

# Noise Impact Assessment

---

## Various Park Improvements at Stephen Sorensen Park

Community of Lake Los Angeles,  
Los Angeles County, California

### Prepared For:

County of Los Angeles  
Department of Parks and Recreation  
Planning & CEQA Section  
1000 S. Fremont Ave, Unit #40  
Building A-9 West, 3rd Floor  
Alhambra, CA 91803

**August 2020**



**ECORP Consulting, Inc.**  
ENVIRONMENTAL CONSULTANTS

**CONTENTS**

1.0 INTRODUCTION ..... 1

    1.1 Project Location and Description..... 1

2.0 ENVIRONMENTAL NOISE AND GROUNDBORNE VIBRATION ANALYSIS..... 2

    2.1 Fundamentals of Noise and Environmental Sound..... 2

        2.1.1 Addition of Decibels..... 2

        2.1.2 Sound Propagation and Attenuation ..... 3

        2.1.3 Noise Descriptors ..... 4

        2.1.4 Human Response to Noise..... 6

        2.1.5 Effects of Noise on People..... 6

    2.2 Fundamentals of Environmental Groundborne Vibration ..... 7

        2.2.1 Vibration Sources and Characteristics..... 7

3.0 EXISTING ENVIRONMENTAL NOISE SETTING..... 8

    3.1 Noise Sensitive Land Uses ..... 8

    3.2 Existing Ambient Noise Environment..... 9

        3.2.1 Existing Ambient Noise Measurements..... 9

4.0 REGULATORY FRAMEWORK..... 10

    4.1 Federal..... 10

        4.1.1 Occupational Safety and Health Act of 1970 ..... 10

    4.2 State ..... 10

        4.2.1 State of California General Plan Guidelines ..... 10

        4.2.2 State Office of Planning and Research Noise Element Guidelines ..... 10

    4.3 Local ..... 10

        4.3.1 Los Angeles County General Plan Noise Element ..... 10

        4.3.2 Los Angeles County Code..... 11

5.0 IMPACT ASSESSMENT ..... 12

    5.1 Thresholds of Significance..... 12

    5.2 Methodology ..... 13

    5.3 Impact Analysis ..... 13

        5.3.1 Project Construction Noise..... 13

        5.3.2 Project Operational Noise..... 16

6.0 REFERENCES..... 21

**LIST OF TABLES**

Table 2-1. Common Acoustical Descriptors.....5  
 Table 2-2. Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibration Levels ..... 8  
 Table 3-1. Existing (Baseline) Noise Measurements .....9  
 Table 4-1. Exterior Noise Standards..... 11  
 Table 4-2. Construction Noise Standards..... 12  
 Table 5-1. Construction Average (dBA) Noise Levels at Nearest Receptor..... 15  
 Table 5-2. Representative Vibration Source Levels for Construction Equipment..... 18  
 Table 5-3 Specific Plan Construction Vibration Levels at 400 Feet ..... 19

**LIST OF FIGURES**

Figure 1. Common Noise Levels .....2

**LIST OF ATTACHMENTS**

- Attachment A – Baseline (Existing) Noise Measurements – Project Site and Vicinity
- Attachment B – Roadway Construction Noise Model Outputs – Project Construction Noise

**LIST OF ACRONYMS AND ABBREVIATIONS**

County	County of Los Angeles
CNEL	Community Noise Equivalent Level
dB	Decibel
dBA	Decibel is A-weighted
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HDR	High Density Residential
Hz	Hertz
L <sub>dn</sub>	Day/Night noise level
L <sub>eq</sub>	Equivalent noise level
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Administration
PPV	Peak particle velocity
Project	Stephen Sorensen Park Project
RMS	Root mean square
WEAL	Western Electro-Acoustic Laboratory, Inc.

## 1.0 INTRODUCTION

This report documents the results of a Noise Impact Assessment completed for the Various Park Improvements at Stephen Sorensen Park (Project), which includes the development of new park amenities at the existing Sorensen Park located in the unincorporated community of Lake Los Angeles in Los Angeles County. This assessment was prepared as a comparison of predicted Project noise levels to noise standards promulgated by the County of Los Angeles (County) General Plan Noise Element and Municipal Code. The purpose of this report is to estimate Project-generated noise levels and determine the level of impact the Project would have on the environment.

### 1.1 Project Location and Description

The Proposed Project is located within the existing Stephen Sorensen Park which is bound by East Avenue P and Lake Los Angeles Avenue. The Project site is currently a functional and operational park that accommodates sporting events and various community activities. The Project is proposing the development of various new park amenities including a 25,000-square foot skate park, a 2,500-square foot gazebo/stage structure, a 1,600-square foot concrete slab with fitness zone and shade structure, a 1,800-square foot shade structure for the existing playground, and associated Americans with Disabilities Act (ADA) improvements. The Project would increase total useable park space by approximately 0.57 acres. The Project site is surrounded by East Avenue P and residents beyond to the south, undeveloped land with commercial land uses beyond to the east, undeveloped land with residents beyond to the west and Tameobit Wildlife Sanctuary to the north.

Project construction is anticipated to occur between March 2022 and July 2023 and would be implemented in four phases. Phase 1 would consist of grading and earthwork and would last approximately one month. Phase 2 would commence after completion of Phase 1 and would consist of the construction of the concrete slab with fitness zone, the shade structure covering the fitness zone, and the shade structure for the existing playground swing set. Phase 2 is expected to last approximately two months, spanning April and May 2022. Phase 3, commencing in July 2022, would consist of the construction of the gazebo and is expected to last approximately one month. A total of 76 cubic yards of soil would be cut and another 76 cubic yards filled during this time. Phase 4, anticipated to last approximately 3 months, would consist of the site preparation, grading, construction, and paving of the skate park. Site preparation and grading would begin March 2023 and occur for approximately two weeks. Construction and paving would take place starting in April 2023 and last for approximately three months.

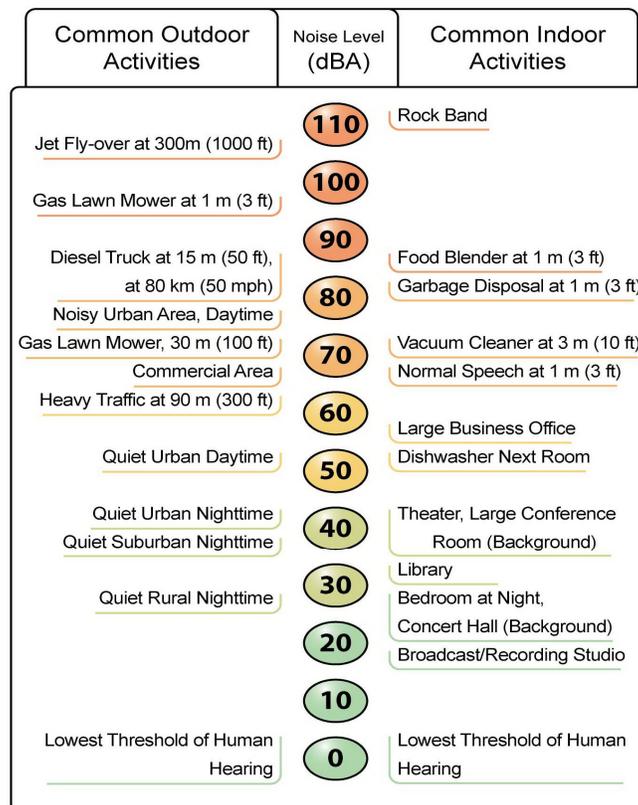
## 2.0 ENVIRONMENTAL NOISE AND GROUNDBORNE VIBRATION ANALYSIS

### 2.1 Fundamentals of Noise and Environmental Sound

#### 2.1.1 Addition of Decibels

The decibel (dB) scale is logarithmic, not linear; therefore, sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted (dBA), an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be three dB higher than one source under the same conditions (Federal Transit Administration [FTA] 2018). For example, a 65-dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by three dB). Under the decibel scale, three sources of equal loudness together would produce an increase of five dB.

Typical noise levels associated with common noise sources are depicted on Figure 1.



Source: California Department of Transportation (Caltrans) 2012

**Figure 1. Common Noise Levels**

### **2.1.2 Sound Propagation and Attenuation**

Noise can be generated by a number of sources including mobile sources such as automobiles, trucks, and airplanes, and stationary sources such as construction sites, machinery, and industrial operations. Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately six dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately three dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics (Federal Highway Administration [FHWA] 2011). No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. For line sources, an overall attenuation rate of three dB per doubling of distance is assumed (FHWA 2011).

Noise levels may also be reduced by intervening structures; generally, a single row of detached buildings between the receptor and the noise source reduces the noise level by about five dBA (FHWA 2008), while a solid wall or berm generally reduces noise levels by 10 to 20 dBA (FHWA 2011). However, noise barriers or enclosures specifically designed to reduce site-specific construction noise can provide a sound reduction of 35 dBA or greater (Western Electro-Acoustic Laboratory, Inc. [WEAL] 2000). To achieve the most potent noise-reducing effect, a noise enclosure/barrier must physically fit in the available space, must completely break the "line of sight" between the noise source and the receptors, must be free of degrading holes or gaps, and must not be flanked by nearby reflective surfaces. Noise barriers must be sizable enough to cover the entire noise source and extend lengthwise and vertically as far as feasibly possible to be most effective. The limiting factor for a noise barrier is not the component of noise transmitted through the material, but rather the amount of noise flanking around and over the barrier. In general, barriers contribute to decreasing noise levels only when the structure breaks the line of sight between the source and the receiver.

The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows (Caltrans 2002). The exterior-to-interior reduction of newer residential units is generally 30 dBA or more (Harris Miller, Miller & Hanson Inc. [HMMH] 2006). Generally, in exterior noise environments ranging from 60 dBA Community Noise Equivalent Level (CNEL) to 65 dBA CNEL, interior noise levels can typically be maintained below 45 dBA, a typically residential interior noise standard, with the incorporation of an adequate forced air mechanical ventilation system in each residential building, and standard thermal-pane residential windows/doors with a minimum rating of Sound Transmission Class (STC) 28. (STC is an integer rating of how well a building partition attenuates airborne sound. In the U.S., it is widely used to rate interior partitions, ceilings, floors, doors, windows, and exterior wall configurations.) In exterior noise environments of 65 dBA CNEL or greater, a combination of forced-air mechanical ventilation and sound-rated construction methods is often required to meet the interior noise level limit. Attaining the necessary noise reduction from exterior to interior spaces is readily achievable in noise environments less than 75 dBA CNEL with proper wall construction techniques following California Building Code methods, the selections of proper windows and doors, and the incorporation of forced-air mechanical ventilation systems.

### **2.1.3 Noise Descriptors**

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The  $L_{eq}$  is a measure of ambient noise, while the Community Noise Equivalent Level (CNEL) is a measurement of community noise. Each is applicable to this analysis and defined in Table 2-1.

<b>Table 2-1. Common Acoustical Descriptors</b>	
<b>Descriptor</b>	<b>Definition</b>
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micropascals (or 20 micronewtons per square meter), where one pascal is the pressure resulting from a force of one newton exerted over an area of one square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micropascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hertz (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A weighting filter network. 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 and correlates well with subjective reactions to noise.
Equivalent Noise Level, $L_{eq}$	The average acoustic energy content of noise for a stated period of time. Thus, the $L_{eq}$ of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
$L_{max}$ , $L_{min}$	The maximum and minimum A-weighted noise level during the measurement period.
$L_{01}$ , $L_{10}$ , $L_{50}$ , $L_{90}$	The A-weighted noise levels that are exceeded one percent, 10 percent, 50 percent, and 90 percent of the time during the measurement period.
Day/Night Noise Level, $L_{dn}$ or DNL	A 24-hour average $L_{eq}$ with a 10 dBA “weighting” added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour $L_{eq}$ would result in a measurement of 66.4 dBA $L_{dn}$ .
Community Noise Equivalent Level, CNEL	A 24-hour average $L_{eq}$ with a five dBA “weighting” during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA “weighting” added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour $L_{eq}$ would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.

The dBA sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about  $\pm$  one dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends on the distance between the receptor and the noise source. Close to the noise source, the models are accurate to within about  $\pm$  one to two dBA.

#### **2.1.4 Human Response to Noise**

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in dBA noise levels, the following relationships should be noted in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of one dBA cannot be perceived by humans.
- Outside of the laboratory, a three-dBA change is considered a just-perceivable difference.
- A change in level of at least five dBA is required before any noticeable change in community response would be expected. An increase of five dBA is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

#### **2.1.5 Effects of Noise on People**

##### **Hearing Loss**

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

The Occupational Safety and Health Administration (OSHA) has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over eight hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

## **Annoyance**

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The  $L_{dn}$  as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. For ground vehicles, a noise level of about 55 dBA  $L_{dn}$  is the threshold at which a substantial percentage of people begin to report annoyance.

## **2.2 Fundamentals of Environmental Groundborne Vibration**

### **2.2.1 *Vibration Sources and Characteristics***

Sources of earthborne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or manmade causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions).

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV), another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Table 2-2 displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high-noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Ground vibration can be a concern in instances where buildings shake and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. For instance, heavy-duty trucks generally generate groundborne vibration velocity levels of

0.006 PPV at 50 feet under typical circumstances, which as identified in Table 2-2 is considered very unlikely to cause damage to buildings of any type. Common sources for groundborne vibration are planes, trains, and construction activities such as earth moving, which requires the use of heavy-duty earthmoving equipment.

<b>PPV (inches/second)</b>	<b>Approximate Vibration Velocity Level (VdB)</b>	<b>Human Reaction</b>	<b>Effect on Buildings</b>
0.006–0.019	64–74	Range of threshold of perception	Vibrations unlikely to cause damage of any type
0.08	87	Vibrations readily perceptible	Recommended upper level to which ruins and ancient monuments should be subjected
0.1	92	Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration sensitive activities	Virtually no risk of architectural damage to normal buildings
0.2	94	Vibrations may begin to annoy people in buildings	Threshold at which there is a risk of architectural damage to normal dwellings
0.4–0.6	98–104	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Architectural damage and possibly minor structural damage

Source: Caltrans 2020

For the purposes of this analysis, a PPV descriptor with units of inches per second is used to evaluate construction-generated vibration for building damage and human complaints.

### **3.0 EXISTING ENVIRONMENTAL NOISE SETTING**

#### **3.1 Noise Sensitive Land Uses**

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as hospitals, historic sites, cemeteries, and certain recreation areas are considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses.

The Project is proposing the development of various new park amenities, including a 25,000-square foot skate park, a 2,500-square foot gazebo/stage structure, a 1,600-square foot concrete slab with fitness zone and shade structure, a 1,800-square foot shade structure for the existing playground, and associated ADA improvements. The nearest sensitive receptors to the Project site are rural residents located across East Avenue P with the closest being approximately 400 feet away from the proposed park improvements.

### 3.2 Existing Ambient Noise Environment

The noise environment in the Proposed Project area is impacted by various noise sources. Mobile sources of noise, especially cars and trucks on area roadways such as East Avenue P, are the most common and significant sources of noise in the Project area. Other sources of noise are the residential land uses throughout the area that generate typical neighborhood noise as well as the various activities that take place at Stephen Sorensen Park. The Project site is located outside of any airport land use plan. Furthermore, the Project site is located beyond two miles from any airport. The Brian Ranch Airport is the closest airport to the Project site and is located approximately 7.2 miles away.

#### 3.2.1 Existing Ambient Noise Measurements

The Project site is located within the existing Stephen Sorensen Park and has numerous existing amenities such as sports courts and fields, children’s play areas, barbecue and picnic areas, and a gymnasium/community center. It is bounded by East Avenue P to the south, with residences beyond, undeveloped land to the east, with commercial land uses beyond, undeveloped land to the west and Tameobit Wildlife Sanctuary to the north, with residences beyond. In order to quantify existing ambient noise levels in the Project area, ECORP Consulting, Inc. conducted three short-term noise measurements on July 15, 2020. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the Project site during the daytime (see Attachment A for a visual depiction of the Noise Measurement Locations). The 10-minute measurements were taken between 10:39 a.m. and 11:28 a.m. Short-term ( $L_{eq}$ ) measurements are considered representative of the noise levels throughout the daytime. The average noise levels and sources of noise measured at each location are listed in Table 3-1.

<b>Location Number</b>	<b>Location</b>	<b><math>L_{eq}</math> dBA</b>	<b>Lmin dBA</b>	<b>Lmax dBA</b>	<b>Time</b>
1	Adjacent to park perimeter fence along Avenue P	<b>49.7</b>	43.0	69.3	10:39 a.m.-10:49 a.m.
2	10 feet east of Mackenna’s Gold Avenue on the Parkway	<b>51.1</b>	39.2	69.4	10:56 a.m.-11:06 a.m.
3	Southern cul-de-sac of 167 <sup>th</sup> Street East on the parkway	<b>49.2</b>	39.3	54.9	11:18 a.m.-11:28 a.m.

*Source: Measurements were taken by ECORP with a Larson Davis SoundExpert LxT precision sound level meter, which satisfies the American National Standards Institute for general environmental noise measurement instrumentation. Prior to the measurements, the SoundExpert LxT sound level meter was calibrated according to manufacturer specifications with a Larson Davis CAL200 Class I Calibrator. See Attachment A for noise measurement outputs.*

As shown in Table 3-1, the ambient recorded noise levels range from 49.2 to 51.1 dBA in the area near the Project site. The most common noise in the Project vicinity is produced by automotive vehicles on adjacent roadways (e.g., cars, trucks, buses, motorcycles). Vehicular noise varies with the volume, speed, and type of traffic. Slower traffic produces less noise than fast-moving traffic. Trucks typically generate more noise than cars. Infrequent or intermittent noise also is associated with vehicles including sirens, vehicle alarms, slamming of doors, garbage and construction vehicle activity, and honking of horns. These noises add to urban noise and are regulated by a variety of agencies.

## **4.0 REGULATORY FRAMEWORK**

### **4.1 Federal**

#### **4.1.1 Occupational Safety and Health Act (OSHA) of 1970**

OSHA regulates onsite noise levels and protects workers from occupational noise exposure. To protect hearing, worker noise exposure is limited to 90 dB with A-weighting (dBA) over an eight-hour work shift (29 Code of Federal Regulations 1910.95). Employers are required to develop a hearing conservation program when employees are exposed to noise levels exceeding 85 dBA. These programs include provision of hearing protection devices and testing employees for hearing loss on a periodic basis.

### **4.2 State**

#### **4.2.1 State of California General Plan Guidelines**

The State of California regulates vehicular and freeway noise affecting classrooms, sets standards for sound transmission and occupational noise control, and identifies noise insulation standards and airport noise/land-use compatibility criteria. The State of California General Plan Guidelines (State of California 2003), published by the Governor's Office of Planning and Research (OPR), also provides guidance for the acceptability of projects within specific CNEL/L<sub>dn</sub> contours. The guidelines also present adjustment factors that may be used in order to arrive at noise acceptability standards that reflect the noise-control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

#### **4.2.2 State Office of Planning and Research Noise Element Guidelines**

The State OPR Noise Element Guidelines include recommended exterior and interior noise level standards for local jurisdictions to identify and prevent the creation of incompatible land uses due to noise. The Noise Element Guidelines contain a land-use compatibility table that describes the compatibility of various land uses with a range of environmental noise levels in terms of the CNEL.

### **4.3 Local**

#### **4.3.1 Los Angeles County General Plan Noise Element**

The Noise Element of the Los Angeles County General Plan provides policy direction for minimizing noise impacts on the community and for coordinating with surrounding jurisdictions and other entities regarding noise control. By identifying noise-sensitive land uses and establishing compatibility guidelines for land use and noises, noise considerations will influence the general distribution, location, and intensity of future land uses. The result is that effective land use planning and mitigation can alleviate the majority of noise problems.

The Noise Element sets various goals and policies that would apply to projects within unincorporated areas of Los Angeles County. The following goals are applicable to the Proposed Project:

**Goal N 1:** The reduction of excessive noise impacts.

**Policy N 1.3:** Minimize impacts to noise-sensitive land uses by ensuring adequate site design, acoustical construction, and use of barriers, berms, or additional engineering controls through Best Available Technologies (BAT).

**Policy N 1.4:** Enhance and promote noise abatement programs in an effort to maintain acceptable levels of noise as defined by the Los Angeles County Exterior Noise Standards and other applicable noise standards.

**Policy N 1.6:** Ensure cumulative impacts related to noise do not exceed health-based safety margins.

### 4.3.2 Los Angeles County Code

The County regulations with respect to noise are included in Chapter 12, *Noise Control*, of the County Code. The Noise Regulations provide noise standards within the County. Section 12.08.390 sets forth maximum exterior noise levels for various land uses and are presented in Table 4-1.

Noise Zone	Designated Noise Zone Land Use (Receptor Property)	Time Interval	Exterior Noise Level (dB)
I	Noise Sensitive Area <sup>1</sup>	Anytime	45
II	Residential Properties	10:00 p.m.-7:00 a.m. (nighttime)	45
		7:00 a.m.-10:00 p.m. (daytime)	50
III	Commercial Properties	10:00 p.m.-7:00 a.m. (nighttime)	55
		7:00 a.m.-10:00 p.m. (daytime)	60
IV	Industrial Properties	Anytime	70

Source: Los Angeles County 2020

Notes: <sup>1</sup>Noise sensitive areas are areas where conspicuous signs are displayed indicating the presence of the zone.

Section 12.08.440 prohibits the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between the hours of 7:00 p.m. and 7:00 a.m., or any time on Sundays or holidays. The maximum noise allowed during the permitted construction hours at affected buildings shall not exceed the levels listed in Table 4-2.

<b>Table 4-2. Construction Noise Standards</b>			
<b>Time Interval</b>	<b>Single-Family Residential</b>	<b>Multi-Family Residential</b>	<b>Semi-Residential/ Commercial</b>
<b>Mobile Equipment<sup>1</sup></b>			
7:00 a.m.-8:00 p.m. (daytime)	75 dBA	80 dBA	85 dBA
8:00 p.m.-7:00 a.m. (nighttime)	60 dBA	64 dBA	70 dBA
<b>Stationary Equipment<sup>2</sup></b>			
7:00 a.m.-8:00 p.m. (daytime)	60 dBA	65 dBA	70 dBA
8:00 p.m.-7:00 a.m. (nighttime)	50 dBA	55 dBA	60 dBA

Source: Los Angeles County 2020

Notes: <sup>1</sup>Mobile Equipment- Maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment. <sup>2</sup>Stationary Equipment- Maximum noise level for respectively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment.

Section 12.08.570, *Activities Exempt from Chapter Restrictions*, exempts activity noise on public playgrounds and public or private school grounds. The County regulates vibration in Section 12.08.560 of the County Code. This section prohibits the operation of any device that creates a vibration that is above the vibration perception threshold of any individual at or beyond the property line of private property. The perception threshold shall be a motion velocity of 0.01 inches per second over the range of 1 to 100 Hertz.

## 5.0 IMPACT ASSESSMENT

### 5.1 Thresholds of Significance

The impact analysis provided below is based on the following California Environmental Quality Act Guidelines Appendix G thresholds of significance. The Project would result in a significant noise-related impact if it would produce the following:

- 1) 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.
- 2) Generation of excessive groundborne vibration or groundborne noise levels.
- 3) 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 project area to excessive noise levels.

For purposes of this analysis and where applicable, the County noise standards were used for evaluation of Project-related noise impacts.

## 5.2 Methodology

This analysis of the existing and future noise environments is based on noise prediction modeling and empirical observations. In order to estimate the worst-case construction noise levels that may occur at the nearest noise-sensitive receptors in the Project vicinity, predicted construction noise levels were calculated utilizing the FHWA's Roadway Construction Model (2006). Operational noise levels are addressed qualitatively with reference measurements taken by Illingworth & Rodkin, Inc. (2015) and traffic levels calculated by KOA Traffic Engineers (2020). Groundborne vibration levels associated with construction-related activities for the Project were evaluated utilizing typical groundborne vibration levels associated with construction equipment, obtained from the Caltrans guidelines set forth above. Potential groundborne vibration impacts related to structural damage and human annoyance were evaluated, taking into account the distance from construction activities to nearby land uses.

## 5.3 Impact Analysis

### 5.3.1 Project Construction Noise

#### **Would the Project Result in Short-Term Construction-Generated Noise in Excess of Standards?**

Construction noise associated with the Proposed Project would be temporary and would vary depending on the nature of the activities being performed. Noise generated would primarily be associated with the operation of off-road equipment for onsite construction activities as well as construction vehicle traffic on area roadways. Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., building construction, paving). Noise generated by construction equipment, including earthmovers, material handlers, and portable generators, can reach high levels. Typical operating cycles for these types of construction equipment may involve one or two minutes of full-power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts). During construction, exterior noise levels could negatively affect sensitive receptors in the vicinity of the construction site.

Nearby noise-sensitive land uses consist of rural residences located across East Avenue P with the closest being approximately 400 feet distant from the nearest proposed improvements. Construction will take place at three locations on the Project site. As previously described, Section 12.08.440 of the County Code prohibits the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between the hours of 7:00 p.m. and 7:00 a.m., or any time on Sundays or holidays. Additionally, the construction noise threshold is imposed for mobile and stationary equipment. For the purposes of this analysis, a noise impact is identified as 75 dBA generated from mobile construction equipment and 60 dBA generated from stationary construction equipment.

To estimate the worst-case construction noise levels that may occur at the nearest noise-sensitive receptors in the Project vicinity, the construction equipment noise levels were calculated using the Roadway Noise Construction Model for the site preparation, grading, facility construction and paving for

the various phases. Consistent with FTA recommendations for calculating construction noise, construction noise was measured from the center of the Project site (FTA 2018). The anticipated short-term construction noise levels generated for the necessary equipment is presented in Table 5-1.

<b>Table 5-1. Unmitigated Construction Average (dBA) Noise Levels at Nearest Receptor</b>			
<b>Equipment</b>	<b>Estimated Exterior Construction Noise Level @ 400 feet</b>	<b>Construction Noise Standards (dBA Leq)</b>	<b>Exceeds Standard at Nearest Residence?</b>
<b><u>Phase 1, Phase 2 &amp; Phase 3</u></b>			
<b>Grading and Earthwork</b>			
Grader (1)	63.0	75	No
Concrete/Industrial Saws (1)	64.5	75	No
Rubber Tired Dozers (1)	59.6	75	No
Tractors/Loaders/Backhoes (2)	62.0 (each)	75	No
<b>Combined Site Preparation Equipment</b>	<b>69.5</b>	75	No
<b>Construction</b>			
Crane (1)	54.5	75	No
Forklifts (2)	61.4 (each)	75	No
Tractors/Loaders/Backhoes (2)	62.0 (each)	75	No
<b>Combined Building Equipment</b>	<b>67.9</b>	75	No
<b>Paving</b>			
Cement and Mortar Mixers (2)	56.8 (each)	60	No
Pavers (1)	56.1	75	No
Rollers (1)	54.9	75	No
Tractors/Loaders/Backhoes (1)	62.0	75	No
<b>Combined Paving Equipment</b>	<b>65.1</b>	75	No
<b><u>Phase 4</u></b>			
<b>Site Preparation</b>			
Grader (1)	63.0	75	No
Tractors/Loaders/Backhoes (1)	62.0	75	No
<b>Combined Site Preparation Equipment</b>	<b>65.5</b>	75	No
<b>Grading</b>			
Concrete/ Industrial Saw (1)	64.5	75	No
Rubber Tired Dozers (1)	59.6	75	No
Tractors/Loaders/Backhoes (2)	62.0 (each)	75	No
<b>Combined Grading Equipment</b>	<b>68.4</b>	75	No
<b>Construction</b>			
Crane (1)	54.5	75	No
Forklifts (2)	61.4 (each)	75	No
Tractors/Loaders/Backhoes (2)	62.0 (each)	75	No
<b>Combined Building Equipment</b>	<b>67.9</b>	75	No
<b>Paving</b>			
Cement and Mortar Mixers (2)	56.8 (each)	60	No

Pavers (1)	56.1	75	No
Rollers (1)	54.9	75	No
Tractors/Loaders/Backhoes (1)	62.0	75	No
<b>Combined Paving Equipment</b>	<b>65.1</b>	75	<b>No</b>

Source: Construction noise levels were calculated by ECORP Consulting, Inc. using the FHWA Roadway Noise Construction Model (FHWA 2006). Refer to Attachment B for Model Data Outputs.

Notes: Construction equipment used during construction derived from CalEEMod 2016.3.2. CalEEMod is designed to calculate air pollutant emissions from construction activity and contains default construction equipment and usage parameters for typical construction projects based on several construction surveys conducted in order to identify such parameters. The distance to the nearest sensitive receptor was calculated from the center of the nearest proposed improvement (approximately 400 feet).

As shown, none of the expected stationary equipment would result in noise levels beyond the stationary equipment source threshold of 60 dBA at a residential receptor. Additionally, no mobile equipment would surpass the mobile equipment source threshold of 75 dBA at a residential receptor, either individually or combined. Therefore, Project construction activities would not expose persons to and generate noise levels in excess of County standards. Nonetheless, in addition to complying with the County’s noise standards regarding construction working hours and noise levels, the Los Angeles County Public Works (LACPW) Department requires construction noise to be minimized through the implementation of best management practices (BMPs) that may include, but are not limited to, the following:

- Proper maintenance and tuning of all construction equipment engines to minimize noise emissions
- Proper maintenance and functioning of the mufflers on all internal combustion and equipment engine
- Locate fixed and/or stationary equipment as far as possible from noise-sensitive receptors
- Appoint a public liaison for Project construction that would be responsible for addressing public concerns about construction activities; including excessive noise. As needed, the liaison would determine the cause of concern (e.g., starting too early, bad muffler) and implement measures to address the concern

These BMPs would reduce construction noise levels shown in Table 5-1.

### 5.3.2 Project Operational Noise

#### Would the Project Result in a Substantial Permanent Increase in Ambient Noise Levels in Excess of County Standards During Operations?

As previously described, noise-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, hospitals, guest lodging, libraries, and some passive recreation areas would each be considered noise sensitive and may warrant unique measures for protection from intruding noise. The nearest noise-sensitive land use consists of rural residents located across East Avenue P with the closest being approximately 400 feet distant from the proposed improvements.

### *Project Operational Offsite Traffic Noise*

Project operation would result in additional traffic on adjacent roadways, thereby increasing vehicular noise in the Project area. According to Caltrans Technical Noise Supplement to the Traffic Noise Analysis Protocol (2013), doubling of traffic on a roadway is necessary in order to result in an increase of 3 dB (a barely perceptible increase). According to the traffic study prepared for the Los Angeles County General Plan EIR (2014), East Avenue O between 175<sup>th</sup> Street East and 180<sup>th</sup> Street East, located approximately 1.5 miles north of the Project site, accommodates approximately 600 vehicle trips per day (the General Plan EIR did not contain traffic data specific to East Avenue P). According to the Traffic Study prepared by KOA Traffic Engineers (2020), the Project is anticipated to generate approximately 24 new trips a day during the week and 16 new trips a day during the weekends. This amount of additional traffic would not result in a doubling of traffic on the major roadways that surrounds the Project site, and thus the Project's contribution to existing traffic noise would not be perceptible.

### *Operational Stationary Noise*

Noise in our daily environment fluctuates over time. Some noise levels occur in regular patterns, others are random. Parkland uses, such as that where the Project is located, are not typically associated with excessive, ongoing operations-related noise that would lead to substantial permanent increases in ambient noise levels. Instead, much of the noise produced by parkland uses is classified as instantaneous and random such as cheering, a skateboard rolling over pavement, or a ball hitting a surface. As previously discussed, the Project is proposing the development of a 25,000-square foot skate park, a 2,500-square foot gazebo/stage structure, a 1,600-square foot concrete slab with fitness zone and shade structure, a 1,800-square foot shade structure for the existing playground, and associated ADA improvements. The predominant onsite operational noise associated with the Project would be activity at the proposed 25,000-square foot skate park located adjacent to the existing gymnasium/community building at the northwestern corner of the park.

A previous noise study completed by Illingworth & Rodkin, Inc. (2015) recorded noise measurements at the Jose Avenue Skatepark located in Santa Cruz, California. The measurements were taken in five-minute intervals for approximately one hour. Sources of noise identified during the survey included the sound of the skateboard rolling on the surface, wipeouts, grinding, yelling, talking and biking. The noise recorded measurements ranged from 52.0 dBA to 60.0 dBA, at a distance of approximately 30 feet from the edge of the "skatepark bowl". As previously stated, sound levels attenuate at a rate of approximately six dB for each doubling of distance from a stationary or point source. Therefore, based on the previous measurement at a similar skate park, the nearest residence located approximately 400 feet away could experience exterior noise levels up to 39.0 dBA. This noise level falls below the day and nighttime residential exterior noise limits presented in the County Code. Additionally, according to the Project proponent, the Proposed Project facilities would normally be open from 7:00 a.m. to 10:00 p.m. Monday through Sunday. Thus, the noise producing sources related to the existing park and the Proposed Project would not be in operations during nighttime (10:00 p.m. to 7:00 a.m.) hours. It is anticipated that approximately ten events a year will extend these hours of operations but in no case later than midnight. However, these events will be approved by the Los Angeles County Department of Parks and Recreation and information regarding such events would be posted on-site prior to the event occurrence.

Furthermore, the ambient recorded noise levels range from 49.2 to 51.1 dBA in the areas near the Project site. As such, the noise produced as a result of the Proposed Project (39.0 dBA) would not exceed that already experienced in the surrounding areas.

**Would the Project Result in the Generation of Excessive Groundborne Vibration or Groundborne Noise Levels?**

*Construction-Generated Vibration*

Excessive groundborne vibration impacts result from continuously occurring vibration levels. Increases in groundborne vibration levels attributable to the Proposed Project would be primarily associated with short-term construction-related activities. Construction on the Project site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance.

Construction-related ground vibration is normally associated with impact equipment such as pile drivers, jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. It is not anticipated that pile drivers would be necessary during Project construction. Vibration decreases rapidly with distance and it is acknowledged that construction activities would occur throughout the Project site and would not be concentrated at the point closest to sensitive receptors. Groundborne vibration levels associated with construction equipment are summarized in Table 5-2.

<b>Equipment Type</b>	<b>PPV at 25 Feet (inches per second)</b>
Large Bulldozer	0.089
Pile Driver	0.170
Caisson Drilling	0.089
Loaded Trucks	0.076
Rock Breaker	0.089
Jackhammer	0.035
Small Bulldozer/Tractor	0.003

Source: FTA 2018; Caltrans 2020

As previously stated, the County’s regulation pertaining to vibration is included in Section 12.08.560 of the County Code and limits vibration to a perception threshold of 0.01 inches per sec. It is acknowledged that construction activities would occur throughout the Project site and would not be concentrated at the point closest to the nearest structure. The nearest offsite structure of concern to the construction site are the residents across East Avenue P with the closest one being approximately 400 feet distant. Based on the vibration levels presented in Table 5-2, in the case that pile drivers are employed, ground vibration

generated by heavy-duty equipment would not be anticipated to exceed approximately 0.170 inch per second PPV at 25 feet. Ground vibration would only reach a maximum of 0.089 inch per second in the case that pile drivers are not used.

Based on the representative vibration levels presented for various construction equipment types in Table 5-2 and the construction vibration assessment methodology published by the FTA (2018), it is possible to estimate the potential Project construction vibration levels at the nearest offsite structure 400 feet distant. The FTA provides the following equation:  $[PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}]$ . Table 5-3 presents the expected Project related vibration levels at a distance of 400 feet.

Table 5-3. Specific Plan Construction Vibration Levels at 400 Feet										
Receiver PPV Levels (in/sec) <sup>1</sup>							Peak Vibration	RMS Velocity Levels <sup>2</sup>	Threshold	Exceed Threshold
Large Bulldozer	Pile Driver	Drilling	Loaded Trucks	Rock Breaker	Jack-hammer	Small Bulldozer				
0.001	0.002	0.001	0.001	0.001	0.001	0.000	0.002	0.0014	0.01	No

<sup>1</sup>Based on the Vibration Source Levels of Construction Equipment included on Table 5-2 (FTA 2018).

<sup>2</sup>Vibration levels in PPV are converted to RMS velocity using a 0.70 conversion factor identified by Caltrans (2020),

As shown, groundborne vibrations attenuate rapidly from the source due to geometric spreading and material damping. Geometric spreading occurs because the energy is radiated from the source and spreads over an increasingly large distance while material damping is a property of the friction loss which occurs during the passage of a vibration wave. As shown in Table 5-3, the nearest structures at 400 feet from the construction site would not experience groundborne levels in exceedance of County standards.

### Operational Groundborne Vibration

Project operations would not include the use of any stationary equipment that would result in excessive groundborne vibration levels.

### Would the Project Expose People Residing or Working in the Project Area to Excessive Airport Noise?

The Project site is located approximately 7.2 miles southeast of the Brian Ranch Airport. The Proposed Project is not located within an airport land use plan or within two miles of a public airport or public use airport. Implementation of the Proposed Project would not affect airport operations nor result in increased exposure of people working at or visiting the Project site to aircraft noise.

### Would the Project Result in Cumulatively Considerable Noise Impacts?

#### Cumulative Construction Noise

Construction activities associated with the Proposed Project and other construction projects in the area may overlap, resulting in construction noise in the area. However, construction noise impacts primarily affect the areas immediately adjacent to the construction site. Construction noise for the Proposed Project

was determined to be less than significant following compliance with the County Code and Mitigation Measures **NOI-1** and **NOI-2**. Cumulative development in the vicinity of the Project site could result in elevated construction noise levels at sensitive receptors in the Project area. However, each project would be required to comply with the applicable Los Angeles County Code limitations on allowable hours of construction and construction noise limits. Therefore, the Project would not contribute to cumulative impacts during construction.

#### *Cumulative Operational Noise*

Cumulative long-term noise sources associated with development at the Project, combined with other cumulative projects, could cause local noise level increases. Noise levels associated with the Proposed Project and related cumulative projects together could result in higher noise levels than considered separately. The Project would be an extension to the existing Stephen Sorensen Park, operations of the Proposed Project would not result in any substantial changes in the noise environment due to onsite sources. Noise increase as a result of the Project would not exceed County standards. Therefore, the Project would not contribute to cumulative impacts during operations

## 6.0 REFERENCES

- Caltrans. 2020. *Transportation- and Construction-Induced Vibration Guidance Manual*.
- \_\_\_\_\_. 2013. *Technical Noise Supplement to the Traffic Noise Analysis Protocol*.
- \_\_\_\_\_. 2012. *IS/EA Annotated Outline*. <http://www.dot.ca.gov/ser/vol1/sec4/ch31ea/chap31ea.htm>.
- \_\_\_\_\_. 2002. *California Airport Land Use Planning Handbook*.
- FHWA. 2011. *Effective Noise Control During Nighttime Construction*.  
[http://ops.fhwa.dot.gov/wz/workshops/accessible/schexnayder\\_paper.htm](http://ops.fhwa.dot.gov/wz/workshops/accessible/schexnayder_paper.htm).
- \_\_\_\_\_. 2006. *Roadway Construction Noise Model*.
- FTA. 2018. *Transit Noise and Vibration Impact Assessment*.
- HMMH. 2006. *Transit Noise and Vibration Impact Assessment, Final Report*.
- Illingworth & Rodkin, Inc. 2015. *Monterey Avenue Skate Park Project Noise and Vibration Assessment Capitola, California*.
- KOA. 2020. *County of Los Angeles Traffic Study for Stephen Sorensen Park Various Improvements*.
- Los Angeles. County of. 2015. *Los Angeles County General Plan*.
- \_\_\_\_\_. 2014. *Los Angeles County General Plan Environmental Impact Report*.
- \_\_\_\_\_. 2020. *Los Angeles County Code*.
- State of California OPR. 2003. *California General Plan Guidelines*.
- WEAL. 2000. *Sound Transmission Sound Test Laboratory Report No. TL 96-186*.

## **LIST OF ATTACHMENTS**

---

Attachment A - Baseline (Existing) Noise Measurements – Project Site and Vicinity

Attachment B – Roadway Construction Noise Model Outputs – Project Construction Noise

Baseline (Existing) Noise Measurements – Project Site and Vicinity

<b>Site Number:</b> 1			
<b>Recorded By:</b> Lindsay Liegler			
<b>Job Number:</b> 2017-276.005			
<b>Date:</b> 7/15/2020			
<b>Time:</b> 10:39 a.m.			
<b>Location:</b> Adjacent to park perimeter fence along Avenue P			
<b>Source of Peak Noise:</b> Vehicles along Avenue P			
Noise Data			
Leq (dB)	Lmin (dB)	Lmax (dB)	Peak (dB)
49.7	43.0	69.3	101.5

Equipment						
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note
Sound	Sound Level Meter	Larson Davis	LxT SE	0005120	8/05/2019	
	Microphone	Larson Davis	377B02	174464	8/05/2019	
	Preamp	Larson Davis	PRMLxT1L	042852	8/05/2019	
	Calibrator	Larson Davis	CAL200	14105	8/02/2019	
Weather Data						
Est.	Duration: 10 minutes			Sky: Clear		
	Note: dBA Offset = 0.05			Sensor Height (ft): 4 ft		
	Wind Ave Speed (mph)		Temperature (degrees Fahrenheit)		Wind Ave Speed (mph)	
	8		90		8	

**Photo of Measurement Location**



Summary	
File Name on Meter	LxT_Data.341
File Name on PC	SLM_0005120_LxT_Data_341.00.lbin
Serial Number	0005120
Model	SoundExpert® LxT
Firmware Version	2.302
User	Lindsay Liegler
Location	
Job Description	
Note	

Measurement	
Description	DG LBVI
Start	2020-07-15 10:39:49
Stop	2020-07-15 10:50:34
Duration	00:10:45.4
Run Time	00:10:45.4
Pause	00:00:00.0
Pre Calibration	2020-07-15 10:30:38
Post Calibration	None
Calibration Deviation	---

Overall Settings	
RMS Weight	A Weighting
Peak Weight	Z Weighting
Detector	Slow
Preamp	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Low
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	Z Weighting
OBA Max Spectrum	Bin Max
Overload	123.1 dB
	<b>A</b> <b>C</b> <b>Z</b>
Under Range Peak	79.4                      76.4                      81.4 dB
Under Range Limit	27.4                      26.7                      32.1 dB
Noise Floor	17.1                      17.6                      22.9 dB

Results	
LAeq	49.7
LAE	77.8
EA	6.668 µPa²h
LZpeak (max)	2020-07-15 10:47:29                      101.5 dB
LASmax	2020-07-15 10:50:25                      69.3 dB
LASmin	2020-07-15 10:40:21                      43.0 dB
SEA	-99.94 dB
LAS > 85.0 dB (Exceedance Counts / Duration)	0                      0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0                      0.0 s
LZpeak > 135.0 dB (Exceedance Counts / Duration)	0                      0.0 s
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0                      0.0 s
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0                      0.0 s

Community Noise	Ldn	LDay 07:00-22:00	LNight 22:00-07:00	Lden	LDay 07:00-19:00	LEvening 19:00-22:00
	49.7	49.7	-99.94	49.7	49.7	-99.94

LCeq	62.5 dB
LAeq	49.7 dB
LCeq - LAeq	12.8 dB
LALeq	55.7 dB
LAeq	49.7 dB
LALeq - LAeq	6.0 dB

	A		C		Z	
	dB	Time Stamp	dB	Time Stamp	dB	Time Stamp
Leq	49.7		62.5			
LS(max)	69.3	2020/07/15 10:50:25				
LS(min)	43.0	2020/07/15 10:40:21				
LPeak(max)					101.5	2020/07/15 10:47:29

# Overloads	0
Overload Duration	0.0 s
# OBA Overloads	8
OBA Overload Duration	22.4 s

Statistics	
LAI5.00	51.0 dB
LAI10.00	49.1 dB
LAI33.30	47.2 dB
LAI50.00	46.5 dB
LAI66.60	45.7 dB
LAI90.00	44.6 dB

<b>Site Number:</b> 2			
<b>Recorded By:</b> Lindsay Liegler			
<b>Job Number:</b> 2017-276.005			
<b>Date:</b> 7/15/2020			
<b>Time:</b> 10:56 a.m.			
<b>Location:</b> 10 feet east of Mackenna's Gold Avenue on the Parkway			
<b>Source of Peak Noise:</b> Vehicles on Mackenna's Gold Avenue			
Noise Data			
Leq (dB)	Lmin (dB)	Lmax (dB)	Peak (dB)
51.1	39.2	69.4	96.3

Equipment						
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note
Sound	Sound Level Meter	Larson Davis	LxT SE	0005120	8/05/2019	
	Microphone	Larson Davis	377B02	174464	8/05/2019	
	Preamp	Larson Davis	PRMLxT1L	042852	8/05/2019	
	Calibrator	Larson Davis	CAL200	14105	8/02/2019	
Weather Data						
Est.	Duration: 10 minutes			Sky: Clear		
	Note: dBA Offset = 0.05			Sensor Height (ft): 4 ft		
	Wind Ave Speed (mph)		Temperature (degrees Fahrenheit)		Wind Ave Speed (mph)	
	8		90		8	

**Photo of Measurement Location**



Summary	
File Name on Meter	LxT_Data.342
File Name on PC	SLM_0005120_LxT_Data_342.00.lbin
Serial Number	0005120
Model	SoundExpert® LxT
Firmware Version	2.302
User	Lindsay Liegler
Location	
Job Description	
Note	

Measurement	
Description	DG LBVI
Start	2020-07-15 10:56:11
Stop	2020-07-15 11:07:33
Duration	00:11:21.9
Run Time	00:11:21.9
Pause	00:00:00.0
Pre Calibration	2020-07-15 10:30:34
Post Calibration	None
Calibration Deviation	---

Overall Settings				
RMS Weight	A Weighting			
Peak Weight	Z Weighting			
Detector	Slow			
Preamp	PRMLxT1L			
Microphone Correction	Off			
Integration Method	Linear			
OBA Range	Low			
OBA Bandwidth	1/1 and 1/3			
OBA Freq. Weighting	Z Weighting			
OBA Max Spectrum	Bin Max			
Overload	123.1 dB			
	<b>A</b>	<b>C</b>	<b>Z</b>	
Under Range Peak	79.4	76.4	81.4 dB	
Under Range Limit	27.4	26.7	32.1 dB	
Noise Floor	17.1	17.6	22.9 dB	

Results				
LAeq	51.1			
LAE	79.4			
EA	9.671 µPa²h			
LZpeak (max)	2020-07-15 11:01:18	96.3 dB		
LASmax	2020-07-15 10:59:47	69.4 dB		
LASmin	2020-07-15 11:05:26	39.2 dB		
SEA	-99.94 dB			
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s		
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s		
LZpeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s		
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s		
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s		

Community Noise	Ldn	LDay 07:00-22:00	LNight 22:00-07:00	Lden	LDay 07:00-19:00	LEvening 19:00-22:00
	51.1	51.1	-99.94	51.1	51.1	-99.94

LCeq	63.4 dB
LAeq	51.1 dB
LCeq - LAeq	12.4 dB
LALeq	52.9 dB
LAeq	51.1 dB
LALeq - LAeq	1.8 dB

	A		C		Z	
	dB	Time Stamp	dB	Time Stamp	dB	Time Stamp
Leq	51.1		63.4			
Ls(max)	69.4	2020/07/15 10:59:47				
Ls(min)	39.2	2020/07/15 11:05:26				
LPeak(max)					96.3	2020/07/15 11:01:18

# Overloads	0
Overload Duration	0.0 s
# OBA Overloads	7
OBA Overload Duration	15.0 s

Statistics	
LAI5.00	51.4 dB
LAI10.00	49.5 dB
LAI33.30	47.4 dB
LAI50.00	46.1 dB
LAI66.60	44.7 dB
LAI90.00	41.6 dB

<b>Site Number:</b> 3			
<b>Recorded By:</b> Lindsay Liegler			
<b>Job Number:</b> 2017-276.005			
<b>Date:</b> 7/15/2020			
<b>Time:</b> 11:18 a.m.			
<b>Location:</b> Southern cul-de-sac of 167 <sup>th</sup> Street East on the parkway			
<b>Source of Peak Noise:</b> Vehicles on adjacent roadway and typical neighborhood noise.			
Noise Data			
Leq (dB)	Lmin (dB)	Lmax (dB)	Peak (dB)
49.2	39.3	54.9	94.1

Equipment						
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note
Sound	Sound Level Meter	Larson Davis	LxT SE	0005120	8/05/2019	
	Microphone	Larson Davis	377B02	174464	8/05/2019	
	Preamp	Larson Davis	PRMLxT1L	042852	8/05/2019	
	Calibrator	Larson Davis	CAL200	14105	8/02/2019	
Weather Data						
Est.	Duration: 10 minutes			Sky: Clear		
	Note: dBA Offset = 0.05			Sensor Height (ft): 4 ft		
	Wind Ave Speed (mph)		Temperature (degrees Fahrenheit)		Barometer Pressure (hPa)	
	8		90		2.984	

**Photo of Measurement Location**



**Summary**

File Name on Meter LxT\_Data.343  
 File Name on PC SLM\_0005120\_LxT\_Data\_343.00.lbin  
 Serial Number 0005120  
 Model SoundExpert® LxT  
 Firmware Version 2.302  
 User Lindsay Liegler  
 Location  
 Job Description  
 Note

**Measurement**

Description DG LBVI  
 Start 2020-07-15 11:19:01  
 Stop 2020-07-15 11:30:00  
 Duration 00:10:59.2  
 Run Time 00:10:59.2  
 Pause 00:00:00.0  
 Pre Calibration 2020-07-15 10:30:34  
 Post Calibration None  
 Calibration Deviation ---

**Overall Settings**

RMS Weight A Weighting  
 Peak Weight Z Weighting  
 Detector Slow  
 Preamp PRMLxT1L  
 Microphone Correction Off  
 Integration Method Linear  
 OBA Range Low  
 OBA Bandwidth 1/1 and 1/3  
 OBA Freq. Weighting Z Weighting  
 OBA Max Spectrum Bin Max  
 Overload 123.1 dB  
 Under Range Peak A C Z  
 Under Range Limit 79.4 76.4 81.4 dB  
 Noise Floor 17.1 17.6 22.9 dB

**Results**

LAeq 49.2  
 LAE 77.4  
 EA 6.149 µPa²h  
 LZpeak (max) 2020-07-15 11:19:31 94.1 dB  
 LASmax 2020-07-15 11:29:03 54.9 dB  
 LASmin 2020-07-15 11:29:53 39.3 dB  
 SEA -99.94 dB  
 LAS > 85.0 dB (Exceedance Counts / Duration) 0 0.0 s  
 LAS > 115.0 dB (Exceedance Counts / Duration) 0 0.0 s  
 LZpeak > 135.0 dB (Exceedance Counts / Duration) 0 0.0 s  
 LZpeak > 137.0 dB (Exceedance Counts / Duration) 0 0.0 s  
 LZpeak > 140.0 dB (Exceedance Counts / Duration) 0 0.0 s

Community Noise Ldn LDay 07:00-22:00 LNight 22:00-07:00 Lden LDay 07:00-19:00 LEvening 19:00-22:00  
 49.2 49.2 -99.94 49.2 49.2 -99.94

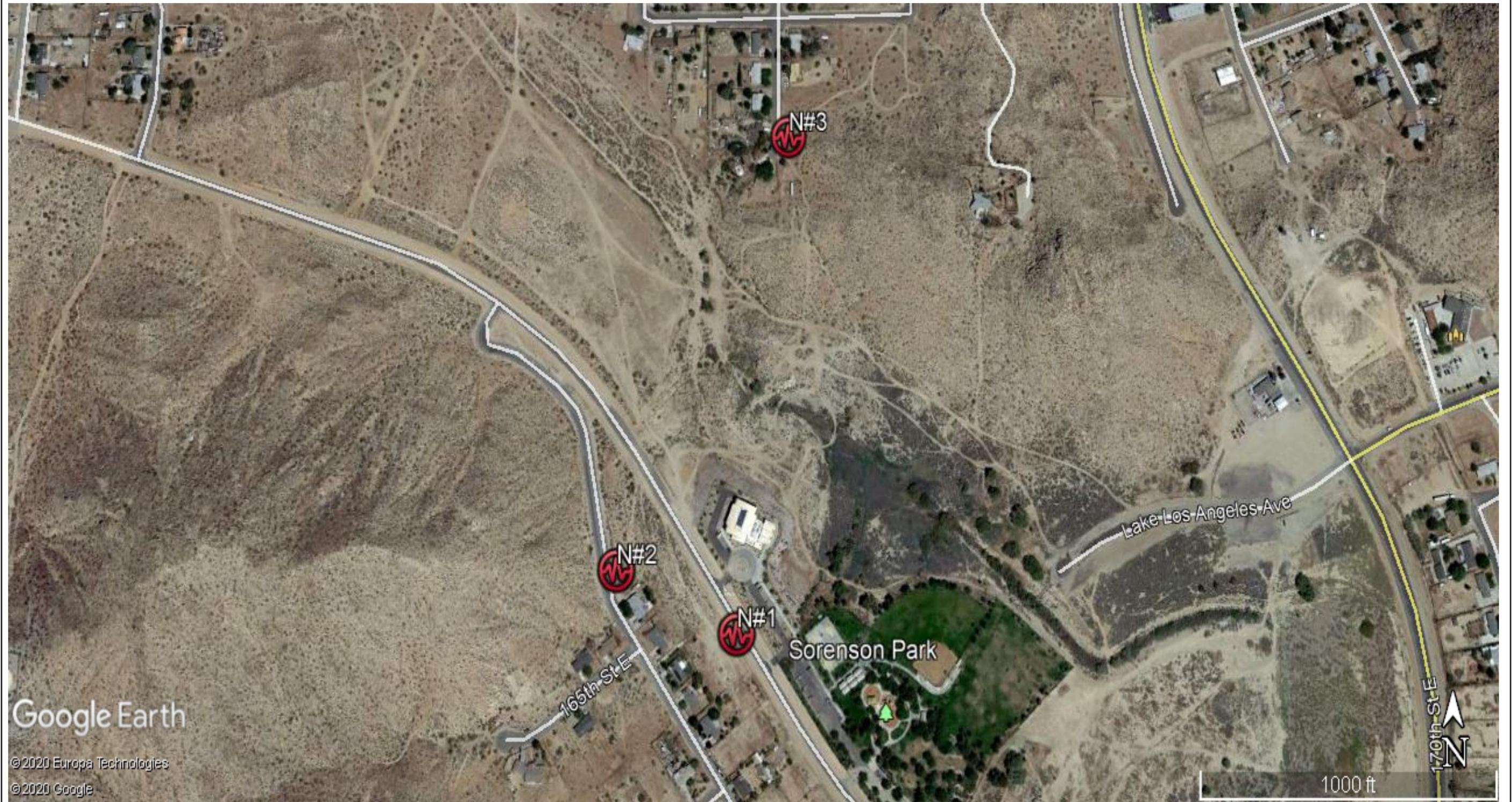
LCeq 59.3 dB  
 LAeq 49.2 dB  
 LCeq - LAeq 10.1 dB  
 LAleq 50.8 dB  
 LAeq 49.2 dB  
 LAleq - LAeq 1.6 dB

	A		C		Z	
	dB	Time Stamp	dB	Time Stamp	dB	Time Stamp
Leq	49.2		59.3			
Ls(max)	54.9	2020/07/15 11:29:03				
Ls(min)	39.3	2020/07/15 11:29:53				
Lpeak(max)					94.1	2020/07/15 11:19:31

# Overloads 0  
 Overload Duration 0.0 s  
 # OBA Overloads 2  
 OBA Overload Duration 4.0 s

**Statistics**

LAI5.00 53.0 dB  
 LAI10.00 52.9 dB  
 LAI33.30 48.3 dB  
 LAI50.00 47.6 dB  
 LAI66.60 47.2 dB  
 LAI90.00 43.9 dB



Map Date: 7/30/2020  
Photo (or Base) Source: Google Earth 2020

Roadway Construction Noise Model Outputs – Project Construction Noise

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 8/13/2020  
 Case Description: Phase 1 Grading and Earthwork

Description of Receptors Land Use of Receptors  
 Residences Residential

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)
			Spec Lmax (dBA)	Actual Lmax (dBA)	
Grader	No	40	85		400
Concrete Saw	No	20		89.6	400
Dozer	No	40		81.7	400
Tractor	No	40	84		400
Tractor	No	40	84		400

Calculated (dBA)

Equipment	*Lmax	Leq
Grader	66.9	63
Concrete Saw	71.5	64.5
Dozer	63.6	59.6
Tractor	65.9	62
Tractor	65.9	62
<b>Total</b>	<b>71.5</b>	<b>69.5</b>

\*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 8/13/2020  
 Case Description: Phase 2 & 3 Paving

Description of Receptors: Residences  
 Land Use of Receptors: Residential

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)
			Spec Lmax (dBA)	Actual Lmax (dBA)	
Concrete Mixer Truck	No	40		78.8	400
Concrete Mixer Truck	No	40		78.8	400
Paver	No	50		77.2	400
Roller	No	20		80	400
Tractor	No	40	84		400

Calculated (dBA)

Equipment	*Lmax	Leq
Concrete Mixer Truck	60.7	56.8
Concrete Mixer Truck	60.7	56.8
Paver	59.2	56.1
Roller	61.9	54.9
Tractor	65.9	62
<b>Total</b>	<b>65.9</b>	<b>65.1</b>

\*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 8/13/2020  
 Case Description: **Phase 2 & 3 Construction**

Description of Receptors Land Use of Receptors  
 Residences Residential

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)
			Spec Lmax (dBA)	Actual Lmax (dBA)	
Crane	No	16		80.6	400
Gradall	No	40		83.4	400
Gradall	No	40		83.4	400
Tractor	No	40	84		400
Tractor	No	40	84		400

Calculated (dBA)

Equipment	*Lmax	Leq
Crane	62.5	54.5
Gradall	65.3	61.4
Gradall	65.3	61.4
Tractor	65.9	62
Tractor	65.9	62
<b>Total</b>	<b>65.9</b>	<b>67.9</b>

\*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 8/17/2020  
 Case Description: **Phase 4 Site Preparation**

Description of Receptors Land Use of Receptors  
 Residences Residential

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)
			Spec Lmax (dBA)	Actual Lmax (dBA)	
Grader	No	40	85		400
Tractor	No	40	84		400

Calculated (dBA)

Equipment	*Lmax	Leq
Grader	66.9	63
Tractor	65.9	62
<b>Total</b>	<b>66.9</b>	<b>65.5</b>

\*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 8/17/2020

Case Description: **Phase 4 Grading**

**Description of Receptors Land Use of Receptors**

Residences Residential

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)
			Spec Lmax (dBA)	Actual Lmax (dBA)	
Concrete Saw	No	20		89.6	400
Dozer	No	40		81.7	400
Tractor	No	40	84		400
Tractor	No	40	84		400

**Calculated (dBA)**

Equipment	*Lmax	Leq
Concrete Saw	71.5	64.5
Dozer	63.6	59.6
Tractor	65.9	62
Tractor	65.9	62
<b>Total</b>	<b>71.5</b>	<b>68.4</b>

\*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 8/17/2020  
 Case Description: Phase 4 Construction

Description of Receptors: Residences  
 Land Use of Receptors: Residential

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)
			Spec Lmax (dBA)	Actual Lmax (dBA)	
Crane	No	16		80.6	400
Gradall	No	40		83.4	400
Gradall	No	40		83.4	400
Tractor	No	40	84		400
Tractor	No	40	84		400

Calculated (dBA)

Equipment	*Lmax	Leq
Crane	62.5	54.5
Gradall	65.3	61.4
Gradall	65.3	61.4
Tractor	65.9	62
Tractor	65.9	62
<b>Total</b>	<b>65.9</b>	<b>67.9</b>

\*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 8/17/2020  
 Case Description: Phase 4 Paving

Description of Receptors Land Use of Receptors  
 Residences Residential

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)
			Spec Lmax (dBA)	Actual Lmax (dBA)	
Concrete Mixer Truck	No	40		78.8	400
Concrete Mixer Truck	No	40		78.8	400
Paver	No	50		77.2	400
Roller	No	20		80	400
Tractor	No	40	84		400

Calculated (dBA)

Equipment	*Lmax	Leq
Concrete Mixer Truck	60.7	56.8
Concrete Mixer Truck	60.7	56.8
Paver	59.2	56.1
Roller	61.9	54.9
Tractor	65.9	62
<b>Total</b>	<b>65.9</b>	<b>65.1</b>

\*Calculated Lmax is the Loudest value.