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Memorandum

Date: March 18, 2026

To: Victor Mendez, Senior Planner, City of Costa Mesa

From: Philip Ault, Director of Noise and Air Quality, FirstCarbon Solutions
Tanay Pradhan, Air Quality and Noise Scientist

Subject: Operational Noise Impacts Analysis for The Nest Event Center Project in Costa Mesa, California

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At the request of the City of Costa Mesa (City), FirstCarbon Solutions (FCS) prepared this memorandum to analyze operational noise impacts from The Nest Event Center Project (proposed project). This assessment reviews the existing noise levels at the project site and analyzes potential future operational noise levels that could result from implementation of the proposed project.

PROJECT UNDERSTANDING

The proposed project is located at 932 West 17th Street in Costa Mesa, California. The existing site consists of two one-story multi-tenant buildings and a single access point from West 17th Street. Existing tenants include office, retail, and storage uses. Adjacent uses consist of commercial and industrial properties to the north, west, and east. To the south, across West 17th Street, is an age-restricted (55+) senior mobile home park known as Play Port Mobile Village.

The proposed project would convert an existing 4,200 square-foot vacant building into an event center accommodating gatherings such as birthdays, weddings, showers, and corporate events. Staffing levels will vary by event size and are expected to range from three to five employees with the potential for additional vendor employees. Maximum venue capacity is 150 patrons.

The building is constructed in accordance with the 2022 California Building Code standards and includes an exterior cement wall finish. Minimum façade requirements under the 2022 California Building Code include adequate wall and roof insulation, half inch drywall thickness for interior walls, and adherence to minimum sound transmission class (STC) ratings for doors and windows.

An approximately 6,000 square-foot outdoor event area is proposed adjacent to the building and is intended to function as an accessory component of the event center, allowing patrons to circulate between indoor and outdoor areas. Only background level music will be permitted outdoors. Events are proposed to take place between 4:00 p.m. and 10:00 p.m. on Fridays, 12:00 p.m. and 10:00 p.m. on Saturdays, and 12:00 p.m. and 8:00 p.m. on Sundays. Cleanup activities conclude within one hour

following the end of an event. No events are proposed Monday through Thursday, but administrative work, venue tours, vendor walkthroughs, and maintenance would take place Tuesday through Thursday between 10:00 a.m. and 4:00 p.m.

The site proposes 22 parking spaces, including ADA stalls. Because all other tenants conclude operations by 5:00 p.m. on weekdays and do not operate on weekends, the entire parking supply is available during event hours. There is on-street street parking available along 17th Street during off-peak and weekend hours. While on-street parking is not required to accommodate typical operations, these spaces can be used by visitors, vendors, and employees. For larger events, valet services may be provided to assist with parking at the event center.

NOISE FUNDAMENTALS

A summary of the fundamentals of noise is provided as Attachment A to this document.

REGULATORY FRAMEWORK

The project site is located within the City of Costa Mesa, in Orange County. The City addresses noise in the Noise Element of the General Plan and the Costa Mesa Municipal Code (CMMC).

City of Costa Mesa General Plan

The following General Plan noise goals, objectives, and policies are applicable to the proposed project:

Goals, Objectives, and Policies

Goal N-1: Noise Hazards and Conditions

The City of Costa Mesa aims to protect residents, local workers, and property from injury, damage, or destruction from noise hazards and to work toward improved noise abatement.

Objective N-1A Control noise levels within the City for the protection of residential areas, park areas, and other sensitive land uses from excessive and unhealthful noise.

Policy N-1.1 Enforce the maximum acceptable exterior noise levels for residential areas at 65 CNEL.

Goal N-2 Noise and Land Use Compatibility. Integrate the known impacts of excessive noise on aspects of land use planning and siting of residential and nonresidential projects.

Objective N-2A Plan for the reduction in noise impacts on sensitive receptors and land uses.

Policy N-2.2 Require, as a part of the environmental review process, that full consideration be given to the existing and projected noise environment.

Policy N-2.4 Require that all proposed projects are compatible with adopted noise/land use compatibility criteria

Policy N-2.5 Enforce applicable interior and exterior noise standards.

City of Costa Mesa Municipal Code

The City of Costa Mesa has established noise performance standards in CMMC Title 13, Chapter XIII Noise Control. These provisions are summarized below:

13-280–Exterior Noise Standards.

(a) The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within the City:

Residential Exterior Noise Standards

Noise Level	Time Period
55 dB(A)	7:00 AM through 11:00 PM
50 dB(A)	11:00 PM through 7:00 AM

In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by 5 dBA.

(b) It is unlawful for any person at any location within the City to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential property, either within or outside the City, to exceed:

(1) The noise standard for a cumulative period of more than 30 minutes in any hour;
(2) The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour;
(3) The noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour;
(4) The noise standard plus 15 dBA for a cumulative period of more than 1 minute in any hour; or
(5) The noise standard plus 20 dBA for any period of time.

(c) In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

13-281. Interior Noise Standards.

(a) The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within the City:

Residential Interior Noise Standards

Noise Level	Time Period
55 dBA	7:00 AM through 11:00 PM
45 dBA	11:00 PM through 7:00 AM

In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five dB(A).

(b) It is unlawful for any person at any location within the City to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level when measured within any other dwelling unit on any residential property, either within or outside the City, to exceed:
   (1) The interior noise standard for a cumulative period of more than 5 minutes in any hour;
   (2) The interior noise standard plus 5 dBA for a cumulative period of more than 1 minute in any hour; or
   (3) The interior noise standard plus 10 dBA for any period of time.

(c) In the event the ambient noise level exceeds either of the first two noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise limit category the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

13.283–Loud, Unnecessary Noise: It shall be unlawful for any person to willfully make or continue, or cause to be made or continued, any loud, unnecessary and unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area, regardless of whether the noise level exceeds the standards specified in Section 13-280. The standard which may be considered in determining whether a violation of the provisions of this section exists may include, but not be limited to the following:

a. The level of the noise;
b. Whether the nature of the noise is usual or unusual;
c. Whether the origin of the noise is natural or unnatural;
d. The level and intensity of the background noise, if any;
e. The proximity of the noise to residential sleeping facilities;
f. The nature and zoning of the area within which the noise emanates;
g. The density of the inhabitation of the area within which the noise emanates;
h. The time of the day and night the noise occurs;
i. The duration of the noise;
j. Whether the noise is recurrent, intermittent, or constant; or
k. Whether the noise is produced by a commercial or noncommercial activity.

SIGNIFICANCE THRESHOLDS

For purposes of this analysis, the proposed project is analyzed for compliance with the CMMC Section 13-280 daytime exterior and interior noise threshold of 55 A-weighted decibel (dBA) equivalent sound

level (L_{eq}) as measured at the nearest residential receptor between the hours of 7:00 a.m. and 11:00 p.m. Since the project's operational noise is primarily speech and music, a 5 dBA lower threshold of 50 dBA L_{eq} would apply, consistent with CMMC Section 13-280(a). A significant impact would occur if stationary noise generated by the proposed project were to exceed this threshold. The nighttime noise standard is not analyzed in this analysis due to the fact that the proposed project would not operate between the hours of 11:00 p.m. and 7:00 a.m. and would only operate on the project site during daytime hours.

In addition, it should be noted that the Costa Mesa General Plan also establishes an exterior noise standard of 65 dBA CNEL at residential land uses. Since the project is not assumed to generate noise over a 24-hour period, it would not be appropriate to compare noise generated by the project to the 24-hour threshold. Further, due to noise weighting, compliance with the 50 dBA L_{eq} noise standard established by the City's Municipal Code would mean the project complies with the City's General Plan exterior noise threshold for residential land uses as well. Therefore, the following analysis does not compare project impacts to the General Plan 24-hour noise standard.

For mobile noise, a significant impact would occur if implementation of the proposed project would result in a substantial increase in traffic noise levels compared with existing traffic noise levels without the project. As noted in the characteristics of noise discussion, audible increases in noise levels generally refer to a change of 3 dBA or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. A change of 5 dBA is considered the minimum readily perceptible change to the human ear in outdoor environments. Therefore, for purposes of this analysis, an increase of 3 dBA or greater above ambient noise levels would be considered a substantial permanent increase in traffic noise levels.

EXISTING NOISE CONDITIONS

An ambient noise monitoring effort was conducted to document daytime ambient noise levels on the project site. Short-term noise monitoring was conducted by FirstCarbon Solutions (FCS) on February 25, 2026, between 11:47 a.m. and 12:39 p.m. The dominant noise sources in the project vicinity include traffic from West 17th Street and Monrovia Avenue. The short-term existing noise measurement results are summarized in Table 1. The noise monitoring data sheets are included in Attachment B.

Table 1: Existing Ambient Noise Levels on the Project Site

Site ID #	Location Description (Primary Noise Source)	dBA L_{eq}	dBA L_{max}
ST-1	Near the northern portion of the project site, within the back parking and dumpster area near the northern property boundary. (Traffic from West 17th Street. Echoed traffic noise from Monrovia Avenue. Airplane traffic from John Wayne Airport.)	51.6	80.3
ST-2	Near the southern boundary of the project site, on the east side of the main entry driveway, adjacent to West 17th Street. (Traffic from West 17th Street and Monrovia Avenue. Airplane flying overhead and air conditioning unit from the eastern onsite building.)	61.7	78.2
Notes:			

Site ID #	Location Description (Primary Noise Source)	dBA L_{eq}	dBA L_{max}

dBA = A-weighted decibel
L_{eq} = equivalent sound level
L_{max} = maximum noise level
Source: FirstCarbon Solutions (FCS). 2026.

OPERATIONAL NOISE IMPACT ANALYSIS

Operational/Stationary Source Noise Impacts

As mentioned above, a significant impact would be identified if noise generated by project-related stationary sources were to exceed the City's exterior performance standard of 50 dBA L_{eq} at the nearest residential receptor between 7:00 a.m. and 11:00 p.m. In addition, it should be noted that compliance with the exterior noise threshold of 50 dBA L_{eq} would ensure compliance with the interior noise threshold for receiving residential land uses if windows remain closed. Therefore, this analysis focuses primarily on compliance with the exterior noise performance threshold.

The proposed project does not include installation of any new HVAC systems or other new mechanical equipment, but the construction of the project may relocate rooftop HVAC equipment. Since the project is not introducing any new mechanical equipment and the distance between the proposed project rooftop and nearby receptors is not changing, the reorientation of HVAC systems would not be anticipated to cause any significant changes to existing conditions. Therefore, this report does not include an analysis of the noise generated by mechanical equipment.

The project would provide additional parking through the restriping of parking areas on site. While the project would include additional parking facilities, these additional spaces would be spread throughout the site and would not be concentrated in locations close to nearby receptors. Further, parking noise is typically generated by people conversing, doors shutting, and vehicles idling. These noise sources would only occur instantaneously or for short durations of time. As a result, actual noise levels from parking activity would be low and would not contribute to noise levels when weighted over time. Therefore, this report does not include an analysis of the noise generated by the additional parking provided on site.

Accordingly, this analysis focuses on outdoor use activity associated with the proposed event center, which represents the only significant new operational stationary noise source.

Outdoor Use Activities

The proposed outdoor event area is located adjacent to the indoor hall and functions as a flexible space for guest circulation and small-group interaction. Based on the project description, typical events would include 40 to 75 guests, while infrequent larger events (approximately twice per month) could include up to 120 guests, with a maximum occupancy of 150 guests.

To evaluate the reasonable worst-case scenario, the analysis assumes that up to 150 guests could be present within the outdoor area at one time. Outdoor activity is assumed to occur only during the project's

permitted operating hours Fridays from 4:00 p.m. to 10:00 p.m., Saturdays from 12:00 p.m. to 10:00 p.m., and Sundays from 12:00 p.m. to 8:00 p.m. with outdoor background music included as part of the project. Typical noise levels of people conversing range from approximately 60 dBA to 72 dBA L_{max} at 3 feet, for normal to loud adult voices, with background music typically playing around the level of normal conversation. As a conservative assumption, background music is modeled equivalent to the noise level for loud adult voices of 72 dBA L_{max}. This approach is conservative as background music would be played below levels that would perceptually mask conversational speech.

The nearest portion of the proposed outdoor seating area where people could congregate with outdoor music would be located approximately 250 feet from the nearest residential property. This analysis assumes a reasonable worst-case scenario that up to 150 guests could be congregated in the outdoor patio area with background music all within 250 feet of the nearest residential property, with each of them conversing in normal voices 50 percent of the time and using very loud voices 50 percent of the time. If this activity were continued for an entire hour, it would result in a reasonable worst-case combined hourly average noise level of 31 dBA L_{eq} at the nearest residential property line (903 West 17th Street), assuming no shielding reduction of any kind (i.e., no shielding reduction from existing structures of any kind). The calculation sheet is provided in Attachment B.

Due to the distance between the outdoor gathering area and the nearest residential receptor, noise from people conversing in the outdoor area and outdoor music would be substantially reduced before reaching off-site properties. As shown above, even under a conservative scenario in which elevated conversation occurs among a portion of up to 150 guests, the resulting noise levels at the nearest residential property line would attenuate to 31 dBA L_{eq} at the nearest residential property line which is well below the City's 50 dBA L_{eq} exterior noise standard. Furthermore, these reasonable worst-case operational noise levels of 30 dBA L_{eq} would not exceed the existing daytime ambient noise level conditions shown in Table 1 above as ranging from approximately 51 dBA to 61 dBA L_{eq}. Because these noise levels would remain below both the applicable 50 dBA L_{eq} threshold and below documented existing ambient conditions, operational noise from outdoor gatherings would be **less than significant.**

The combined effect of all stationary operational noise sources, including indoor use activities, is discussed under the Combined Operational/Stationary Source Noise Impacts discussion below.

Indoor Use Activities - Live Music

As noted in the project description, the proposed event center may include indoor music or acoustic entertainment associated with private events. Unlike outdoor music, indoor performances are not restricted to just background music and could be amplified.

While no existing comparable music measurements are available for this venue, indoor acoustic music typically generates substantially lower sound levels than outdoor amplified performances because indoor building assemblies and room acoustics naturally limit sound propagation. For conservative analysis, indoor music is assumed to include loud amplified entertainment. However, indoor amplified entertainment would not be generated during every event.

As a reasonable worst-case scenario calculation, this analysis assumes amplified entertainment could generate an average noise level of approximately 93 dBA L_{eq}[1] over the course of an entire hour, as measured at 1-meter from the speaker or stage where the performance occurs, at the closest possible point to residences inside the project building. The closest residential property line (903 West 17th Street) would be 215 feet from the proposed project building. A glass door and frosted window on the proposed south elevation and windows on the proposed west elevation could have direct line of sight to the existing residences across West 17th Street. Further, the proposed windows are fixed (non-operational) and would remain closed at all times. The south facing façade also has a small portion that has a direct line of sight to the existing residences across West 17th Street. However, the majority of the south elevation is a shared wall with the building directly south and the only opening on this façade is a single door through which people can access the facility, which is expected to remain closed a majority of the time.

Therefore, based on the fact that the building construction has been constructed in compliance with the 2022 California Building standards, and has an exterior cement wall finish, a conservative estimate of the interior-to-exterior noise reduction provided by the building envelope is a minimum of 20-dBA.[2] This would result in a reasonable worst-case hourly average noise level of 37 dBA L_{eq} at the nearest residential property line assuming no shielding from any intervening structures. The calculation sheet is provided in Attachment B.

Therefore, due to the distance between the proposed project and the nearest residential receptors, noise from indoor music would remain below City's 50 dBA L_{eq} exterior noise standard. Furthermore, these reasonable worst-case operational noise levels of 37 dBA L_{eq} would not exceed the existing daytime ambient noise level conditions shown in Table 1 above as ranging from approximately 51 dBA to 61 dBA L_{eq}. Because these noise levels would remain below both the applicable 50 dBA L_{eq} threshold and below documented existing ambient conditions, operational noise from indoor music would be **less than significant**.

Combined Operational/Stationary Source Noise Impacts

Table 2: provides a summary of the combined stationary source operational noise levels and their comparison to the City's exterior noise performance threshold of 50 dBA L_{eq}, as measured at the nearest residential property line.

Table 2: Stationary Operational Noise Impact Summary

Source	Noise Level at Residential Property Line	City's Exterior Noise Performance Threshold	Exceed Threshold by 3 dBA or Greater? (Yes/No)
People Conversing at Outdoor Gatherings	31 dBA L_{eq}	50 dBA L_{eq}	No

[1] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden. 2010. Noise Navigator Sound Level Database with Over 1700 Measurement Values.

[2] United States Environmental Protection Agency (EPA). 1978. Protective Noise Levels. EPA 550/9-79-100. November 1978.

Source	Noise Level at Residential Property Line	City's Exterior Noise Performance Threshold	Exceed Threshold by 3 dBA or Greater? (Yes/No)
Indoor Amplified Music	37 dBA L_{eq}	50 dBA L_{eq}	No
Combined Noise Levels	**38 dBA L_{eq}**	**50 dBA L_{eq}**	**No**

Notes:
dBA = A-weighted decibel
L_{eq} = equivalent sound level
Source: FirstCarbon Solutions (FCS). 2026.

As shown above in Table 2, the combined stationary source operational noise levels would not exceed the City's exterior noise performance threshold of 50 dBA L_{eq} as measured at the nearest residential receptor. Furthermore, these combined reasonable worst-case operational noise levels of 38 dBA L_{eq} would not exceed the existing daytime ambient noise level conditions shown in Table 1 above as ranging from approximately 51 dBA to 61 dBA L_{eq}. Therefore, project-related operational stationary source noise levels would not result in a substantial permanent increase in noise levels in excess of established standards, and the impact on off-site sensitive receptors would be **less than significant**.

Operational/Mobile Source Noise Impacts

According to the Fehr & Peers memorandum,[3] the maximum number of mobile trips would be 192 daily trips generated during infrequent large events (including maximum-capacity scenarios). Typically, a doubling of daily trips along a roadway would cause mobile noise to increase by 3 dBA[4] which would result in a significant noise impact due to mobile noise. According to the Costa Mesa Average Daily Traffic (ADT) Map, existing ADT along West 17th Street is 5,950 trips. Therefore, an additional 192 daily trips would not cause ADT to double on West 17th Street and traffic noise levels would not increase by more than 3 dBA. Thus, mobile source noise impacts would be **less than significant**.

CONCLUSION

As demonstrated in the impact analysis above, combined operational stationary sources (including outdoor activity and background music) and mobile sources of the proposed project would not result in a substantial permanent increase in ambient noise levels in excess of established standards, and the impact on off-site sensitive receptors would be **less than significant**. Therefore, the project does not need to include any sound attenuation features or building envelope improvements to limit noise generated by the project's operation. Compliance with the 2022 California Building standards and the proposed exterior cement wall finish would provide sufficient sound reduction to maintain compliance with the CMMC's noise standards.

[3] Fehr & Peers. 2026. City of Costa Mesa, The Nest on 17th Event Space Trip Generation Assessment. January 22.

[4] California Department of Transportation. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. September.

Thank you for the opportunity to conduct this noise impact analysis. Please feel free to contact Phil Ault (559.930.6191 or pault@fcs-intl.com) should you have any questions.

Sincerely,

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Attachment A: Fundamentals of Noise
Attachment B: Noise Monitoring Data

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Attachment A:

Fundamentals of Noise

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NOISE AND VIBRATION FUNDAMENTALS

Characteristics of Noise and Descriptors

Sound can be described in terms of its loudness (amplitude) and frequency (pitch). Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The standard unit of measurement for sound is the decibel, abbreviated dB. Because the human ear is not equally sensitive to sound at all frequencies, the A-weighted scale (dBA) is used to reflect the normal hearing sensitivity range of the human ear. Table 1 provides examples of A-weighted noise levels from common sources.

Although the terms “sound” and “noise” are often used synonymously, noise is commonly defined as sound that is either loud, unpleasant, unexpected, or undesired.[1] Because decibels are logarithmic units, they cannot be simply added or subtracted. For example, two cars each producing 60 dBA of noise would not produce a combined 120 dBA.

Table 1: A-Weighted Decibel Scale

Common Noise Sources	Sound Level, dBA
Near Jet Engine	130
Rock and Roll Band	110
Jet Flyover at 1,000 feet	100
Power Motor	90
Food Blender	80
Living Room Music	70
Human Voice at 3 feet	60
Residential Air Conditioner at 50 feet	50
Bird Calls	40
Quiet Living Room	30
Average Whisper	20
Rustling Leaves	10
Notes: These noise levels are approximations intended for general reference and information use. They do	

[1] California Department of Transportation (Caltrans). 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol.

Common Noise Sources	Sound Level, dBA
not meet the standard required for detailed noise analysis but are provided for the reader to gain a rudimentary concept of various noise levels. Source: Cowan, James P. 1993. Handbook of Environmental Acoustics.	

Table 2 briefly defines common noise measurement descriptors and other sound terminology used in this memorandum.

Table 2: Sound Terminology

Term	Definition
Sound	A vibratory disturbance created by a vibrating object which, when transmitted by pressure waves through a medium such as air, can be detected by a receiving mechanism such as the human ear or a microphone.
Noise	Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
Ambient Noise	The composite of noise from all sources near and far in a given environment.
Decibel (dB)	A unitless measure of sound on a logarithmic scale which represents the squared ratio of sound pressure amplitude to a reference sound pressure. The reference pressure is 20 micropascals, representing the threshold of human hearing (0 dB).
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level that approximates the frequency response of the human ear.
Equivalent Noise Level (L_{eq})	The average sound energy occurring over a specified time period. In effect, L_{eq} is the steady-state sound level that in a stated period would contain the same acoustical energy as the time-varying sound that actually occurs during the same period.
Maximum and Minimum Noise Levels (L_{max} and L_{min})	The maximum or minimum instantaneous sound level measured during a measurement period.
Day-Night Level (DNL or L_{dn})	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring between 10:00 p.m. and 7:00 a.m. (nighttime).
Community Noise Equivalent Level (CNEL)	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added to the A-weighted sound levels occurring between 7:00 p.m. and 10:00 p.m. and 10 dB added to the A- weighted sound levels occurring between 10:00 p.m. and 7:00 a.m.

Term	Definition
Statistical Descriptor (L_X)	L_X is used to represent the noise level exceeded X% of a specified time period. For example, L_{90} represents the noise level that is exceeded 90% of a specified time period. L_{90} is commonly used to represent ambient or background steady-state noise levels.

Source: Data compiled by FirstCarbon Solutions (FCS) 2024.

Effects of Environmental Noise

The degree to which noise can impact an environment ranges from levels that interfere with speech and sleep to levels that can cause adverse health effects. Most human response to noise is subjective.

Factors that influence individual responses may include the intensity, frequency, and pattern of noise; the amount of background or existing noise present; and the nature of work or human activity that is exposed to intruding noise.

According to the National Institute of Health (NIH), extended or repeated exposure to sounds at or above 85 dB can cause hearing loss. Sounds of 75 dBA or less, even after continuous and repeated exposure, are unlikely to cause hearing loss.[2] The World Health Organization (WHO) reports that adults should not be exposed to sudden "impulse" noise events of 140 dB or greater. For children, this limit is 120 dB.[3]

Exposure to elevated nighttime noise levels can disrupt sleep, leading to increased levels of fatigue and decreased work or school performance. For the preservation of healthy sleeping environments, the WHO recommends that continuous interior noise levels should not exceed 30 dBA L_{eq} and that individual noise events of 45 dBA or higher be limited.[4]

Some epidemiological studies have shown a weak association between long-term exposure to noise levels of 65 to 70 dBA L_{eq} or greater and cardiovascular effects, including ischemic heart disease and hypertension. However, at this time, the relationship is largely inconclusive.

It is generally accepted that people with normal hearing sensitivity can barely perceive a 3 dBA change in noise levels, though if changes occur to the character of a sound (i.e., changes to the frequency content), then changes less than 3 dBA may be more noticeable.[5] Changes of 5 dBA may be readily perceptible,

[2] National Institute of Health (NIH), National Institute on Deafness and Other Communication. www.nidcd.nih.gov/health/noise-induced-hearing-loss.

[3] World Health Organization (WHO). 1999. Guidelines for Community Noise.

[4] Ibid.

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

and changes of 10 dBA are perceived as a doubling in loudness.[6] However, few people are highly annoyed by daytime noise levels below 55 dBA.[7]

Loud noises, such as those from construction activities, can interfere with peoples' abilities to effectively communicate via speech, as well as other activities, resulting in annoyance or inconvenience. The EPA has found that a home interior noise level of 45 dBA L_{eq} generally protects speech and communication by providing 100 percent intelligibility of speech sounds.[8] Other common daily activities that may be disrupted by elevated interior noise levels include watching television, listening to music, or activities requiring concentration (such as reading). The EPA has determined that, given the preservation of an indoor noise level associated with 100 percent speech intelligibility (i.e., 45 dBA L_{eq}), the average community reaction is not evident and "7 dBA below levels associated with significant complaints and threats of legal action." Any complaints and annoyance are dependent on "attitude and other non-level related factors."

Noise Attenuation

Generally speaking, noise levels decrease, or "attenuate," as distances from noise sources to receivers increases. For each doubling of distance, noise from stationary or small, localized sources, commonly referred to as "point sources," may attenuate at a rate of 6 dBA for each doubling of distance. This attenuation is referred to as the inverse square law. For example, if a point source emits a noise level of 80 dBA at a reference distance of 50 feet, its noise level would be approximately 74 dBA at a distance of 100 feet, 68 dBA at a distance of 200 feet, etc. Noise emitted by "line" sources, such as highways, attenuates at the rate of 3 dBA for each doubling of distance.[9]

Factors such as ground absorption and atmospheric effects may also affect the propagation of noise. In particular, ground attenuation by non-reflective surfaces, such as soft dirt or grass, may contribute to increased attenuation rates of up to an additional 8-10 dBA per doubling of distance.[10]

Noise is most audible when traveling by direct line of sight, an unobstructed visual path between a noise source and a receiver. Barriers that break the line of sight between noise sources and receivers, such as walls and buildings, can greatly reduce source noise levels by allowing noise to reach receivers by diffraction only. Barriers can reduce source noise levels by up to 20 dBA, though it is generally infeasible for temporary barriers to reduce source noise levels by more than 15 dBA.[11] In cases where the noise

[6] Ibid.

[7] World Health Organization (WHO). 1999. Guidelines for Community Noise.

[8] United States Environmental Protection Agency (EPA). 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.

[9] California Department of Transportation (Caltrans). 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol.

[10] Ibid.

[11] Ibid.

path from source to receiver is direct but grazes the top of a barrier, noise attenuation of up to 5 dBA may still occur.[12]

Recommended Noise Levels to Protect Public Welfare

In 1972, Congress enacted the Noise Control Act. This act authorized the United States Environmental Protection Agency (EPA) to publish descriptive data on the effects of noise and establish levels of sound "requisite to protect the public welfare with an adequate margin of safety." These levels are separated into health (hearing loss levels) and welfare (annoyance levels) categories, as shown in Table 3. The EPA cautions that these identified levels are not standards because they do not take into account the cost or feasibility of the levels.

For protection against hearing loss, 96 percent of the population would be protected if sound levels are less than or equal to an $L_{eq(24)}$ of 70 dBA. The EPA activity and interference guidelines are designed to ensure reliable speech communication at about 5 feet in the outdoor environment. For outdoor and indoor environments, interference with activity and annoyance should not occur if levels are below 55 dBA and 45 dBA, respectively.

Table 3: Summary of EPA Recommended Noise Levels to Protect Public Welfare

Effect	Level	Area
Hearing loss	$L_{eq}(24) \leq 70$ dB	All areas
Outdoor activity interference and annoyance	$L_{dn} \leq 55$ dB	Outdoors in residential areas, farms, and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	$L_{eq}(24) \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{eq} \leq 45$ dB	Indoor residential areas.
	$L_{eq}(24) \leq 45$ dB	Other indoor areas with human activities such as schools, etc.

Note:
(24) signifies an L_{eq} duration of 24 hours.
Source: United States Environmental Protection Agency. 1978. Protective Noise Levels, EPA 550/9-79-100. November.

[12] Ibid.

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Characteristics of Vibration and Descriptors

Groundborne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. Vibrating objects in contact with the ground radiate vibration waves through various soil and rock strata to the foundations of nearby buildings.

Although groundborne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. When assessing annoyance from groundborne vibration, vibration is typically expressed as root mean square (rms) velocity in units of decibels of 1 microinch per second. To distinguish these vibration levels referenced in decibels from noise levels referenced in decibels, the unit is written as “VdB.”

In extreme cases, excessive groundborne vibration has the potential to cause structural damage to buildings. Common sources of groundborne vibration include construction activities such as blasting, pile driving, and operating heavy earthmoving equipment. However, construction vibration impacts on building structures are generally assessed in terms of peak particle velocity (PPV). For the purposes of this analysis, project-related impacts are expressed in terms of PPV. Typical vibration source levels from construction equipment are shown in Table 4.

Table 4: Vibration Levels of Construction Equipment

Construction Equipment	PPV at 25 Feet (inches/second)	rms Velocity in Decibels (VdB) at 25 Feet
Water Trucks	0.001	57
Scraper	0.002	58
Bulldozer (Small)	0.003	58
Jackhammer	0.035	79
Concrete Mixer	0.046	81
Concrete Pump	0.046	81
Paver	0.046	81
Pickup Truck	0.046	81
Auger Drill Rig	0.051	82
Backhoe	0.051	82
Crane (Mobile)	0.051	82
Excavator	0.051	82
Grader	0.051	82
Loader	0.051	82

Construction Equipment	PPV at 25 Feet (inches/second)	rms Velocity in Decibels (VdB) at 25 Feet
Loaded Trucks	0.076	86
Bulldozer (Large)	0.089	87
Caisson drilling	0.089	87
Vibratory Roller (Small)	0.101	88
Compactor	0.138	90
Clam shovel drop	0.202	94
Vibratory Roller (Large)	0.210	94
Pile Driver (Impact: typical)	0.644	104
Pile Driver (Impact: upper range)	1.518	112

Notes:
PPV = peak particle velocity
VdB = velocity in decibels
rms = root mean square
Source: Compilation of scientific and academic literature, generated by Federal Transit Administration (FTA) and Federal Highway Administration (FHWA).

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil type, but it has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests. The vibration level (calculated below as PPV) at a distance from a point source can generally be calculated using the vibration reference equation:

$$PPV = PPV_{ref} * (25/D)^n \text{ (in/sec)}$$

Where:

PPV_{ref} = reference measurement at 25 feet from vibration source
D = distance from equipment to property line
n = vibration attenuation rate through ground

According to Section 7 of the FTA Transit Noise and Vibration Impact Assessment Manual, an “n” value of 1.5 is recommended to calculate vibration propagation through typical soil conditions.[13]

[13] Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. September.

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Attachment B:

Noise Monitoring Data

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Project Number: 0080.0041 Sheet 1 of 2

Project Name: Costa Mesa The Nest

Test Personnel: Henry Welch

NOISE MEASUREMENT SURVEY

Site Number: 1 Date: 2/25/2026 Time: From 12:23 to 12:39

Site Location: Near the northern portion of the project site, within the back parking and dumpster area near the northern property boundary.

Primary Noise Sources: Traffic from 17th Street mainly. Echoed traffic noise from Monrovia Avenue. Airplane traffic from likely John Wayne Airport.

Measurement Results

	dBA
L_{eq}	51.6
L_{max}	80.3
L_{min}	39.4
L_{peak}	
L_5	49.7
L_{10}	48.3
L_{50}	44.4
L_{90}	41.1
SEL	

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
12:34	Gararge Door opens approx 25 yards west	
12:36	Guy on phone call, approx 20 yards west	
12:39	Car drives past device on gravel to park	

Comments: Had to move device approx 15 feet west of initial pin location due to fence. Had to do measurement twice, after 1st measurement disrupted by backing up truck coming down alley.

Equipment: LXT 1 Measured Difference: -0.01 dBA

Settings: A-Weighted ☑ Other ☐ Slow ☑ Fast ☐ Windscreen ☑

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Atmospheric Conditions

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
	4	70	69	

Comments: Light breeze, bright and sunny weather

Photos Taken

Photo Number	Location/Description
1	Facing North. Looking towards dumpsters
2	Facing East. Facing Wooden Fence
3	Facing South. Facing down Alleyway/driveway
4	Facing West. Facing parking lot, and back yard of neighboring property

Traffic Description

Roadway	# Lanes	Posted Speed	Average Speed	NB/EB Counts	SB/WB Counts

Measurement Report

Report Summary

Meter's File Name	LxT_Data.045.s	Computer's File Name	LxT_0004228-20260225 122252-LxT_Data.045.ldbin
Meter	LxT2 0004228	Firmware	2.404
User	Henry Welch	Location	Site 1
Job Description	0080.00041 Costa Mesa Nest		
Note	approx. 20 ft west of pin mapped		

Measurement

Start Time	2026-02-25 12:22:52	Duration	0:16:44.5		
End Time	2026-02-25 12:39:37	Run Time	0:16:44.5	Pause Time	0:00:00.0
Pre-Calibration	2026-02-25 12:22:42	Post-Calibration	None	Calibration Deviation	0.0

Results

Overall Metrics

LA_{eq}	51.6 dB		
LAE	81.6 dB	SEA	--- dB
EA	16.1 µPa²h		
EA8	462.5 µPa²h		
EA40	2.3 mPa²h		
LAS_{peak}	84.3 dB	2026-02-25 12:23:05	
LAS_{max}	80.3 dB	2026-02-25 12:22:52	
LAS_{min}	39.4 dB	2026-02-25 12:24:06	
LA_{eq}	51.6 dB		
LC_{eq}	62.7 dB	LC_{eq} - LA_{eq}	11.1 dB
LAI_{eq}	63.1 dB	LAI_{eq} - LA_{eq}	11.5 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LASpk > 135.0 dB	0	0:00:00.0
LASpk > 137.0 dB	0	0:00:00.0
LASpk > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	51.6 dB	51.6 dB	--- dB

LDEN	LDay	LEve	LNight
51.6 dB	51.6 dB	--- dB	--- dB

Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	45.6 dB		--- dB		--- dB	
$L_{S(max)}$	80.3 dB	2026-02-25 12:22:52	--- dB	None	--- dB	None
$L_{S(min)}$	39.4 dB	2026-02-25 12:24:06	--- dB	None	--- dB	None
$L_{Peak(max)}$	84.3 dB	2026-02-25 12:23:05	--- dB	None	--- dB	None

Overloads	Count	Duration
	0	0:00:00.0

Statistics

LAS 5.0	49.7 dB
LAS 10.0	48.3 dB
LAS 33.3	45.3 dB
LAS 50.0	44.4 dB
LAS 66.6	43.4 dB
LAS 90.0	41.1 dB

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Project Number: 0080.0041

Project Name: Costa Mesa The Nest

Test Personnel: Henry Welch

NOISE MEASUREMENT SURVEY

Site Number: 2 Date: 2/25/2026 Time: From 11:47 to 12:02

Site Location: Near the southern boundary of the project site, on the east side of the main entry driveway, adjacent to West 17th Street.

Primary Noise Sources: Traffic from 17th Street mainly. Echoed traffic noise from Monrovia Avenue. Airplane traffic from likely John Wayne Airport. Air conditioning unit from Building 309 just to the north east of device

Measurement Results

	dBA
L_{eq}	61.7
L_{max}	78.2
L_{min}	43.4
L_{peak}	
L_5	67.5
L_{10}	66
L_{50}	53.4
L_{90}	48.9
SEL	

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
11:51	Car turned around in driveway	
11:55	Couple walked past chatting	

Comments:

Equipment: LXT 1

Settings: A-Weighted ☑ Other ☐

Measured Difference: -0.48 dBA

Slow ☑ Fast ☐ Windscreen ☑

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Atmospheric Conditions

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
	4	70	69	

Comments: Light breeze, bright and sunny weather

Photos Taken

Photo Number	Location/Description
1	Facing North. Looks into driveway between buildings
2	Facing East. Facing building 903 and looking down 17th street
3	Facing South. Facing 17th street and opposing wall that protects neighborhood and housing
4	Facing West. Looking towards western buildings and looking down 17th street.

Traffic Description

Roadway	# Lanes	Posted Speed	Average Speed	NB/EB Counts	SB/WB Counts

Measurement Report

Report Summary

Meter's File Name	LxT_Data.044.s	Computer's File Name	LxT_0004228-20260225 114727-LxT_Data.044.ldbin
Meter	LxT2 0004228	Firmware	2.404
User	Henry Welch	Location	Site 2
Job Description	0080.0041 Costa Mesa Nest		
Note			

Measurement

Start Time	2026-02-25 11:47:27	Duration	0:15:16.7		
End Time	2026-02-25 12:02:44	Run Time	0:15:16.7	Pause Time	0:00:00.0
Pre-Calibration	2026-02-25 11:46:51	Post-Calibration	None	Calibration Deviation	0.0

Results

Overall Metrics

LA_{eq}	61.7 dB		
LAE	91.3 dB	SEA	--- dB
EA	150.7 µPa²h		
EA8	4.7 mPa²h		
EA40	23.7 mPa²h		
LAS_{peak}	91.1 dB	2026-02-25 11:49:11	
LAS_{max}	78.2 dB	2026-02-25 11:49:12	
LAS_{min}	43.4 dB	2026-02-25 11:48:36	
LA_{eq}	61.7 dB		
LC_{eq}	69.8 dB	LC_{eq} - LA_{eq}	8.1 dB
LAI_{eq}	62.8 dB	LAI_{eq} - LA_{eq}	1.1 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LASpk > 135.0 dB	0	0:00:00.0
LASpk > 137.0 dB	0	0:00:00.0
LASpk > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
61.7 dB	61.7 dB	--- dB

LDEN	LDay	LEve	LNight
61.7 dB	61.7 dB	--- dB	--- dB

Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	61.7 dB		--- dB		--- dB	
$L_{S(max)}$	78.2 dB	2026-02-25 11:49:12	--- dB	None	--- dB	None
$L_{S(min)}$	43.4 dB	2026-02-25 11:48:36	--- dB	None	--- dB	None
$L_{Peak(max)}$	91.1 dB	2026-02-25 11:49:11	--- dB	None	--- dB	None

Overloads	Count	Duration
	0	0:00:00.0

Statistics

LAS 5.0	67.5 dB
LAS 10.0	66.0 dB
LAS 33.3	59.4 dB
LAS 50.0	53.4 dB
LAS 66.6	50.6 dB
LAS 90.0	48.9 dB

People Conversing

Receptor:	Receiving residential property line	Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements							
		Reference (dBA) 3 ft		Usage	Distance to	Ground	Shielding	Calculated (dBA)		Energy
No.	Noise Source Description	Lmax	Quantity	factor[1]	Receptor	Effect[2]	(dBA)[3]	Lmax	Leq	
1	Adult Very Loud Voices	72	25	50	250	1	0	33.6	25.3	342.3369296
2	Adult Very Loud Voices	72	25	50	250	1	0	33.6	25.3	342.3369296
3	Adult Very Loud Voices	72	25	50	250	1	0	33.6	25.3	342.3369296
4	Adult conversing	60	25	50	250	1	0	21.6	13.3	21.6
5	Adult conversing	60	25	50	250	1	0	21.6	13.3	21.6
6	Adult conversing	60	25	50	250	1	0	21.6	13.3	21.6
7	Outdoor Music	72	1	100	250	1	0	33.6	14.4	27.38695437
8										
9										
10										
							Lmax[4]	34	Leq	30.5

Notes:

[1] Percentage of time activity occurs each hour

[2] Soft ground terrain between project site and receptor.

[3] Shielding due to terrain or structures

[4] Calculated Lmax is the Loudest value.

Reference Noise Level	Reference Distance	Distance from Noise	Calculated Noise Level	Interior to Exterior Noise Reduction
93	3.28084	215	56.7	36.7

$$\mathrm{SPL}_2 = \mathrm{SPL}_1 - 20 \log \left(\frac{R_2}{R_1} \right),$$

where:

- SPL_1 – Sound pressure level at point 1;
- SPL_2 – Sound pressure level at point 2;
- R_1 – Distance from the sound source to point 1; and
- R_2 – Distance from the sound source to point 2.