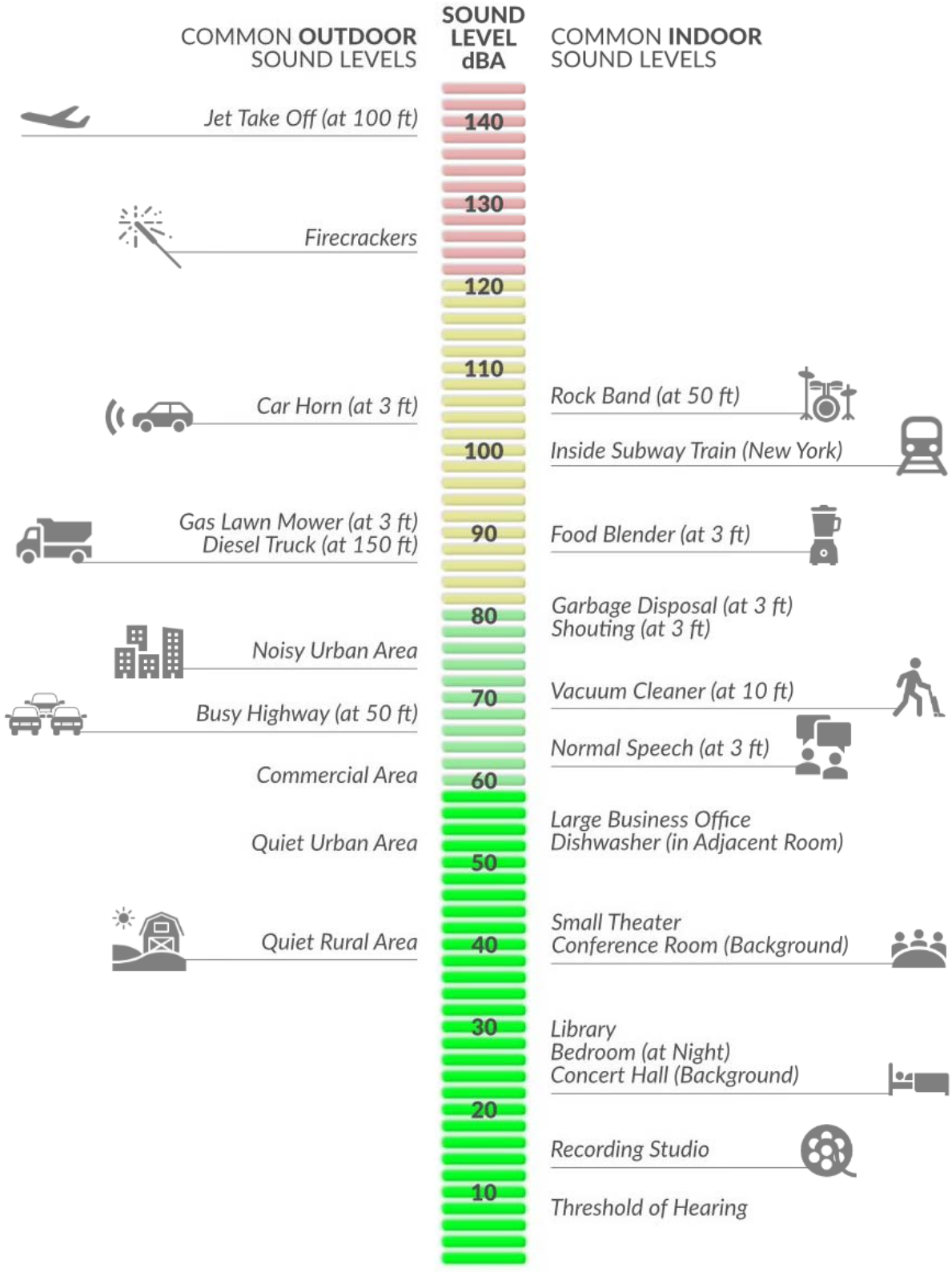
The way in which vibration is transmitted through the earth is called propagation. Propagation of earthborn vibrations is complicated and difficult to predict because of the endless variations in the soil through which waves travel. There are three main types of vibration propagation: surface, compression, and shear waves.

Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. Compression waves, or P-waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. Shear waves, or S-waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse or "side-to-side and perpendicular to the direction of propagation".

As vibration waves propagate from a source, the energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. Wave energy is also reduced with distance as a result of material damping in the form of internal friction, soil layering, and void spaces. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

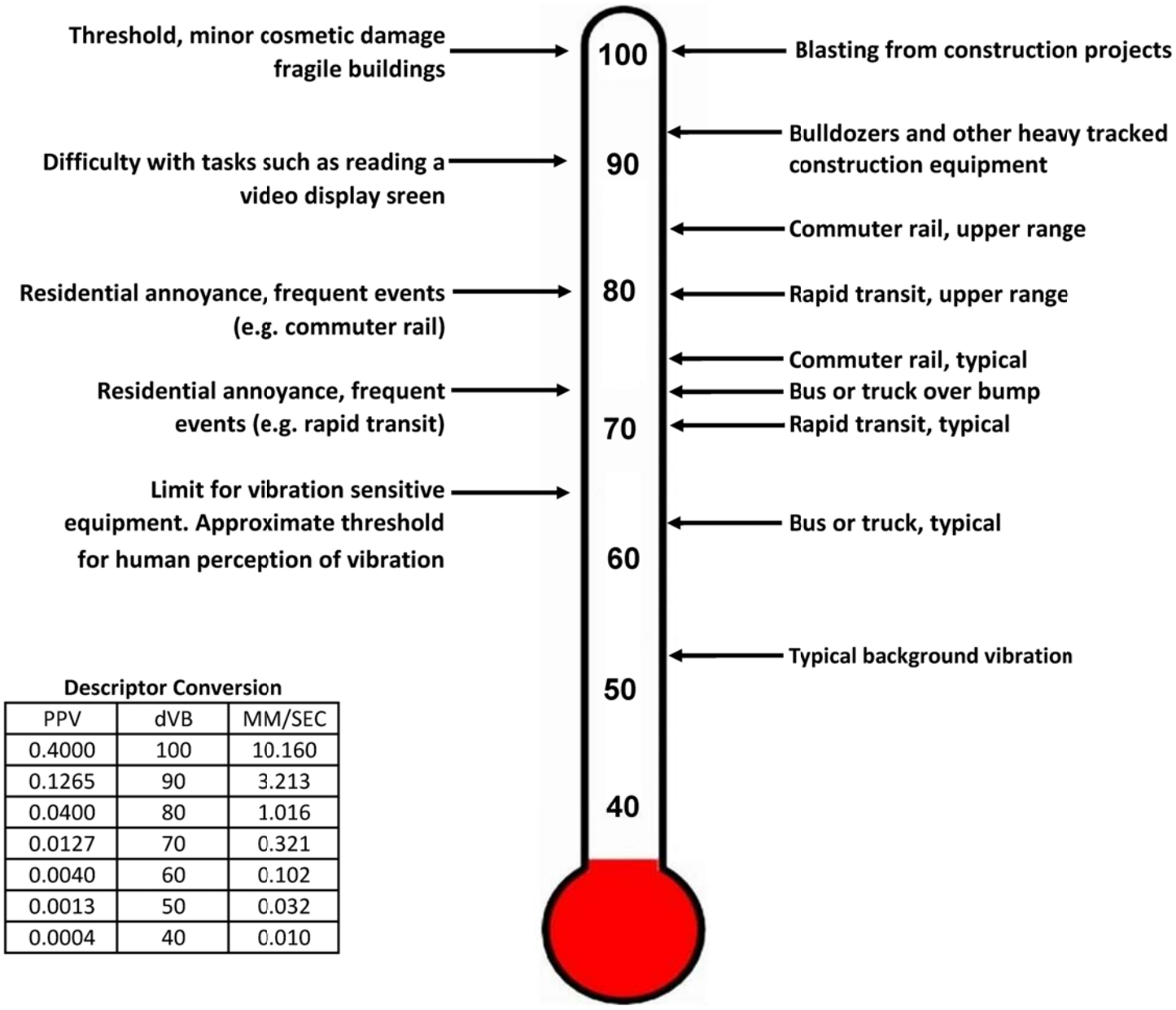
Vibration amplitudes are usually expressed as either peak particle velocity (PPV) or the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous peak of the vibration signal in inches per second. The RMS of a signal is the average of the squared amplitude of the signal in vibration decibels (VdB), ref one micro-inch per second. The Federal Railroad Administration uses the abbreviation "VdB" for vibration decibels to reduce the potential for confusion with sound decibel.

PPV is appropriate for evaluating the potential of building damage and VdB is commonly used to evaluate human response. Decibel notation acts to compress the range of numbers required in measuring vibration. Similar to the noise descriptors, L_{eq} and L_{max} can be used to describe the average vibration and the maximum vibration level observed during a single vibration measurement interval. Figure 4 illustrates common vibration sources and the human and structural responses to ground-borne vibration. As shown in the figure, the threshold of perception for human response is approximately 65 VdB; however, human response to vibration is not usually substantial unless the vibration exceeds 70 VdB. Vibration tolerance limits for sensitive instruments such as magnetic resonance imaging (MRI) or electron microscopes could be much lower than the human vibration perception threshold.



Based on Policy & Guidance from Federal Aviation Administration

Figure 3
A-Weighted Comparative Sound Levels



Descriptor Conversion

PPV	dVB	MM/SEC
0.4000	100	10.160
0.1265	90	3.213
0.0400	80	1.016
0.0127	70	0.321
0.0040	60	0.102
0.0013	50	0.032
0.0004	40	0.010

Source: FRA, 2012. Federal Railroad Administration High-Speed Ground Transportation Noise and Vibration Impact Assessment. Office of Railroad Policy Development, Washington, D.C. DOT/FRA/ORD-12/15. September.

Figure 4
Typical Levels of Groundborne Vibration

3. EXISTING NOISE ENVIRONMENT

This section describes the existing noise setting in the project vicinity.

EXISTING LAND USES AND SENSITIVE RECEPTORS

The project site is bordered by Taylor Avenue to the north, single-family residential uses to the east, the Interstate 10 freeway to the south, and single-family residential and commercial uses to the west of the project site.

The State of California defines sensitive receptors as those land uses that require serenity or are otherwise adversely affected by noise events or conditions. Schools, libraries, churches, hospitals, single and multiple-family residential, including transient lodging, motels and hotel uses make up the majority of these areas. Existing sensitive land uses that may be affected by project noise include the existing single-family residential uses located adjacent to the east and west and approximately 57 feet northeast (across Taylor Avenue) and 145 feet northwest (across Taylor Avenue) of the project site.

AMBIENT NOISE MEASUREMENTS

An American National Standards Institute (ANSI Section SI.4 2014, Class 1) Larson Davis model LxT sound level meter was used to document existing ambient noise levels. In order to document existing ambient noise levels in the project area, four (4) 15-minute daytime noise measurements were taken between 12:45 PM and 2:26 PM on March 31, 2023. Figure 5 shows the noise measurement locations. Field worksheets and noise measurement output data are provided in Appendix C.

As shown on Figure 5, existing ambient noise measurements were taken at the following locations:

- NM1: Noise measurement represents the residential use located to the east of the project site (17831 Taylor Avenue, Bloomington). The noise meter was placed near the northwestern property line of the residential use just south of Taylor Avenue.
- NM2: Noise measurement represents the residential and commercial use located to the north of the project site along the northern side of Taylor Avenue (17796 Taylor Avenue, Bloomington). The noise meter was placed near the southwestern property line of the residential and commercial use just north of Taylor Avenue.
- NM3: Noise measurement represents the residential use located to the west of the project site (17743 Taylor Avenue, Bloomington). The noise measurement was taken near the eastern property line of the residential use along the western property line of the project site.
- NM4: Noise measurement represents the residential uses to the northwest of the project site on the eastern side of Alder Avenue (10161 Alder Avenue, Bloomington). The noise measurement was taken just northwest of the property line of the residential use and east of Alder Avenue.

Table 1 provides a summary of the short-term ambient noise data. Measured short-term ambient noise levels ranged between 64 and 65.8 dBA L_{eq}. The dominant noise source in the project vicinity was vehicle traffic associated with Taylor Avenue, Alder Avenue, Valley Boulevard, and the Interstate 10 Freeway as well as truck movement and auto repair and machinery noise associated with surrounding commercial uses.

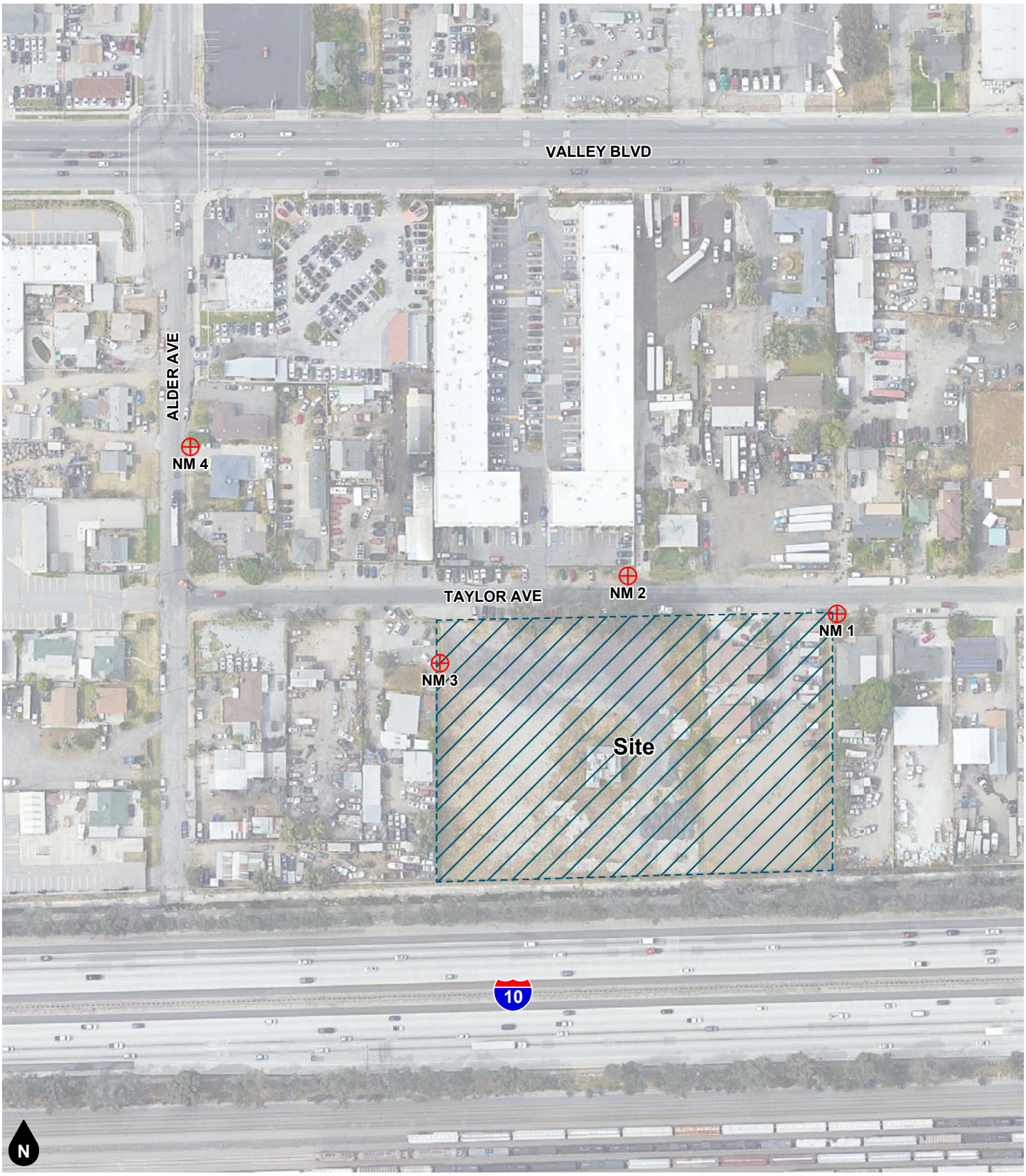
Table 1
Short-Term Noise Measurement Summary (dBA)

Daytime Measurements[1,2]								
Site Location	Time Started	Leq	Lmax	Lmin	L(2)	L(8)	L(25)	L(50)
NM1	12:45 PM	64.7	74.8	56.6	72.3	69.6	64.3	60.3
NM2	1:12 PM	65.8	81.6	60.6	73.7	67.7	64.4	63.4
NM3	1:40 PM	64.6	69.6	61.1	67.8	66.3	65.1	64.2
NM4	2:11 PM	64.0	80.2	55.3	71.2	67.0	63.1	61.1

Notes:

(1) See Figure 5 for noise measurement locations. Each noise measurement was performed over a 15-minute duration.

(2) Noise measurements were performed on March 31, 2023.



Legend

⊕ Noise Measurement Location

NM 1

Figure 5
Noise Measurement Location Map

4. REGULATORY SETTING

This section documents the regulatory framework and applicable noise standards.

FEDERAL REGULATION

Federal Noise Control Act of 1972

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. After its inception, EPA's Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In response, the EPA published Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (Levels of Environmental Noise). The Levels of Environmental Noise recommended that the Ldn should not exceed 55 dBA outdoors or 45 dBA indoors to prevent significant activity interference and annoyance in noise-sensitive areas.

In addition, the Levels of Environmental Noise identified five (5) dBA as an "adequate margin of safety" for a noise level increase relative to a baseline noise exposure level of 55 dBA Ldn (i.e., there would not be a noticeable increase in adverse community reaction with an increase of five dBA or less from this baseline level). The EPA did not promote these findings as universal standards or regulatory goals with mandatory applicability to all communities, but rather as advisory exposure levels below which there would be no risk to a community from any health or welfare effect of noise.

In 1981, EPA administrators determined 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 to State and local governments. However, noise control guidelines and regulations contained in EPA rulings in prior years remain in place by designated Federal agencies, allowing more individualized control for specific issues by designated Federal, State, and local government agencies.

STATE REGULATIONS

State of California General Plan Guidelines 2017

Though not adopted by law, the State of California General Plan Guidelines 2017, published by the California Governor's Office of Planning and Research (OPR) (OPR Guidelines), provides guidance for the compatibility of projects within areas of specific noise exposure. The OPR Guidelines identify the suitability of various types of construction relative to a range of outdoor noise levels and provide each local community some flexibility in setting local noise standards that allow for the variability in community preferences. Findings presented in the Levels of Environmental Noise Document (EPA 1974) influenced the recommendations of the OPR Guidelines, most importantly in the choice of noise exposure metrics (i.e., Ldn or CNEL) and in the upper limits for the normally acceptable outdoor exposure of noise-sensitive uses.

The OPR Guidelines include a Noise and Land Use Compatibility Matrix which identifies acceptable and unacceptable community noise exposure limits for various land use categories. Where the "normally acceptable" range is used, it is defined as the highest noise level that should be considered for the construction of the buildings which do not incorporate any special acoustical treatment or noise mitigation. The "conditionally acceptable" or "normally unacceptable" ranges include conditions calling for detailed acoustical study prior to the construction or operation of the proposed project. The County of San Bernardino has adopted its own version of land use compatibility guidelines titled the County of San Bernardino Noise Standards for Mobile Noise Standards (discussed further in Local Regulations below).

California Department of Transportation (Caltrans)

The California Department of Transportation (Caltrans) has developed several publications on groundborne vibration. The *Transportation and Construction Vibration Guidance Manual* (Caltrans, 2020) provides informational content that supplements previous publications with improved knowledge and information relating to groundborne transportation- and construction-induced vibrations. Although the *Transportation and Construction Vibration Guidance Manual* is not an official policy, standard, specification, or regulation, it serves as a useful guide for evaluating vibration impacts.

Table 2 and Table 3 show the guideline criteria for potential damage and annoyance resulting from groundborne vibration. As shown in Table 2, these guidelines specify that the threshold at which there is a risk of architectural damage is a peak particle velocity (PPV) of 0.25 inches/second (in/sec) for historic buildings, 0.3 in/sec at older residential structures, and 0.5 in/sec at new residential structures and modern commercial/industrial buildings. Table 3 shows that a PPV of 0.1 in/sec is the threshold at which groundborne vibration becomes strongly perceptible in regard to annoyance.

LOCAL REGULATIONS

County of San Bernardino General Plan

The County of San Bernardino Countywide Plan (Policy Plan) serves as the County's General Plan and was adopted in October 2020. The County's Policy Plan's Hazards Element provides goals and policies that are intended to protect life, property, and commerce from impacts associated with natural hazards, human-generated hazards, and increased risk due to climate change. The noise related goals and policies from the Hazards Element that are applicable to the proposed project are presented below:

Goal HZ-2 Human-generated Hazards. People and the natural environment are protected from exposure to hazardous materials, excessive noise, and other human-generated hazards.

Policies

Policy HZ-2.7 Truck delivery areas. We encourage truck delivery areas to be located away from residential properties and require associated noise impacts to be mitigated.

Policy HZ-2.8 Proximity to noise generating uses. We limit or restrict new noise sensitive land uses in proximity to existing conforming noise generating uses and planned industrial areas.

Policy HZ-2.9 Control sound at the source. We prioritize noise mitigation measures that control sound at the source before buffers, sound walls, and other perimeter measures.

County of San Bernardino Development Code

Section 83.01.080 of the County of San Bernardino Development Code establishes noise criteria not to be exceeded at the property line of adjacent land uses. These criteria would apply to on-site operational noise generated by the project. Nearby residential land uses may be affected by project-generated operational noise. Sections of the code applicable to the proposed project are presented below.

Noise Standards for Stationary Noise Sources

Stationary noise sources are regulated within the County of San Bernardino Development Code Section 83.01.080(c)(1). Table 4 shows the County-established noise standards for stationary noise sources.

For purposes of this analysis, project operational noise was evaluated in light of the L_{eq}(30-minute) and the maximum (Lmax) noise standards. It is highly unlikely that the other standards would be exceeded if the project

is in compliance with these two standards. The 30-minute L_{eq} is referred to as "L_{eq}" throughout this document. The L_{eq} and L_{eq}(30-minute) are equivalent in this analysis.

The County's Leq standards are presented in Table 4. Exterior noise level standards for residential land uses are 55 dBA L_{eq} during daytime hours and 45 dBA L_{eq} during nighttime hours; 55 dBA L_{eq} for daytime and nighttime hours at professional service land uses; 60 dBA L_{eq} for both daytime and nighttime at other commercial land uses; and 70 dBA L_{eq} for both daytime and nighttime at industrial land uses.

Per Development Code Section 83.01.080(e), the base standards may be adjusted such that the allowable noise exposure standard shall be increased to reflect the ambient noise level if the measured ambient level exceeds any of the first four noise limit categories. If the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level.

In addition, County of San Bernardino Development Code Section 83.01.080(c)(2) states that:

"No person shall operate or cause to be operated a source of sound at a location or allow the creation of noise on property owned, leased, occupied, or otherwise controlled by the person, which causes the noise level, when measured on another property, either incorporated or unincorporated, to exceed any one of the following:

(A) The noise standard for the receiving land use as specified in Subdivision (b) (Noise-Impacted Areas), above, for a cumulative period of more than 30 minutes in any hour.
(B) The noise standard plus five dB(A) for a cumulative period of more than 15 minutes in any hour.
(C) The noise standard plus ten dB(A) for a cumulative period of more than five minutes in any hour.
(D) The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.
(E) The noise standard plus 20 dB(A) for any period of time."

Noise Standards for Adjacent Mobile Noise Sources

Mobile noise sources are regulated within the County of San Bernardino Development Code Section 83.01.080(d). Table 5 shows the County-established interior and exterior standards for mobile noise sources. As shown in Table 5, the noise level criteria of 45 dBA CNEL for interior noise and the 65 dBA CNEL apply to residential land uses.

Noise Standards for Construction Noise

Temporary construction, maintenance, repair, and demolition activities between 7:00 AM and 7:00 PM, except Sundays and Federal holidays are exempt from Section 83.01.080(g)(3) the San Bernardino Development Code.

Groundborne Vibration

Section 83.01.090(a) of the County of San Bernardino Development Code prohibits the creation of ground vibration that can be felt without the aid of instruments at or beyond the lot-line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths (0.2) inches per second measured at or beyond the lot-line. Per Section 83.01.090(c), construction and demolition related ground vibration is exempt from this requirement as long as it occurs between 7:00 AM and 7:00 PM Mondays through Saturdays and not on Sundays or Federal holidays.

Table 2
Guideline Criteria for Vibration Damage Potential

Structure Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Notes:

PPV = Peak Particle Velocity

Source: *Transportation and Construction Vibration Guidance Manual* (California Department of Transportation, April 2020); Chapter 7, Table 19.

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
Guideline Criteria for Vibration Annoyance Potential

Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.90	0.10
Severe	2.00	0.40

Notes:
PPV = Peak Particle Velocity
Source: *Transportation and Construction Vibration Guidance Manual* (California Department of Transportation, April 2020); Chapter 7, Table 20.
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 4
County of San Bernardino Standards for Stationary Noise Sources (dBA, Leq)

Affected Land Uses (Receiving Noise)	7:00 AM to 10:00 PM dBA L_{eq} (Daytime)	10:00 PM to 7:00 AM dBA L_{eq} (Nighttime)
Residential	55	45
Professional Services	55	55
Other Commercial	60	60
Industrial	70	70

Source: County of San Bernardino Development Code Section 83.01.080(c)(1), Table 83-2.

Notes:

(1) Per County of San Bernardino Development Code Section 83.01.080(e), if the measured ambient level exceeds any of the first four noise limit categories, the allowable noise exposure standard shall be increased to reflect the ambient noise level. If the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level. See Table 1 for existing measured ambient noise levels.

Table 5
County of San Bernardino Noise Standards for Mobile Noise Sources

Land Use		L_{dn} (or CNEL) dB(A)	
Category	Type	Interior[1]	Exterior[2]
Residential	Single and multi-family, duplex, mobile homes	45	60[3]
Commercial	Hotel, motel, transient housing	45	60[3]
	Commercial retail, bank, restaurant	50	n/a
	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	n/a
Institutional/ Public	Hospital, nursing home, school classroom, religious institution, library	45	65
Open Space	Park	n/a	65

Notes:

Source: County of San Bernardino Development Code, Development Code Table 83-3.

(1) The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.

(2) The outdoor environment shall be limited to:

Hospital/office building patios
Hotel and motel recreation areas
Mobile home parks
Multi-family private patios or balconies
Park picnic areas
Private yard of single-family dwellings
School playgrounds

(3) An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation.

5. ANALYTICAL METHODOLOGY AND MODEL PARAMETERS

This section discusses the analysis methodologies used to assess noise impacts.

CONSTRUCTION NOISE MODELING

Construction noise associated with the proposed project was calculated at the sensitive receptor locations, utilizing methodology presented in the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (2018) together with several key construction parameters, including: distance to each sensitive receiver, equipment usage, percent usage factor, and baseline parameters for the project site. Distances to receptors were based on the acoustical center of the project site.

The equipment used to calculate the construction noise levels for each phase were based on the assumptions provided in the California Emissions Estimator Model (CalEEMod) modeling provided in the Air Quality Analysis prepared for the proposed project (Lilburn, 2023). For analysis purposes, the distance measured from the project site to sensitive receptors was assumed to be the acoustical center of the project site to the property line of residential properties with existing residential buildings. Sound emission levels associated with typical construction equipment as well as typical usage factors provided in Table 6 were utilized for modeling purposes. Construction noise worksheets are provided in Appendix D.

STATIONARY SOURCE/OPERATIONAL NOISE MODELING

The SoundPLAN acoustical modeling software was utilized to model project operational worst-case stationary noise impacts from the proposed project to adjacent sensitive uses (e.g., residences). SoundPLAN is capable of evaluating stationary noise sources (e.g., parking lots, drive-thru menus, carwash equipment, vacuums, etc.). The SoundPLAN software utilizes algorithms (based on the inverse square law) to calculate noise level projections. The software allows the user to input specific noise sources, spectral content, sound barriers, building placement, topography, and sensitive receptor locations. In addition to the information provided below, noise modeling input and outputs assumptions are provided in Appendix E.

Sound levels associated with project operation was modeled utilizing representative sound levels in the SoundPLAN model. Modeled noise sources include parking lot noise, loading and HVAC equipment. All noise sources were modeled to be in full operation for an entire hour. This is a conservative modeling effort, given that several of the noise sources are not in operation continuously for an entire hour.

Parking Lot Noise

Parking lot noise was calculated using SoundPLAN methodology. Specifically, the traffic volume of the parking lot is entered with the number of moves per parking lot, the hour and the number of parking bays. The user defines whether the parking lots are for automobiles, motorcycles, or trucks, and the emission level of a parking lot is automatically adjusted accordingly. The values for the number of parking moves for each time slice is the number of parking moves per reference unit (most often per parking bay), averaged for the hour[1].

SoundPLAN utilizes parking lot noise emission levels from the 6th revised edition of the parking lot study "Recommendations for the Calculation of Sound Emissions of Parking Areas, Motorcar Centers and Bus Stations as well as of Multi-Story Car Parks and Underground Car Parks" published by the Bavarian Landesamt für Umwelt provides calculation methods to determine the emissions of parking lots.

The parking lot emission table documents the reference level (Lw, ref) from the parking lot study.

$$Lw, ref = Lw0 + KPA + KI + KD + KStrO + 10 \log(B) \text{ [dB(A)]}$$

[1] SoundPLAN Essential 4.0 Manual. SoundPLAN International, LLC. May 2016.

With the following parameters:

Lw0 = Basic sound power, sound power level of one motion / per hour on P+R areas = 63 dB(A)
KPA = Surcharge parking lot type
KI = Surcharge for impulse character
KD = Surcharge for the traffic passaging and searching for parking bays in the driving lanes 2,5 * lg (f * B - 9)
f = Parking bays per unit of the reference value
B = Reference value
KStrO = Surcharge for the road surface
B = Reference value

Mechanical Equipment (HVAC Units) Noise

A noise reference level of 67.7 dBA at 3 feet (sound power level of 78.7 dB) was utilized to represent rooftop 50 Ton Carrier HVAC units[2]. A total of three rooftop units were modeled on the proposed rooftops. The noise source height for each HVAC unit was assumed at 1 meter above the roof top. Roof top is assumed to be approximately 6.7 meters (~22 feet) above grade. It is assumed that no HVAC equipment will be stored at ground level outside of the proposed building.

Loading Area

Several roll up doors, presumably to be utilized for unloading merchandise are proposed along the southern side of the proposed building. A sound power level of 63.5 dBA, resulting in an overall sound level of 65 dBA L_{eq} aa measured at any point within the entire loading area was utilized to represent this noise source.

MOBILE SOURCE NOISE MODELING

Noise from vehicular traffic was projected using a computer program that replicates the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108). The FHWA model arrives at the predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). The County determined that a traffic impact analysis was not required for the project. Therefore, to be conservative, it was assumed that 100 percent of the total project average daily vehicle trips provided in the traffic scope could travel along each of the modeled roadway segments.[3] In addition, existing average daily vehicle trips are not available for the portions of Taylor Avenue and Alder Avenue that lie in proximity of the project site. Therefore, the existing traffic volumes were estimated based on the ambient noise measurements.[4] Key model parameters and REMEL adjustments are presented below:

- Roadway classification (e.g., freeway, major arterial, arterial, secondary, collector, etc.)
- Roadway Active Width (distance between the center of the outer most travel lanes on each side of the roadway)
- Average Daily Traffic Volumes (ADT), Travel Speeds, Percentages of automobiles, medium trucks and heavy trucks
- Roadway grade and angle of view
- Site Conditions (e.g. soft vs. hard)
- Percentage of total ADT which flows each hour through-out a 24-hour period

Table 7 shows the roadway parameters and vehicle distribution utilized for this study. The following outlines key adjustments to the REMEL for project site parameter inputs:

[2] MD Acoustics, LLC Noise Measurement Data for RTU –Carrier 50TFQ0006.
[3] Per the traffic scope prepared for the prosed project, the project would generate 683 average daily vehicle trips.
[4] Noise Measurement (NM)1 was utilized to estimate existing average daily vehicle trips along Taylor Avenue and NM4 was utilized to estimate existing average daily vehicle trips along Alder Avenue.

- Vertical and horizontal distances (Sensitive receptor distance from noise source)
- Noise barrier vertical and horizontal distances (Noise barrier distance from sound source and receptor).
- Traffic noise source spectra
- Topography

Traffic noise levels were projected to the on-site receptors. The traffic noise calculation worksheets are included in Appendix F.

GROUNDBORNE VIBRATION MODELING

Groundborne vibration modeling was performed using vibration propagation equations and construction equipment source levels obtained from the FTA *Transit Noise and Vibration Impact Assessment Manual* (2018). Table 8 shows typical vibration levels associated with commonly used construction equipment based on data from the FTA.

There are several types of construction equipment that can cause vibration levels high enough to annoy persons in the vicinity and/or result in architectural or structural damage to nearby structures and improvements. For example, as shown in Table 8, a vibratory roller could generate up to 0.21 PPV at a distance of 25 feet; and operation of a large bulldozer (0.089 PPV) at a distance of 25 feet (two of the most vibratory pieces of construction equipment). Groundborne vibration at sensitive receptors associated with this equipment would drop off as the equipment moves away. For example, as the vibratory roller moves further than 100 feet from the sensitive receptors, the vibration associated with it would drop below 0.0026 PPV. It should be noted that these vibration levels are reference levels and may vary slightly depending upon soil type and specific usage of each piece of equipment.

The fundamental equation used to calculate vibration propagation through average soil conditions and distance is as follows:

$$PPV_{equipment} = PPV_{ref} (25/D_{rec})^{n}$$

Where: PPV_{ref} = *reference PPV at 25ft.*
D_{rec} = *distance from equipment to receiver in ft.*
n = 1.1 (*the value related to the attenuation rate through ground*)

Groundborne vibration calculations are provided in Appendix G.

Table 6 (1 of 2)
CA/T Equipment Noise Emissions and Acoustical Usage Factor Database

Equipment Description	Impact Device?	Acoustical Use Factor (%)	Spec. Lmax @ 50ft (dBA, slow)	Actual Measured Lmax @ 50ft (dBA, slow)	No. of Actual Data Samples (Count)
All Other Equipment > 5 HP	No	50	85	-N/A-	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	-N/A-	0
Blasting	Yes	-N/A-	94	-N/A-	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	-N/A-	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Forklift[2,3]	No	50	n/a	61	n/a
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	-N/A-	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydr. Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	-N/A-	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarafier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	50	85	77	9
Paving Equipment	No	50	85	77	9
Pneumatic Tools	No	50	85	85	90

Table 6 (2 of 2)
CA/T Equipment Noise Emissions and Acoustical Usage Factor Database

Equipment Description	Impact Device?	Acoustical Use Factor (%)	Spec. Lmax @ 50ft (dBA, slow)	Actual Measured Lmax @ 50ft (dBA, slow)	No. of Actual Data Samples (Count)
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/chipping gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (Single Nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Shears (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	-N/A-	0
Tractor	No	40	84	-N/A-	0
Vacuum Excavator (Vac-truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder/Torch	No	40	73	74	5

Notes:

(1) Source: FHWA Roadway Construction Noise Model User's Guide January 2006.

(2) Warehouse & Forklift Noise Exposure - NoiseTesting.info Carl Stautins, November 4, 2014 http://www.noisetesting.info/blog/carl-strautins/page-3/

(3) Data provided Leq as measured at the operator. Sound Level at 50 feet is calculated using Inverse Square Law.

Table 7
Project Average Daily Traffic Volumes and Roadway Parameters

Roadway	Segment	Average Daily Traffic Volume[1]		Posted Travel Speeds (MPH)	Site Conditions
		Existing	Existing Plus Project		
Taylor Avenue	In the vicinity of the project site	19330	20013	25	Soft
Alder Avenue	Taylor Avenue to Valley Boulevard	13,700	14,383	25	Soft

Vehicle Distribution[2]			
Motor-Vehicle Type	Daytime % (7 AM-7 PM)	Evening % (7 PM-10 PM)	Night % (10 PM-7 AM)
Automobiles	75.56	13.96	10.49
Medium Trucks	48.91	2.17	48.91
Heavy Trucks	47.30	5.41	47.30

Notes:

(1) The County determined that a traffic impact analysis was not required for the project. Therefore, to be conservative, it was assumed that 100 percent of the total project average daily vehicle trips (683 average daily vehicle trips), as provided in the traffic scope, could travel along each of the modeled roadway segments. In addition, existing average daily vehicle trips are not available for the portions of Taylor Avenue and Alder Avenue that lie in proximity of the project site. Therefore, the existing traffic volumes were estimated based on the ambient noise measurements. Noise Measurement (NM)1 was utilized to estimate existing average daily vehicle trips along Taylor Avenue and NM4 was utilized to estimate existing average daily vehicle trips along Alder Avenue.

(2) Existing and project vehicle percentages are based on the Riverside County Industrial Hygiene Letter for Traffic Noise.

Table 8
Construction Equipment Vibration Source Levels

Equipment		PPV at 25 ft, in/sec	Approximate Lv* at 25 ft
Pile Driver (impact)	upper range	1.518	112
	typical	0.644	104
Pile Driver (sonic)	upper range	0.734	105
	typical	0.170	93
clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large Bulldozer		0.089	87
Caisson Drilling		0.089	87
Loaded Trucks		0.076	86
Jackhammer		0.035	79
Small Bulldozer		0.003	58

Source: Federal Transit Administration: Transit Noise and Vibration Impact Assessment Manual, 2018.
*RMS velocity in decibels, VdB re 1 micro-in/sec

6. NOISE AND VIBRATION IMPACT ANALYSIS

This section analyzes the significance of project-related noise and groundborne vibration impacts relative to standards established by the County of San Bernardino and other applicable agencies in the context of CEQA. Appendix G of the California Environmental Quality Act Guidelines (Title 14, Division 6, Chapter 3 of the California Code of Regulations) includes an environmental checklist that identifies issues upon which findings of significance should be made. The CEQA Environmental Checklist Appendix G, XIII. Noise, requires determination if the project would result in:

a) *Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

b) *Generation of excessive groundborne vibration or groundborne noise levels?*

c) *For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?*

NOISE IMPACTS

Would the project result in:

a) *Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

Finding: Less Than Significant With Mitigation Incorporated

In relation to the Environmental Checklist noise issue "a", applicable standards established by the County of San Bernardino can be categorized into the following areas:

- Construction Noise
- Stationary Source Noise
- Mobile Source Noise

Construction Noise

Construction noise sources are regulated within Section 83.01.080(g)(3) of the County of San Bernardino's Development Code which prohibits construction activities other than between the hours of 7:00 AM and 7:00 PM, except Sundays and Federal holidays. Accordingly, the project would result in a significant impact if:

- Project construction occurs outside the hours of 7:00 AM and 7:00 PM, or on Sundays or Federal holidays.

Project construction noise levels at nearby sensitive receptors were calculated using the FTA methodology. Construction noise modeling worksheets for each phase are provided in Appendix D. Anticipated noise levels during each construction phase are presented in Table 9.

As shown in Table 9, modeled construction noise levels are forecast to reach up to 79.6 dBA L_{eq} at the nearest residential property line to the east, 75.6 dBA L_{eq} at the nearest residential property line to the northeast, 78.1 dBA L_{eq} at the nearest residential property line to the north, 68.9 dBA L_{eq} at the nearest residential

property line to the northwest, and 73.9 dBA L_{eq} at the nearest residential property line to the west of the project site.

Table 9 also includes a comparison of existing noise levels and project construction noise levels. Short-term noise measurement (NM)1 was chosen to represent noise levels at the nearest property lines of the residential uses to the east and northeast, NM2 was chosen to represent noise levels at the nearest property lines of the residential use located to the north, NM4 was chosen to represent noise levels at the nearest property lines of the residential use to the northwest, and NM3 was chosen to represent noise levels at the nearest property lines of the residential use to the west of the project site.

Project construction will not occur outside of the hours outlined as "exempt" in County of San Bernardino Development Code Section 83.01.080(g)(3); therefore, the project would not exceed County-established standards relating to construction noise. The project impact is less than significant; no mitigation is required.

Notwithstanding the above, best management practices (BMPs) provided in the Project Description should be added to project plans and in contract specifications to minimize construction noise emanating from the proposed project.

Stationary Source Noise

Stationary noise source standards are established within Section 83.01.080 of the County of San Bernardino Development Code. Accordingly, the project would result in a significant impact if:

- Operational noise exceeds the L_{eq} County-established stationary noise standards at nearby land uses.

The SoundPLAN noise model was utilized to model project peak hour operation. As shown in Figures 6 and 7, noise levels associated with the proposed project would range between 32.6 and 39.7 dBA L_{eq} and will not exceed the County's day or nighttime noise criteria at the adjacent land uses (residential 55 dBA L_{eq} day/45 dBA L_{eq} night and commercial 60 dBA L_{eq} for both day and nighttime). No mitigation is required.

Mobile Source Noise

Based on the County of San Bernardino mobile source noise standards (see Table 5), the noise level criteria of 45 dBA CNEL for interior noise and 60 dBA CNEL for exterior noise apply to residential land uses in the vicinity of the project site. It is widely accepted that the average healthy human ear can barely perceive changes of 3 dBA in an outdoor environment and that a change of 5 dBA is readily perceptible.[5] Accordingly, the project would result in a significant impact if the addition of project trips on surrounding roadways causes noise levels to increase by:

- 5 dBA in residential areas where the existing ambient noise level is within the County standard (60 dBA exterior or 45 dBA interior); or,
- 3 dBA in residential areas where the existing ambient noise level exceeds the County standard (60 dBA exterior or 45 dBA interior).

Operational Mobile Source Noise

Roadway noise levels were calculated for land uses adjacent to Beech Avenue in the project vicinity based on the FHWA Traffic Noise Prediction Model methodology. During operation, the proposed project is expected

[5] California Department of Transportation's Technical Noise Supplement to the Traffic Noise Analysis Protocol (2013)

to generate a total of approximately 683 daily trips, including 22 trips during the AM peak hour and 23 trips during the PM peak hour.[6] Roadway noise levels were calculated for the following scenarios:

- Existing (without Project): This scenario refers to existing year traffic noise conditions.
- Existing Plus Project: This scenario refers to existing year plus project traffic noise conditions.

Table 10 shows the change in existing roadway noise levels with the addition of project-generated operational trips. FHWA Traffic Noise Prediction Model calculation worksheets are provided in Appendix F.

As shown in Table 10, the modeled traffic noise levels at the nearest sensitive receptor along Taylor Avenue in the project vicinity are 69.2 dBA CNEL for Existing conditions and 69.3 dBA CNEL for Existing Plus Project conditions; the addition of project trips is expected to result in an increase of approximately 0.1 dBA CNEL. In addition, the modeled traffic noise levels at the nearest sensitive receptor along Alder Avenue in the project vicinity are 68.5 dBA CNEL for Existing conditions and 68.7 dBA CNEL for Existing Plus Project conditions; the addition of project trips is expected to result in an increase of approximately 0.2 dBA CNEL. Therefore, the addition of project trips is not expected to change noise levels in excess of the applicable thresholds at the study roadway segments (see Table 10). The project impact is less than significant; no mitigation is required.

Construction Mobile Source Noise

Construction truck trips would occur throughout the construction period. Given the project site's proximity to the Interstate 10 Freeway, it is anticipated that vendor and/or haul truck traffic would take the most direct route to the appropriate freeway ramps.

According to the FHWA, the traffic volumes need to be doubled in order to increase noise levels by 3 dBA CNEL.[7] As shown in the CalEEMod output files provided in the Air Quality Analysis prepared for the proposed project (Lilburn, 2023), the greatest number of construction-related vehicle trips per day would be during building construction at up to 27 vehicle trips per day (17.6 worker and 9 hauling trips). Therefore, at only up to 27 daily vehicle trips, the addition of project vendor/haul trucks and worker vehicles per day along off-site roadway segments is not anticipated to result in a doubling of traffic volumes. Off-site project generated construction vehicle trips would result in a negligible noise level increase. The project impact is less than significant; no mitigation is required.

GROUNDBORNE VIBRATION IMPACTS

Would the project result in:

b) Generation of excessive groundborne vibration or groundborne noise levels?

Finding: Less Than Significant

In relation to the Environmental Checklist noise issue "b", Section 83.01.090(a) of the County of San Bernardino Development Code prohibits the creation of ground vibration that can be felt without the aid of instruments at or beyond the lot-line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths (0.2) inches per second (in/sec) measured at or beyond the lot-line. Per Section 83.01.090(c), construction and demolition related ground vibration is exempt from this requirement as long as it occurs between 7:00 AM and 7:00 PM Mondays through Saturdays and not on Sundays or Federal holidays. Additionally, the Caltrans *Transportation and Construction Vibration Guidance Manual* provides

[6] As a traffic impact analysis was not required for the proposed project, the average daily vehicle trips from the traffic scope were utilized in this analysis.

[7] Federal Highway Administration, Highway Noise Prediction Model, December 1978.

guidance criteria at which there is a potential for architectural damage (see Regulatory Section, Table 2). Accordingly, the project would result in a significant impact if:

- Groundborne vibration levels generated by the project during construction or operation have the potential to cause architectural damage at nearby buildings by exceeding the following PPV:
  - 0.08 in/sec at extremely fragile historic buildings, ruins, ancient monuments;
  - 0.10 in/sec at fragile buildings;
  - 0.25 in/sec at historic and some old buildings;
  - 0.30 in/sec at older residential structures;
  - 0.50 in/sec at new residential structures and modern industrial/commercial buildings; or
- Groundborne vibration levels generated by project construction produce a PPV greater than 0.2 inches per second at or beyond the property line outside the hours of 7:00 AM and 7:00 PM Mondays through Saturdays and not on Sundays or Federal holidays.
- Groundborne vibration levels generated by project operation produce a PPV greater than 0.2 inches per second at or beyond the property line.

Groundborne vibration modeling was performed based on the FTA methodology; worksheets are provided in Appendix G.

The closest existing structures include residential structures located as close as approximately 3 feet east, 101 feet west, 90 feet north, and 6 feet west of the project site. In addition, commercial structures are located as close as approximately 90 to 116 feet north and 74 feet northwest of the project site.

Construction Vibration

Table 11 summarizes the modeled groundborne vibration levels at the nearest sensitive receptors. Project construction will not occur outside of the hours outlined as "exempt" in County of San Bernardino Development Code Section 83.01.090(c). Therefore, the project would not exceed County-established standards relating to construction vibration; however, as shown in Table 11, the use of vibratory rollers and large bulldozers during project construction may exceed the Caltrans guidance for potential architectural damage to the residential structures to the east and west of the project site. This impact can be mitigated with implementation of the following measure:

Mitigation Measure NOI-1: The use of vibratory rollers, or other similar vibratory equipment, shall be prohibited within 20 feet and the use of large bulldozers within 12 feet of residential structures surrounding the project site.

As also shown in Table 11, the project would not exceed County-established standards nor guidance thresholds for potential architectural damage to nearby buildings with implementation of Mitigation Measure NOI-1. The project impact is less than significant with mitigation incorporated.

Operational Vibration

The most substantial sources of groundborne vibration during post-construction project operations will include the movement of passenger vehicles and trucks on paved and generally smooth surfaces. Loaded trucks generally have a PPV of 0.076 at a distance of 25 feet (Caltrans 2020), which is a substantially lower PPV than that of a vibratory roller (0.210 in/sec PPV at 25 feet). Therefore, groundborne vibration levels generated by project operation would not exceed those modeled for project construction.

AIR TRAFFIC IMPACTS

Would the project result in:

c) *For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?*

Finding: No Impact

In relation to the Environmental Checklist noise issue "c", the project is not located within an airport land use plan or within two miles of an airport/airstrip. The closest airport to the project site is the Flabob Airport, with airport runways located approximately 5.41 miles southeast of the project site. As shown on Maps FL-1 and FL-3 of the Riverside County Airport Land Use Compatibility Plan (ALUCP) Policy Document (adopted December 2004), the project site is well outside both the airport's compatibility zones and the 55 dBA CNEL noise contour for the Flabob Airport.[8] Therefore, the project would not expose people residing or working in the project area to excessive noise levels associated with airports. The project would have no impact.

[8] https://www.rcaluc.org/Portals/13/PDFGeneral/plan/newplan/14-%20Vol.%201%20Flabob.pdf

Table 9
Construction Noise Levels (dBA L_{eq})

Phase	Receptor Location	Existing Ambient Noise Levels (dBA Leq)[1]	Construction Noise Levels (dBA Leq)[2]
Demolition	Residential to the East (17831 Taylor Avenue, Bloomington)	64.7	79.6
	Residential to the Northeast (17832 Taylor Avenue, Bloomington)	64.7	75.6
	Residential to the North (17796 Taylor Avenue, Bloomington)	65.8	78.1
	Residential to the Northwest (17726 Taylor Avenue, Bloomington)	64	66.3
	Residential to the West (17743 Taylor Avenue, Bloomington)	64.6	69.2
Site Preparation	Residential to the East (17831 Taylor Avenue, Bloomington)	64.7	73.9
	Residential to the Northeast (17832 Taylor Avenue, Bloomington)	64.7	71.1
	Residential to the North (17796 Taylor Avenue, Bloomington)	65.8	75.1
	Residential to the Northwest (17726 Taylor Avenue, Bloomington)	64	68.9
	Residential to the West (17743 Taylor Avenue, Bloomington)	64.6	73.9
Grading	Residential to the East (17831 Taylor Avenue, Bloomington)	64.7	73.5
	Residential to the Northeast (17832 Taylor Avenue, Bloomington)	64.7	70.7
	Residential to the North (17796 Taylor Avenue, Bloomington)	65.8	74.7
	Residential to the Northwest (17726 Taylor Avenue, Bloomington)	64	68.5
	Residential to the West (17743 Taylor Avenue, Bloomington)	64.6	73.5
Building Construction	Residential to the East (17831 Taylor Avenue, Bloomington)	64.7	72.1
	Residential to the Northeast (17832 Taylor Avenue, Bloomington)	64.7	69.3
	Residential to the North (17796 Taylor Avenue, Bloomington)	65.8	73.3
	Residential to the Northwest (17726 Taylor Avenue, Bloomington)	64	67.1
	Residential to the West (17743 Taylor Avenue, Bloomington)	64.6	72.1
Paving	Residential to the East (17831 Taylor Avenue, Bloomington)	64.7	70.6
	Residential to the Northeast (17832 Taylor Avenue, Bloomington)	64.7	67.8
	Residential to the North (17796 Taylor Avenue, Bloomington)	65.8	71.8
	Residential to the Northwest (17726 Taylor Avenue, Bloomington)	64	65.6
	Residential to the West (17743 Taylor Avenue, Bloomington)	64.6	70.6
Architectural Coating	Residential to the East (17831 Taylor Avenue, Bloomington)	64.7	60.2
	Residential to the Northeast (17832 Taylor Avenue, Bloomington)	64.7	57.4
	Residential to the North (17796 Taylor Avenue, Bloomington)	65.8	61.4
	Residential to the Northwest (17726 Taylor Avenue, Bloomington)	64	55.2
	Residential to the West (17743 Taylor Avenue, Bloomington)	64.6	60.2

Notes:

(1) Existing measured noise levels (see Table 1). NM1 was used for residential uses to the east and northeast, NM2 was used for residential uses to the north, NM4 was used for residential uses to the northwest, and NM3 was used for residential uses to the west of the project site.

(2) Construction noise worksheets are provided in Appendix D.

Table 10
Mobile Source Noise Impacts (dBA CNEL)

Roadway	Segment	Distance from roadway centerline to Nearest Sensitive Receptor (feet)[1]	Modeled Noise Levels at ROW (dBA CNEL)				Threshold[4] (Allowable Change in dBA CNEL)	Significant Impact?
			Interior/ Exterior[2,3]	Existing	Existing Plus Project	Change in dBA		
Taylor Avenue	In the vicinity of the project site	30	Exterior	69.2	69.3	+0.1	+3	No
			Interior	49.2	49.3	+0.1	+3	No
Alder Avenue	Taylor Avenue to Valley Boulevard	25	Exterior	68.5	68.7	+0.2	+3	No
			Interior	48.5	48.7	+0.2	+3	No

Notes:
(1) Distance calculated from roadway centerline to the property line of the nearest sensitive receptor.
(2) Exterior noise levels calculated 5 feet above pad elevation, perpendicular to subject roadway.
(3) Interior sound level estimated based on typical 20 dBA reduction from exterior to interior sound transmission with windows closed.
(4) 5 dBA in residential areas where the existing ambient noise level is within the County standard (60 dBA exterior or 45 dBA interior); or, 3 dBA in residential areas where the existing ambient noise level exceeds the County standard (60 dBA exterior or 45 dBA interior).

Table 11
Construction Vibration Levels at the Nearest Receptors

Receptor Location	Distance from Property Line to Nearest Structure (feet)	Equipment	Vibration Level (PPV)[1]	Potential Architectural Damage Threshold[2]	Threshold Exceeded?	Vibration Level with Mitigation (PPV)[1,3]	Threshold Exceeded with Mitigation?
Residential to East (17831 Taylor Ave)	3	Vibratory Roller	5.052	0.3	Yes	0.293	No
	3	Large Bulldozer	2.141	0.3	Yes	0.268	No
Residential to Northeast (17832 Taylor Ave)	101	Vibratory Roller	0.026	0.3	No	-	-
	101	Large Bulldozer	0.011	0.3	No	-	-
Residential and Commerial to North (Residential Use & B&C Tire Road Service, 17796 Taylor Ave)	90	Vibratory Roller	0.031	0.3	No	-	-
	90	Large Bulldozer	0.013	0.3	No	-	-
Commercial to North (Import & Domestic Converters, 17781 Valley Blvd & Hollywood Customs, 17763 Valley Blvd)	116	Vibratory Roller	0.021	0.5	No	-	-
	116	Large Bulldozer	0.009	0.5	No	-	-
Commercial to Northwest (Inland Empire Trailers, 17748 Taylor Ave)	74	Vibratory Roller	0.041	0.5	No	-	-
	74	Large Bulldozer	0.017	0.5	No	-	-
Residential to West (17743 Taylor Ave)	6	Vibratory Roller	1.786	0.3	Yes	0.293	No
	6	Large Bulldozer	0.757	0.3	Yes	0.293	No

Notes:

(1) PPV = Peak Particle Velocity in inches per second.

(2) Caltrans guidance identifies the threshold at which there is a risk of architectural damage as 0.3 in/sec PPV at older residential structures and 0.5 in/sec PPV at modern industrial/commercial buildings (see Table 3). In addition, Section 83.01.090(c) of the County's Development Code includes a threshold of 0.2 in/sec PPV; however, construction and demolition related ground vibration is exempt from this requirement as long as it occurs between 7:00 AM and 7:00 PM Mondays through Saturdays and not on Sundays or Federal holidays.

(3) Best management practices (BMPs) to prevent potential architectural damage consists of prohibiting the use of vibratory rollers and large bulldozers, or other similar vibratory equipment, within 20 feet and large bulldozers within 12 feet of residential structures to the east and west.

Signs and symbols

- Proposed Project
- Proposed Building
- Receiver
- Point source - HVAC
- Area source - Loading
- Parking lot
- Noise Levels (dBA, Leq)

Figure 6
Operational Noise Levels (dBA Leq)

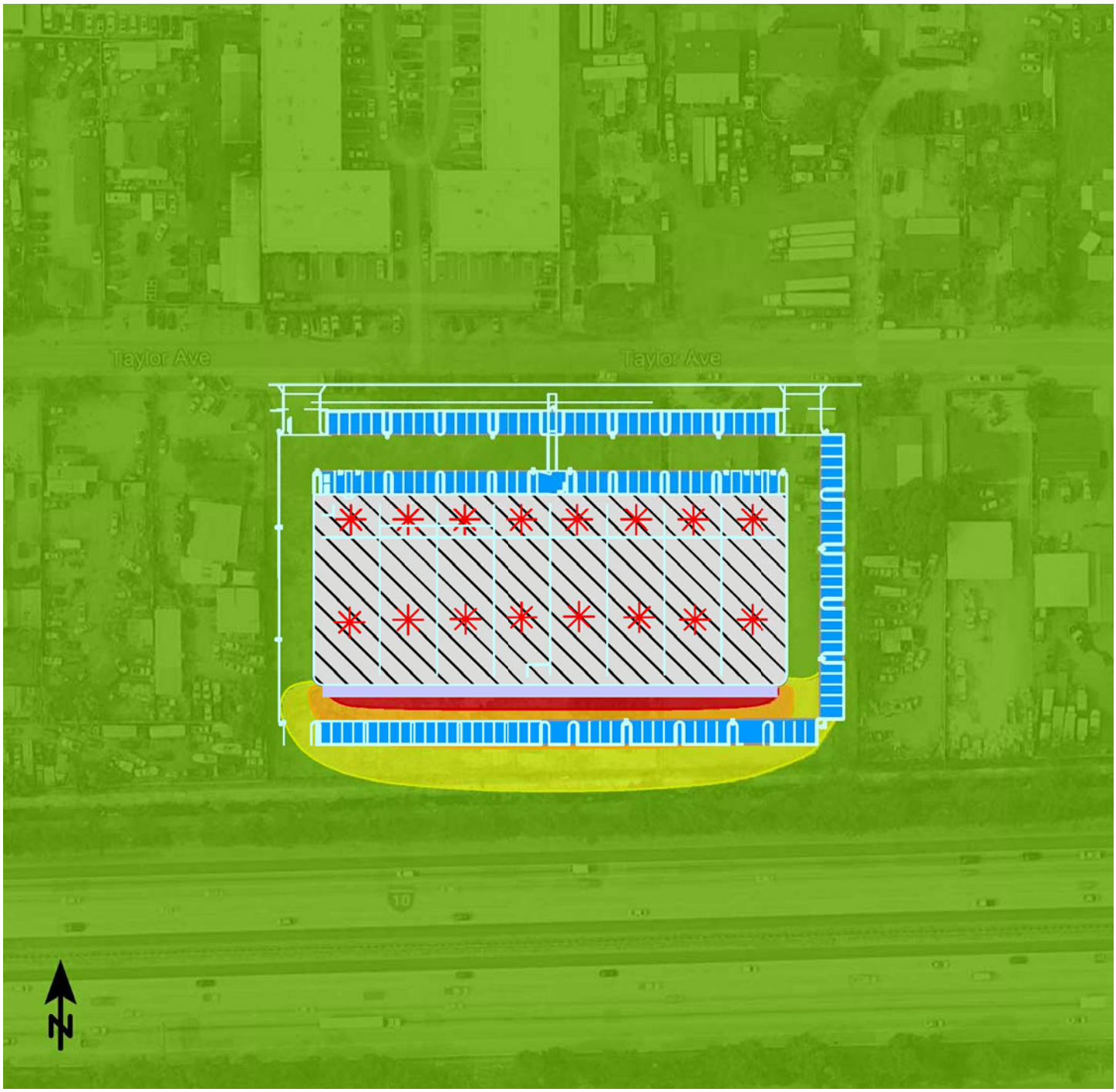


Figure 7
Operational Noise Contours (dBA Leq)

7. REFERENCES

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2019 Chapter 12, Section 1206.4 Allowable Interior Noise Levels

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APPENDICES

Appendix A List of Acronyms
Appendix B Glossary
Appendix C Noise Measurement Field Worksheets
Appendix D Construction Noise Model Worksheets
Appendix E SoundPLAN Worksheets
Appendix F FHWA Traffic Noise Model Worksheets
Appendix G Groundborne Vibration Worksheets

APPENDIX A

LIST OF ACRONYMS

Term	Definition
ADT	Average Daily Traffic
ANSI	American National Standard Institute
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
D/E/N	Day / Evening / Night
dB	Decibel
dBA or dB(A)	Decibel "A-Weighted"
dBA/DD	Decibel per Double Distance
dBA L_{eq}	Average Noise Level over a Period of Time
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
L_{02},L_{08},L_{50},L_{90}	A-weighted Noise Levels at 2 percent, 8 percent, 50 percent, and 90 percent, respectively, of the time period
DNL	Day-Night Average Noise Level
$L_{eq(x)}$	Equivalent Noise Level for '"x" period of time
L_{eq}	Equivalent Noise Level
L_{max}	Maximum Level of Noise (measured using a sound level meter)
L_{min}	Minimum Level of Noise (measured using a sound level meter)
Lp	Sound Pressure Level
LOS C	Level of Service C
Lw	Sound Power Level
OPR	California Governor's Office of Planning and Research
PPV	Peak Particle Velocities
RCNM	Road Construction Noise Model
REMEL	Reference Energy Mean Emission Level
RMS	Root Mean Square

APPENDIX B

GLOSSARY

Term	Definition
Ambient Noise Level	The all-encompassing noise environment associated with a given environment, at a specified time, usually a composite of sound from many sources, at many directions, near and far, in which usually no particular sound is dominant.
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear.
CNEL	Community Noise Equivalent Level. CNEL is a weighted 24-hour noise level that is obtained by adding five decibels to sound levels in the evening (7:00 PM to 10:00 PM), and by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the evening and nighttime hours.
Decibel, dB	A logarithmic unit of noise level measurement that relates the energy of a noise source to that of a constant reference level; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
DNL, Ldn	Day Night Level. The DNL, or Ldn is a weighted 24-hour noise level that is obtained by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the nighttime hours.
Equivalent Continuous Noise Level, L_{eq}	A level of steady state sound that in a stated time period, and a stated location, has the same A-weighted sound energy as the time-varying sound.
Fast/Slow Meter Response	The fast and slow meter responses are different settings on a sound level meter. The fast response setting takes a measurement every 100 milliseconds, while a slow setting takes one every second.
Frequency, Hertz	In a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., the number of cycles per second).
L_{02}, L_{08}, L_{50}, L_{90}	The A-weighted noise levels that are equaled or exceeded by a fluctuating sound level, 2 percent, 8 percent, 50 percent, and 90 percent of a stated time period, respectively.
L_{max}, L_{min}	Lmax is the RMS (root mean squared) maximum level of a noise source or environment measured on a sound level meter, during a designated time interval, using fast meter response. Lmin is the minimum level.
Offensive/ Offending/Intrusive Noise	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of sound depends on its amplitude, duration, frequency, and time of occurrence, and tonal information content as well as the prevailing ambient noise level.
Root Mean Square (RMS)	A measure of the magnitude of a varying noise source quantity. The name derives from the calculation of the square root of the mean of the squares of the values. It can be calculated from either a series of lone values or a continuous varying function.

APPENDIX C

NOISE MEASUREMENT FIELD WORKSHEETS

Noise Measurement
Field Data

Project Name: Alder Taylor Retail Center Project, County of San Bernardino **Date:** March 31, 2023

Project #: 19617

Noise Measurement #: NM1 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Edward Gallagher

Nearest Address or Cross Street: 17831 Taylor Avenue, Bloomington, CA 92316

Site Description (Type of Existing Land Use and any other notable features): Noise Measurement Site: Just NW of residence 17831 Taylor Ave.
Adjacent: Taylor Ave (running E-W) adjacent to north with commercial and residential uses further north, single-family residential to southeast & project site to southwest, & 10 Fwy (running E-W) ~400' S & rail yard (active trains running E-W) ~600' S of NM1.

Weather: <50% cloud, filtered sunshine. Sunset 7:10PM **Settings:** SLOW FAST

Temperature: 58 deg F **Wind:** 5 mph **Humidity:** 48% **Terrain:** Flat

Start Time: 12:45 PM **End Time:** 1:00 PM **Run Time:**

Leq: 64.7 dB
Lmax 74.8 dB
L2 72.3 dB
L8 69.6 dB
L25 64.3 dB
L50 60.3 dB

Primary Noise Source: Traffic noise from the 12 vehicles passing microphone on Taylor Ave. Truck starts engine and moves off at 12:55 PM. Traffic noise from 10 Fwy (~400' S of NM1).

Secondary Noise Sources: Traffic ambiance from vehicles on other roads. Overhead air traffic. Bird song. Some leaf rustle from 5 mph breeze and some residential ambiance.

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CA 250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	CA 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2723
FACTORY CALIBRATION DATE:	11/17/2021	**FACTORY CALIBRATION DATE:**	11/18/2021
FIELD CALIBRATION DATE:	3/31/2023		

Noise Measurement
Field Data

PHOTOS:

NM1 looking NE across Taylor Ave towards frontyard of residence 17832 Taylor Ave. Bloomington.

NM1 looking S towards the 10 Freeway (~400'). Residence 17831 Taylor Ave on left of image & residence 17805 Taylor Ave on right of image.

Summary	
File Name on Meter	LxT_Data.219.s
File Name on PC	LxT_0003099-20230331 124553-LxT_Data.219.ldbin
Serial Number	0003099
Model	SoundTrack LxT®
Firmware Version	2.404
User	Ian Edward Gallagher
Location	NM1 34° 4'7.95"N 117°24'55.89"W
Job Description	15 minute noise measurement (1 x 15 minutes)
Note	Ganddini Project 19617, Alder Taylor Retail Center, County of San Bernardino

Measurement	
Start	2023-03-31 12:45:53
Stop	2023-03-31 13:00:53
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre-Calibration	2023-03-31 12:45:39
Post-Calibration	None

Overall Settings	
RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	C Weighting
OBA Max Spectrum	At LMax
Overload	122.5 dB

Results				
LA_{eq}	64.7			
LAE	94.3			
EA	297.465	µPa²h		
EA8	9.519	mPa²h		
EA40	47.594	mPa²h		
$LA_{peak\ (max)}$	2023-03-31 12:52:57		97.1	dB
LAS_{max}	2023-03-31 12:56:03		74.8	dB
LAS_{min}	2023-03-31 12:48:46		56.6	dB

			Statistics		
LC_{eq}	75.0	dB	**LA2.00**	72.3	dB
LA_{eq}	64.7	dB	**LA8.00**	69.6	dB
LC_{eq} - LA_{eq}	10.2	dB	**LA25.00**	64.3	dB
LAI_{eq}	67.0	dB	**LA50.00**	60.3	dB
LA_{eq}	64.7	dB	**LA66.60**	59.6	dB
LAI_{eq} - LA_{eq}	2.2	dB	**LA90.00**	58.7	dB
Overload Count	0				

Measurement Report

Report Summary

Meter's File Name	LxT_Data.219.s	Computer's File Name	LxT_0003099-20230331 124553-LxT_Data.219.ldbin
Meter	LxT1 0003099		
Firmware	2.404		
User	Ian Edward Gallagher	Location	NM1 34° 4'7.95"N 117°24'55.89"W
Job Description	15 minute noise measurement (1 x 15 minutes)		
Note	Ganddini Project 19617, Alder Taylor Retail Center, Bloomington		
Start Time	2023-03-31 12:45:53	Duration	0:15:00.0
End Time	2023-03-31 13:00:53	Run Time	0:15:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	64.7 dB		
LAE	94.3 dB	SEA	--- dB
EA	297.5 µPa²h	LAFTM5	68.6 dB
EA8	9.5 mPa²h		
EA40	47.6 mPa²h		
LA_{peak}	97.1 dB	2023-03-31 12:52:57	
LAS_{max}	74.8 dB	2023-03-31 12:56:03	
LAS_{min}	56.6 dB	2023-03-31 12:48:46	
LA_{eq}	64.7 dB		
LC_{eq}	75.0 dB	LC_{eq} - LA_{eq}	10.2 dB
LAI_{eq}	67.0 dB	LAI_{eq} - LA_{eq}	2.2 dB

Exceedances	Count	Duration
LAS > 65.0 dB	14	0:03:51.9
LAS > 85.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	--- dB	--- dB	0.0 dB

	LDEN	LDay	LEve	LNight
	--- dB	--- dB	--- dB	--- dB

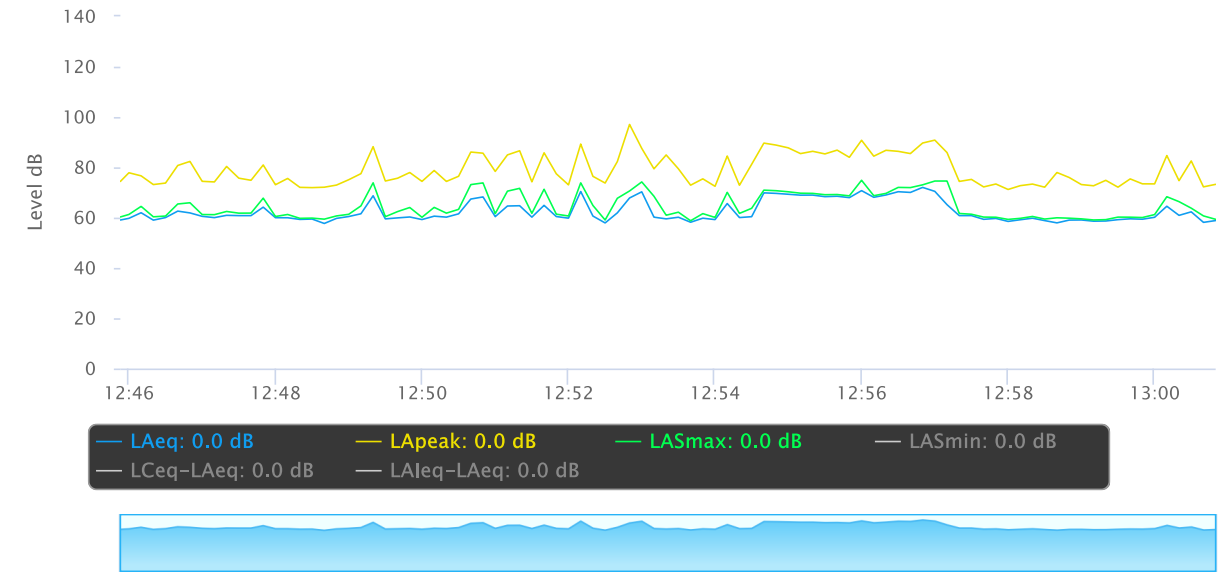
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	64.7 dB		75.0 dB		--- dB	
$L_{S(max)}$	74.8 dB	2023-03-31 12:56:03	--- dB		--- dB	
$L_{S(min)}$	56.6 dB	2023-03-31 12:48:46	--- dB		--- dB	
$L_{Peak(max)}$	97.1 dB	2023-03-31 12:52:57	--- dB		--- dB	

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

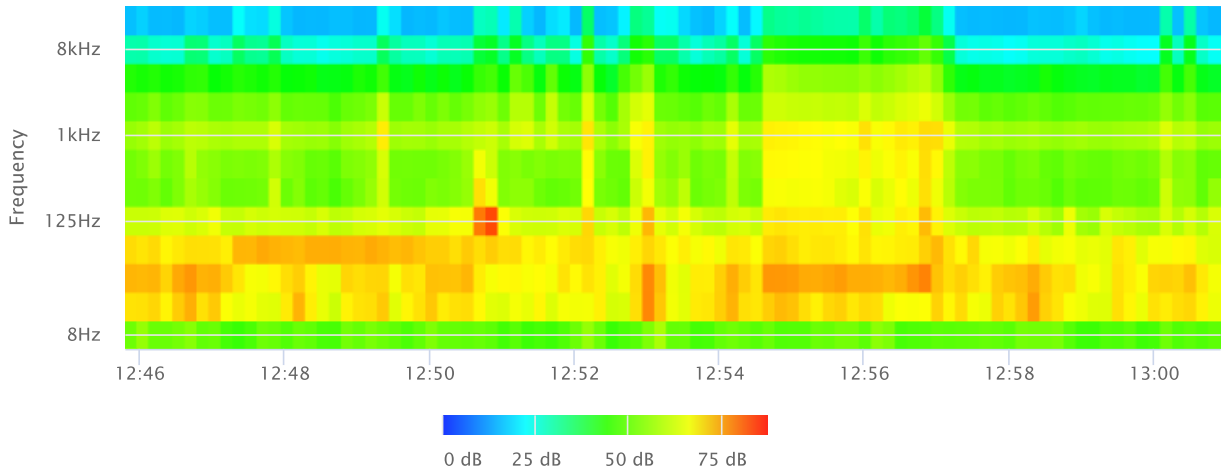
Statistics

LAS 2.0	72.3 dB
LAS 8.0	69.6 dB
LAS 25.0	64.3 dB
LAS 50.0	60.3 dB
LAS 66.6	59.6 dB
LAS 90.0	58.7 dB

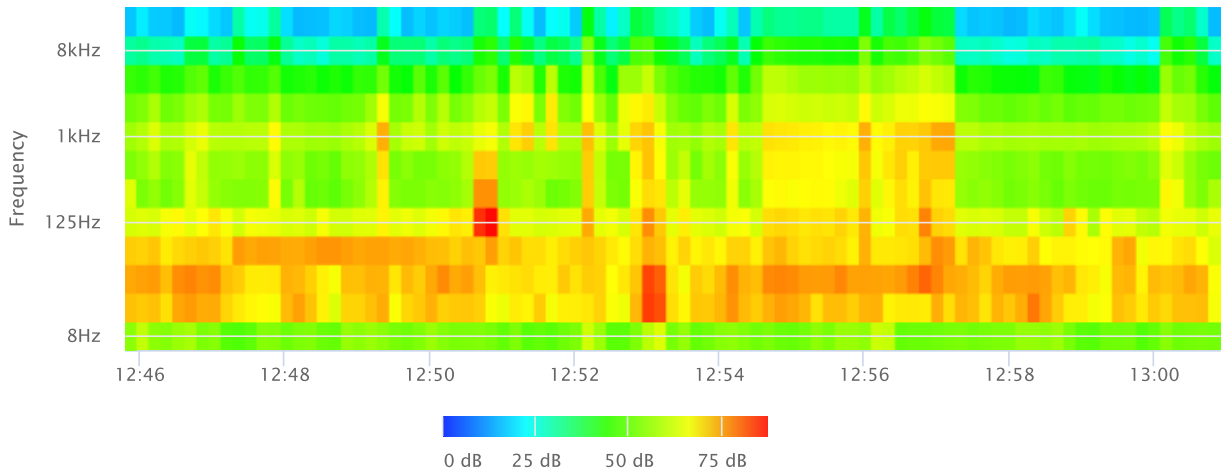
Time History



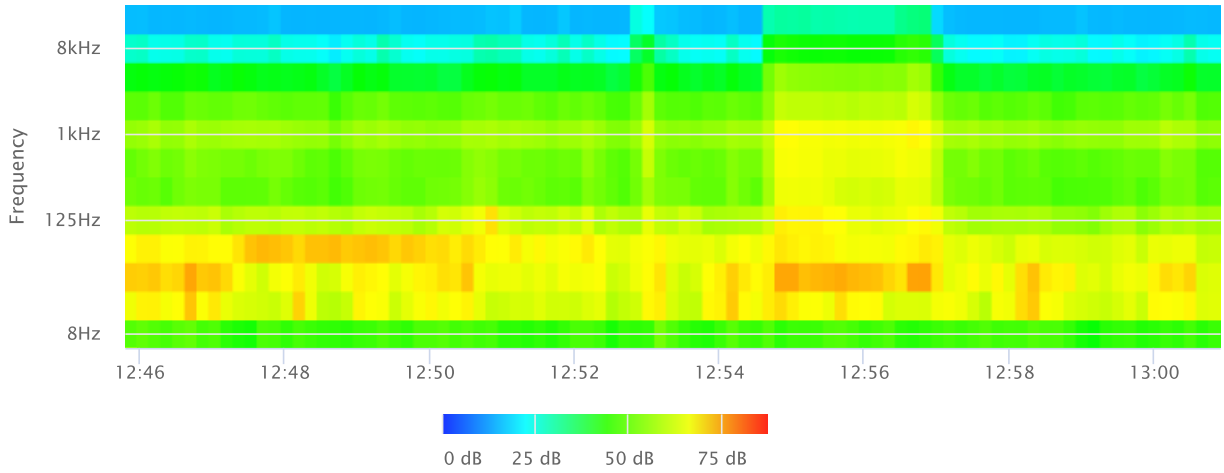
OBA 1/1 Leq



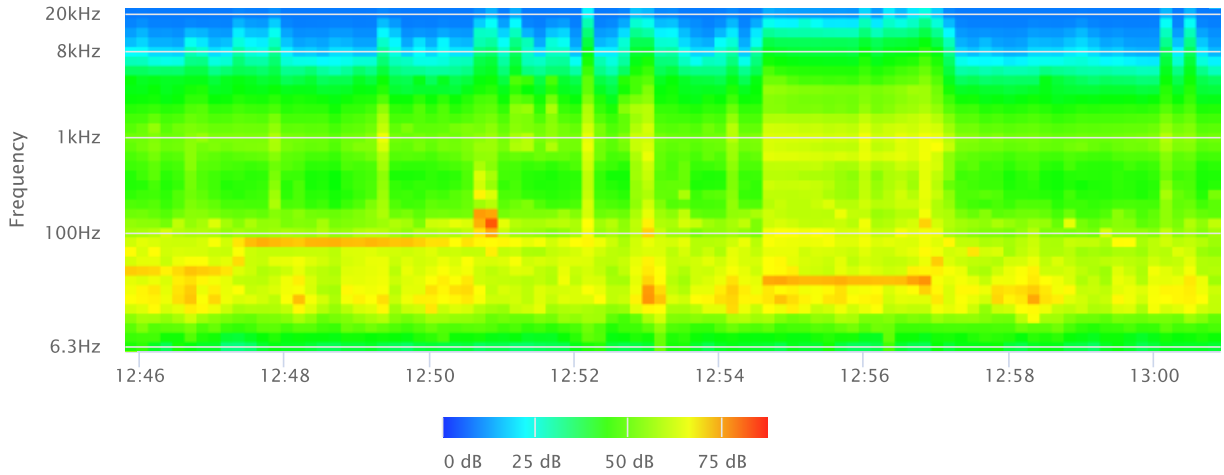
OBA 1/1 Lmax



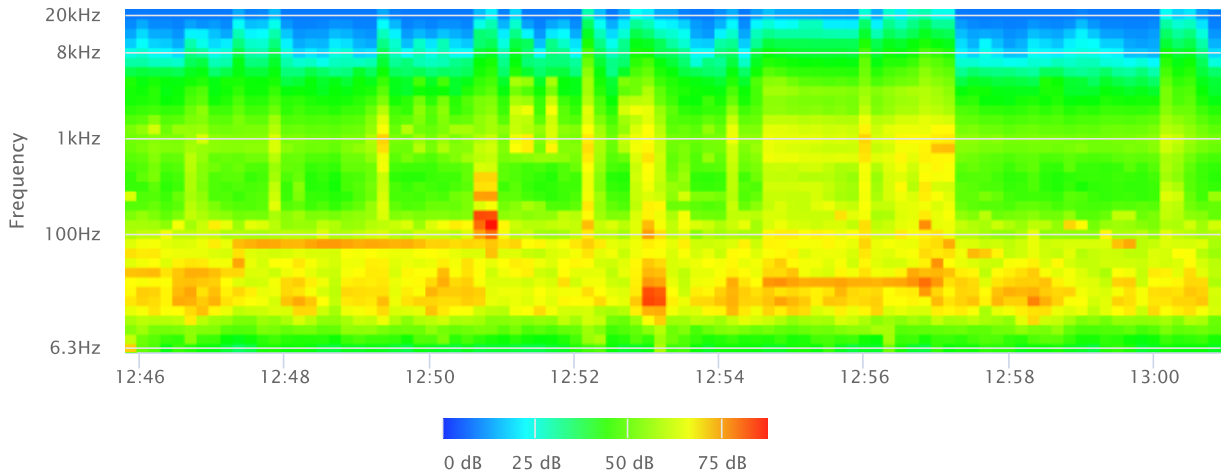
OBA 1/1 Lmin



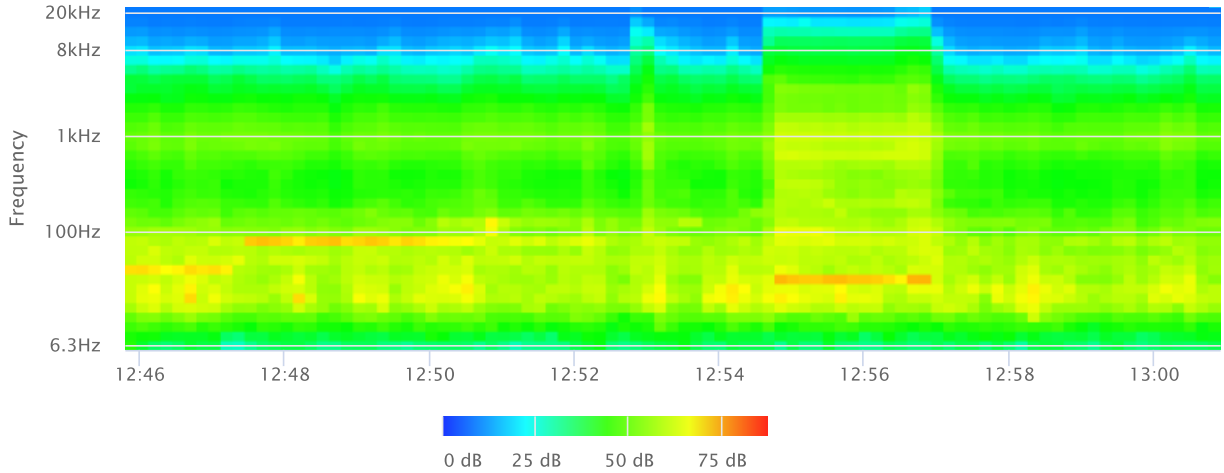
OBA 1/3 Leq



OBA 1/3 Lmax



OBA 1/3 Lmin


20kHz
8kHz
1kHz
100Hz
6.3Hz
Frequency
12:46
12:48
12:50
12:52
12:54
12:56
12:58
13:00
0 dB
25 dB
50 dB
75 dB

Noise Measurement
Field Data

Project Name: Alder Taylor Retail Center Project, County of San Bernardino **Date:** March 31, 2023

Project #: 19617

Noise Measurement #: NM2 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Edward Gallagher

Nearest Address or Cross Street: 17796 Taylor Avenue, Bloomington, CA 92316

Site Description (Type of Existing Land Use and any other notable features): Noise Measurement Site: Just SW of residence 17796 Taylor Ave.
Adjacent: Taylor Ave (running E-W) adjacent to with project site further south and 10 Fwy (running E-W) ~420' S & rail yard (active trains running E-W) ~620' S of NM2. Commercial and residnetial uses to north.

Weather: <50% cloud, filtered sunshine. Sunset 7:10PM **Settings:** SLOW FAST

Temperature: 58 deg F **Wind:** 5 mph **Humidity:** 48% **Terrain:** Flat

Start Time: 1:12 PM **End Time:** 1:27 PM **Run Time:**

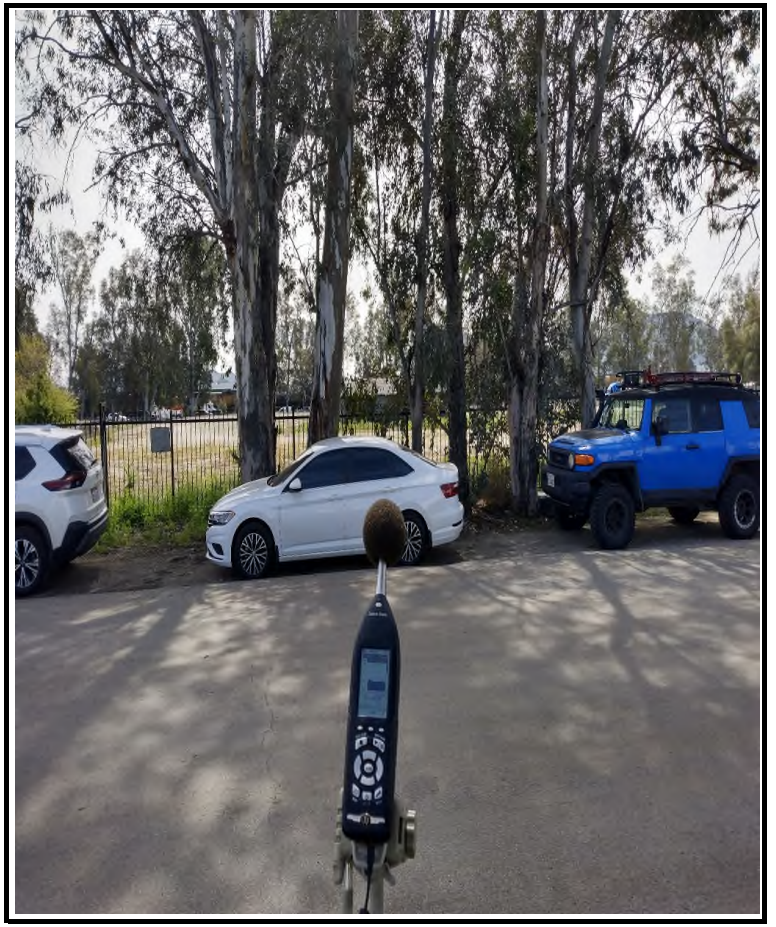
Leq:	65.8	dB	**Primary Noise Source:** Traffic noise from the 19 vehicles passing microphone on Taylor Ave.
Lmax	81.6	dB	Traffic noise from 10 Fwy (~420' S). Car mechanic just N of NM2, power tools.
L2	73.7	dB	**Secondary Noise Sources:** Traffic ambiance from vehicles on other roads. Overhead air traffic. Bird song.
L8	67.7	dB	Some leaf rustle from 5 mph breeze and some residential ambiance.
L25	64.4	dB	
L50	63.4	dB	

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CA 250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	CA 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2723
FACTORY CALIBRATION DATE:	11/17/2021	**FACTORY CALIBRATION DATE:**	11/18/2021
FIELD CALIBRATION DATE:	3/31/2023		

Noise Measurement
Field Data

PHOTOS:

NM2 looking NE towards residence/business 17796 Taylor Ave, Bloomington. Car mechanic business 17781 Taylor Ave on left of image with electric & pneumatic tools in operation.



NM2 looking S across Taylor Ave towards projet site and 10 Freeway (~420')

Summary	
File Name on Meter	LxT_Data.220.s
File Name on PC	LxT_0003099-20230331 131209-LxT_Data.220.ldbin
Serial Number	0003099
Model	SoundTrack LxT®
Firmware Version	2.404
User	Ian Edward Gallagher
Location	NM2 34° 4'8.36"N 117°24'58.89"W
Job Description	15 minute noise measurement (1 x 15 minutes)
Note	Ganddini Project 19617, Alder Taylor Retail Center, County of San Bernardino

Measurement	
Start	2023-03-31 13:12:09
Stop	2023-03-31 13:27:09
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre-Calibration	2023-03-31 13:11:52
Post-Calibration	None

Overall Settings	
RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	C Weighting
OBA Max Spectrum	At LMax
Overload	122.6 dB

Results			
L_{Aeq}	65.8		
LAE	95.4		
EA	384.268	µPa²h	
EA8	12.297	mPa²h	
EA40	61.483	mPa²h	
$L_{Apeak\ (max)}$	2023-03-31 13:16:09	96.5	dB
L_{ASmax}	2023-03-31 13:16:09	81.6	dB
L_{ASmin}	2023-03-31 13:26:46	60.6	dB

			Statistics		
L_{Ceq}	77.2	dB	**LA2.00**	73.7	dB
L_{Aeq}	65.8	dB	**LA8.00**	67.7	dB
L_{Ceq} - L_{Aeq}	11.4	dB	**LA25.00**	64.4	dB
L_{AIeq}	67.2	dB	**LA50.00**	63.4	dB
L_{Aeq}	65.8	dB	**LA66.60**	62.9	dB
L_{AIeq} - L_{Aeq}	1.4	dB	**LA90.00**	62.0	dB
Overload Count	0				

Measurement Report

Report Summary

Meter's File Name	LxT_Data.220.s	Computer's File Name	LxT_0003099-20230331 131209-LxT_Data.220.ldbin
Meter	LxT1 0003099		
Firmware	2.404		
User	Ian Edward Gallagher	Location	NM2 34° 4'8.36"N 117°24'58.89"W
Job Description	15 minute noise measurement (1 x 15 minutes)		
Note	Ganddini Project 19617, Alder Taylor Retail Center, Bloomington		
Start Time	2023-03-31 13:12:09	Duration	0:15:00.0
End Time	2023-03-31 13:27:09	Run Time	0:15:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	65.8 dB		
LAE	95.4 dB	SEA	--- dB
EA	384.3 µPa²h	LAFTM5	69.7 dB
EA8	12.3 mPa²h		
EA40	61.5 mPa²h		
LA_{peak}	96.5 dB	2023-03-31 13:16:09	
LAS_{max}	81.6 dB	2023-03-31 13:16:09	
LAS_{min}	60.6 dB	2023-03-31 13:26:46	
LA_{eq}	65.8 dB		
LC_{eq}	77.2 dB	LC_{eq} - LA_{eq}	11.4 dB
LAI_{eq}	67.2 dB	LAI_{eq} - LA_{eq}	1.4 dB

Exceedances	Count	Duration
LAS > 65.0 dB	18	0:05:16.1
LAS > 85.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	--- dB	--- dB	0.0 dB

	LDEN	LDay	LEve	LNight
	--- dB	--- dB	--- dB	--- dB

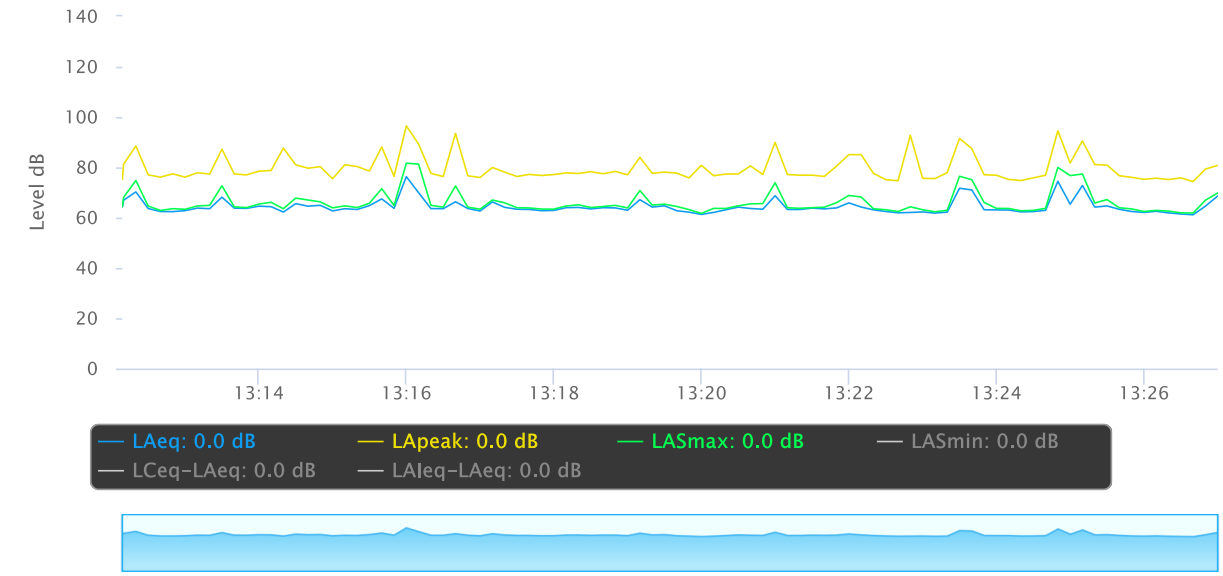
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	65.8 dB		77.2 dB		--- dB	
$L_{S(max)}$	81.6 dB	2023-03-31 13:16:09	--- dB		--- dB	
$L_{S(min)}$	60.6 dB	2023-03-31 13:26:46	--- dB		--- dB	
$L_{Peak(max)}$	96.5 dB	2023-03-31 13:16:09	--- dB		--- dB	

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

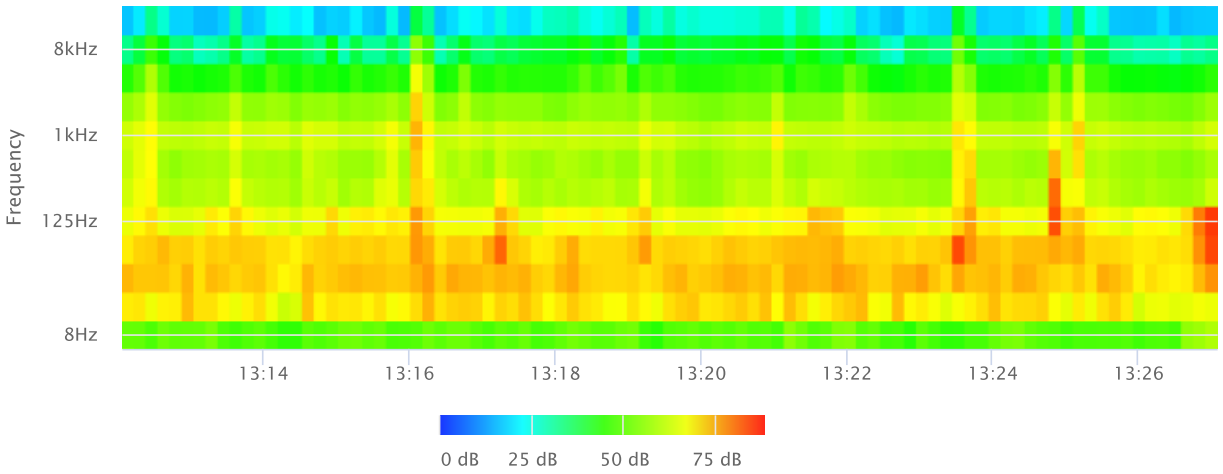
Statistics

LAS 2.0	73.7 dB
LAS 8.0	67.7 dB
LAS 25.0	64.4 dB
LAS 50.0	63.4 dB
LAS 66.6	62.9 dB
LAS 90.0	62.0 dB

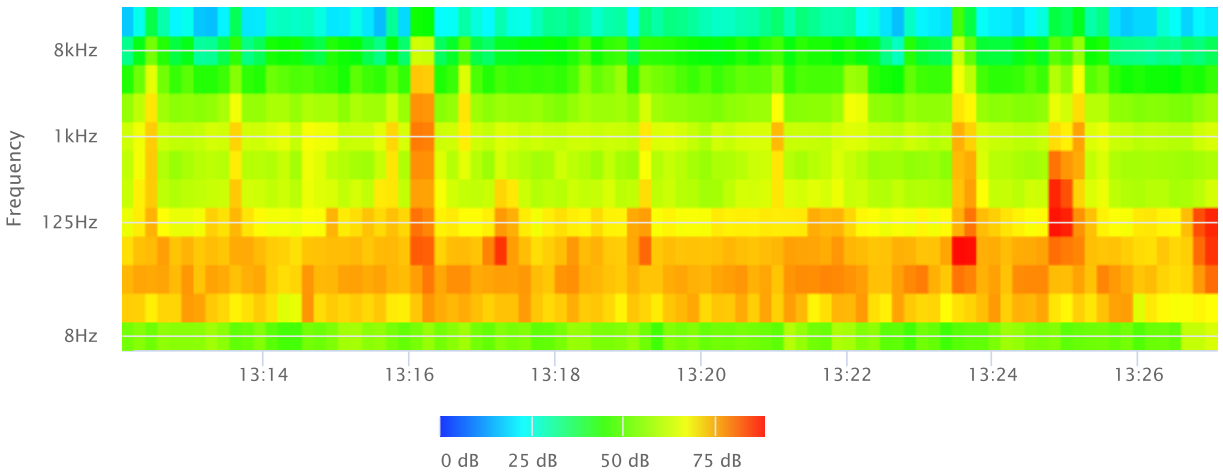
Time History



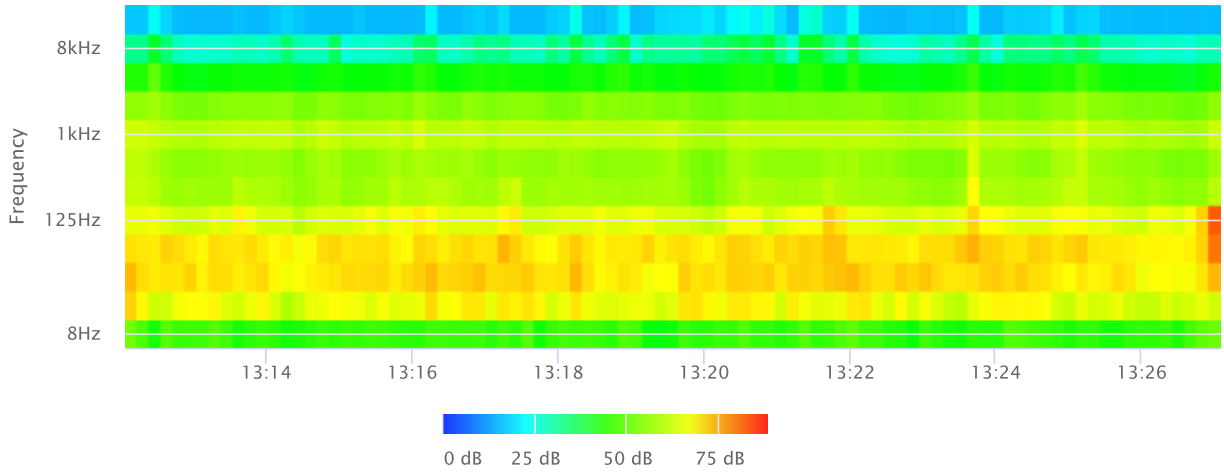
OBA 1/1 Leq



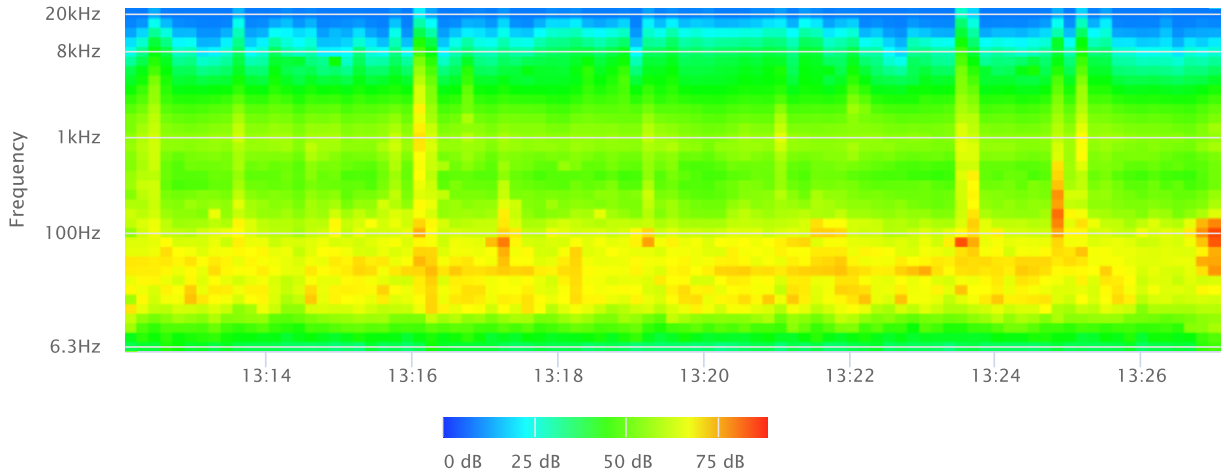
OBA 1/1 Lmax



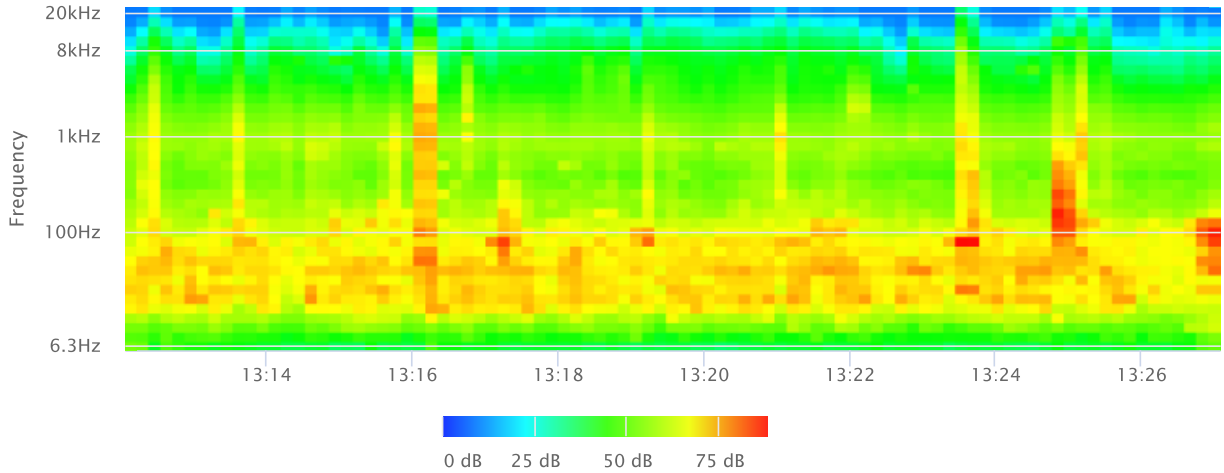
OBA 1/1 Lmin



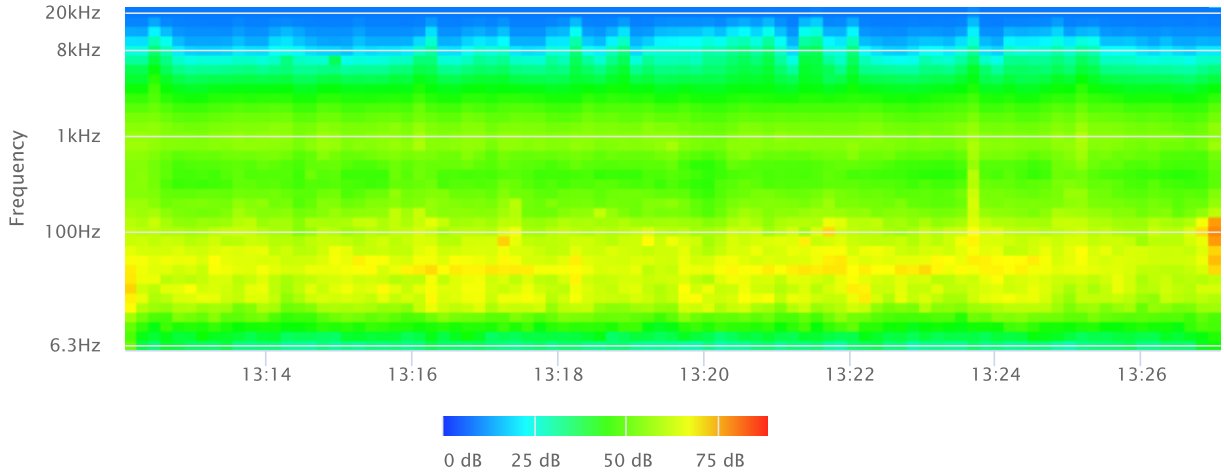
OBA 1/3 Leq



OBA 1/3 Lmax



OBA 1/3 Lmin


20kHz
8kHz
1kHz
100Hz
6.3Hz
Frequency
13:14
13:16
13:18
13:20
13:22
13:24
13:26
0 dB
25 dB
50 dB
75 dB

Noise Measurement
Field Data

Project Name: Alder Taylor Retail Center Project, County of San Bernardino **Date:** March 31, 2023

Project #: 19617

Noise Measurement #: NM3 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Edward Gallagher

Nearest Address or Cross Street: 17743 Taylor Avenue, Bloomington, CA 92316

Site Description (Type of Existing Land Use and any other notable features): Noise Measurement Site: Western project property line, just east of residence 17743 Taylor Ave. Adjacent: Taylor Ave (running E-W) ~80' north with commerical uses further north; residential use to west; project site to east, south, & north; and the 10 Fwy (running E-) ~350' S & rail yard (active trains running E-W) ~550' S of NM3.

Weather: <50% cloud, filtered sunshine. Sunset 7:10PM **Settings:** SLOW FAST

Temperature: 58 deg F **Wind:** 5 mph **Humidity:** 48% **Terrain:** Flat

Start Time: 1:40 PM **End Time:** 1:55 PM **Run Time:**

Leq:	64.6	dB
Lmax	69.6	dB
L2	67.8	dB
L8	66.3	dB
L25	65.1	dB
L50	64.2	dB

Primary Noise Source: Traffic noise from the vehicles passing microphone on Taylor Ave. Traffic noise from the 10 Fwy (~350' S). Machinery noise from local businesses.

Secondary Noise Sources: Traffic ambiance from vehicles on other roads. Overhead air traffic. Bird song. Some leaf rustle from 5 mph breeze and some residential ambiance.

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CA 250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	CA 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2723
FACTORY CALIBRATION DATE:	11/17/2021	**FACTORY CALIBRATION DATE:**	11/18/2021
FIELD CALIBRATION DATE:	3/31/2023		

Noise Measurement
Field Data

PHOTOS:

NM3 looking SW across western edge of project site towards frontyard of residence 17743 Taylor Ave, Bloomington.

NM3 looking N from western edge of site across Taylor Ave towards commercial building, 17763 Valley Blvd, Bloomington.

Summary			
File Name on Meter	LxT_Data.221.s		
File Name on PC	LxT_0003099-20230331 134055-LxT_Data.221.ldbin		
Serial Number	0003099		
Model	SoundTrack LxT®		
Firmware Version	2.404		
User	Ian Edward Gallagher		
Location	NM3 34° 4'7.26"N 117°25'1.62"W		
Job Description	15 minute noise measurement (1 x 15 minutes)		
Note	Ganddini Project 19617, Alder Taylor Retail Center, County of San Bernardino		
Measurement			
Start	2023-03-31 13:40:55		
Stop	2023-03-31 13:55:55		
Duration	00:15:00.0		
Run Time	00:15:00.0		
Pause	00:00:00.0		
Pre-Calibration	2023-03-31 13:40:15		
Post-Calibration	None		
Overall Settings			
RMS Weight	A Weighting		
Peak Weight	A Weighting		
Detector	Slow		
Preamplifier	PRMLxT1L		
Microphone Correction	Off		
Integration Method	Linear		
OBA Range	Normal		
OBA Bandwidth	1/1 and 1/3		
OBA Frequency Weighting	C Weighting		
OBA Max Spectrum	At LMax		
Overload	122.6 dB		
Results			
LA_{eq}	64.6		
LAE	94.1		
EA	287.054 µPa²h		
EA8	9.186 mPa²h		
EA40	45.929 mPa²h		
$LA_{peak\ (max)}$	2023-03-31 13:48:05	85.6 dB	
LAS_{max}	2023-03-31 13:43:31	69.6 dB	
LAS_{min}	2023-03-31 13:50:15	61.1 dB	
			Statistics
LC_{eq}	78.6 dB	**LA2.00**	67.8 dB
LA_{eq}	64.6 dB	**LA8.00**	66.3 dB
LC_{eq} - LA_{eq}	14.0 dB	**LA25.00**	65.1 dB
LAI_{eq}	65.2 dB	**LA50.00**	64.2 dB
LA_{eq}	64.6 dB	**LA66.60**	63.8 dB
LAI_{eq} - LA_{eq}	0.7 dB	**LA90.00**	62.7 dB
Overload Count	0		

Measurement Report

Report Summary

Meter's File Name	LxT_Data.221.s	Computer's File Name	LxT_0003099-20230331 134055-LxT_Data.221.ldbin
Meter	LxT1 0003099		
Firmware	2.404		
User	Ian Edward Gallagher	Location	NM3 34° 4'7.26"N 117°25'1.62"W
Job Description	15 minute noise measurement (1 x 15 minutes)		
Note	Ganddini Project 19617, Alder Taylor Retail Center, Bloomington		
Start Time	2023-03-31 13:40:55	Duration	0:15:00.0
End Time	2023-03-31 13:55:55	Run Time	0:15:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	64.6 dB		
LAE	94.1 dB	SEA	--- dB
EA	287.1 µPa²h	LAFTM5	66.4 dB
EA8	9.2 mPa²h		
EA40	45.9 mPa²h		
LA_{peak}	85.6 dB	2023-03-31 13:48:05	
LAS_{max}	69.6 dB	2023-03-31 13:43:31	
LAS_{min}	61.1 dB	2023-03-31 13:50:15	
LA_{eq}	64.6 dB		
LC_{eq}	78.6 dB	LC_{eq} - LA_{eq}	14.0 dB
LAI_{eq}	65.2 dB	LAI_{eq} - LA_{eq}	0.7 dB

Exceedances

	Count	Duration
LAS > 65.0 dB	13	0:10:12.9
LAS > 85.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
--- dB	--- dB	0.0 dB

LDEN	LDay	LEve	LNight
--- dB	--- dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	64.6 dB		78.6 dB		--- dB	
$L_{S(max)}$	69.6 dB	2023-03-31 13:43:31	--- dB		--- dB	
$L_{S(min)}$	61.1 dB	2023-03-31 13:50:15	--- dB		--- dB	
$L_{Peak(max)}$	85.6 dB	2023-03-31 13:48:05	--- dB		--- dB	

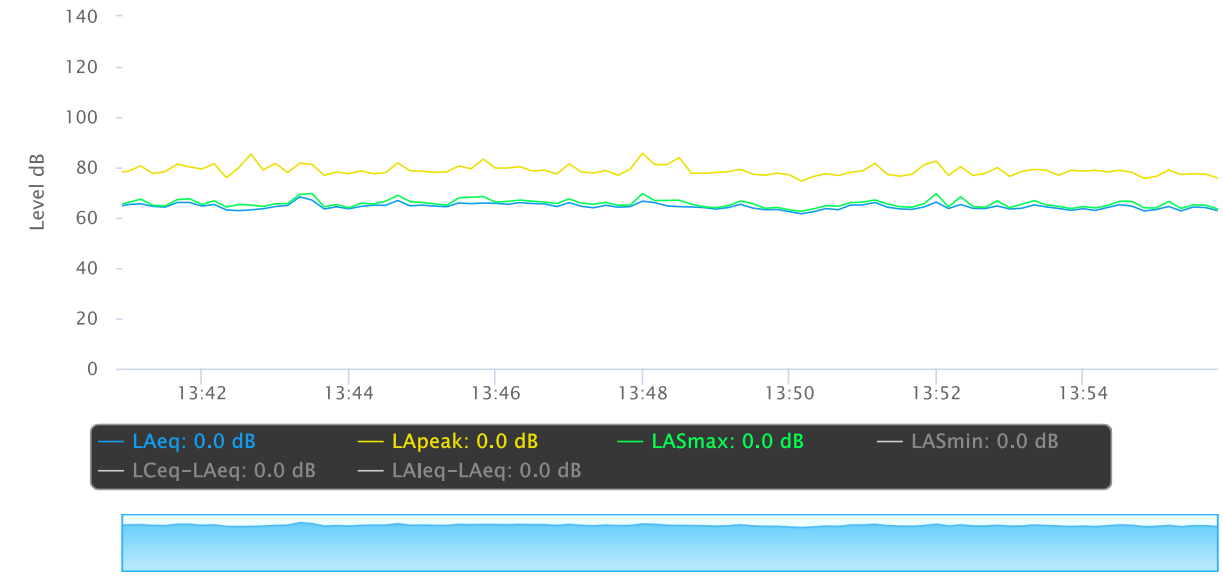
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

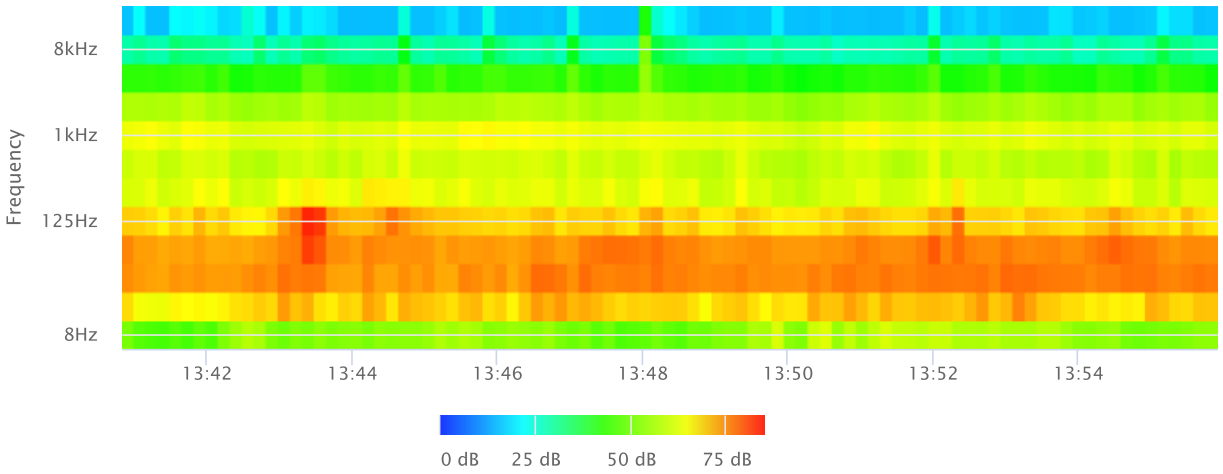
Statistics

LAS 2.0	67.8 dB
LAS 8.0	66.3 dB
LAS 25.0	65.1 dB
LAS 50.0	64.2 dB
LAS 66.6	63.8 dB
LAS 90.0	62.7 dB

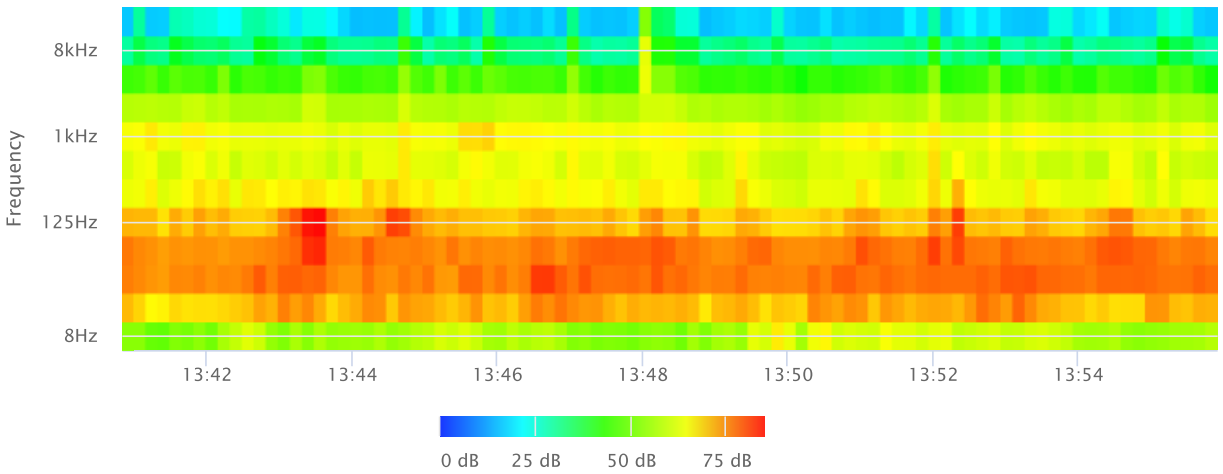
Time History



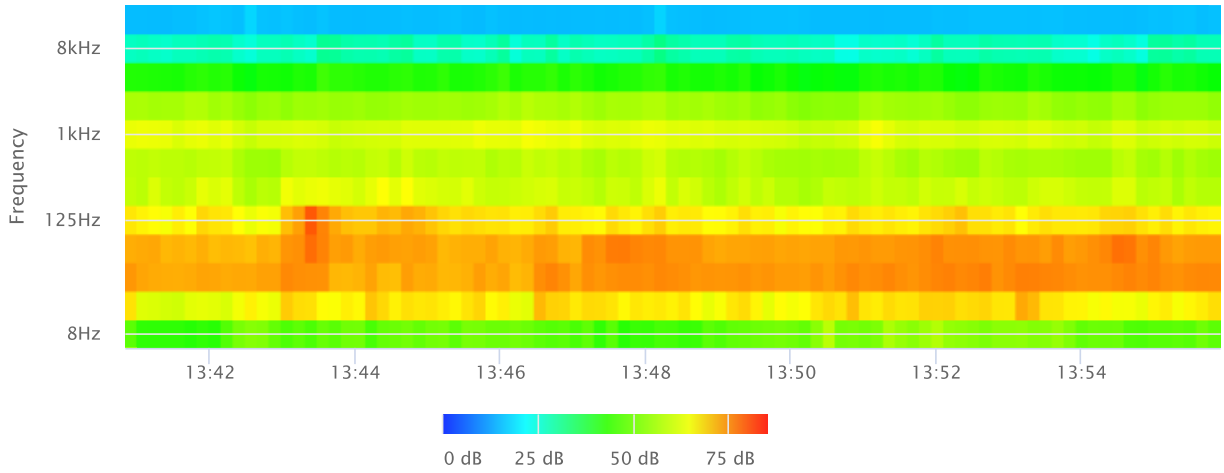
OBA 1/1 Leq



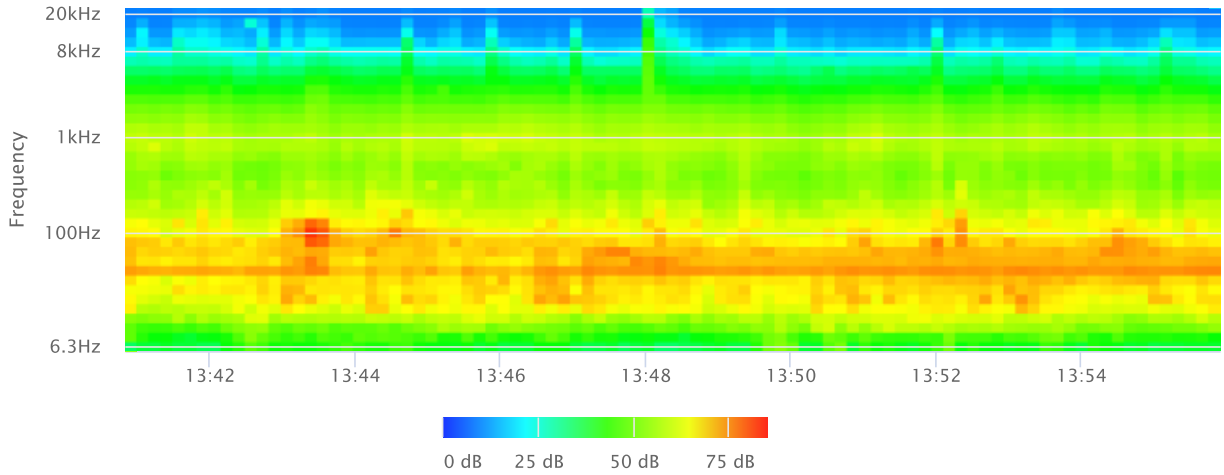
OBA 1/1 Lmax



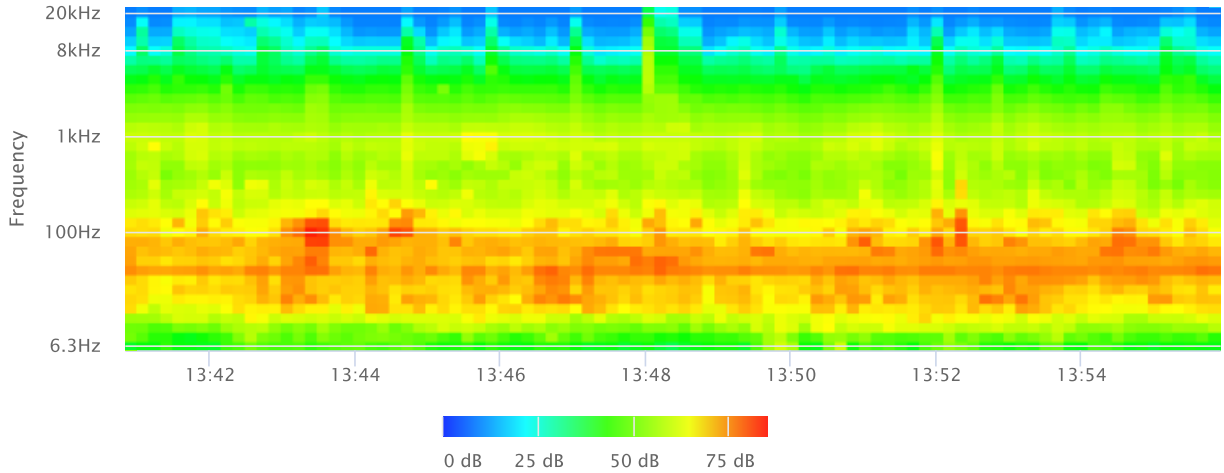
OBA 1/1 Lmin



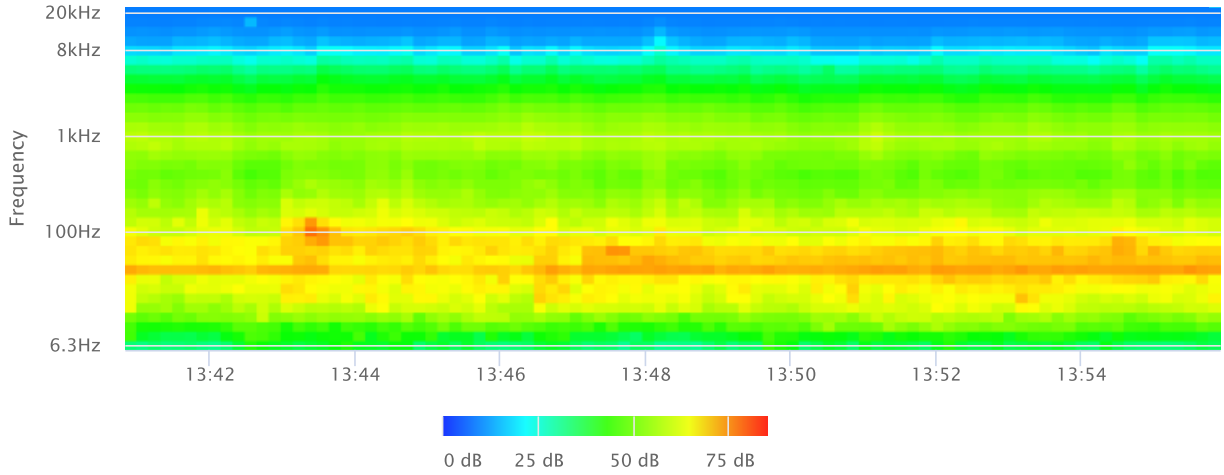
OBA 1/3 Leq



OBA 1/3 Lmax



OBA 1/3 Lmin


20kHz
8kHz
1kHz
100Hz
6.3Hz
Frequency
13:42
13:44
13:46
13:48
13:50
13:52
13:54

0 dB
25 dB
50 dB
75 dB

Noise Measurement
Field Data

Project Name: Alder Taylor Retail Center Project, County of San Bernardino **Date:** March 31, 2023

Project #: 19617

Noise Measurement #: NM4 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Edward Gallagher

Nearest Address or Cross Street: 10161 Alder Avenue, Bloomington, CA 92316

Site Description (Type of Existing Land Use and any other notable features): Noise Measurement Site: Just NW of residence 10161 Alder Ave.
Adjacent: Alder Ave (running N-S) adjacent to west with residential uses further west, residential uses to east, & 10 Fwy (running E-W) ~650' S & rail yard (active trains running E-W) ~850' S of NM4.

Weather: <50% cloud, filtered sunshine. Sunset 7:10PM **Settings:** SLOW FAST

Temperature: 58 deg F **Wind:** 5 mph **Humidity:** 48% **Terrain:** Flat

Start Time: 2:11 PM **End Time:** 2:25 PM **Run Time:**

Leq: 64 dB
Lmax 80.2 dB
L2 71.2 dB
L8 67.0 dB
L25 63.1 dB
L50 61.1 dB

Primary Noise Source: Traffic noise from the 23 vehicles passing microphone on Alder Ave. Traffic noise from the 10 Fwy (~650' S). Traffic noise from vehicles on Valley Blvd.

Secondary Noise Sources: Traffic ambiance from vehicles on other roads. Overhead air traffic. Bird song. Some leaf rustle from 5 mph breeze and some residential ambiance.

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CA 250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	CA 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2723
FACTORY CALIBRATION DATE:	11/17/2021	**FACTORY CALIBRATION DATE:**	11/18/2021
FIELD CALIBRATION DATE:	3/31/2023		

Noise Measurement
Field Data

PHOTOS:

NM4 looking W across Alder Ave towards single family residence 10160 Alder Ave, Bloomington.

NM4 looking SE across frontyard to residence 10161 Alder Ave, Bloomington.

Summary	
File Name on Meter	LxT_Data.222.s
File Name on PC	LxT_0003099-20230331 141134-LxT_Data.222.ldbin
Serial Number	0003099
Model	SoundTrack LxT®
Firmware Version	2.404
User	Ian Edward Gallagher
Location	NM4 34° 4'9.94"N 117°25'5.39"W
Job Description	15 minute noise measurement (1 x 15 minutes)
Note	Ganddini Project 19617, Alder Taylor Retail Center, County of San Bernardino

Measurement	
Start	2023-03-31 14:11:34
Stop	2023-03-31 14:26:34
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre-Calibration	2023-03-31 14:11:15
Post-Calibration	None

Overall Settings	
RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	C Weighting
OBA Max Spectrum	At LMax
Overload	122.6 dB

Results			
LA_{eq}		64.0	
LAE		93.5	
EA		250.059	µPa²h
EA8		8.002	mPa²h
EA40		40.009	mPa²h
$LA_{peak\ (max)}$	2023-03-31 14:12:24	93.5	dB
LAS_{max}	2023-03-31 14:11:49	80.2	dB
LAS_{min}	2023-03-31 14:15:50	55.3	dB

		Statistics	
LC_{eq}	74.1 dB	**LA2.00**	71.2 dB
LA_{eq}	64.0 dB	**LA8.00**	67.0 dB
LC_{eq} - LA_{eq}	10.1 dB	**LA25.00**	63.1 dB
LAI_{eq}	65.9 dB	**LA50.00**	61.1 dB
LA_{eq}	64.0 dB	**LA66.60**	60.2 dB
LAI_{eq} - LA_{eq}	1.9 dB	**LA90.00**	57.8 dB
Overload Count	0		

Measurement Report

Report Summary

Meter's File Name	LxT_Data.222.s	Computer's File Name	LxT_0003099-20230331 141134-LxT_Data.222.ldbin
Meter	LxT1 0003099		
Firmware	2.404		
User	Ian Edward Gallagher	Location	NM4 34° 4'9.94"N 117°25'5.39"W
Job Description	15 minute noise measurement (1 x 15 minutes)		
Note	Ganddini Project 19617, Alder Taylor Retail Center, Bloomington		
Start Time	2023-03-31 14:11:34	Duration	0:15:00.0
End Time	2023-03-31 14:26:34	Run Time	0:15:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	64.0 dB		
LAE	93.5 dB	SEA	--- dB
EA	250.1 µPa²h	LAFTM5	68.4 dB
EA8	8.0 mPa²h		
EA40	40.0 mPa²h		
LA_{peak}	93.5 dB	2023-03-31 14:12:24	
LAS_{max}	80.2 dB	2023-03-31 14:11:49	
LAS_{min}	55.3 dB	2023-03-31 14:15:50	
LA_{eq}	64.0 dB		
LC_{eq}	74.1 dB	LC_{eq} - LA_{eq}	10.1 dB
LAI_{eq}	65.9 dB	LAI_{eq} - LA_{eq}	1.9 dB

Exceedances	Count	Duration
LAS > 65.0 dB	29	0:03:12.5
LAS > 85.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	--- dB	--- dB	0.0 dB

	LDEN	LDay	LEve	LNight
	--- dB	--- dB	--- dB	--- dB

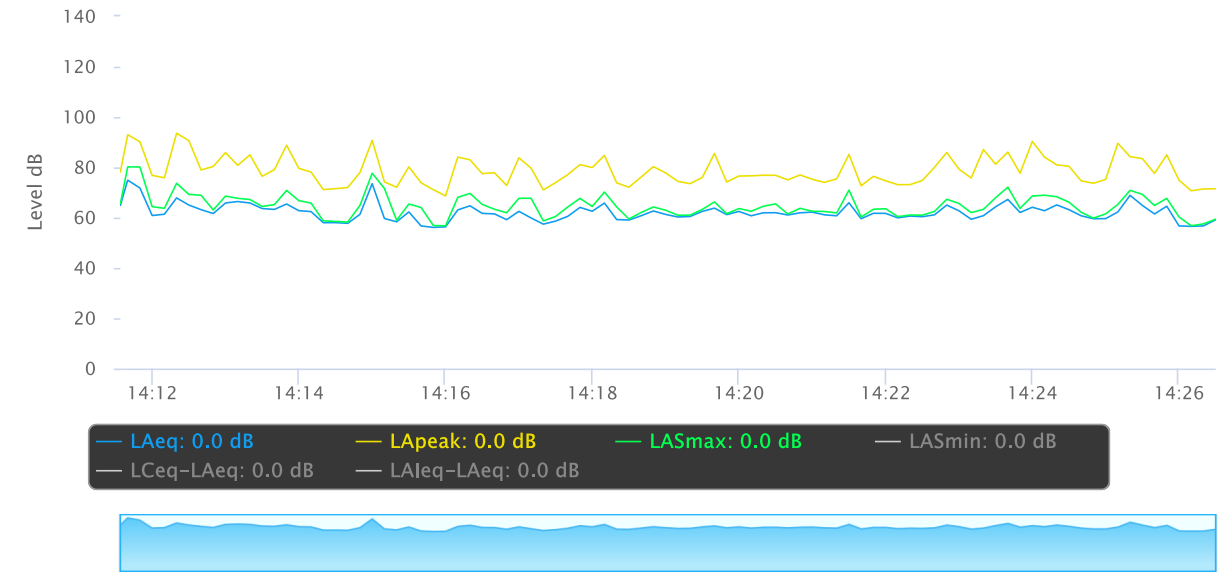
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	64.0 dB		74.1 dB		--- dB	
$L_{S(max)}$	80.2 dB	2023-03-31 14:11:49	--- dB		--- dB	
$L_{S(min)}$	55.3 dB	2023-03-31 14:15:50	--- dB		--- dB	
$L_{Peak(max)}$	93.5 dB	2023-03-31 14:12:24	--- dB		--- dB	

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

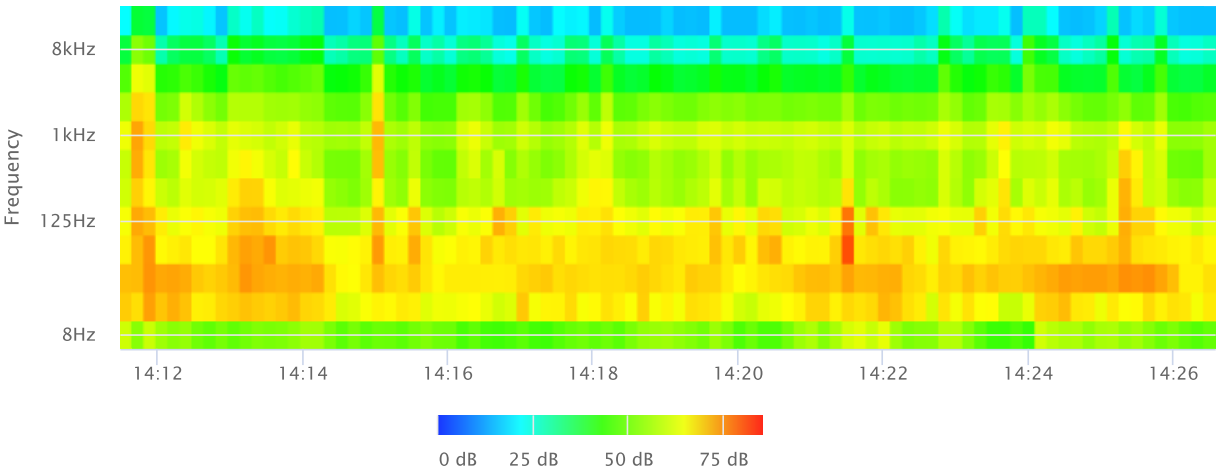
Statistics

LAS 2.0	71.2 dB
LAS 8.0	67.0 dB
LAS 25.0	63.1 dB
LAS 50.0	61.1 dB
LAS 66.6	60.2 dB
LAS 90.0	57.8 dB

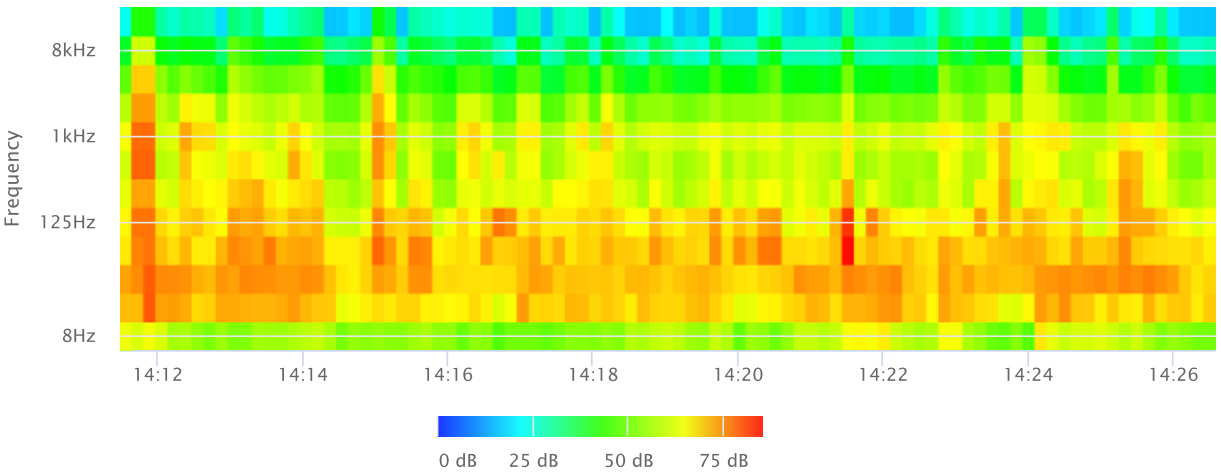
Time History



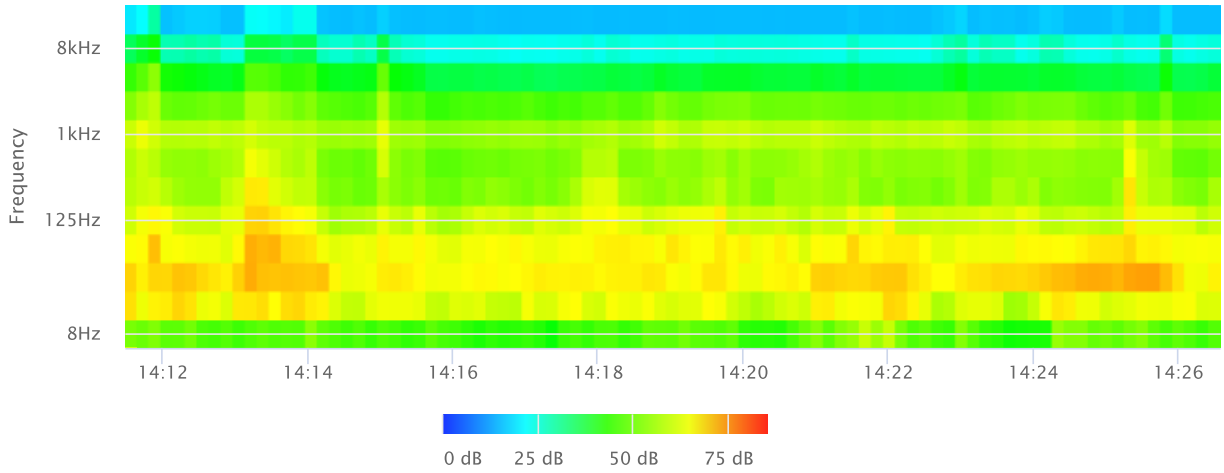
OBA 1/1 Leq



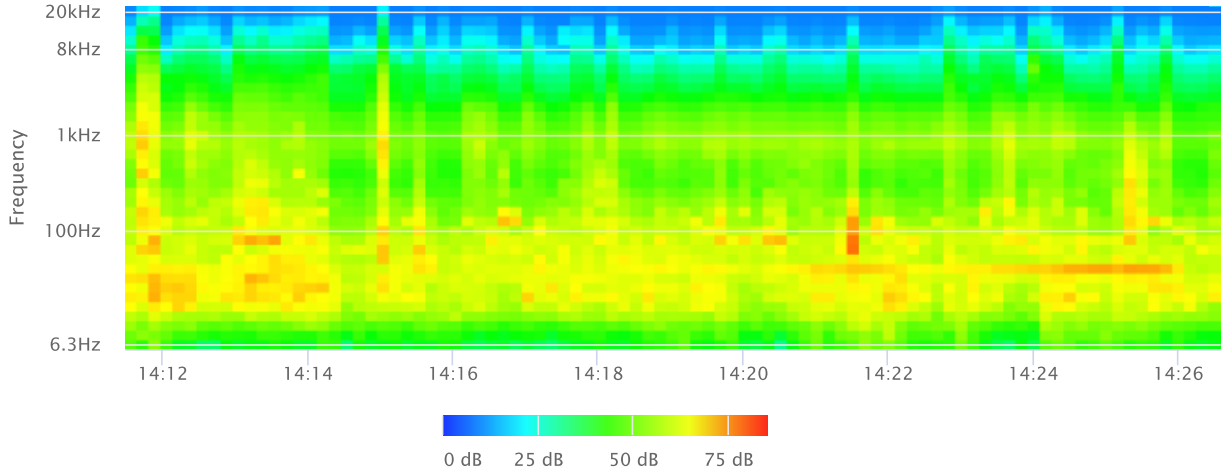
OBA 1/1 Lmax



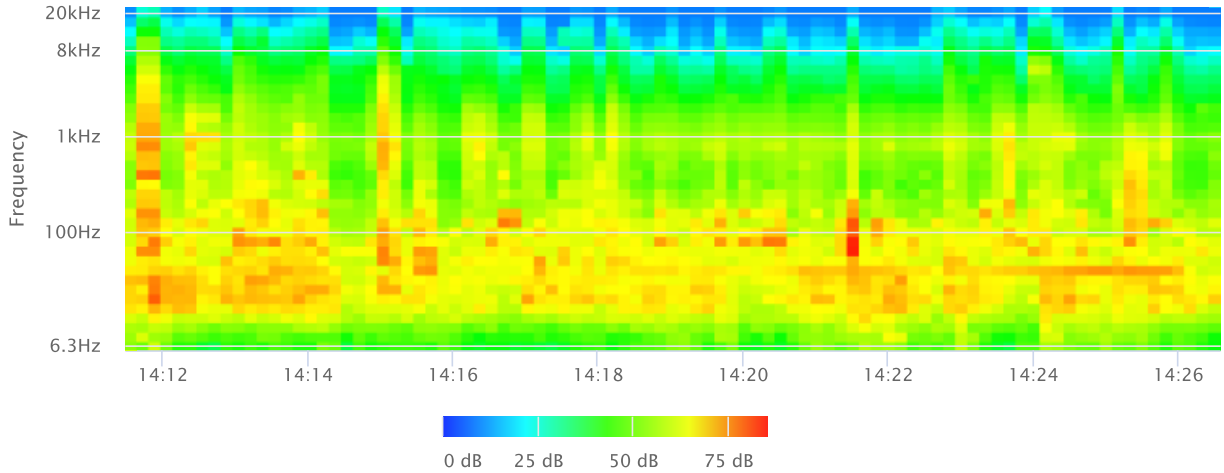
OBA 1/1 Lmin



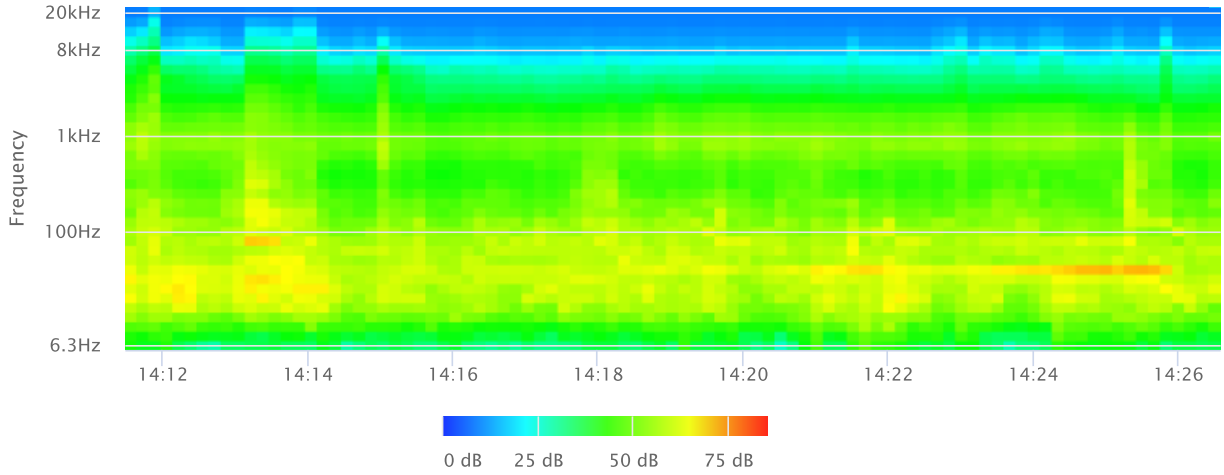
OBA 1/3 Leq



OBA 1/3 Lmax



OBA 1/3 Lmin


20kHz
8kHz
1kHz
100Hz
6.3Hz
Frequency
14:12
14:14
14:16
14:18
14:20
14:22
14:24
14:26
0 dB
25 dB
50 dB
75 dB

APPENDIX D

CONSTRUCTION NOISE MODEL WORKSHEETS

Receptor - Residential to the East (17831 Taylor Avenue, Bloomington)

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA
Demolition									
Concrete/Industrial Saws	1	90	115	20	0.20	-7.2	-7.0	82.8	75.8
Excavators	3	81	115	40	1.20	-7.2	0.8	73.8	74.6
Rubber Tired Dozers	2	82	115	40	0.80	-7.2	-1.0	74.8	73.8
							Log Sum	83.9	79.6
Site Preparation									
Rubber Tired Dozers	3	82	246	40	1.20	-13.8	0.8	68.2	69.0
Tractors/Loaders/Backhoes	4	84	246	40	1.60	-13.8	2.0	70.2	72.2
							Log Sum	72.3	73.9
Grading									
Grader	1	85	246	40	0.40	-13.8	-4.0	71.2	67.2
Excavators	1	81	246	40	0.40	-13.8	-4.0	67.2	63.2
Rubber Tired Dozers	1	82	246	40	0.40	-13.8	-4.0	68.2	64.2
Tractors/Loaders/Backhoes	3	84	246	40	1.20	-13.8	0.8	70.2	71.0
							Log Sum	75.5	73.5
Building Construction									
Cranes	1	81	246	16	0.16	-13.8	-8.0	67.2	59.2
Forklifts[2]	3	48	246	40	1.20	-13.8	0.8	34.2	35.0
Generator Sets	1	81	246	50	0.50	-13.8	-3.0	67.2	64.2
Welders	1	74	246	40	0.40	-13.8	-4.0	60.2	56.2
Tractors/Loaders/Backhoes	3	84	246	40	1.20	-13.8	0.8	70.2	71.0
							Log Sum	73.4	72.1
Paving									
Cement and Mortar Mixer	2	79	246	40	0.8	-13.8	-1.0	65.2	64.2
Pavers	1	77	246	50	0.50	-13.8	-3.0	63.2	60.2
Paving Equipment	2	77	246	50	1.00	-13.8	0.0	63.2	63.2
Tractors/Loaders/Backhoes	1	84	246	40	0.40	-13.8	-4.0	70.2	66.2
Rollers	2	80	246	20	0.40	-13.8	-4.0	66.2	62.2
							Log Sum	73.4	70.6
Architectural Coating									
Air Compressors	1	78	246	40	0.40	-13.8	-4.0	64.2	60.2
							Log Sum	64.2	60.2

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construction Noise Model User's Guide (January 2006) (https://www.nrc.gov/docs/ML1805/ML18059A141.pdf)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (property line).

Receptor - Residential to the Northeast (17832 Taylor Avenue, Bloomington)

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA
Demolition									
Concrete/Industrial Saws	1	90	181	20	0.20	-11.2	-7.0	78.8	71.8
Excavators	3	81	181	40	1.20	-11.2	0.8	69.8	70.6
Rubber Tired Dozers	2	82	181	40	0.80	-11.2	-1.0	70.8	69.9
							Log Sum	79.9	75.6
Site Preparation									
Rubber Tired Dozers	3	82	340	40	1.20	-16.7	0.8	65.3	66.1
Tractors/Loaders/Backhoes	4	84	340	40	1.60	-16.7	2.0	67.3	69.4
							Log Sum	69.5	71.1
Grading									
Grader	1	85	340	40	0.40	-16.7	-4.0	68.3	64.4
Excavators	1	81	340	40	0.40	-16.7	-4.0	64.3	60.4
Rubber Tired Dozers	1	82	340	40	0.40	-16.7	-4.0	65.3	61.4
Tractors/Loaders/Backhoes	3	84	340	40	1.20	-16.7	0.8	67.3	68.1
							Log Sum	72.7	70.7
Building Construction									
Cranes	1	81	340	16	0.16	-16.7	-8.0	64.3	56.4
Forklifts[2]	3	48	340	40	1.20	-16.7	0.8	31.3	32.1
Generator Sets	1	81	340	50	0.50	-16.7	-3.0	64.3	61.3
Welders	1	74	340	40	0.40	-16.7	-4.0	57.3	53.4
Tractors/Loaders/Backhoes	3	84	340	40	1.20	-16.7	0.8	67.3	68.1
							Log Sum	70.6	69.3
Paving									
Cement and Mortar Mixer	2	79	340	40	0.8	-16.7	-1.0	62.3	61.4
Pavers	1	77	340	50	0.50	-16.7	-3.0	60.3	57.3
Paving Equipment	2	77	340	50	1.00	-16.7	0.0	60.3	60.3
Tractors/Loaders/Backhoes	1	84	340	40	0.40	-16.7	-4.0	67.3	63.4
Rollers	2	80	340	20	0.40	-16.7	-4.0	63.3	59.4
							Log Sum	70.6	67.8
Architectural Coating									
Air Compressors	1	78	340	40	0.40	-16.7	-4.0	61.3	57.4
							Log Sum	61.3	57.4

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construction Noise Model User's Guide (January 2006) (https://www.nrc.gov/docs/ML1805/ML18059A141.pdf)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (property line).

Receptor - Residential to the North (17796 Taylor Avenue, Bloomington)

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA
Demolition									
Concrete/Industrial Saws	1	90	136	20	0.20	-8.7	-7.0	81.3	74.3
Excavators	3	81	136	40	1.20	-8.7	0.8	72.3	73.1
Rubber Tired Dozers	2	82	136	40	0.80	-8.7	-1.0	73.3	72.3
							Log Sum	82.4	78.1
Site Preparation									
Rubber Tired Dozers	3	82	215	40	1.20	-12.7	0.8	69.3	70.1
Tractors/Loaders/Backhoes	4	84	215	40	1.60	-12.7	2.0	71.3	73.4
							Log Sum	73.5	75.1
Grading									
Grader	1	85	215	40	0.40	-12.7	-4.0	72.3	68.4
Excavators	1	81	215	40	0.40	-12.7	-4.0	68.3	64.4
Rubber Tired Dozers	1	82	215	40	0.40	-12.7	-4.0	69.3	65.4
Tractors/Loaders/Backhoes	3	84	215	40	1.20	-12.7	0.8	71.3	72.1
							Log Sum	76.6	74.7
Building Construction									
Cranes	1	81	215	16	0.16	-12.7	-8.0	68.3	60.4
Forklifts[2]	3	48	215	40	1.20	-12.7	0.8	35.3	36.1
Generator Sets	1	81	215	50	0.50	-12.7	-3.0	68.3	65.3
Welders	1	74	215	40	0.40	-12.7	-4.0	61.3	57.4
Tractors/Loaders/Backhoes	3	84	215	40	1.20	-12.7	0.8	71.3	72.1
							Log Sum	74.6	73.3
Paving									
Cement and Mortar Mixer	2	79	215	40	0.8	-12.7	-1.0	66.3	65.4
Pavers	1	77	215	50	0.50	-12.7	-3.0	64.3	61.3
Paving Equipment	2	77	215	50	1.00	-12.7	0.0	64.3	64.3
Tractors/Loaders/Backhoes	1	84	215	40	0.40	-12.7	-4.0	71.3	67.4
Rollers	2	80	215	20	0.40	-12.7	-4.0	67.3	63.4
							Log Sum	74.6	71.8
Architectural Coating									
Air Compressors	1	78	215	40	0.40	-12.7	-4.0	65.3	61.4
							Log Sum	65.3	61.4

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construction Noise Model User's Guide (January 2006) (https://www.nrc.gov/docs/ML1805/ML18059A141.pdf)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (property line).

Receptor - Residential to the Northwest (17726 Taylor Avenue, Bloomington)

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA
Demolition									
Concrete/Industrial Saws	1	90	527	20	0.20	-20.5	-7.0	69.5	62.6
Excavators	3	81	527	40	1.20	-20.5	0.8	60.5	61.3
Rubber Tired Dozers	2	82	527	40	0.80	-20.5	-1.0	61.5	60.6
							Log Sum	70.6	66.3
Site Preparation									
Rubber Tired Dozers	3	82	439	40	1.20	-18.9	0.8	63.1	63.9
Tractors/Loaders/Backhoes	4	84	439	40	1.60	-18.9	2.0	65.1	67.2
							Log Sum	67.3	68.9
Grading									
Grader	1	85	439	40	0.40	-18.9	-4.0	66.1	62.2
Excavators	1	81	439	40	0.40	-18.9	-4.0	62.1	58.2
Rubber Tired Dozers	1	82	439	40	0.40	-18.9	-4.0	63.1	59.2
Tractors/Loaders/Backhoes	3	84	439	40	1.20	-18.9	0.8	65.1	65.9
							Log Sum	70.4	68.5
Building Construction									
Cranes	1	81	439	16	0.16	-18.9	-8.0	62.1	54.2
Forklifts[2]	3	48	439	40	1.20	-18.9	0.8	29.1	29.9
Generator Sets	1	81	439	50	0.50	-18.9	-3.0	62.1	59.1
Welders	1	74	439	40	0.40	-18.9	-4.0	55.1	51.2
Tractors/Loaders/Backhoes	3	84	439	40	1.20	-18.9	0.8	65.1	65.9
							Log Sum	68.4	67.1
Paving									
Cement and Mortar Mixer	2	79	439	40	0.8	-18.9	-1.0	60.1	59.2
Pavers	1	77	439	50	0.50	-18.9	-3.0	58.1	55.1
Paving Equipment	2	77	439	50	1.00	-18.9	0.0	58.1	58.1
Tractors/Loaders/Backhoes	1	84	439	40	0.40	-18.9	-4.0	65.1	61.2
Rollers	2	80	439	20	0.40	-18.9	-4.0	61.1	57.2
							Log Sum	68.4	65.6
Architectural Coating									
Air Compressors	1	78	439	40	0.40	-18.9	-4.0	59.1	55.2
							Log Sum	59.1	55.2

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construction Noise Model User's Guide (January 2006) (https://www.nrc.gov/docs/ML1805/ML18059A141.pdf)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (property line).

Receptor - Residential to the West (17743 Taylor Avenue, Bloomington)

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA
Demolition									
Concrete/Industrial Saws	1	90	377	20	0.20	-17.5	-7.0	72.5	65.5
Excavators	3	81	377	40	1.20	-17.5	0.8	63.5	64.2
Rubber Tired Dozers	2	82	377	40	0.80	-17.5	-1.0	64.5	63.5
							Log Sum	73.5	69.2
Site Preparation									
Rubber Tired Dozers	3	82	246	40	1.20	-13.8	0.8	68.2	69.0
Tractors/Loaders/Backhoes	4	84	246	40	1.60	-13.8	2.0	70.2	72.2
							Log Sum	72.3	73.9
Grading									
Grader	1	85	246	40	0.40	-13.8	-4.0	71.2	67.2
Excavators	1	81	246	40	0.40	-13.8	-4.0	67.2	63.2
Rubber Tired Dozers	1	82	246	40	0.40	-13.8	-4.0	68.2	64.2
Tractors/Loaders/Backhoes	3	84	246	40	1.20	-13.8	0.8	70.2	71.0
							Log Sum	75.5	73.5
Building Construction									
Cranes	1	81	246	16	0.16	-13.8	-8.0	67.2	59.2
Forklifts[2]	3	48	246	40	1.20	-13.8	0.8	34.2	35.0
Generator Sets	1	81	246	50	0.50	-13.8	-3.0	67.2	64.2
Welders	1	74	246	40	0.40	-13.8	-4.0	60.2	56.2
Tractors/Loaders/Backhoes	3	84	246	40	1.20	-13.8	0.8	70.2	71.0
							Log Sum	73.4	72.1
Paving									
Cement and Mortar Mixer	2	79	246	40	0.8	-13.8	-1.0	65.2	64.2
Pavers	1	77	246	50	0.50	-13.8	-3.0	63.2	60.2
Paving Equipment	2	77	246	50	1.00	-13.8	0.0	63.2	63.2
Tractors/Loaders/Backhoes	1	84	246	40	0.40	-13.8	-4.0	70.2	66.2
Rollers	2	80	246	20	0.40	-13.8	-4.0	66.2	62.2
							Log Sum	73.4	70.6
Architectural Coating									
Air Compressors	1	78	246	40	0.40	-13.8	-4.0	64.2	60.2
							Log Sum	64.2	60.2

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construction Noise Model User's Guide (January 2006) (https://www.nrc.gov/docs/ML1805/ML18059A141.pdf)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (property line).

APPENDIX E

SOUNDPLAN WORKSHEETS

Noise emissions of industry sources

Source name	Reference	Level		Frequency spectrum [dB(A)]										Corrections		
			dB(A)	31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz	Cwall dB	CI dB	CT dB
HVAC1	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC2	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC3	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC4	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC5	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC6	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC7	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC8	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC9	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC10	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC11	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC12	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC13	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC14	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC15	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC16	Lw/unit	Day	78.7	42.5	46.5	59.5	64.5	58.5	69.5	71.5	70.5	72.5	72.5	-	-	-
		Night	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loading	Lw/m²	Day	63.5											-	-	-
		Night	-											-	-	-

Noise emissions of parking lot traffic

Name	Parking lot type	Size	Movements per hour		Road surface	Separated method	Lw,ref
			Day	Night			dB(A)
P1	Visitors and staff	34 Parking bays	0.200	0.000	Asphaltic driving lanes	no	81.8
P2	Visitors and staff	30 Parking bays	0.200	0.000	Asphaltic driving lanes	no	81.1
P3	Visitors and staff	22 Parking bays	0.200	0.000	Asphaltic driving lanes	no	79.2
P4	Visitors and staff	41 Parking bays	0.200	0.000	Asphaltic driving lanes	no	82.9

Receiver list

No.	Receiver name	Building side	Floor	Limit		Level		Conflict	
				Day	Night	Day	Night	Day	Night
				dB(A)		dB(A)		dB	
1	1	-	EG	-	-	39.5	0.0	-	-
2	2	-	EG	-	-	39.7	0.0	-	-
3	3	-	EG	-	-	38.1	0.0	-	-
4	4	-	EG	-	-	32.6	0.0	-	-

APPENDIX F

FHWA TRAFFIC NOISE MODEL WORKSHEETS

Existing Traffic Noise

1	:Id
Taylor Avenue	:Road
In vicinity of project site	:Segment

Vehicle Distribution (Light Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.56	13.96	10.49	97.40
Medium Trucks	48.91	2.17	48.91	1.84
Heavy Trucks	47.30	5.41	47.30	0.74

ADT	19330
Speed	25
Distance	30
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	1185.50	14.50	5.64	876.10	2.57	2.58	219.44	19.33	7.52
Speed in MPH	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	59.44	71.09	77.24	59.44	71.09	77.24	59.44	71.09	77.24
ADJUSTMENTS									
Flow	26.45	7.33	3.23	25.14	-0.18	-0.17	19.13	8.58	4.48
Distance	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	63.04	55.56	57.62	61.73	48.05	54.22	55.72	56.81	58.86
	DAY LEQ	64.70		EVENING LEQ	62.59		NIGHT LEQ	62.10	

F	**CNEL**	**69.18**	
	DAY LEQ	64.70	

Day hour	89.00
Absorptive?	no
Use hour?	no
GRADE dB	0.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside light truck mix.

Existing Plus Project Traffic Noise

1	:Id
Taylor Avenue	:Road
In vicinity of project site	:Segment

Vehicle Distribution (Light Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.56	13.96	10.49	97.40
Medium Trucks	48.91	2.17	48.91	1.84
Heavy Trucks	47.30	5.41	47.30	0.74

ADT	20013
Speed	25
Distance	30
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	1227.39	15.01	5.84	907.06	2.66	2.67	227.20	20.01	7.78
Speed in MPH	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	59.44	71.09	77.24	59.44	71.09	77.24	59.44	71.09	77.24
ADJUSTMENTS									
Flow	26.60	7.48	3.38	25.29	-0.03	-0.02	19.28	8.73	4.63
Distance	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	63.19	55.71	57.77	61.88	48.21	54.37	55.87	56.96	59.02
	DAY LEQ	64.85		EVENING LEQ	62.74		NIGHT LEQ	62.25	

CNEL	69.33
DAY LEQ	64.85

Day hour	89.00
Absorptive?	no
Use hour?	no
GRADE dB	0.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside light truck mix.

Existing Traffic Noise

2	:Id
Alder Avenue	:Road
Taylor Avenue to Valley Boulevard	:Segment

Vehicle Distribution (Light Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.56	13.96	10.49	97.40
Medium Trucks	48.91	2.17	48.91	1.84
Heavy Trucks	47.30	5.41	47.30	0.74

ADT	13700
Speed	25
Distance	25
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	840.21	10.27	4.00	620.93	1.82	1.83	155.53	13.70	5.33
Speed in MPH	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	59.44	71.09	77.24	59.44	71.09	77.24	59.44	71.09	77.24
ADJUSTMENTS									
Flow	24.96	5.83	1.73	23.65	-1.68	-1.66	17.63	7.08	2.98
Distance	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	62.34	54.86	56.91	61.03	47.35	53.52	55.01	56.11	58.16
	DAY LEQ	64.00		EVENING LEQ	61.89		NIGHT LEQ	61.40	

CNEL	68.48
DAY LEQ	64.00

Day hour	90.00
Absorptive?	no
Use hour?	no
GRADE dB	1.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside light truck mix.

Existing Plus Project Traffic Noise

2	:Id
Alder Avenue	:Road
Taylor Avenue to Valley Boulevard	:Segment

Vehicle Distribution (Light Truck Mix)				
Motor-Vehicle Type	Daytime % (7 AM - 7 PM)	Evening % (7 PM - 10 PM)	Night % (10 PM - 7 AM)	Total % of Traffic Flow
Automobiles	75.56	13.96	10.49	97.40
Medium Trucks	48.91	2.17	48.91	1.84
Heavy Trucks	47.30	5.41	47.30	0.74

ADT	14383
Speed	25
Distance	25
Left Angle	-90
Right Angle	90

	Daytime			Evening			Night		
Noise Parameters	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
INPUT PARAMETERS									
Vehicles per hour	882.10	10.79	4.20	651.89	1.91	1.92	163.28	14.38	5.59
Speed in MPH	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
NOISE CALCULATIONS									
Reference levels	59.44	71.09	77.24	59.44	71.09	77.24	59.44	71.09	77.24
ADJUSTMENTS									
Flow	25.17	6.04	1.94	23.86	-1.47	-1.45	17.84	7.29	3.19
Distance	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00
LEQ	62.55	55.07	57.12	61.24	47.56	53.73	55.22	56.32	58.37
	DAY LEQ	64.21		EVENING LEQ	62.10		NIGHT LEQ	61.61	

CNEL	68.69
DAY LEQ	64.21

Day hour	90.00
Absorptive?	no
Use hour?	no
GRADE dB	1.00

Notes:

(1) FHWA Traffic Noise Prediction Model FHWA-RD-77-108

(2) Vehicle percentages based on County of Riverside light truck mix.

APPENDIX G

GROUNDBORNE VIBRATION WORKSHEETS

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Residential to the East		
Address:	17831 Taylor Avenue, Bloomington		

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment Type =	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	3.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	5.052	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Residential to the East		
Address:	17831 Taylor Avenue, Bloomington		

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment = Type	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	3.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	2.141	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Residential to the Northeast		
Address:	17832 Taylor Avenue, Bloomington		

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment Type =	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	101.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.026	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Residential to the Northeast		
Address:	17832 Taylor Avenue, Bloomington		

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment = Type	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	101.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.011	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Residential & Commercial to the North		
Address:	Residential Use & B&C Tire Road Service, 17796 Taylor Avenue, Bloomington		

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment Type	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	90.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.031	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Residential & Commercial to the North		
Address:	Residential Use & B&C Tire Road Service, 17796 Taylor Avenue, Bloomington		

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment Type =	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	90.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.013	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Commercial to the North		
Address:	Import & Domestic Converters, 17781 Valley Boulevard & Hollywood Customs, 17763, Valley Boulevard, Bloomington		

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment Type =	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	116.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.021	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Commercial to the North		
Address:	Import & Domestic Converters, 17781 Valley Boulevard & Hollywood Customs, 17763, Valley Boulevard, Bloomington		

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment Type =	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	116.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.009	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Commercial to the Northwest		
Address:	Inland Empire Trailers, 17748 Taylor Avenue, Bloomington		

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment Type	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	74.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.041	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Commercial to the Northwest		
Address:	Inland Empire Trailers, 17748 Taylor Avenue, Bloomington		

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment Type =	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	74.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.017	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Residential to the West		
Address:	17743 Taylor Avenue, Bloomington		

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment Type =	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	6.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	1.786	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Residential to the West		
Address:	17743 Taylor Avenue, Bloomington		

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment = Type	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	6.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.757	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Vibratory Roller		
Scenario:	BMPs - Damage		
Location:	Residential		
Address:			

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment Type	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	20.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.293	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Large Bulldozer		
Scenario:	BMPs - Damage		
Location:	Residential		
Address:			

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment Type =	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	12.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.268	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Vibratory Roller		
Scenario:	BMPs - Damage		
Location:	Commercial		
Address:			

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment Type	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	15.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.452	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19617 Alder Taylor Retail Center	Date:	5/9/23
Source:	Large Bulldozer		
Scenario:	BMPs - Damage		
Location:	Commercial		
Address:			

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment Type =	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	8.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from the Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020, pg 37.

RESULTS

PPV =	0.492	IN/SEC	OUTPUT IN BLUE

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