Rincon Consultants, Inc.

209 East Victoria Street
Santa Barbara, California 93101

805 319 4092

info@rinconconsultants.com
www.rinconconsultants.com

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Project No: 22-13356

Lindsay Walker
3756 Foothill Road
Santa Barbara, CA 93105

Subject: 3756 Foothill Road Wedding Events Project Noise Technical Memorandum

This memorandum presents the findings of a noise technical study for the property located at the 3756 Foothill Road in Santa Barbara, California. The noise technical study was performed to evaluate compliance of the proposed project with the County of Santa Barbara Environmental Thresholds and Guidelines Manual standards for noise. Noise fundamentals and common definitions used in this memorandum are included in Attachment A.

Project Location

The subject property is located at 3756 Foothill Road in the foothills area above San Roque in an unincorporated area of Santa Barbara County.

Project Description

The project applicant is applying for a permit to host up to ten special events per year. The special events are anticipated to be primarily weddings with attendance of approximately 50 to 150 people. All outdoor special events would end by 10:00 p.m. Each wedding party would be responsible for hiring a DJ if they would like one. Therefore, it is assumed that the special events could have amplified music and sound. Events with amplified sound would either be hosted in the eastern courtyard or the western courtyard of the property.

Existing Setting

The subject property is located in an area that is primarily composed of residential land uses and open space. The nearest residences in the vicinity of the project are single-family houses to the north, south, and west. To characterize the existing noise environment in the project vicinity, a 24-hour ambient noise measurement was conducted beginning on Tuesday, August 2, 2022. The location of the noise measurement was in the southwest corner of the subject property, as shown in Figure 1. Meteorological conditions during the measurement period were favorable for outdoor sound measurements and were noted to be representative of the typical conditions for the season. The sound level meter was equipped with a windscreen during the measurement period. The sound level meter (Extech 407780A) was set to “slow” response and “A” weighting (dBA). The meter was calibrated prior to and after the monitoring period. The measurement was at least 5 feet above the ground and away from reflective surfaces. The results of the 24-hour ambient noise level measurement indicate that the existing noise environment in the project vicinity is 45 dBA CNEL. Data from noise monitoring is included in Attachment A.

Regulatory Setting

Santa Barbara County

The County of Santa Barbara Environmental Thresholds and Guidelines Manual defines noise as unwanted or objectionable sound (Santa Barbara County 2021). The Manual includes noise thresholds which stipulate a significant impact if the proposed project would generate noise that would cause the existing noise levels at nearby sensitive receptors to exceed 65 dBA CNEL. Chapter 40, *Nighttime Noise Restrictions*, of the County of Santa Barbara Municipal Code prohibits outdoor amplified music after 10:00 p.m. on weekdays and after midnight on weekends.

Impact Discussion

Implementation of the project would have the potential for amplified music during special events, which could cause periodic increases in existing ambient noise levels in the project vicinity. Each special event client would be responsible for hiring a DJ if they would like one. Since there is no proposed in-house PA or speaker system, noise levels generated by each special event would be a function of the type of PA system and speakers and the volume level set by the DJ. Noise levels from typical amplified special events with PA speakers could be 85 dBA or more near the speakers.

As discussed above, events with amplified sound would either be hosted in the eastern courtyard or the western courtyard of the property, as shown in Figure 2. Amplified events in the eastern courtyard would benefit from shielding by the project building to the north, south, and west. To the east of the eastern courtyard is a retaining wall and hillside which would also shield noise levels. Therefore, this analysis is based on a scenario involving amplified events in the western courtyard where there would be shielding from the project building to the east and partial shielding from the project building to the south. To provide for a conservative assessment, noise reduction from partial shielding from the project building to the south is not factored into the calculations.

It is assumed that amplified events could last for up to four hours, beginning as late of 6:00 p.m. and continuing until no later than 10:00 p.m. As discussed above, all outdoor special events would end by 10:00 p.m. To estimate the hourly noise level at the nearest residential property line during amplified special events which would keep the ambient to 65 dBA CNEL or less, the measured hourly Leq noise levels during the 24-hour noise measurement were combined with elevated noise levels during the 6:00 p.m. to 10:00 p.m. time period to calculate the resulting CNEL noise level. The results of this analysis indicate that if amplified special events are limited to four hours per day and end by 10:00 p.m., a noise level of less than 70 dBA Leq (i.e., up to 69 dBA Leq) at the nearest residential property lines during the special events would ensure that the ambient does not exceed 65 dBA CNEL. This is the maximum CNEL predicted at nearby residences with the restrictions described under the Recommendations section below and does not mean that every event at the project site would produce this noise level. Noise from the project would vary depending on the particular event and the event duration. Certain events could produce noise levels of less than 65 dBA CNEL at nearby residences.

The closest residential property line to the project western courtyard is the single-family house to the south at a distance of approximately 300 feet. Based on a standard noise attenuation rate of approximately 6 dBA per doubling of distance and no reduction from intervening buildings, structures, or terrain, restricting amplified noise to a limit of 90 dBA at a distance of 25 feet from the speakers on-site would result in a noise level of up to 68 dBA at the nearest residential property line. Noise levels at residences further than 300 feet would be less.

Figure 1 Approximate Noise Measurement Location

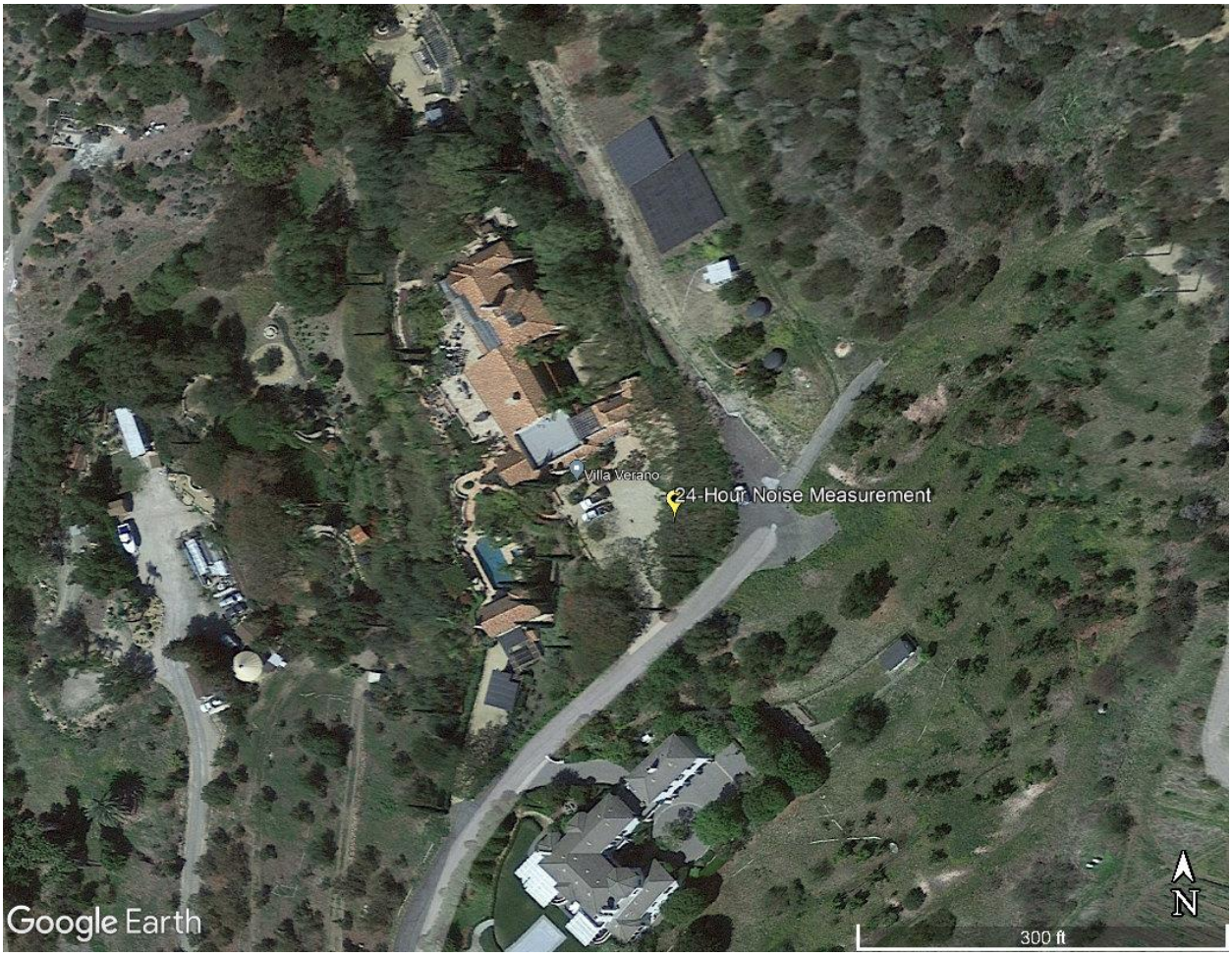
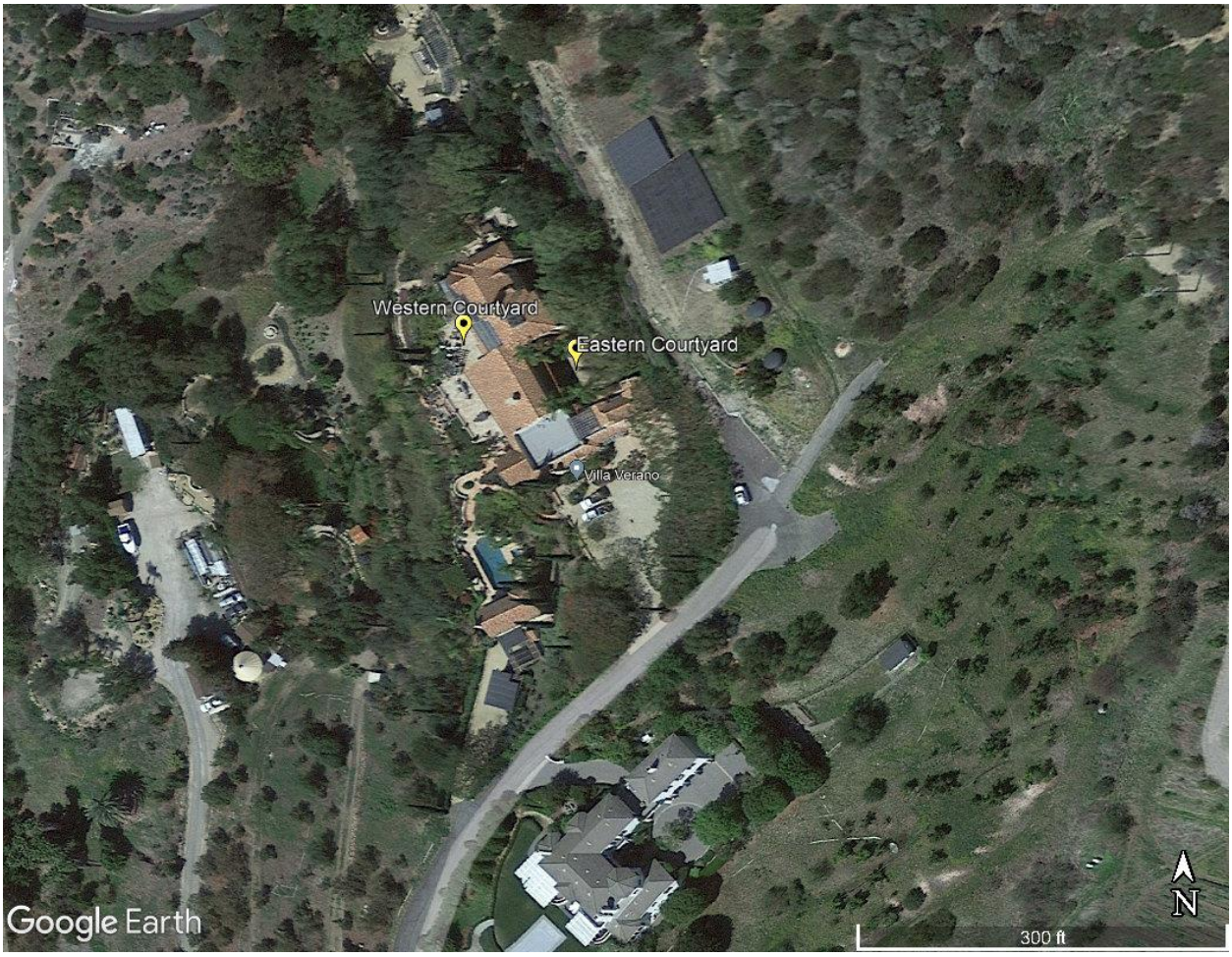


Figure 2 Potential Amplified Special Event Areas



Recommendations

The following conditions of approval are recommended to comply with the Santa Barbara County noise standards:

Special Event Noise Reduction

During outdoor amplified special events at the subject property, the following noise-reduction measures shall be adhered to:

- Provide advance notice of amplified special events to all nearby residential neighbors, to the degree feasible.
- Conclude all outdoor amplified sound by 10:00 p.m.
- Limit amplified sound to a maximum period of four (4) hours per day.
- Require that the sound system contractor/DJ limit noise levels to 90 dBA at a distance of 25 feet from the speakers. The sound system contractor/DJ can verify the noise level in real time using a

sound level meter or decibel reader phone application such as the NIOSH SLM app. Measures to achieve this include, but are not limited to, volume control, bandwidth, and peak limiters. The sound system/contractor shall use speaker angle or directivity techniques to ensure that the noise is directed away from the nearest off-site residences.

Conclusions

With adherence to the recommended Special Event Noise Reduction measures, periodic increases in the ambient noise level in the project vicinity would be limited to 65 dBA CNEL or less to ensure that the project complies with the Santa Barbara County noise standards. Therefore, with adherence to the noise-reduction recommendations, project noise impacts would be less than significant.This concludes our noise analysis of the subject project at 3756 Foothill Road in Santa Barbara. Please do not hesitate to contact me with questions about the noise analysis or recommendations.



Josh Carman, INCE-USA
Director – Noise, Air Quality & GHG

References

Harris, Cyril M. 1998. *Handbook of Acoustical Measurements and Noise Control*. 3rd edition. Woodbury, NY: Acoustical Society of America.

Santa Barbara County. 2021. *Environmental Thresholds and Guidelines Manual*. January.

Attachment A

Noise Fundamentals and Common Definitions

Noise Descriptors

The following are brief definitions of terminology used in this chapter:

- **Sound.** A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- **Decibel (dB).** A unitless measure of sound, expressed on a logarithmic scale and with respect to a defined reference sound pressure. The standard reference pressure is 20 micropascals (20 µPa).
- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Equivalent Continuous Noise Level (L_{eq}); also called the Energy-Equivalent Noise Level.** The value of an equivalent, steady sound level which, in a stated time period (often over an hour) and at a stated location, has the same A-weighted sound energy as the time-varying sound. Thus, the L_{eq} metric is a single numerical value that represents the equivalent amount of variable sound energy received by a receptor over the specified duration.
- **Statistical Sound Level (L_n).** The sound level that is exceeded "n" percent of time during a given sample period. For example, the L_{50} level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the "median sound level." The L_{10} level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum) and this is often known as the "intrusive sound level." The L_{90} is the sound level exceeded 90 percent of the time and is often considered the "effective background level" or "residual noise level."
- **Maximum Sound Level (L_{max})**. The highest RMS sound level measured during the measurement period.
- **Root Mean Square Sound Level (RMS).** The square root of the average of the square of the sound pressure over the measurement period.
- **Day-Night Sound Level (L_{dn} or DNL).** The energy-average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the sound levels occurring during the period from 10:00 PM to 7:00 AM.
- **Community Noise Equivalent Level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added from 7:00 PM to 10:00 PM and 10 dB from 10:00 PM to 7:00 AM. NOTE: For general community/environmental noise, CNEL and L_{dn} values rarely differ by more than 1 dB (with the CNEL being only slightly more restrictive – that is, higher than the L_{dn}

value). As a matter of practice, L_{dn} and CNEL values are interchangeable and are treated as equivalent in this assessment.

- **Sensitive Receptor.** Noise- and vibration-sensitive receptors include land uses where quiet environments are necessary for enjoyment and public health and safety. Residences, schools, motels and hotels, libraries, religious institutions, hospitals, and nursing homes are examples.Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (California Department of Transportation [Caltrans] 2013).

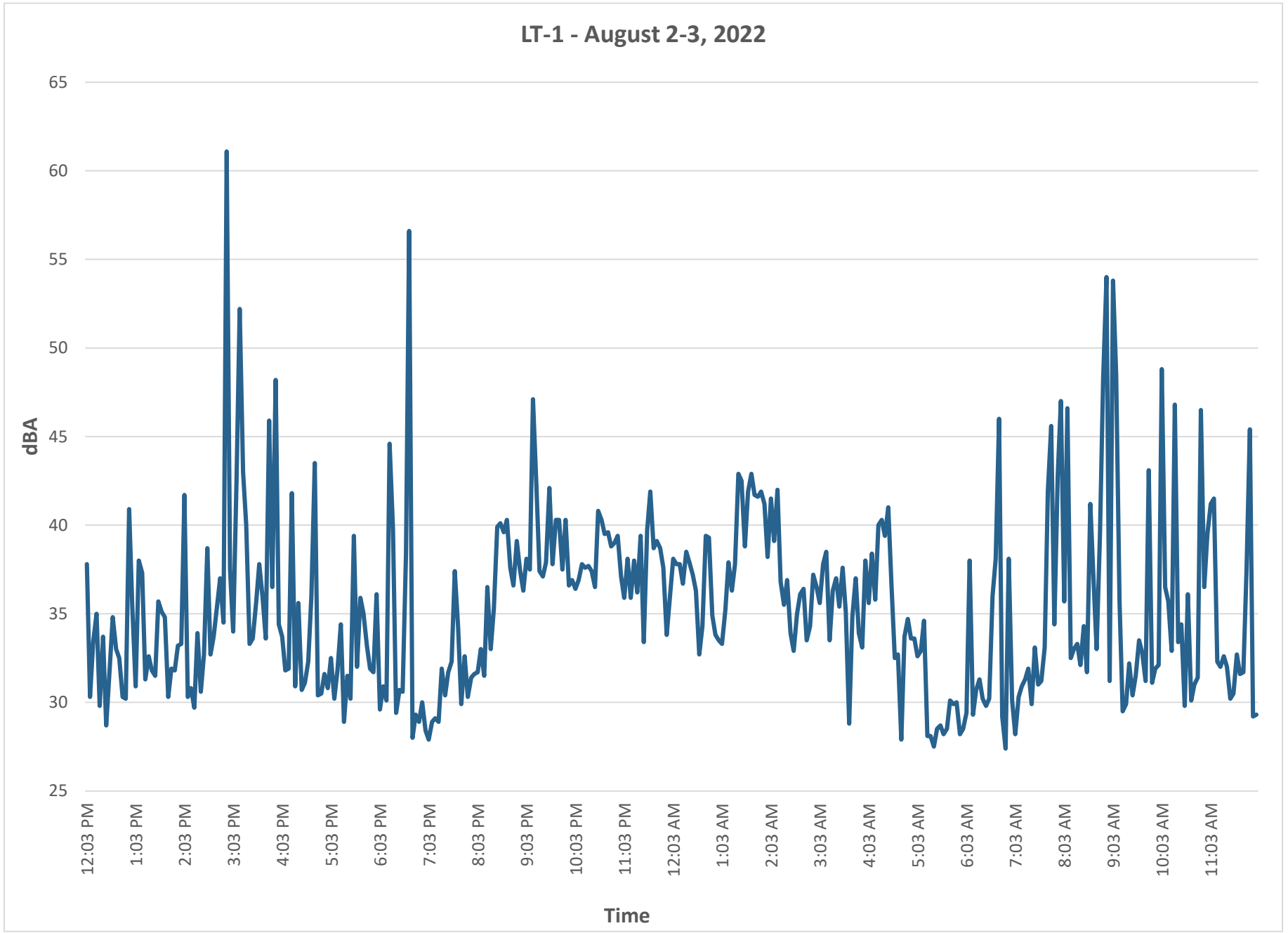
Noise levels are commonly measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response, which is most sensitive to frequencies around 4,000 Hertz and less sensitive to frequencies around and below 100 Hertz (Kinsler, et. al. 1999). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; dividing the energy in half would result in a 3 dB decrease (Crocker 2007).

Human perception of noise has no simple correlation with sound energy: the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources do not “sound twice as loud” as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease (i.e., twice the sound energy); that a change of 5 dBA is readily perceptible (8 times the sound energy); and that an increase (or decrease) of 10 dBA sounds twice (half) as loud as what is readily perceptible (Crocker 2007).

Sound changes occur in both level and frequency spectrum as it travels from the source to the receiver. The most obvious change is the decrease in level as the distance from the source increases. The manner by which noise reduces with distance depends on factors such as the type of sources (e.g., point or line, the path the sound will travel, site conditions, and obstructions). Noise levels from a point source typically attenuate, or drop off, at a rate of 6 dBA per doubling of distance (e.g., construction, industrial machinery, ventilation units). Noise from a line source (e.g., roadway, pipeline, railroad) typically attenuates at about 3 dBA per doubling of distance (Caltrans 2013). The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site, such as a parking lot or smooth body of water, receives no additional ground attenuation and the changes in noise levels with distance (drop-off rate) result from simply the geometric spreading of the source. An additional ground attenuation value of 1.5 dBA per doubling of distance applies to a soft site (e.g., soft dirt, grass, or scattered bushes and trees) (Caltrans 2013). Noise levels may also be reduced by intervening structures; the amount of attenuation provided by this “shielding” depends on the size of the object and the frequencies of the noise levels. Natural terrain features such as hills and dense woods, and man-made features such as buildings and walls, can significantly alter noise levels. Generally, any large structure blocking the line of sight will provide at least a 5-dBA reduction in source noise levels at the receiver (Federal Highway Administration [FHWA] 2011). Structures can substantially reduce exposure to interior noise as well. The FHWA’s guidelines indicate that modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA, with closed windows.

The impact of noise is not a function of loudness alone. The time of day when noise occurs, and the duration of the noise are also important factors of project noise impact. Most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors have been developed by academics and industry professionals. One of the most frequently used noise metrics is the equivalent noise level (L_{eq}); it considers both duration and sound power level. L_{eq} is defined as the single steady A-weighted level equivalent to the same amount of energy as that contained in the actual fluctuating levels over time.

Noise that occurs at night tends to be more disturbing than that occurring during the day. Community noise is usually measured using Day-Night Average Level (L_{dn}), which is the 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. There is also the Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a +5 dBA penalty for noise occurring from 7:00 p.m. to 10:00 p.m. and a +10 dBA penalty for noise occurring from 10:00 p.m. to 7:00 a.m. (Caltrans 2013). Noise levels described by L_{dn} and CNEL usually differ by about 1 dBA. The relationship between the peak-hour L_{eq} value and the L_{dn}/CNEL depends on the distribution of traffic during the day, evening, and night).


LT-1 - August 2-3, 2022
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