HARKER SCHOOL BUCKNALL CAMPUS PROJECT NOISE AND VIBRATION ASSESSMENT

San José, California

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INTRODUCTION

The project proposes the construction of a two-story multipurpose building at the Harker School Bucknall Campus located at 4300 Bucknall Road in San José, California. The proposed multipurpose building would have one level of below-grade parking on an existing private primary school campus to support an increase in enrollment from 580 to 650 students. The project would require the demolition of an existing library building on the north side of the campus and modifications to surface parking lots and drop-off zones. Additionally, the proposed project would demolish an orchestra/music portable building located on the eastern side of the campus. The new two-story multipurpose building would incorporate a parking area, library, multipurpose room, and 13 classrooms on the second and third floors. Thirty-three parking spaces would be provided on the first floor. The new building would connect to and expand the existing parking lot on the southwest corner of the project site, and the parking lot would replace the two existing driveways with three realigned driveways (one 24-foot-wide driveway and two 26-foot-wide driveways). The parking lot would also have a new site access driveway cut within the parking lot for fire access. The number of parking spaces in the existing south side parking lot would be reduced to nine. A total of 123 parking spaces would be provided in the proposed reconfigured parking lots and new building.

The grounds of the school around the retained gymnasium and new multipurpose building will be redesigned with new landscaping and play areas. This would include a relocated basketball area, running track, playground, seating area, and various landscaping features.

This report evaluates the project's potential to result in significant impacts with respect to applicable California Environmental Quality Act (CEQA) guidelines. The report is divided into two sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise and groundborne vibration, summarizes applicable regulatory criteria, and discusses ambient noise conditions in the project vicinity; and 2) the Impacts and Mitigation Measures Section describes the significance criteria used to evaluate project impacts, provides a discussion of each project impact, and presents mitigation measures, where necessary, to mitigate project impacts to a less-than-significant level.

SETTING

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (*frequency*) of the vibrations by which it is produced. Higher-pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is the intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales that are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement that

indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a tenfold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA).* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period, 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. This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within plus or minus 1 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 the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level* (*CNEL*) is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 p.m. to 10:00 p.m.) and a 10 dB penalty added to nocturnal (10:00 p.m. to 7:00 a.m.) noise levels. The *Day/Night Average Sound Level* (*DNL* or L_{dn}) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors, the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA DNL. Typically, the highest steady traffic noise level during the daytime is about equal to the DNL, and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection, and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12 to 17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
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 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 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 and a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, 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 sounds 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 A-weighted noise level during the measurement period.
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 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
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 upon its amplitude, duration, frequency, and time of occurrence, and tonal or informational content, as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, September 2013.

newer dwelling.[1] Sleep and speech interference are therefore possible when exterior noise levels are about 57 to 62 dBA DNL with open windows and 65 to 70 dBA DNL if the windows are closed. Levels of 55 to 60 dBA are common along collector streets and secondary arterials, while

[1] Based on the U.S. Department of Transportation Federal Highway Administration document "Highway Traffic Noise: Analysis and Abatement Guidance" (2010) and data from Illingworth & Rodkin, Inc. noise monitoring projects.

65 to 70 dBA is a typical value for a primary/major arterial. Levels of 75 to 80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed; those facing major roadways and freeways typically need special glass windows.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community from noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio, and television, house vibrations, and interference with sleep and rest. The DNL, as a measure of noise, has been found to provide a valid correlation between noise level and the percentage of people who are 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. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 50 dBA DNL. At a DNL of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the DNL increases to 70 dBA, the percentage of the population highly annoyed increases to about 25 to 30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between a DNL of 60 to 70 dBA. Between a DNL of 70 to 80 dBA, each additional decibel increases the percentage of the population highly annoyed by about 3 percent. People appear to respond more adversely to aircraft noise. When the DNL is 60 dBA, approximately 30 to 35 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 3 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 4 percent increase in the percentage of the population highly annoyed.[2]

Fundamentals of Groundborne Vibration

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 method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction-generated vibration for building damage and human complaints. Table 3 displays the reactions of people and the effects on buildings that continuous or frequent intermittent vibration levels produce. The guidelines in Table 3 represent syntheses of vibration criteria for human response and potential damage to buildings resulting from construction vibration.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction-related groundborne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess groundborne vibration, and almost exclusively to assess the potential of vibration to cause damage and the degree of annoyance for humans.

[2] Kryter, Karl D. The Effects of Noise on Man. Menlo Park, Academic Press, Inc., 1985.

TABLE 3 Reaction of People and Damage to Buildings from Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Threshold at which there is a risk of damage to fragile buildings with no risk of damage to most buildings
0.25	Strongly perceptible to severe	Threshold at which there is a risk of damage to historic and some old buildings.
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential structures
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to new residential and modern commercial/industrial structures

Source: Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life, are evaluated against different vibration limits. Human perception of vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as paint flaking or minimal extension of cracks in building surfaces; minor, including limited surface cracking; or major, which may threaten the structural integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher. The damage criteria presented in Table 3 include several categories for ancient, fragile, and historic structures, the types of structures most at risk of damage. Most buildings are included within the categories ranging from "Historic and some old buildings" to "Modern industrial/commercial buildings". Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

The annoyance levels shown in Table 3 should be interpreted with care since vibration may be found to be annoying at lower levels than those shown, 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 vibrations, 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.

Regulatory Background – Noise

This section describes the relevant guidelines, policies, and standards established by Federal Agencies, State Agencies, Santa Clara County, and the City of San José. The State CEQA Guidelines, Appendix G, are used to assess the potential significance of impacts pursuant to local General Plan policies or the applicable standards of other agencies. A summary of the applicable regulatory criteria follows.

Federal Government

Federal Transit Administration. The Federal Transit Administration (FTA) has identified construction noise thresholds in the *Transit Noise and Vibration Impact Assessment Manual*,[3] which limits daytime construction noise to 80 dBA L_{eq} at residential land uses, 85 dBA L_{eq} at commercial and office uses, and to 90 dBA L_{eq} at industrial land uses.

State of California

2022 California Building CALGreen Code. The State of California established exterior sound transmission control standards for new non-residential buildings as set forth in the 2022 California Green Building Standards Code (Section 5.507.4.1 and 5.507.4.2). The sections that pertain to this project are as follows:

> **5.507.4.1 Exterior noise transmission, prescriptive method.** Wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 when the building falls within the 65 dBA L_{dn} noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway noise source, as determined by the local general plan noise element.
>
> **5.507.4.2 Performance method.** For buildings located, as defined by Section 5.507.4.1, wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level ($L_{eq\,(1\text{-}hr)}$) of 50 dBA in occupied areas during any hour of operation.

The performance method, which establishes the acceptable interior noise level, is the method typically used when applying these standards.

2014 California Collaborative For High Performing Schools Acoustical Performance. The CCHP has established acoustical performance criteria for environmental noise from exterior sources for new construction modernizations.

General performance criteria for background noise: In Core Learning Spaces the Exterior-source background A-weighted noise levels shall be 45 dBA or less.

3 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, FTA Report No. 0123, September 2018.

For an enhanced rating the following criteria shall be achieved:

a) In Core Learning Spaces and spaces designated as PAS or APS, exterior source background A-weighted noise levels shall be 35 dBA or less.

b) In Ancillary Learning Spaces and LAS, exterior-source background A-weighted noise levels shall be 40 dBA or less.

State CEQA Guidelines. The California Environmental Quality Act (CEQA) contains guidelines to evaluate the significance of the effects of environmental noise attributable to a proposed project. Under CEQA, noise impacts would be considered significant if the project would result in:

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

(b) Generation of excessive groundborne vibration or groundborne noise levels;

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

Santa Clara County

Santa Clara County Airport Land Use Commission Comprehensive Land Use Plan. The Comprehensive Land Use Plan (CLUP) adopted by the Santa Clara County Airport Land Use Commission contains standards for projects within the vicinity of San José Mineta International Airport, which are relevant to this project:

4.3.2.1 Noise Compatibility Policies

N-1 The Community Noise Equivalent Level (CNEL) method of representing noise levels shall be used to determine if a specific land use is consistent with the CLUP.

N-2 In addition to the other guidelines and policies herein, the Noise Compatibility Guidelines/Policies presented in Table 4-1 shall be used to determine if a specific land use is consistent with this CLUP.

N-3 Noise impacts shall be evaluated according to the Aircraft Noise Contours presented on Figure 5 (not shown in this report).

Table 4 - 1

NOISE COMPATIBILITY POLICIES

LAND USE CATEGORY	CNEL					
	55-60	60-65	65-70	70-75	75-80	80-85
Residential – low density Single-family, duplex, mobile homes	*	**	***	****	****	****
Residential – multi-family, condominiums, townhouses	*	**	***	****	****	****
Transient lodging - motels, hotels	*	*	**	****	****	****
Schools, libraries, indoor religious assemblies, hospitals, nursing homes	*	***	****	****	****	****
Auditoriums, concert halls, amphitheaters	*	***	***	****	****	****
Sports arena, outdoor spectator sports, parking	*	*	*	**	***	****
Playgrounds, neighborhood parks	*	*	***	****	****	****
Golf courses, riding stables, water recreation, cemeteries	*	*	*	**	***	****
Office buildings, business commercial and professional, retail	*	*	**	***	****	****
Industrial, manufacturing, utilities, agriculture	*	*	*	***	***	****
* Generally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements. Mobile homes may not be acceptable in these areas. Some outdoor activities might be adversely affected.					
** Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Outdoor activities may be adversely affected. Residential: Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.					
*** Generally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Outdoor activities are likely to be adversely affected.					
**** Unacceptable	New construction or development shall not be undertaken.					

Source: Based on General Plan Guidelines, Appendix C (2003), Figure 2 and Santa Clara County ALUC 1992 Land Use Plan, Table 1

Source: Comprehensive Land Use Plan Santa Clara County, Norman Y Mineta San José International Airport, May 25, 2011, Amended May 23, 2019. And Comprehensive Land Use Plan Santa Clara County, Reid-Hillview Airport, October 24,2007, Amended November 16, 2016.

City of San José

City of San José General Plan. The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies with the goal of minimizing the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies in the City of San José. The following policies are applicable to the proposed project:

EC-1.1 Locate new development in areas where noise levels are appropriate for the proposed uses. Consider federal, state, and City noise standards and guidelines as a part of new development review. Applicable standards and guidelines for land uses in San José include:

Exterior Noise Levels

- The City's acceptable exterior noise level objective is 60 dBA DNL or less for residential and most institutional land uses (Table EC-1). The acceptable exterior noise level objective is established for the City, except in the environs of the San José International Airport and the Downtown.

EC-1.2 Minimize the noise impacts of new development on land uses sensitive to increased noise levels (Categories 1, 2, 3 and 6) by limiting noise generation and by requiring use of noise attenuation measures such as acoustical enclosures and sound barriers, where feasible. The City considers significant noise impacts to occur if a project would:

- Cause the DNL at noise sensitive receptors to increase by five dBA DNL or more where the noise levels would remain "Normally Acceptable" or

- Cause the DNL at noise sensitive receptors to increase by three dBA DNL or more where noise levels would equal or exceed the "Normally Acceptable" level.

EC-1.3 Mitigate noise generation of new nonresidential land uses to 55 dBA DNL at the property line when located adjacent to existing or planned noise sensitive residential and public/quasi-public land uses.

EC-1.7 Require construction operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City's Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

- Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

Table EC-1: Land Use Compatibility Guidelines for Community Noise in San José

LAND USE CATEGORY	EXTERIOR NOISE EXPOSURE (DNL IN DECIBELS (DBA)) 55	60	65	70	75	80
1. Residential, Hotels and Motels, Hospitals and Residential Care[1]						
2. Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds						
3. Schools, Libraries, Museums, Meeting Halls, Churches						
4. Office Buildings, Business Commercial, and Professional Offices						
5. Sports Arena, Outdoor Spectator Sports						
6. Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters						

[1]Noise mitigation to reduce interior noise levels pursuant to Policy EC-1.1 is required.

Normally Acceptable:

- Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable:

- Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

Unacceptable:

- New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

Source: Envision San José 2040 General Plan, Adopted November 1, 2011, As Amended on May 16, 2019.

For such large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

Regulatory Background – Vibration

City of San José

City of San José General Plan. The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies to achieve the goal of minimizing vibration impacts on people, residences, and business operations in the City of San José. The following policies are applicable to the proposed project:

EC-2.3 Require new development to minimize continuous vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, including

ruins and ancient monuments or building that are documented to be structurally weakened, a continuous vibration limit of 0.08 in/sec PPV (peak particle velocity) will be used to minimize the potential for cosmetic damage to a building. A continuous vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction. Equipment or activities typical of generating continuous vibration include but are not limited to: excavation equipment; static compaction equipment; vibratory pile drivers; pile-extraction equipment; and vibratory compaction equipment. Avoid use of impact pile drivers within 125 feet of any buildings, and within 300 feet of historical buildings, or buildings in poor condition. On a project-specific basis, this distance of 300 feet may be reduced where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction. Transient vibration impacts may exceed a vibration limit of 0.08 in/sec PPV only when and where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction.

Existing Noise Environment

The project site is located at 4300 Bucknall Road in the City of San José. The site is bound by Bucknall Road to the north, San Tomas Aquino Road to the east, Rincon Avenue to the south, and single-family residences to the west. Additional single-family residences and duplexes are located to the north, east, and south, opposite the associated roadways.

The noise environment at the site and in the surrounding area results primarily from vehicular traffic along Bucknall Road and San Tomas Aquino Road. Distant traffic noise and intermittent aircraft noise also contribute to the noise environment.

A noise monitoring survey consisting of two long-term (LT-1 and LT-2) and two short-term (ST-1 and ST-2) noise measurements was conducted between Wednesday, May 21, 2025, and Friday, May 23, 2025. All measurement locations are shown in Figure 1.

Long-term noise measurement LT-1 was made at the corner of Rincon Avenue and Dorval Drive, which is the side yard equivalent of the residence at 2228 Dorval Drive. LT-1 was set back approximately 20 feet from the centerline of Rincon Avenue. Hourly average noise levels at LT-1 typically ranged from 50 to 67 dBA L_{eq} during daytime hours (7:00 a.m. and 10:00 p.m.) and from 41 to 54 dBA L_{eq} during nighttime hours (10:00 p.m. and 7:00 a.m.). The day-night average noise level during the 24-hour measurement period on Thursday, May 22, 2025, was 59 dBA DNL. The daily trend in noise levels at LT-1 is shown in Figures A1 through A3 of Appendix A.

LT-2 was made from a utility pole in the front yard of 2190 San Tomas Aquinos Road, approximately 35 feet from the centerline of the roadway. Hourly average noise levels at LT-2 typically ranged from 63 to 69 dBA L_{eq} during daytime hours and from 46 to 61 dBA L_{eq} during nighttime hours. The day-night average noise level during the 24-hour measurement periods on

FIGURE 1 Aerial Image of the Project Site and Surrounding Area with the Noise Measurement Locations Identified

Source: Google Earth, 2025.

Thursday, May 22, 2025, was 66 dBA DNL. The daily trend in noise levels at LT-2 is shown in Figures A4 through A6 of Appendix A.

Short-term noise measurements were made on Wednesday, May 21, 2025, between 9:20 a.m. and 9:50 a.m. in 10-minute intervals at each site. Table 4 summarizes the noise measurement results at each location.

TABLE 4 Summary of Short-Term Noise Measurements

Noise Measurement Location	Date, Time	Measured Noise Level, dBA					
		L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}
ST-1: ~30 feet north of the Bucknall Road centerline	5/21/2025, 9:20-9:30	77	71	65	49	43	60
ST-2: ~40 feet west of the Weston Drive centerline	5/21/2025, 9:40-9:50	65	63	56	45	41	52

ST-1 was made along the sidewalk at the corner of Bucknall Road and John Kirk Court. This location represented the front yard at 129 John Kirk Court. The dominant noise source at ST-1 was traffic noise along Bucknall Road, which included one heavy truck (77 dBA) and 33 passenger cars (62 to 75 dBA), during the 10-minute measurement period. In the absence of local traffic noise, background ambient noise levels were about 43 dBA. Other noise contributors at ST-1 included a garage door opening (48 dBA) and a car door slam (60 dBA). The 10-minute L_{eq} measured at ST-1 was 60 dBA.

ST-2 was made at the southwest corner of Weston Drive and Norwich Way. This location represented the front yard equivalent at 4406 Norwich Way. Local traffic along the neighborhood roadways dominated the noise environment at ST-2. Weston Drive traffic included 14 passenger cars, generating noise levels of 52 to 65 dBA. Other noise contributors at ST-2 included birds (42 to 54 dBA) and distant emergency vehicle sirens (47 to 54 dBA). The 10-minute L_{eq} measured at ST-2 was 52 dBA.

PLAN CONSISTENCY ANALYSIS

Noise and Land Use Compatibility

The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies with the goal of minimizing the impact of noise on people through noise reduction and suppression techniques and through appropriate land use policies in the City of San José. The applicable General Plan policies were presented in detail in the Regulatory Background section and are summarized below for the proposed project:

- The City's acceptable exterior noise level standard is 60 dBA DNL or less for the proposed school uses.

- The CALGreen standards specify an interior noise environment attributable to exterior sources not to exceed an hourly equivalent noise level (L_{eq}) of 50 dBA in occupied areas of nonresidential uses during any hour of operation.

- The CCHP has established acoustical performance criteria for environmental noise from exterior sources for new construction modernizations:

    General performance criteria for background noise:
    In Core Learning Spaces the Exterior-source background A-weighted noise level shall be 45 dBA or less.

    For an enhanced rating the following criteria shall be achieved:

    a) In Core Learning Spaces and spaces designated as PAS or APS, exterior source background A-weighted noise levels shall be 35 dBA or less.

    b) In Ancillary Learning Spaces and LAS, exterior-source background A-weighted noise levels shall be 40 dBA or less.

The future noise environment at the site would continue to result primarily from vehicular traffic along Bucknall Road and San Tomas Aquino Road. The traffic study completed for the proposed project did not include future cumulative noise traffic volumes. To estimate future noise levels affecting the site, a steady increase of 1% to 2% increase was assumed each year through 2045, which is standard for a mostly built-out area. Therefore, the noise level increase by the year 2045 would be 2 dBA DNL. This increase was applied throughout the project site to represent worst-case conditions.

Future Exterior Noise Environment

The proposed multipurpose building would have outdoor seating areas located at the rear of the building, at the northwest corner of the building, and along the eastern façade of the building. Additionally, the courtyard playground would be reconfigured under project conditions. The courtyard playground is located northwest of the multipurpose building.
Both outdoor seating areas and the courtyard playground would have some exposure to Rincon Avenue traffic noise, with the centers of the outdoor use areas set back approximately 160 to 275 feet from the centerline of the roadway. At these distances, future exterior noise levels would be under 55 dBA DNL, assuming partial attenuation from the intervening school buildings. The proposed buildings would be compatible with the future noise environment at the project site.

Future Interior Noise Environment

The proposed multipurpose building would be located along Rincon Avenue, with setbacks from the centerline ranging from 80 to 210 feet. At these distances, exterior-facing rooms would be exposed to future exterior noise levels ranging from below 40 to 61 dBA L_{eq}, with the day-night average noise level up to 55 dBA DNL.

The proposed classroom addition would be located along San Tomas Aquino Road, with setbacks from the centerline ranging from 70 to 135 feet. At these distances, exterior-facing rooms would be exposed to future exterior noise levels ranging from 41 to 66 dBA L_{eq}, with the day-night average noise level up to 65 dBA DNL.

Educational buildings of normal conventional construction with closed windows in good condition can provide a noise attenuation factor around 30 dBA. This attenuation factor is assumed for the future buildings. Noise levels would meet the general performance criteria for High Performance Schools and approach the threshold for an enhanced rating. Noise levels would be below the 50 dBA L_{eq} threshold set forth in the CALGreen Code. The environmental noise would be below the general thresholds for speech interference (45 dBA for continuous noise and 55 dBA for fluctuating noise). Standard sound insulation is, therefore, adequate to meet the thresholds established by the General Plan and other agencies.

NOISE IMPACTS AND MITIGATION MEASURES

This section describes the significance criteria used to evaluate project impacts under CEQA, provides a discussion of each project impact, and presents mitigation measures, where necessary, to reduce project impacts to less-than-significant levels.

Significance Criteria

The following criteria were used to evaluate the significance of environmental noise resulting from the project:

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

(b) Generation of excessive groundborne vibration or groundborne noise levels;

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

Impact 1a: **Temporary Construction Noise.** Construction of the proposed project would expose existing residential land uses located within 500 feet of the project site to a temporary increase in noise levels for less than one year. With the incorporation of the City's Standard Permit Condition as a project condition of approval, this would be a **less-than-significant** impact.

The proposed project would be constructed in two phases. Phase A would include the construction of the multipurpose building following the demolition of existing buildings along the southern boundary of the site and demolition of the existing library in the northwestern corner of the project site. This phase is expected to start in early June 2026 and be completed by the end of August 2027. Phase B would include the construction of the classroom addition just south of the 500

Building along the eastern boundary of the project site. This phase is expected to start in early January 2028 and be completed by mid-June 2028. While total project construction is expected to take about 24 months, there would be a four-month hiatus between the two phases. During both phases, construction is expected to occur on weekdays between 8:00 a.m. and 4:00 p.m.

Noise impacts resulting from construction depend upon the noise generated by various pieces of construction equipment, the timing and duration of noise-generating activities, and the distance between construction noise sources and noise-sensitive areas. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (e.g., early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise-sensitive land uses, or when construction lasts over extended periods.

Policy EC-1.7 of the City's General Plan requires that all construction operations within the City use best available noise suppression devices and techniques and limit construction hours near residential uses per the Municipal Code allowable hours, which are between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday when construction occurs within 500 feet of a residential land use. Further, the City considers significant construction noise impacts to occur if a project that is located within 500 feet of residential uses or 200 feet of commercial or office uses would involve substantial noise-generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

The City of San José does not establish noise level thresholds for construction activities. The Federal Transit Administration (FTA) thresholds are used in this analysis to develop acceptable noise levels for temporary construction work. The FTA identifies construction noise limits in the *Transit Noise and Vibration Impact Assessment Manual*.[4] During daytime hours, an exterior threshold of 80 dBA L_{eq} shall be enforced at residential land uses. While the on-site Harker School would be considered a sensitive use during the school year, the school buildings would not be regarded as sensitive receptors under CEQA, and therefore, would not be treated as receptors in this analysis.

Construction activities generate considerable amounts of noise, especially during earth-moving activities when heavy equipment is used. The hauling of excavated materials and construction materials would generate truck trips on local roadways, as well. For the proposed project, pile driving, which produces excessive noise levels, is not expected. The typical range of maximum instantaneous noise levels for the proposed project would be 70 to 90 dBA L_{max} at a distance of 50 feet (see Table 5) from the equipment.

Table 6 shows the hourly average noise level ranges, by construction phase, typical for various types of projects. Hourly average noise levels generated by construction are about 75 to 89 dBA L_{eq} for school buildings, measured at a distance of 50 feet from the center of a busy construction site. Construction-generated noise levels drop off at a rate of about 6 dBA per doubling of the distance between the source and receptor. Shielding by buildings or terrain often results in lower construction noise levels at distant receptors.

[4] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, FTA Report No. 0123, September 2018.

TABLE 5 Construction Equipment 50-Foot Noise Emission Limits

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/Continuous
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor[3]	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	105	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines larger than 5 HP	85	Continuous

Notes:

[1] Measured at 50 feet from the construction equipment, with a "slow" (1 sec.) time constant.

[2] Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.

[3] Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.

TABLE 6 Typical Ranges of Construction Noise Levels at 50 Feet, L_{eq} (dBA)

	Domestic Housing		Office Building, Hotel, Hospital, School, Public Works		Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station		Public Works Roads & Highways, Sewers, and Trenches	
	I	II	I	II	I	II	I	II
Ground Clearing	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundations	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84

I - All pertinent equipment present at site.
II - Minimum required equipment present at site.

Source: U.S.E.P.A., Legal Compilation on Noise, Vol. 1, p. 2-104, 1973.

Equipment expected to be used in each construction stage is summarized in Table 7, along with the quantity of each type of equipment and the reference noise level at 50 feet, assuming the operation of the two loudest pieces of construction equipment for each construction stage.

Federal Highway Administration's (FHWA's) Roadway Construction Noise Model (RCNM) was used to calculate the hourly average noise levels for each phase of construction, assuming the two loudest pieces of equipment would operate simultaneously, as recommended by the FTA for construction noise evaluations. This construction noise model includes representative sound levels for the most common types of construction equipment, along with the approximate usage factors of such equipment that were developed based on an extensive database of information gathered during the construction of the Central Artery/Tunnel Project in Boston, Massachusetts (CA/T Project or "Big Dig"). The usage factors represent the percentage of time that the equipment would be operating at full power.

TABLE 7 Construction Noise Levels for the Proposed Project at a Distance of 50 feet

Phase of Construction	Total Number of Workdays	Construction Equipment (Quantity)	Construction Noise Level at 50 feet, dBA L_{eq}
Phase A			
Demolition	20	Excavator (1)[a] Tractor/Loader/Backhoe (1)[a] Bobcat (1)	82
Grading/Excavation	40	Excavator (1) Rubber-Tired Dozer (1)[a] Tractor/Loader/Backhoe (1)[a] Compactor (1)	82
Trenching/ Foundation	40	Cement & Mortar Mixer (1)[a] Tractor/Loader/Backhoe (1)[a]	81
Building – Exterior	100	Crane (1)[a] Forklift (2) Welder (2)[a]	75
Building – Interior/ Architectural Coating	80	Air Compressor (1)[a] Aerial Lift (4)[a]	75
Paving	40	Cement & Mortar Mixer (1) Roller (1) Tractor/Loader/Backhoe (2)[a] Compactor (2)[a]	82
Phase B			
Demolition	3	Concrete/Industrial Saw (1)[a] Rubber-Tired Dozer (1) Tractor/Loader/Backhoe (2)[a]	85
Site Preparation	1	Grader (1)[a] Tractor/Loader/Backhoe (1)[a]	84
Grading/Excavation	2	Grader (1)[a] Rubber-Tired Dozer (1) Tractor/Loader/Backhoe (1)[a]	84
Trenching/ Foundation	2	Tractor/Loader/Backhoe (1)[a] Excavator (1)[a]	82
Building – Exterior	100	Crane (1)[a] Forklift (1) Tractor/Loader/Backhoe (2)[a]	81
Building – Interior/ Architectural Coating	5	Air Compressor (1)[a]	74
Paving	5	Cement & Mortar Mixer (4)[a] Paver (1) Roller (1) Tractor/Loader/Backhoe (1)[a]	81

[a] Denotes two loudest pieces of construction equipment per phase.

To assess construction noise impacts at the receiving property lines of existing noise-sensitive receptors, the worst-case hourly average noise level, which is calculated by combining all pieces of equipment per phase, was propagated from the geometrical center of the construction sites for each phase to the nearest property lines of the surrounding land uses. These noise level estimates

are shown in Tables 8 and 9 for each respective phase. Noise levels in Tables 8 and 9 do not assume reductions due to intervening buildings or existing barriers.

TABLE 8 Construction Noise Levels for Phase A of the Proposed Project at the Receiving Property Lines in the Project Vicinity

Phase of Construction	Calculated Hourly Average Noise Levels, dBA L_{eq}			
	West Res. (190ft)	North Res. (120ft)	East Res. (505ft)	South Res. (145ft)
Demolition	70	74	62	73
Grading/Excavation	72	76	64	75
Trenching/ Foundation	70	74	61	72
Building – Exterior	65	69	57	68
Building – Interior/ Architectural Coating	65	69	57	68
Paving	73	77	65	75

TABLE 9 Construction Noise Levels for Phase B of the Proposed Project at the Receiving Property Lines in the Project Vicinity

Phase of Construction	Calculated Hourly Average Noise Levels, dBA L_{eq}			
	West Res. (625ft)	North Res. (415ft)	East Res. (145ft)	South Res. (260ft)
Demolition	65	68	77	72
Site Preparation	62	65	74	69
Grading/Excavation	64	67	77	71
Trenching/ Foundation	60	63	72	67
Building – Exterior	62	65	74	69
Building – Interior	52	55	65	59
Paving	62	66	75	70

As shown in Table 7, construction noise levels would intermittently range from 75 to 82 dBA L_{eq} when activities occur 50 feet from nearby receptors during Phase 1 and from 74 to 85 dBA L_{eq} when activities occur 50 feet from nearby receptors during Phase 2. When activities are focused near the center of the project site, construction noise levels would typically range from 57 to 77 dBA L_{eq} at the surrounding receptors during Phase A (Table 8) and from 52 to 77 dBA L_{eq} during Phase B (Table 9).

The project site is located within 500 feet of existing residential uses. Further, the total duration of project construction would occur for approximately 24 months, with a four-month gap between Phases 1 and 2. According to Policy 1.7 of the City's General Code, the temporary construction impact would be considered a significant impact.

The City of San José has a Standard Permit Conditions for Construction-Related Noise that would be incorporated into the proposed project as a condition of approval. The Standard Permit Condition provides a list of noise minimization measures, including the following:

- Limit construction to the hours of 7:00 a.m. to 7:00 p.m. Monday through Friday for any on-site or off-site work within 500 feet of any residential unit. Construction outside of these hours may be approved through a development permit based on a site-specific "construction noise mitigation plan" and a finding by the Director of Planning, Building and Code Enforcement that the construction noise mitigation plan is adequate to prevent noise disturbance of affected residential uses.

- Construct solid plywood fences around ground level construction sites adjacent to operational businesses, residences, or other noise-sensitive land uses.

- Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

- Prohibit unnecessary idling of internal combustion engines.

- Locate stationary noise-generating equipment such as air compressors or portable power generators as far as possible from sensitive receptors. Construct temporary noise barriers to screen stationary noise-generating equipment when located near adjoining sensitive land uses.

- Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project site.

- Notify all adjacent businesses, residences, and other noise-sensitive land uses of the construction schedule, in writing, and provide a written schedule of "noisy" construction activities to the adjacent land uses and nearby residences.

- If complaints are received or excessive noise levels cannot be reduced using the measures above, erect a temporary noise control blanket barrier along surrounding building facades that face the construction sites.

- Designate a "disturbance coordinator" who shall be responsible for responding to any complaints about construction noise. The disturbance coordinator shall determine the cause of the noise complaint (e.g., bad muffler, etc.) and shall require that reasonable measures be implemented to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

Implementation of the above Standard Permit Condition measures as project conditions of approval would reduce construction noise levels emanating from the site, limit construction hours, and minimize disruption and annoyance. With the implementation of these measures, and by recognizing that noise generated by construction activities would occur over a temporary period, the impact would be considered less-than-significant.

Mitigation Measure 1a: No further mitigation required.

Impact 1b: Permanent Noise Level Increase/Exceed Applicable Standards. The proposed project would not result in a substantial permanent noise level increase at receptors in the project vicinity. Operational noise levels generated by the proposed project would not exceed General Plan thresholds. This is a **less-than-significant** impact.

According to Policy EC-1.2 of the City's General Plan, a significant permanent noise increase would occur if the project were to increase noise levels at noise-sensitive receptors by 3 dBA DNL or more, where ambient noise levels exceed the "normally acceptable" noise level standard. Where ambient noise levels are at or below the "normally acceptable" noise level standard, noise level increases of 5 dBA DNL or more would be considered significant. The City's General Plan defines the "normally acceptable" outdoor noise level standard for the nearby residential land uses to be 60 dBA DNL. Based on the measurements made in the project vicinity, existing ambient levels at the residences along San Tomas Aquino Road exceed 60 dBA DNL, while levels away from San Tomas Aquino Road are below 60 dBA DNL.

Policies EC-1.3 and EC-1.6 regulate noise generated at new nonresidential land uses to 55 dBA DNL and to noise standards included in the City's Municipal Code, which limits noise levels at receiving residential uses to 55 dBA, at receiving commercial uses to 60 dBA, and at receiving industrial uses to 70 dBA. While exceeding the Municipal Code limits would not be considered a significant impact under CEQA, it is recommended that these limits be considered for design features in the proposed building.

Project Traffic Increase

The traffic study included peak-hour turning movements for existing traffic volumes and project trips at five intersections in the vicinity of the project site. The project trips were added to the existing volumes to estimate existing plus project traffic volumes. By comparing the existing plus project volumes to the existing volumes, the project's contribution to the overall noise level increase is calculated. Table 10 summarizes the noise level increases along each roadway segment included in the traffic report. As shown in Table 10, the project's contribution would not be measurable or detectable (i.e., 0 dBA DNL noise level increase). The project would not result in a permanent noise increase of 3 dBA DNL or more at noise-sensitive receptors in the project vicinity.

TABLE 10 Noise Level Increases at Receptors in the Project Vicinity

Roadway	Segment	Project Noise Level Increase Over Existing Conditions, dBA DNL
San Tomas Aquino Road	North of Campbell Avenue	0
	Campbell Avenue to Bucknall Road	0
	Bucknall Road to Rincon Avenue	0
	South of Rincon Avenue	0
Campbell Avenue	West of San Tomas Aquino Road	0
	East of San Tomas Aquino Road	0
Bucknall Road	West of Weston Drive	0
	Weston Drive to San Tomas Aquino Road	0
	East of San Tomas Aquino Road	0
Weston Drive	Bucknall Road to Rincon Avenue	0
	South of Rincon Avenue	0
Rincon Avenue	Weston Drive to San Tomas Aquino Road	0
	East of San Tomas Aquino Road	0

Mechanical Equipment

The site plan for the proposed multipurpose building shows a pad-mounted transformer within an electrical enclosure located along the eastern façade at the southeastern corner of the building, and a pad-mounted 4-ton condenser situated along the northern façade. Additionally, the roof of the multipurpose building would include solar panels along the southern portion of the roof and a mechanical enclosure containing yet unknown mechanical equipment on the northern portion of the roof. Equipment expected to be located within the mechanical enclosure would likely be heating, ventilation, and air conditioning (HVAC) units and possibly exhaust fans.

Transformers up to 1,000 kVA typically generate noise levels up to 64 dB, as measured at 1 meter (about 3 feet). Assuming the transformer runs continuously during daytime and nighttime hours, the day-night average noise level would be 70 dBA DNL at a distance of about 3 feet. Due to the location of the transformer, the north and west residences would be well shielded from the equipment noise by the multipurpose building and existing onsite school buildings. The electrical enclosure would partially shield the east and south residences. Assuming the electrical enclosure is taller than the transformer, a minimum attenuation for the east and south residences would be 5 dBA.

Typical HVAC condensing units for a building of this size generate noise levels of 56 to 66 dBA at a distance of 3 feet. For a school building of this size, multiple HVAC units would likely operate simultaneously at any given time. Assuming continuous operation of up to five units over 24 hours, hourly average noise levels would be up to 73 dBA L_{eq}. When operating at full speed, noise levels from exhaust fans would be up to 76 dBA at a distance of 5 feet and up to 65 dBA at 5 feet when operating at 35% speed; however, the exhaust fans in similar buildings almost always run at 20% speed, which would generate noise levels even lower. Assuming up to two exhaust fan outlets are located within the mechanical enclosure with up to five HVAC units operating continuously at any given time in a 24-hour period, an exhaust fan, the total hourly average noise levels generated would be 79 dBA L_{eq} for full fan speed and 69 dBA L_{eq} for 35% speed at a distance of 5 feet. Constant

operation over a 24-hour period would result in DNLs ranging from 75 to 86 dBA at 5 feet, depending on the fan speed.

A solid mechanical screen with metal panel siding would surround the mechanical enclosure. The mechanical screen would be approximately seven to 14 feet tall. Each of the surrounding residences would have a minimum attenuation of 12 dBA from the elevation of the rooftop equipment and the mechanical screen. Operational noise levels for all mechanical equipment at the multipurpose building are summarized in Table 11, assuming 12 dBA attenuation for the rooftop equipment and 5 dBA attenuation for the electrical enclosure.

Based on the estimated noise levels in Table 11, noise levels generated by mechanical equipment at the multipurpose building would not exceed the City's 55 dBA DNL threshold at receiving residences. For all existing noise-sensitive receptors, the noise level increase due to mechanical equipment at the multipurpose building would not be measurable or detectable at the surrounding receptors (i.e., 0 dBA DNL increase).

TABLE 11 Operational Noise Levels for Mechanical Equipment at the Multipurpose Building Propagated to the Nearest Surrounding Receptors

Receptor	Ground-Level Transformer		Rooftop Equipment		Combined		Noise Level Increase, dBA DNL
	Distance from Equipment, feet	Hourly L_{eq}, dBA	Distance from Equipment, feet	Hourly L_{eq}, dBA	Hourly L_{eq}, dBA	DNL, dBA	
West Residences	--[a]		250	33[b]	33	40	0
North Residences	--[a]		500	27[b]	27	34	0
East Residences	410	< 20[c]	500	27[b]	28	34	0
South Residences	95	29[c]	150	38[b]	38	45	0

[a] The west and north residences are well shielded from the ground-level transformer.

[b] A conservative attenuation of 12 dBA is applied to the rooftop mechanical equipment due to the elevation of the equipment and the seven-to-14-foot-tall mechanical screen.

[c] A conservative attenuation of 5 dBA is applied to the ground-level transformer due to the electrical enclosure, assuming the enclosure is taller than the transformer.

The classroom addition would include rooftop equipment located in the mechanical well. While specific equipment has not been identified, it is assumed that up to four HVAC units would be located in the mechanical well. Assuming the same type of HVAC units would be used for the classroom addition as the multipurpose building, four units operating continuously over a 24-hour period would result in hourly average noise levels ranging from 62 to 72 dBA L_{eq} at 3 feet, and a day-night average noise level up to 78 dBA DNL at 3 feet.

The mechanical well is surrounded by a solid mechanical screen tall enough to shield the rooftop equipment. A minimum attenuation of 10 dBA would apply to noise levels at all receiving residential property lines. Operational noise levels for all mechanical equipment at the classroom addition are summarized in Table 12, assuming 10 dBA attenuation for the rooftop equipment.

TABLE 12 Operational Noise Levels for Mechanical Equipment at the Classroom Addition Propagated to the Nearest Surrounding Receptors

Receptor	Distance from Center of Courts, feet	Hourly L_{eq}, dBA	DNL, dBA	Noise Level Increase, dBA DNL
West Residences	625	< 20[a]	22	0
North Residences	390	20[a]	26	0
East Residences	130	29[a]	36	0
South Residences	285	23[a]	29	0

[a] A conservative attenuation of 10 dBA is applied to the rooftop mechanical equipment due to the elevation of the equipment and the surrounding mechanical screen tall enough to shield the equipment.

Based on the estimated noise levels in Table 12, noise levels generated by mechanical equipment at the classroom addition would not exceed the City's 55 dBA DNL threshold at receiving residences. For all existing noise-sensitive receptors, the noise level increase due to mechanical equipment at the classroom addition would not be measurable or detectable at the surrounding receptors (i.e., 0 dBA DNL increase).

Outdoor Activities

To accommodate the new building along the southern boundary of the project site, the existing playground would be relocated approximately 150 feet north, where the existing basketball courts are located. Under project conditions, a track would run through the new playground location, as well. The new playground and track would be farther from surrounding off-site sensitive receptors. The new building would also provide additional shielding from the playground. Therefore, noise levels due to playground activities would be reduced with the project at the noise-sensitive receptors.

The basketball courts east of the 500 Building would not be affected by the proposed project. However, the extension to the 500 Building would provide receptors to the east of the project site with additional shielding for these courts. So, noise levels due to basketball court activities would be reduced at these receptors under project conditions.

The new multipurpose building features an outdoor seating area at the northwest corner of the building. Passive uses such as reading or socializing would be expected at this seating area. Due

to the location of the seating area, the proposed multipurpose building and the existing 300 Building would adequately shield all surrounding noise-sensitive receptors from the outdoor seating area. The minimal noise produced at the outdoor seating area would not be audible at the receiving property lines or contribute to ambient noise levels.

Total Combined Project-Generated Noise

The operational noise levels produced by the proposed project combined (i.e., traffic, mechanical equipment, outdoor activities) would not result in an increase of 3 dBA DNL or more at all existing noise-sensitive receptors in the project vicinity. Therefore, the proposed project would not result in a substantial increase over ambient noise levels in the project vicinity.

Operational noise levels due to mechanical equipment noise would not exceed the City's 55 dBA DNL threshold at the surrounding residences. This would be a less-than-significant impact.

Mitigation Measure 1b: None required.

Impact 2: Exposure to Excessive Groundborne Vibration. Construction vibration levels would not exceed the City's thresholds. The temporary construction vibration impact would be **less-than-significant**.

The construction of the project may generate perceptible vibration when heavy equipment or impact tools (e.g., jackhammers, hoe rams) are used. Construction activities would include demolition, site preparation work, foundation work, and new building framing and finishing. Pile driving equipment, which can cause excessive vibration, is not expected to be required for the proposed project.

According to Policy EC-2.3 of the City of San José General Plan, a vibration limit of 0.08 in/sec PPV shall be used to minimize the potential for cosmetic damage to sensitive historical structures, and a vibration limit of 0.20 in/sec PPV shall be used to minimize damage to buildings of normal conventional construction. The vibration limits contained in this policy are conservative and designed to provide the ultimate level of protection for existing buildings in San José. Vibration levels exceeding these thresholds would be capable of cosmetically damaging adjacent buildings. Cosmetic damage (also known as threshold damage) is defined as hairline cracking in plaster, the opening of old cracks, the loosening of paint, or the dislodging of loose objects. Minor damage is defined as hairline cracking in masonry or the loosening of plaster. Major structural damage is defined as wide cracking or the shifting of foundation or bearing walls.

The City's Historic Resource Inventory[5] shows the nearest historical structures are located at 5051 Moorpark Avenue and 870 Forest Ridge Drive, which are about 2 miles from the project site. At this distance, construction vibration levels would be below 0.01 in/sec PPV. Therefore, at this and all other historical buildings located farther from the project site, vibration levels due to construction activities at the site would not exceed 0.08 in/sec PPV. All buildings in the project vicinity would be subject to the 0.2 in/sec PPV threshold.

[5] www.sanjoseca.gov/your-government/departments/planning-building-code-enforcement/planning-division/historic-preservation/historic-resources-inventory

Table 13 presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet. Project construction activities, such as drilling, the use of jackhammers, rock drills, and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.), may generate substantial vibration in the immediate vicinity. Jackhammers typically generate vibration levels of 0.035 in/sec PPV, and drilling typically generates vibration levels of 0.09 in/sec PPV at a distance of 25 feet.

Vibration levels would vary depending on soil conditions, construction methods, and equipment used. Table 13 also summarizes the distances to the 0.2 in/sec PPV threshold for all conventional buildings.

TABLE 13 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)	Minimum Distance to Meet 0.2 in/sec PPV (feet)
Clam shovel drop		0.202	26
Hydromill (slurry wall)	in soil	0.008	2
	in rock	0.017	3
Vibratory Roller		0.210	27
Hoe Ram		0.089	13
Large bulldozer		0.089	13
Caisson drilling		0.089	13
Loaded trucks		0.076	11
Jackhammer		0.035	6
Small bulldozer		0.003	<1

Source: Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, Office of Planning and Environment, U.S. Department of Transportation, September 2018, as modified by Illingworth & Rodkin, Inc., September 2025.

Vibration levels are highest close to the source and then attenuate with increasing distance at the rate $\left({}^{D_{ref}}/_{D}\right)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet. While construction noise levels increase based on the cumulative equipment in use simultaneously, construction vibration levels would be dependent on the location of individual pieces of equipment. That is, equipment scattered throughout the site would not generate a collective vibration level, but a vibratory roller, for instance, operating near the project site boundary would generate the worst-case vibration levels for the receptor sharing that property line. Further, construction vibration impacts are assessed based on damage to buildings on receiving land uses, not receptors at the nearest property lines. Therefore, the distances used to propagate construction vibration levels are measured from the nearest project site boundary and propagated to the nearest receiving off-site structure, unlike construction noise.

Residences to the north, to the south, and to the east are 55 feet or more from the construction sites, which are greater distances than the screening distances shown in Table 13. Vibration levels at these residences would be below 0.09 in/sec PPV and would not exceed the City's 0.2 in/sec PPV threshold.

Two residences (2198 Weston Drive and 2190 Weston Drive) adjoin the Harker School property, which would be within 50 feet of the nearest construction site. The reconfiguration of the south

parking lot would be about 35 feet from these two residences. At 35 feet, vibration levels would be below 0.15 in/sec PPV, which would not exceed the City's 0.2 in/sec PPV threshold. Therefore, construction of the proposed project would result in a less-than-significant vibration impact.

Neither cosmetic, minor, or major damage would occur at buildings located 30 feet or more from the project site. At these locations, and in other surrounding areas where vibration would not be expected to cause cosmetic damage, vibration levels may still be perceptible. However, as with any type of construction, this would be anticipated and would not be considered significant, given the intermittent and short duration of the phases that have the highest potential of producing vibration (use of jackhammers and other high-power tools). By use of administrative controls, such as notifying neighbors of scheduled construction activities and scheduling construction activities with the highest potential to produce perceptible vibration during hours with the least potential to affect nearby businesses, perceptible vibration can be kept to a minimum.

Mitigation Measure 2: **None required.**

Impact 3: **Excessive Aircraft Noise.** The project site is located more than 5.6 miles from San José Mineta International Airport, and the noise environment attributable to aircraft is considered normally acceptable under the Santa Clara County ALUC noise compatibility policies. This is a **less-than-significant** impact.

The proposed project is located more than 5.6 miles from the San José Mineta International Airport. According to the City's Airport Master Plan Environmental Impact Report,[6] the project site lies outside the 60 dBA CNEL contour line (see Figure 2). According to Policy EC-1.11 of the City's General Plan, the required safe and compatible threshold for exterior noise levels due to aircraft would be at or below 65 dBA CNEL. Therefore, the proposed project would be compatible with the City's exterior noise standards for aircraft noise.

Assuming standard construction materials for aircraft noise below 60 dBA CNEL, the future interior noise levels resulting from aircraft would be below 45 dBA CNEL. Therefore, future interior noise at the proposed building would be compatible with the proposed land use. This would be a less-than-significant impact.

Mitigation Measure 3: **None required.**

[6] David J. Powers & Associates, Inc., Integrated Final Environmental Impact Report, Amendment to Norman Y. Mineta San Jose International Airport Master Plan, April 2020.

FIGURE 2 2037 CNEL Noise Contours for SJIA Relative to Project Site

Figure 5
Scenario 2: With Project 2037 Noise Contour Map

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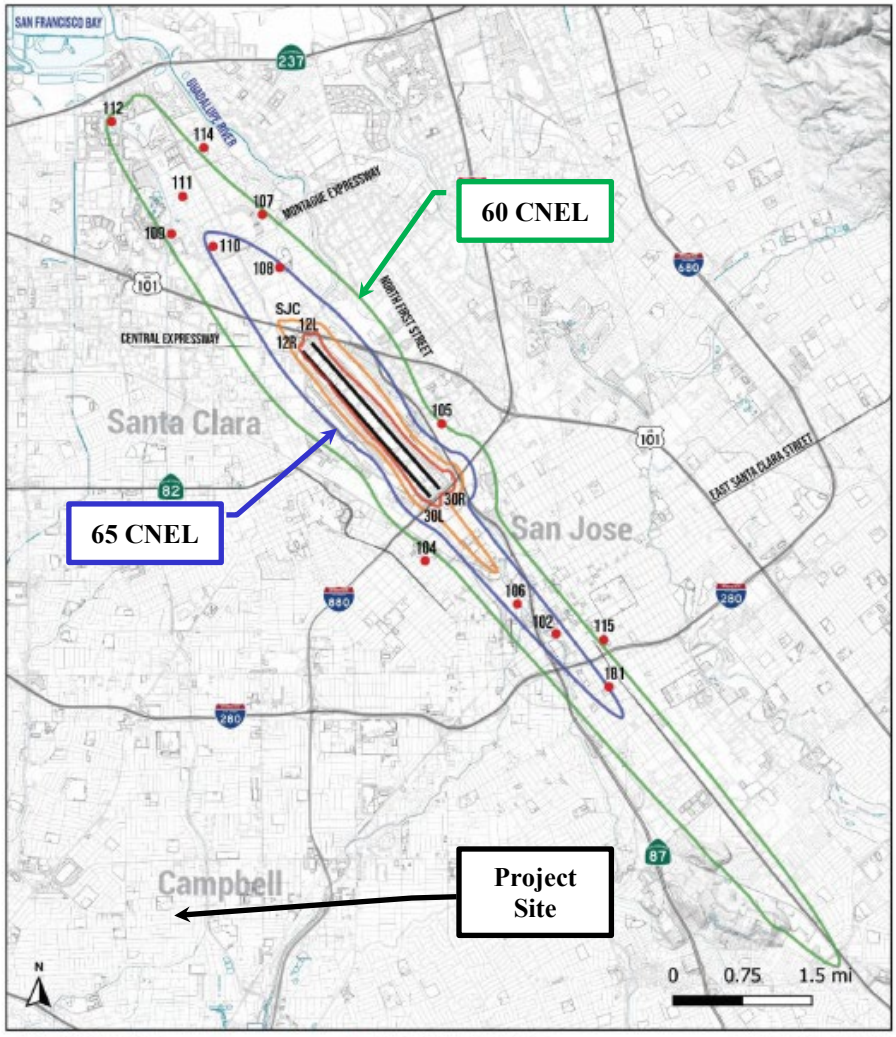

NORMAN Y. MINETA SAN JOSE INTERNATIONAL AIRPORT

Noise Monitoring Station
101 Site ID
Runway
75 dBA and Greater CNEL Contour
70 dBA and Greater CNEL Contour
65 dBA and Greater CNEL Contour
60 dBA and Greater CNEL Contour

Figure 5 Scenario 2: With Project 2037 Noise Contour Map

Source: BridgeNet International 2019

Cumulative Impacts

Cumulative noise impacts could result from either cumulative traffic noise increases under future conditions or temporary construction noise from cumulative construction projects.

A significant cumulative traffic noise increase would occur if two criteria are met: 1) if the cumulative traffic noise level increase was 3 dBA DNL or greater for future levels exceeding 60 dBA DNL or was 5 dBA DNL or greater for future levels at or below 60 dBA DNL; and 2) if the project would make a "cumulatively considerable" contribution to the overall traffic noise increase. A "cumulatively considerable" contribution would be defined as an increase of 1 dBA DNL or more attributable solely to the proposed project.

The traffic study did not include future cumulative traffic volumes. The total net daily trips generated by the proposed project would be 79, with peak hour project trips of 38 net trips during the peak AM hour. These project-generated trips would not result in a significant noise increase when compared to existing volumes. It is assumed that these peak-hour trips would be insignificant under future cumulative conditions, as well. Therefore, the project is not expected to result in a significant cumulative traffic noise increase. This is a less-than-significant impact.

From the City's website,[7] the nearest planned or approved development projects would be located at 1312 El Paseo De Saratoga and 1177 Saratoga Avenue, which are more than 4,000 feet from the proposed project site. No major planned or approved projects are located within 1,000 feet of the project site. There are no planned or approved development projects in the vicinity of the project site, and cumulative construction noise impacts are not expected.

[7] https://gis.sanjoseca.gov/maps/devprojects/

APPENDIX A

FIGURE A1 Daily Trend in Noise Levels for LT-1, Wednesday, May 21, 2025

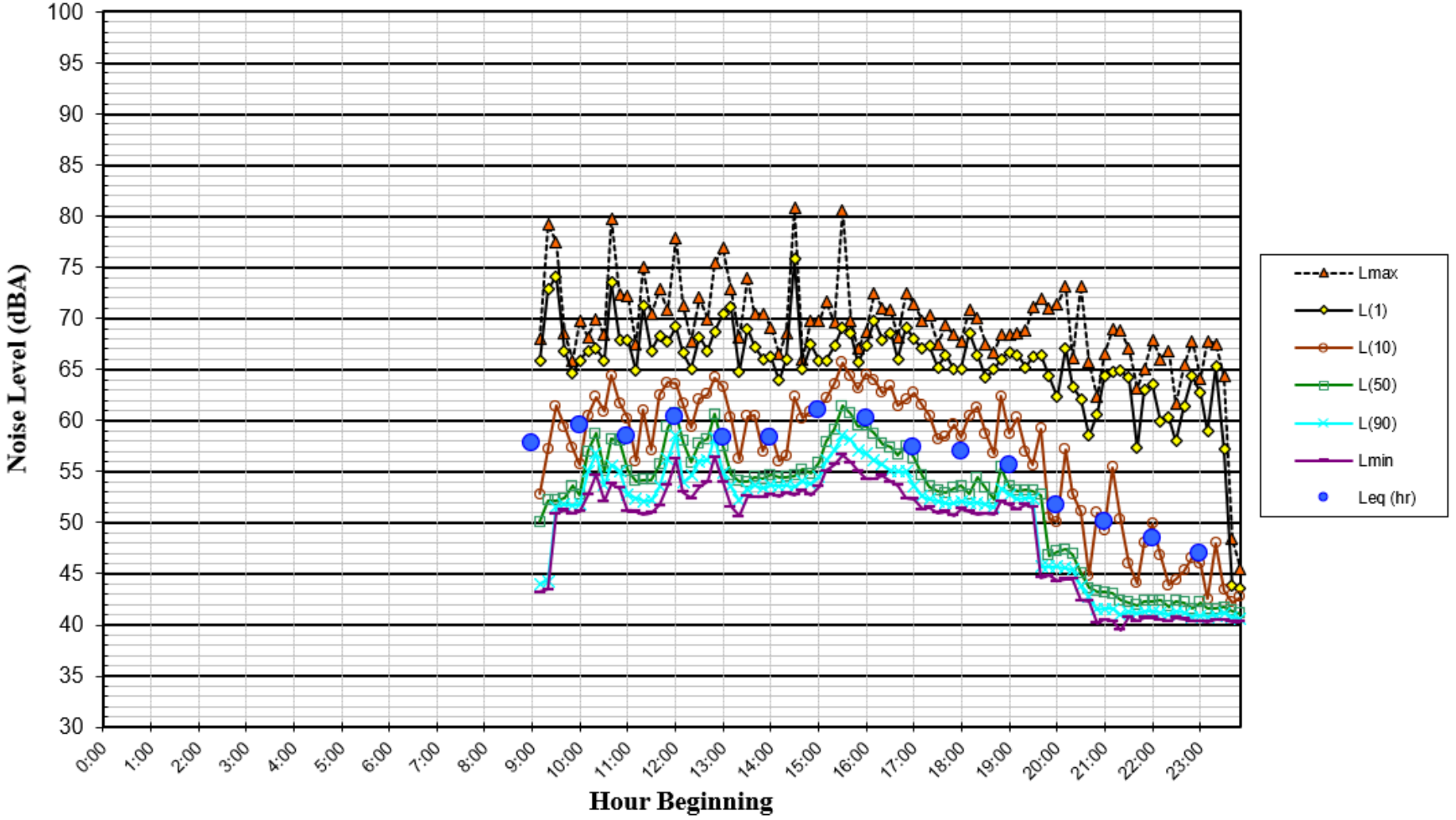

FIGURE A2 Daily Trend in Noise Levels for LT-1, Thursday, May 22, 2025

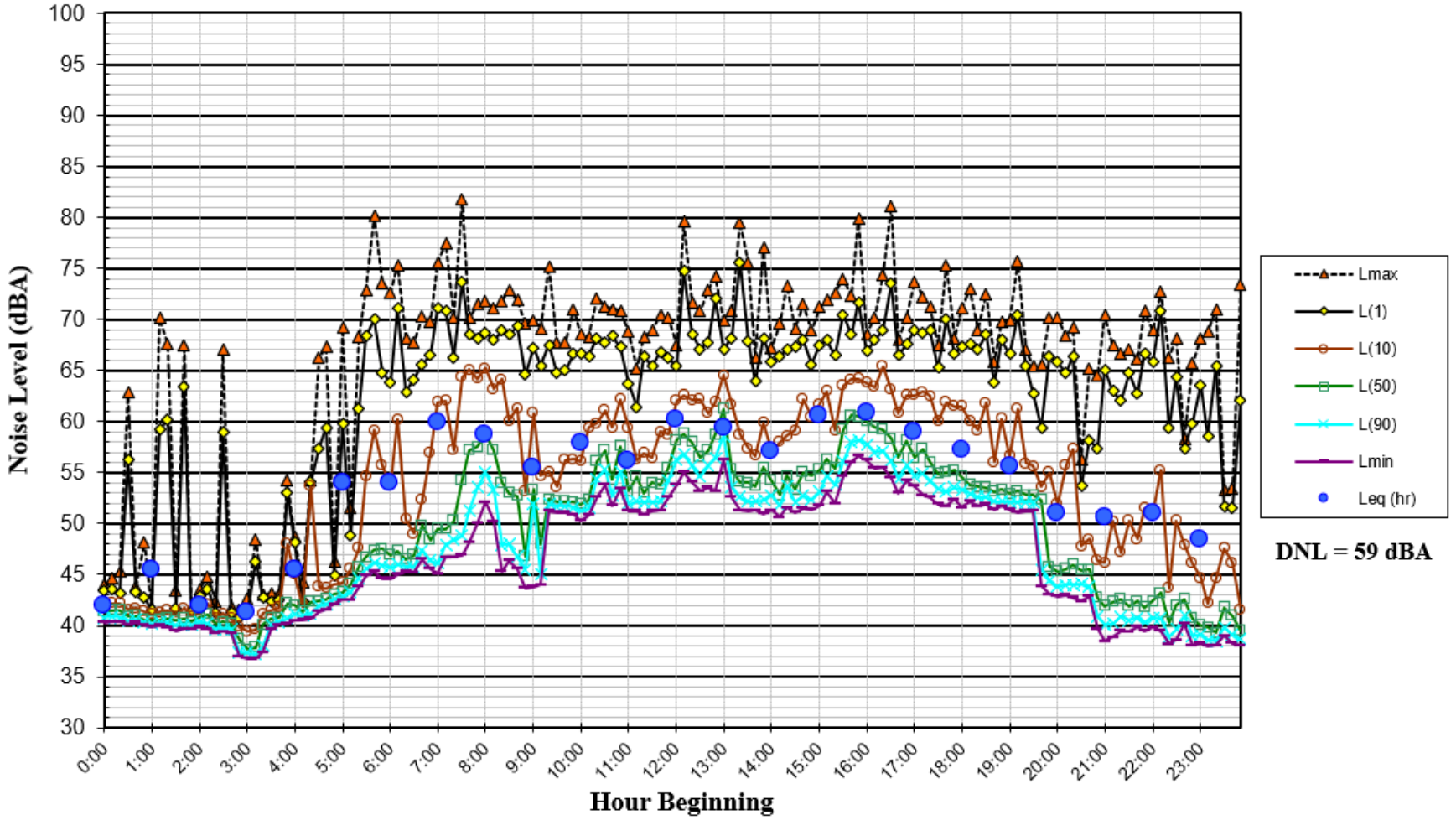

FIGURE A3 Daily Trend in Noise Levels for LT-1, Friday, May 23, 2025

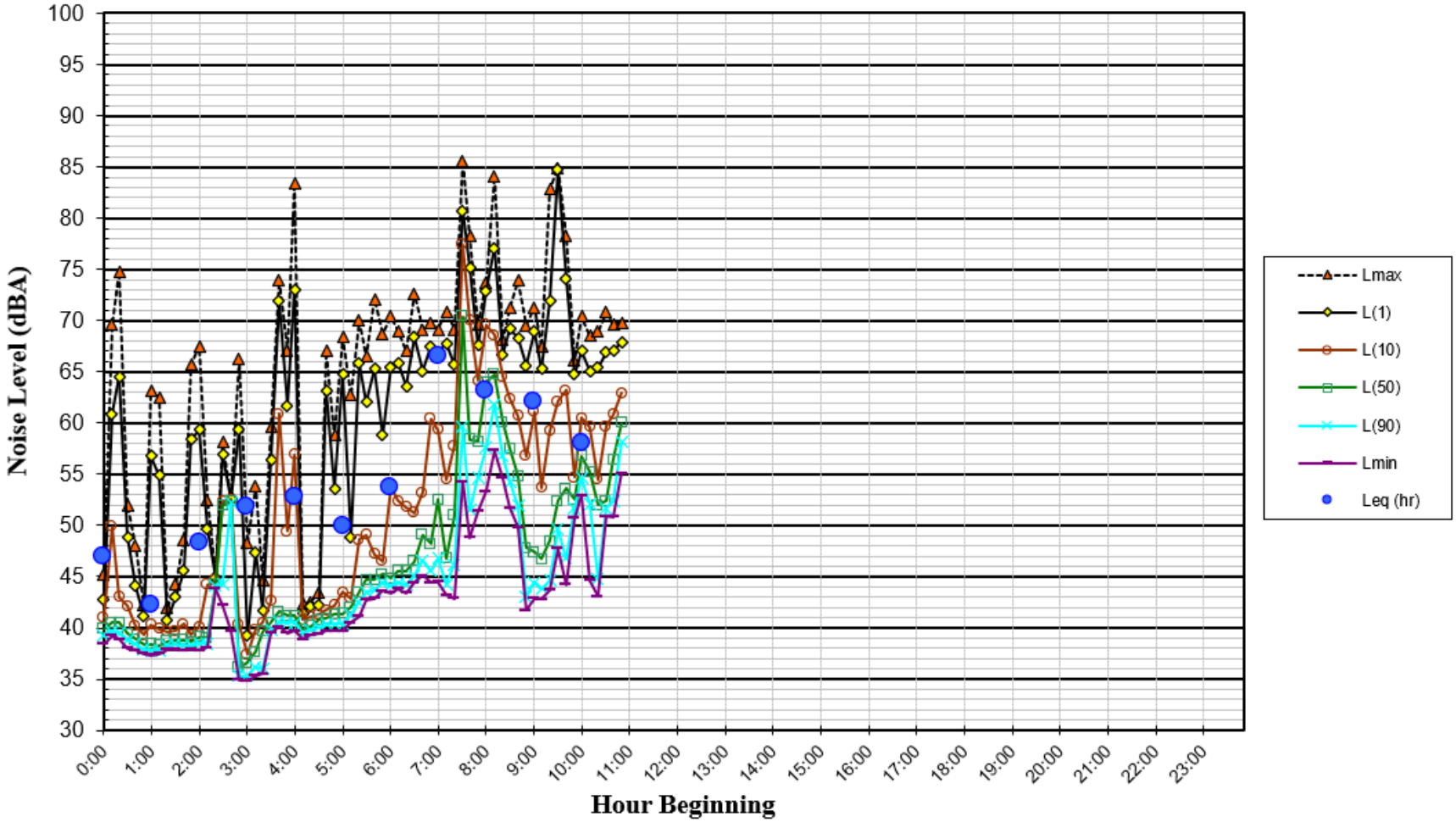

FIGURE A4 Daily Trend in Noise Levels for LT-2, Wednesday, May 21, 2025

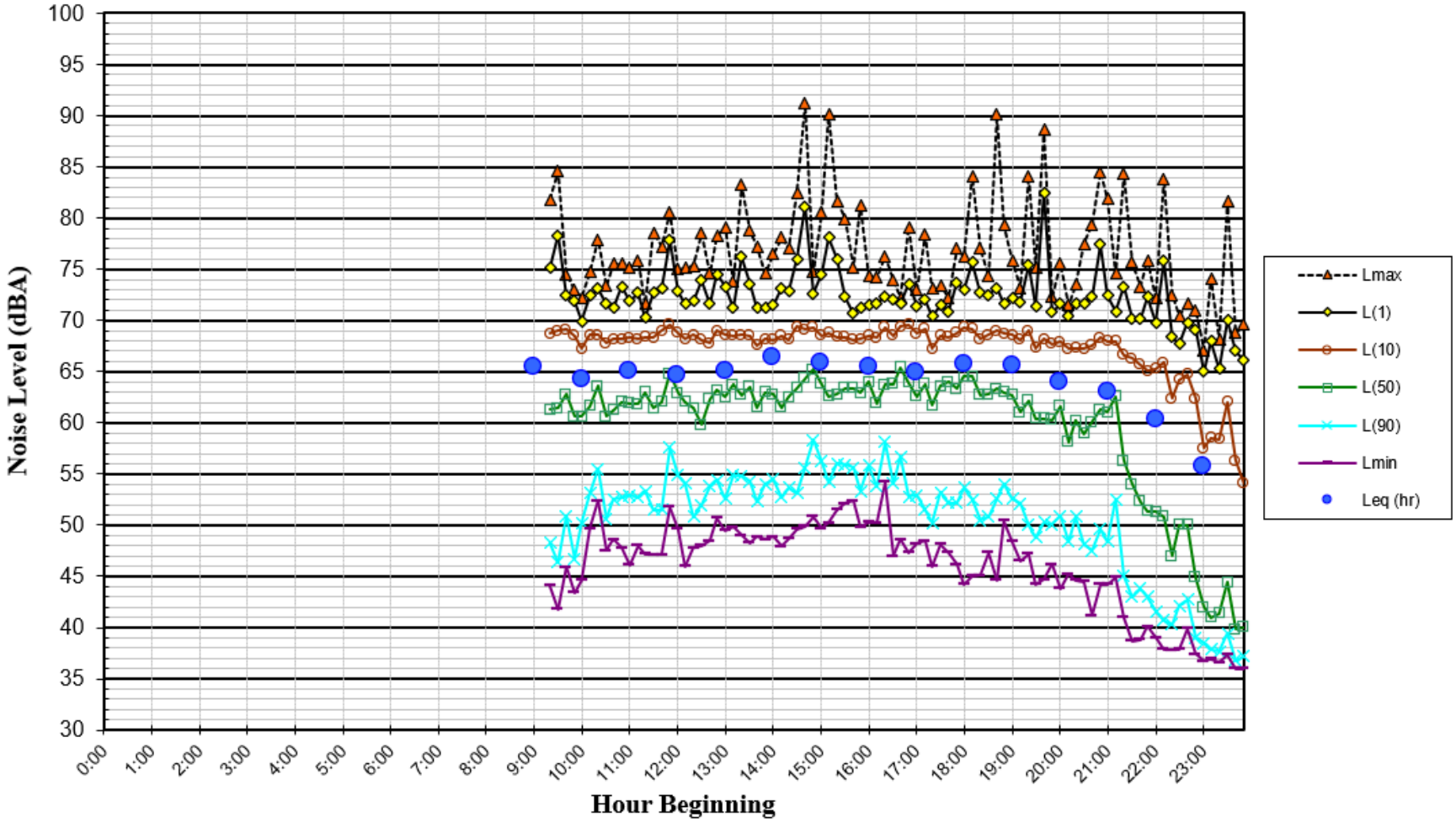

FIGURE A5 Daily Trend in Noise Levels for LT-2, Thursday, May 22, 2025

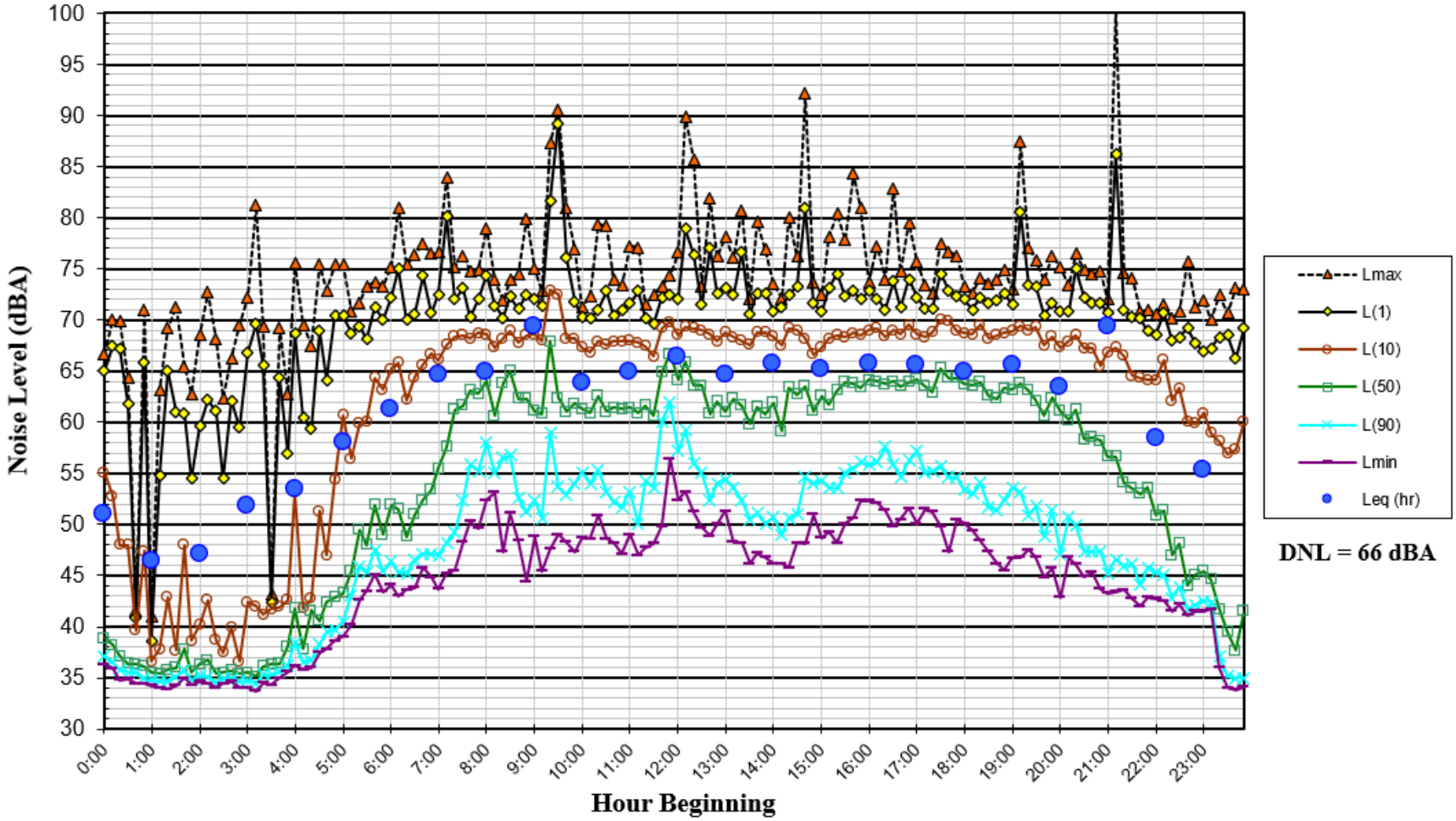

FIGURE A6 Daily Trend in Noise Levels for LT-2, Friday, May 23, 2025