435 EAST 3RD AVENUE MIXED-USE PROJECT NOISE AND VIBRATION ASSESSMENT

San Mateo, California

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INTRODUCTION

A five-story mixed-use project is proposed at 435 East 3rd Avenue in San Mateo, California. The proposed project would include office uses on floors one through four and five residential units on level five. Construction of the project would include demolition of the existing on-site buildings.

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 three 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; 2) the Plan Consistency Analysis section discusses noise and land use compatibility utilizing policies in the City's General Plan; and, 3) 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 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 which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which 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 ten-fold 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 of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

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 about 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 upon 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 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) 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 L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} 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 newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57 to 62 dBA L_{dn} with open windows and 65 to 70 dBA L_{dn} if the windows are closed. Levels of 55 to 60 dBA are common along collector streets and secondary arterials, while 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 for 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 L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 50 dBA L_{dn}. At a L_{dn} of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the L_{dn} 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 L_{dn} of 60 to 70 dBA. Between a L_{dn} of 70 to 80 dBA, each decibel increase increases by about 3 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the L_{dn} 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.

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 to 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 sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average 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.

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.

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 to 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, that 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 to 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 vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage.

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.

Regulatory Background – Noise

This section describes the relevant guidelines, policies, and standards established by State Agencies and the City of San Mateo. The State CEQA Guidelines, Appendix G, are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. A summary of the applicable regulatory criteria is provided below.

State of California

State CEQA Guidelines. The California Environmental Quality Act (CEQA) contains guidelines to evaluate the significance of 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.

2019 California Building Code, Title 24, Part 2. The current version of the California Building Code (CBC) requires interior noise levels in multi-family residential units attributable to exterior environmental noise sources to be limited to a level not exceeding 45 dBA DNL/CNEL in any habitable room.

2019 California Building Cal Green Code. The State of California established exterior sound transmission control standards for new non-residential buildings as set forth in the 2019 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.

<u>City of San Mateo</u>

City of San Mateo General Plan: The Noise Element of the City of San Mateo General Plan sets forth goals and policies to control environmental noise and protect citizens from excessive noise exposure. The goals and policies relevant to this project are summarized below:

GOAL 1: Protect "noise sensitive" land uses from excessive noise levels.

POLICIES:

N 1.1: Interior Noise Level Standard. Require submittal of an acoustical analysis and interior noise insulation for all "noise sensitive" land uses listed in Table N-1 that have an exterior noise level of 60 dB (L_{dn}) or above, as shown on Figure N-1. The maximum interior noise level shall not exceed 45 dB (L_{dn}) in any habitable rooms.

N 1.2: Exterior Noise Level Standard. Require an acoustical analysis for new parks, play areas, and multi-family common open space (intended for the use and the enjoyment of residents) that have an exterior noise level of 60 dB (L_{dn}) or above, as shown on Figure N-1. Require an acoustical analysis that uses peak hour L_{eq} for new parks and play areas. Require a feasibility analysis of noise reduction measures for public parks and play areas. Incorporate necessary mitigation measures into residential project design to minimize common open space noise levels. Maximum exterior noise should not exceed 67 dB (L_{dn}) for residential uses and should not exceed 65 dB (L_{eq}) during the noisiest hour for public park uses.

GOAL 2: Minimize unnecessary, annoying and unhealthful noise.

POLICIES:

N 2.1: Noise Ordinance. Continue implementation and enforcement of City's existing noise control ordinance: (a) which prohibits noise that is annoying or injurious to neighbors of normal sensitivity, making such activity a public nuisance, and (b) restricts the hours of construction to minimize noise impact.

N 2.2: Minimize Noise Impact. Protect all "noise-sensitive" land uses listed in Tables N-1 and N-2 from adverse impacts caused by noise generated on-site by new developments. Incorporate necessary mitigation measures into development design to minimize noise impacts. Prohibit long-term exposure increases of 3 dB (L_{dn}) or greater at the common property line, excluding existing ambient noise levels.

N 2.3: Minimize Commercial Noise. Protect land uses other than those listed as "noise sensitive" in Table N-1 from adverse impacts caused by the on-site noise generated by new developments. Incorporate necessary mitigation measures into development design to minimize noise impacts. Prohibit new uses that generate noise levels of 65 dB (L_{dn}) or above at the property line, excluding existing ambient noise levels.

N 2.4: Traffic Noise. Recognize projected increases in ambient noise levels resulting from traffic increases. Promote the installation of noise barriers along highways where "noise-sensitive" land uses listed in Table N-1 are adversely impacted by unacceptable noise levels [60 dB (L_{dn}) or above]. Require adequate noise mitigation to be incorporated into the widening of SR 92 and US 101. Accept noise increases on El Camino Real at existing development and require new multi-family development to provide common open space having a maximum exterior noise level of 67 dB (L_{dn}).

TABLE N-1
NOISE SENSITIVE LAND-USE COMPATIBILITY GUIDELINES FOR COMMUNITY NOISE ENVIRONMENTS[1]
Day-Night Average Sound Level (L_{dn}), Decibels

Land-Use Category	Normally Acceptable[2]	Conditionally Acceptable[3]	Normally Unacceptable[4]
Single-Family Residential	50 to 59	60 to 70	Greater than 70
Multi-Family Residential	50 to 59	60 to 70	Greater than 70
Hotels, Motels, and Other Lodging Houses	50 to 59	60 to 70	Greater than 70
Long-Term Care Facilities	50 to 59	60 to 70	Greater than 70
Hospitals	50 to 59	60 to 70	Greater than 70
Schools	50 to 59	60 to 70	Greater than 70
Multi-Family Common Open Space Intended for the Use and Enjoyment of Residents	50 to 67	--	Greater than 67

TABLE N-2
NOISE GUIDELINES FOR OUTDOOR ACTIVITIES
Average Sound Level (L_{eq}), Decibels

Land Use Category	Normally Acceptable[2]	Conditionally Acceptable[3]	Normally Unacceptable[4]
Parks, Playgrounds	50 to 65*	--	Greater than 65*

[1] These guidelines are derived from the California Department of Health Services, Guidelines for the Preparation and Content of the Noise Element of the General Plan, 2003. The State Guidelines have been modified to reflect San Mateo's preference for distinct noise compatibility categories and to better reflect local land-use and noise conditions. It is intended that these guidelines be utilized to evaluate the suitability of land-use changes only and not to determine cumulative noise impacts. Land uses other than those classified as being "noise sensitive" are exempt from these compatibility guidelines.

[2] 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.

[3] Conditionally Acceptable – New construction should be undertaken only after a detailed analysis of the noise reduction requirement is conducted and needed noise insulation features included in the design.

[4] Normally Unacceptable – New construction 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.

* Average Sound Level (L_{eq}) for peak hour.

City of San Mateo Municipal Code: The Noise Regulations of the San Mateo Municipal Code, Chapter 7.30 are set forth to protect the inhabitants of the City against all forms of nuisances.

Section 7.30.040 Maximum Permissible Sound Levels. It is unlawful for any person to operate or cause to be operated any source of sound at any location within the city or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured on any other property to exceed:

(1) The noise level standard for that property as specified in Table 7.30.040 for a cumulative period of more than thirty minutes in any hour;

(2) The noise level standard plus five dB for a cumulative period of more than fifteen minutes in any hour;

(3) The noise level standard plus ten dB for a cumulative period of more than five minutes in any hour;

(4) The noise level standard plus fifteen dB for a cumulative period of more than one minute in any hour; or

(5) The noise level standard or the maximum measured ambient level, plus twenty dB for any period of time.

If the measured ambient level for any area is higher than the standard set in Table 7.30.040, then the ambient shall be the base noise level standard for purposes of this section. In such cases, the noise levels for purposes of subsections (2) through (5) of this section shall be increased in five dB increments above the ambient.

Table 7.30.040: Noise Level Standards

Noise Zone	Time Period	Noise Level, dBA
Noise Zone 1	10 p.m.--7 a.m.	50
	7 a.m.--10 p.m.	60
Noise Zone 2	10 p.m.--7 a.m.	55
	7 a.m.--10 p.m.	60
Noise Zone 3	10 p.m.--7 a.m.	60
	7 a.m.--10 p.m.	65
Noise Zone 4	Anytime	70

Section 7.30.060 Special Provisions. Construction, alteration, repair, or land development activities authorized by a valid city permit shall be allowed at the following times:

- Weekdays: between 7:00 a.m. and 7:00 p.m.
- Saturdays: between 9:00 a.m. and 5:00 p.m.
- Sundays and Holidays: between 12:00 p.m. and 4:00 p.m.
- Or at other such hours as authorized or restricted by the permit, so long as they meet the following conditions:

1. No individual piece of equipment shall produce a noise level exceeding 90 dBA at a distance of 25 feet. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to 25 feet as possible.
2. The noise level outside of any point outside the property plane of the project shall not exceed 90 dBA.

Existing Noise Environment

The project site is located at the northwestern corner of the East 3rd Avenue/South Claremont Street intersection in San Mateo, California. Adjoining the project site to the west are existing office buildings and adjoining the site to the north is a parking area for the nearby roofing company. An existing residence is located approximately 50 feet north of the project site boundary. Opposite South Claremont Street to the east are existing commercial buildings, and opposite East 3rd Avenue to the south is an existing commercial building and a future office/residential building currently under construction.

The existing noise environment at the site results primarily from local vehicular traffic along East 3rd Avenue and South Claremont Street. Distant U.S. Highway 101 (Highway 101) traffic noise, train noise from the nearby tracks one block to the west, and aircraft associated with the San Francisco International Airport also contribute to the noise environment.

A noise monitoring survey, which included two long-term (LT-1 and LT-2) and two short-term (ST-1 and ST-2) noise measurements, was performed at the site between Tuesday May 17, 2022 and Thursday May 19, 2022. All measurement locations are shown in Figure 1.

Long-term noise measurement LT-1 was made approximately 50 feet north of the centerline of East 3rd Avenue. Hourly average noise levels at LT-1 typically ranged from 66 to 73 dBA L_{eq} during the day and from 52 to 70 dBA L_{eq} at night. The day-night average noise level (L_{dn}) for the 24-hour period occurring on Wednesday May 18, 2022 was 73 dBA L_{dn}. The daily trends in noise levels at LT-1 are shown in Figures A1 through A3 in the Appendix of this report.

Noise measurement LT-2 was made approximately 35 feet west of the centerline of South Claremont Street. Hourly average noise levels at LT-2 typically ranged from 61 to 67 dBA L_{eq} during the day and from 49 to 66 dBA L_{eq} at night. The day-night average noise level (L_{dn}) for the 24-hour period occurring on Wednesday May 18, 2022 was 67 dBA L_{dn}. The daily trends in noise levels at LT-2 are shown in Appendix Figures A4 through A6.

Two short-term noise measurements were made on Tuesday May 17, 2022 in 10-minute intervals between 11:00 a.m. and 11:30 a.m. ST-1 was made in the northwestern corner of the project site. During this measurement, passenger cars typically generated noise levels ranging from 50 to 56 dBA, and heavy trucks along the surrounding roadways typically generated noise levels ranging from 56 to 60 dBA. A loud passenger car produced noise levels up to 77 dBA. Jets during the ST-1 measurement generated noise levels ranging from 52 to 54 dBA, and a helicopter generated noise levels of 72 dBA. While a train was not observed during the ST-1 measurement, a train did pass by the site following the measurement, with noise levels up to 80 dBA at ST-1. The 10-minute average noise level at ST-1 was 57 dBA $L_{eq(10\text{-}min)}$.

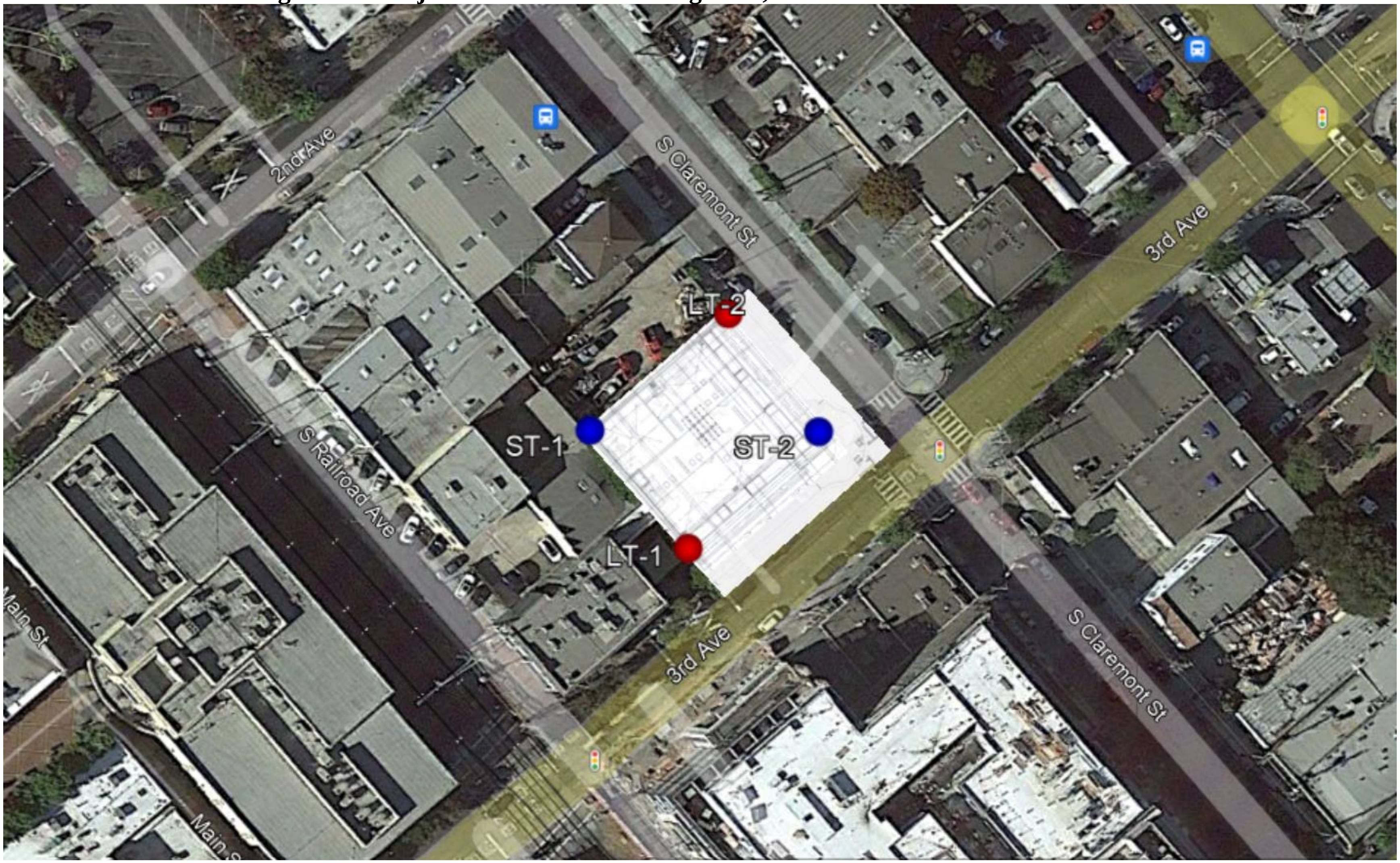
ST-2 was made in the southeastern corner of the project site, approximately 65 feet from the center of the East 3rd Avenue/South Claremont Street intersection. During this measurement, passenger cars typically generated noise levels ranging from 68 to 70 dBA, and heavy trucks along the surrounding roadways typically generated noise levels ranging from 74 to 80 dBA. Loud trucks passing the site proposed noise levels of 78 to 85 dBA. Jets during the ST-2 measurement generated noise levels up to 62 dBA, and a general aviation aircraft generated noise levels of 68 dBA. The 10-minute average noise level at ST-2 was 65 dBA $L_{eq(10\text{-}min)}$.

Table 4 summarizes the results of the 10-minute noise measurements made at ST-1 and ST-2.

TABLE 4 Summary of Short-Term Noise Measurement Data (dBA)

Noise Measurement Location (Date, Time)	L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	$L_{eq(10)}$
ST-1: northwestern corner of the project site (5/17/2022, 11:00-11:10 a.m.)	77	69	58	50	46	57
ST-2: ~65 feet northwest of the intersection of East 3rd Avenue/South Claremont Street (5/17/2022, 11:20-11:30 a.m.)	85	74	68	60	53	65

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



Source: Google Earth, 2022.

PLAN CONSISTENCY ANALYSIS

Noise and Land Use Compatibility

The City of San Mateo General Plan, which is presented in detail in the Regulatory Background section of this report, includes exterior and interior noise thresholds for residential uses. Note, the City's exterior noise thresholds apply only to common use areas and not private balconies, porches, or patios. Additionally, the State of California establishes acceptable interior noise limits within residential and non-residential land uses. The thresholds that apply to the proposed project are summarized below:

- Policy N 1.2 and Table N-1 of the City's General Plan identifies exterior noise thresholds of 59 dBA L_{dn} or below as "normally acceptable" for multi-family residential uses; however, the policy further states that common open spaces at multi-family residential buildings intended for the use and enjoyment of residents would be limited to a maximum allowable noise level of 67 dBA L_{dn}.

- The City and State's acceptable interior noise level standard is 45 dBA L_{dn} or less for the proposed residential land uses.

- The Cal Green Code standards specify an interior noise environment attributable to exterior sources not to exceed an hourly equivalent noise level ($L_{eq\ (1\text{-}hr)}$) of 50 dBA in occupied areas of nonresidential uses during any hour of operation.

The future noise environment at the site would continue to result primarily from vehicular traffic along nearby roadways. The traffic study completed for the proposed project included average daily traffic (ADT) volumes along the roadways surrounding the project site. Comparing the ADT volumes for the cumulative plus project scenario to the existing ADT volumes, the traffic noise level increase experienced at the project site would be up to 1 dBA L_{dn} above existing conditions with the inclusion of the proposed project.

Future Exterior Noise Environment

The proposed project includes office uses on levels one through four, with an office balcony on level four that stretches along the eastern and southern building façades. While the City does not define exterior noise thresholds for office uses, other cities in the Bay Area typically limit exterior noise levels at these types of uses to 70 dBA L_{dn}.

Five residential units are located on level five, and each unit would have a private balcony. However, these private balconies would not be subject to exterior noise thresholds in the City's General Plan. The thresholds included in the general plan are intended for common use outdoor areas at multi-family land uses. Therefore, the office balcony would be the only common use space proposed at the project site.

The office balcony on level four would stretch along the eastern and southern building façades. The center of the balcony is set back approximately 45 feet from the centerline of South Claremont

Street and approximately 40 feet from the centerline of East 3rd Avenue. At these setbacks, the future exterior noise thresholds at the center of the residential balcony would range from 67 dBA L_{dn} along South Claremont Street to 75 dBA L_{dn} along East 3rd Avenue. While future noise levels at the balcony would be below 70 dBA L_{dn} along the eastern building façade, future noise levels would exceed 70 dBA L_{dn} along the southern building façade. However, due to the open nature of the balcony, any measure implemented to reduce noise levels, such as a sound wall or specially-designed fence, the aesthetic appeal at the balcony would be impacted. Since noise levels would fall within the typical range of conditionally acceptable noise levels for a common use exterior area, these common use areas would be considered conditionally compatible with the future noise environment.

Future Interior Noise Environment

<u>Residential Land Uses</u>

Standard residential construction provides approximately 15 dBA of exterior-to-interior noise reduction, assuming the windows are partially open for ventilation. Standard construction with the windows closed provides approximately 20 to 25 dBA of noise reduction in interior spaces. Where exterior noise levels range from 60 to 65 dBA L_{dn}, the inclusion of adequate forced-air mechanical ventilation is often the method selected to reduce interior noise levels to acceptable levels by closing the windows to control noise. Where noise levels exceed 65 dBA L_{dn}, forced-air mechanical ventilation systems and sound-rated construction methods are normally required. Such methods or materials may include a combination of smaller window and door sizes as a percentage of the total building façade facing the noise source, sound-rated windows and doors, sound rated exterior wall assemblies, and mechanical ventilation so windows may be kept closed at the occupant's discretion.

Residential units are located on level five of the proposed building. Units located along the eastern façade nearest South Claremont Street would be set back from the centerline of the roadway by approximately 60 feet. At this distance, the units facing South Claremont Street would be exposed to future exterior noise levels up to 66 dBA L_{dn}. Assuming windows to be partially open, future interior noise levels in these units would be up to 51 dBA L_{dn}.

Units along the southern façade would be set back approximately 55 feet from the centerline of East 3rd Avenue. At this distance, the units facing East 3rd Avenue would be exposed to future exterior noise levels would up to 73 dBA L_{dn}. Assuming windows to be partially open, future interior noise levels in these units would be up to 58 dBA L_{dn}.

To meet the City and State's interior noise requirement of 45 dBA L_{dn}, implementation of noise insulation features would be required.

<u>Office Land Uses</u>

Commercial offices on levels one through four would have setbacks from the centerlines of the surrounding roadways of approximately 40 to 50 feet from South Claremont Street and approximately 35 to 45 feet from East 3rd Avenue. At these distances, daytime hourly average noise levels would range from 67 to 76 dBA L_{eq}, with day-night average noise levels up to 75 dBA L_{dn}.

Standard construction materials for commercial uses would provide about 25 dBA of noise reduction in interior spaces. The inclusion of adequate forced-air mechanical ventilation systems is normally required so that windows may be kept closed at the occupant's discretion and would provide an additional 5 dBA reduction. The standard construction materials in combination with forced-air mechanical ventilation would satisfy the daytime threshold of 50 dBA $L_{eq(1\text{-}hr)}$

Spaces where lower noise levels would be desired, such as private offices and conference rooms, may benefit from additional noise control in order to meet a lower, more desirable interior noise level. Additional noise control could be accomplished by selecting higher sound-rated windows (STC 34 or greater along exterior façades).

Noise Insulation Features to Reduce Future Interior Noise Levels

The following noise insulation features shall be incorporated into the proposed project to reduce interior noise levels to 45 dBA L_{dn} or less at residential interiors:

- Provide a suitable form of forced-air mechanical ventilation, as determined by the local building official, for all residential units on the project site, so that windows can be kept closed at the occupant's discretion to control interior noise and achieve the interior noise standards.

- Preliminary calculations indicate that residential units facing South Claremont Street would require windows and doors with a minimum rating of 30 STC with adequate forced-air mechanical ventilation to meet the interior noise threshold of 45 dBA L_{dn}.

- Units facing East 3rd Avenue would require windows and doors with a minimum rating of 33 to 34 STC with adequate forced-air mechanical ventilation to meet the interior noise threshold of 45 dBA L_{dn}.

The implementation of these noise insulation features would reduce interior noise levels to 45 dBA L_{dn} or less at residential uses.

Conditions of Approval

Interior Noise Standard for Residential Development. The project applicant shall prepare final design plans that incorporate building design and acoustical treatments to ensure compliance with State Building Codes and City noise standards. A project-specific acoustical analysis shall be prepared to ensure that the design incorporates controls to reduce interior noise levels to 45 dBA L_{dn} or lower within the residential unit and to 50 dBA $L_{eq(1\text{-}hr)}$ or lower within nonresidential interiors. The project applicant shall conform with any special building construction techniques requested by the City's Building Department, which may include sound-rated windows and doors, sound-rated wall constructions, and acoustical caulking.

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 significant noise impact would be identified if the project would generate a substantial temporary or permanent noise level increase over ambient noise levels at existing noise-sensitive receptors surrounding the project site and that would exceed applicable noise standards presented in the General Plan or Municipal Code at existing noise-sensitive receptors surrounding the project site.
    - A significant noise impact would be identified if construction-related noise would exceed the applicable noise standards presented in the San Mateo Municipal Code.
    - A significant permanent noise level increase would occur if the project would result in a 3 dBA L_{dn} or greater.
    - A significant noise impact would be identified if the project would expose persons to or generate noise levels that would exceed applicable noise standards presented in the General Plan or Municipal Code.
- A significant impact would be identified if the construction of the project would generate excessive vibration levels surrounding receptors. Groundborne vibration levels exceeding 0.3 in/sec PPV would have the potential to result in cosmetic damage to normal buildings (see Table 3).
- A significant noise impact would be identified if the project would expose people residing or working in the project area to excessive aircraft noise levels.

Impact 1a: **Temporary Construction Noise.** Existing and future noise-sensitive land uses would potentially be exposed to a temporary increase in noise levels excess of the City's construction noise limits. **This is a potentially significant impact.**

The project applicant proposes to demolish the existing buildings on the project site. The construction schedule assumed that the earliest possible start date would be early May 2022, with an estimated completion date of end of July 2023. Construction phases would include demolition, site preparation, trenching, building construction, architectural coating, and paving. During each phase of construction, there would be a different mix of equipment operating, and noise levels would vary by phase and vary within phases, based on the amount of equipment in operation and the location at which the equipment is operating.

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 of time.

Section 7.30.060 of the City of San Mateo's Municipal Code limits construction to weekdays between 7:00 a.m. and 7:00 p.m., Saturdays between 9:00 a.m. and 5:00 p.m., and Sundays and holidays between 12:00 p.m. and 4:00 p.m. Additionally, the City specifies that no individual piece of equipment shall produce a noise level exceeding 90 dBA at a distance of 25 feet and that the noise level outside any point outside the property plane of the project shall not exceed 90 dBA.

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 generates 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 72 to 88 dBA L_{eq} for mixed-use 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 result in lower construction noise levels at distant receptors.

Equipment expected to be used in each construction phase are 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 phase.

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 and 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.

Noise levels calculated at 50 feet in Table 7 were propagated from the geometrical center of the project site to the receiving property lines of existing noise-sensitive receptors surrounding the site. The construction noise levels at the receiving property lines are summarized in Table 8. Noise levels in Table 8 do not assume reductions due to intervening buildings or existing barriers.

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.

TABLE 7 Estimated Construction Noise Levels at a Distance of 50 feet

Phase of Construction	Total Workdays	Construction Equipment (Quantity)	Estimated Construction Noise Level at 50 feet
Demolition	20 days	Concrete/Industrial Saw (1)[a] Excavator (1) Rubber-Tired Dozer (1) Tractor/Loader/Backhoe (1) [a]	85 dBA L_{eq}
Site Preparation	5 days	Grader (1)[a]	81 dBA L_{eq}
Trenching/Foundation	15 days	Tractor/Loader/Backhoe (1) [a]	80 dBA L_{eq}
Building – Exterior	260 days	Crane (1)[a] Forklift (1)[a]	74 dBA L_{eq}
Building – Interior/ Architectural Coating	150 days	Air Compressor (1) [a] Aerial Lift (1)[a]	75 dBA L_{eq}
Paving	5 days	Paver (1)[a] Paving Equipment (1)[a] Roller (1)	83 dBA L_{eq}

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

TABLE 8 Estimated Construction Noise Levels at Receiving Property Lines

Phase of Construction	Calculated Hourly Average Noise Levels, L_{eq} (dBA)					
	North Residences (90ft)	East Commercial (125ft)	SE Commercial (175ft)	South Commercial (125ft)	SW Future Residences (135ft)	West Offices (50ft)
Demolition	79 dBA L_{eq}	77 dBA L_{eq}	74 dBA L_{eq}	77 dBA L_{eq}	76 dBA L_{eq}	85 dBA L_{eq}
Site Preparation	76 dBA L_{eq}	73 dBA L_{eq}	70 dBA L_{eq}	73 dBA L_{eq}	72 dBA L_{eq}	81 dBA L_{eq}
Trenching/Foundation	75 dBA L_{eq}	72 dBA L_{eq}	69 dBA L_{eq}	72 dBA L_{eq}	71 dBA L_{eq}	80 dBA L_{eq}
Building –Exterior	69 dBA L_{eq}	66 dBA L_{eq}	63 dBA L_{eq}	66 dBA L_{eq}	65 dBA L_{eq}	74 dBA L_{eq}
Building – Interior/ Architectural Coating	70 dBA L_{eq}	67 dBA L_{eq}	64 dBA L_{eq}	67 dBA L_{eq}	66 dBA L_{eq}	75 dBA L_{eq}
Paving	78 dBA L_{eq}	75 dBA L_{eq}	72 dBA L_{eq}	75 dBA L_{eq}	75 dBA L_{eq}	83 dBA L_{eq}

As shown in Tables 7 and 8, construction noise levels would intermittently range from 74 to 85 dBA L_{eq} when activities occur approximately 50 feet from nearby receptors and would typically range from 63 to 85 dBA L_{eq} when focused near the center of the site. Individual pieces of equipment could potentially exceed the City's 90 dBA noise limit at a distance of 25 feet. Further, when equipment is used within 25 feet of the project's boundaries, 90 dBA could be exceeded outside the property plane. This is a potentially significant impact.

Mitigation Measure 1a:

Modification, placement, and operation of construction equipment are possible means for minimizing the impact of construction noise on existing sensitive receptors. Construction equipment should be well-maintained and used judiciously to be as quiet as possible. Additionally, construction activities for the proposed project should include the following best management practices to reduce noise from construction activities near sensitive land uses:

- Construction staging areas shall be established at locations that will create the greatest distance between the construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.
- Use of exceptionally loud equipment such as jackhammers and concrete saws within 35 feet of shared property lines shall be limited, as feasible.
- All internal combustion engine-driven equipment shall be equipped with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
- Unnecessary idling of internal combustion engines should be strictly prohibited. If necessary, idling of internal combustion engines shall be limited to 5 minutes.
- Stationary noise-generating equipment, such as air compressors or portable power generators, shall be located as far as possible from sensitive receptors and property lines. If they must be located within 35 feet of receptors and property lines, adequate muffling (with barriers or enclosures where feasible and appropriate) shall be used to reduce noise levels at the adjacent sensitive receptors to 90 dBA. All temporary barriers used shall be eight feet in height at minimum, continuous from grade to top, with no cracks or gaps, and have a minimum surface density of three pounds per square foot (e.g., one-inch thick wood fence boards).
- Utilize "quiet" air compressors and other stationary noise sources where technology exists.
- Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project site.
- The contractor shall prepare a detailed construction plana identifying the schedule for major noise-generating construction activities. The construction plan shall identify a procedure for coordination with adjacent residential land uses so that construction activities can be scheduled to minimize noise disturbance.

- Designate a "disturbance coordinator" who would be responsible for responding to any complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., bad muffler, etc.) and will 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 best management practices would reduce construction noise levels emanating from the site, limit construction hours, and minimize disruption and annoyance. With the implementation of these measures and recognizing that noise generated by construction activities would occur over a temporary period, the impact would be reduced to a less-than-significant level.

Impact 1b: **Permanent Noise Level Increase/Exceed Applicable Standards.** The proposed project would not result in a substantial permanent noise level increase or exceed applicable standards at the noise-sensitive receptors in the project vicinity. **This is a less-than-significant impact.**

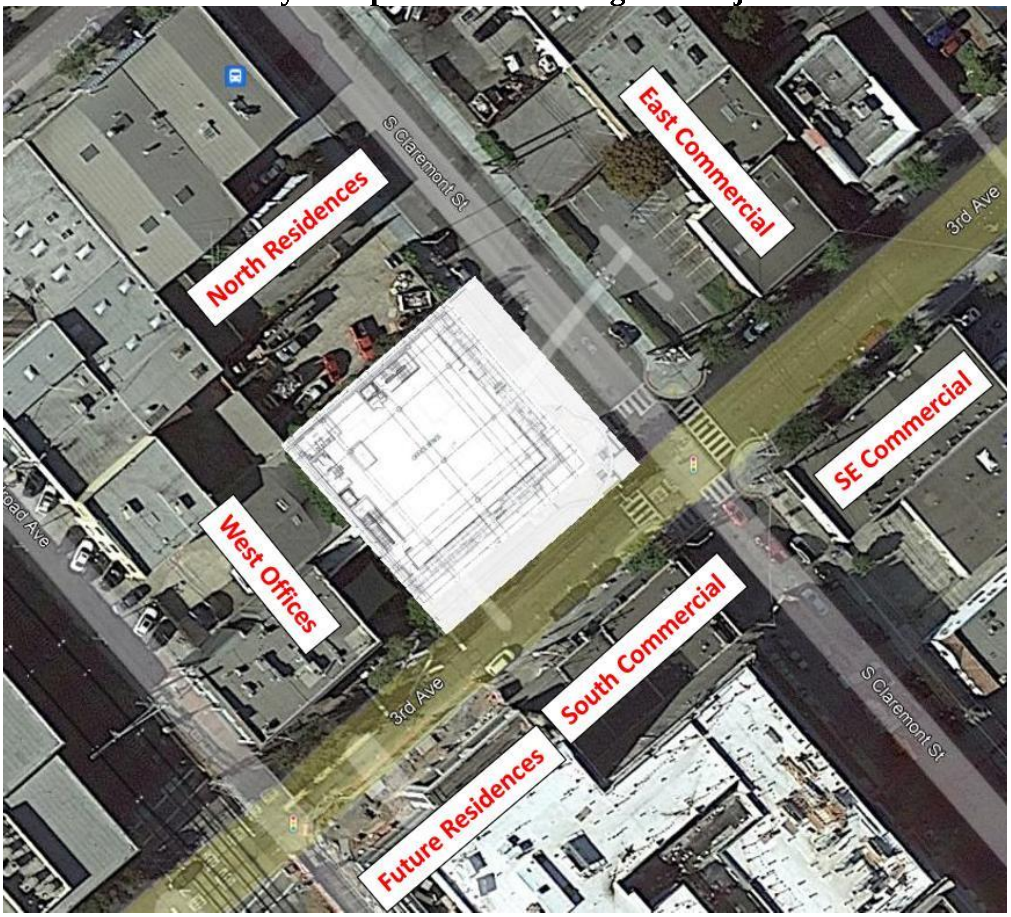
According to Policy N2.2 of the City's General Plan, a significant permanent noise increase would occur at existing noise-sensitive receptors if a new development results in a permanent noise increase of 3 dBA L_{dn} or greater.

Policy N2.3 limits new commercial developments from generating noise levels of 65 dBA L_{dn} or greater at the property line, excluding existing ambient noise levels. Additionally, operational noise is limited to the noise levels specified in Table 7.30.040, adjusted for ambient conditions. Maximum permissible noise levels for noise sources operating more than 30 minutes in a given hour for residences would be that of Zone 1: 50 dBA during nighttime hours (between 10:00 p.m. and 7:00 a.m.) and 60 dBA during daytime hours (between 7:00 a.m. and 10:00 p.m.). Maximum permissible noise levels for noise sources operating more than 30 minutes in a given hour for offices and commercial uses would be that of Zone 2: 55 dBA during nighttime hours and 60 dBA during daytime hours. For noise sources operating more than 15 minutes in a given hour, 5 dBA would be added to these thresholds. Noise sources operating more than five minutes in a given hour would have thresholds 10 dBA above these levels, and noise sources operating more than one minute in a given hour would have thresholds 15 dBA above these levels.

The Municipal Code also states that ambient noise levels would be used if existing ambient noise levels exceed the Municipal Code limits. The measured hourly average noise levels during daytime hours ranged from 66 to 73 dBA L_{eq} (average of 69 dBA L_{eq}) and from 52 to 70 dBA L_{eq} during nighttime hours (average of 63 dBA L_{eq}) along East 3rd Avenue. Hourly average noise levels during daytime hours ranged from 61 to 67 dBA L_{eq} (average of 63 dBA L_{eq}) and from 49 to 66 dBA L_{eq} during nighttime hours (average of 56 dBA L_{eq}) along South Claremont Street. Since the average hourly average noise levels measured in the project vicinity during daytime and nighttime hours exceed the Municipal Code thresholds, the measured average noise levels will be used as the baseline threshold for activities occurring more than 30 minutes in a given hour to conservatively assess the significance of the project's operational noise. Where appropriate, the proper increase will be applied.

Figure 2 shows the project site and surrounding noise-sensitive receptors.

FIGURE 2 Nearby Receptors Surrounding the Project Site



Project Traffic Increase

The traffic study included average daily traffic (ADT) along six roadway segments in the project site vicinity for the existing traffic volumes and the existing plus project volumes. By comparing the existing plus project traffic volumes to the existing volumes, the project's contribution to the overall noise level increase was determined to be less 1 dBA L_{dn} along each roadway segment in the project vicinity. Therefore, the project would not result in a permanent noise increase of 3 dBA L_{dn} or more at noise-sensitive receptors in the project vicinity.

Mechanical Equipment

The site plan shows a pump room, electrical room, and a transformer room on the ground-level of the proposed building. A mechanical yard is shown on level five of the building in the northwestern corner. The equipment located in the mechanical yard would include heat pump condensing units associated with the office space of the proposed project. The rooftop would future solar panels and HVAC units associated with the residential component of the proposed project. For all these units, continuous 24-hour operation would represent worst-case conditions; therefore, the hourly average threshold based on average ambient noise levels would be 63 dBA during daytime hours and 56 dBA during nighttime hours for the existing residence to the north and would be 69 dBA during daytime hours and 63 dBA during nighttime hours for all other receptors surrounding the site.

Transformers up to 1,000 kVA typically generate noise levels up to 64 dB, as measured at 1 meter (3.28 feet). Assuming the transformer runs continuously during daytime and nighttime hours, the day-night average noise level would be 70 dBA L_{dn} at a distance of 1 meter (3.28 feet). With no windows in the transformer room, which would be located along the eastern façade, the building would provide about 20 dBA attenuation for surrounding receptors. The distance from the center of the transformer to the eastern boundary of the site would be approximately 20 feet. At this distance and assuming a 20 dBA reduction from the building, hourly average noise levels would be up to 28 dBA L_{eq}, and the day-night average noise level would be 35 dBA L_{dn}, assuming continuous 24-hour operations. The distance to the property lines of all surrounding receptors shown in Figure 2 would be 80 feet or more from the center of the transformer; therefore, the City's daytime and nighttime thresholds for operations occurring for more than 30 minutes in a given hour would not be exceeded by the ground-level transformer at the noise-sensitive receptors. All other electrical and pump rooms on the ground-level would generate noise levels lower than transformers. For all existing receptors, the noise level increase due to transformer noise would not be measurable or detectable (0 dBA L_{dn} increase).

The proposed office building would include HVAC systems to be multi-split variable refrigerant flow (VRF) heat pump systems. The VRF condensing units would be located within the mechanical yard. Each floor of the office building would have its own VRF condensing unit, with each unit generating noise levels up to 66 dBA at a distance of 3 feet. Under worst-case conditions, all four units would operate simultaneously for a combined noise level of 72 dBA at 3 feet. These types of units would cycle on and off continuously over a given 24-hour period, and assuming all four units would run continuously, the day-night average noise level under worst-case conditions would be 78 dBA L_{dn} at 3 feet.

The nearest receptor would be the office buildings to the west, which would be approximately 20 feet from the center of the mechanical yard. The nearest residential land use would be the existing residences to the north, which would be approximately 70 feet from the center of the mechanical yard. The future residential building to the southeast would also have direct line-of-sight to the mechanical yard and would be approximately 135 feet from the center of the mechanical yard. The residential units located on level 5 of the proposed building would shield the remaining receptors to the east and to the south from the mechanical yard.

In addition to the roof screen shown in the site plan that surrounds the mechanical yard, the elevation of the mechanical yard would provide partial shielding for the two-story office and residential buildings to the west and to the north, respectively. The combination of the mechanical screening and the elevation would provide a minimum attenuation of 20 dBA to the ground-level or second story receptors surrounding the site. The future residential building to the southwest would be a minimum of four stories tall. The partial shielding from the building façade and the mechanical screen would provide a minimum attenuation of 10 dBA for the future residential building. Table 9 summarizes the hourly average and day-night average noise levels propagated from the level 5 mechanical yard to the property lines of the nearest surrounding receptors with direct line-of-sight to the mechanical yard.

TABLE 9 Estimated Operational Noise Levels for Equipment Located in the Level 5 Mechanical Yard

Receptor	Distance from Center of Mech. Yard	Combined L_{eq} from Mech. Yard, dBA	Combined L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
West Offices	20 feet	36[a]	42[a]	0
North Residences	70 feet	25[a]	31[a]	0
Southwest Future Residences	135 feet	29[b]	35[b]	N/A[c]

[a] Conservative 20 dBA noise level reduction from the mechanical screening and the elevation is assumed.
[b] Conservative 10 dBA noise level reduction from the mechanical screening and building façade is assumed.
[c] A noise level increase would not occur at future residences since occupants of this building would not be subject to existing conditions.

Assuming a minimum attenuation of 20 dBA from the mechanical screening and the elevation of the mechanical yard, the equipment in the mechanical yard would not exceed the City's hourly average noise levels during daytime or nighttime hours at the nearest surrounding receptors or the day-night average noise level at the property line. Operations of the equipment would also not exceed the City's thresholds at the future residential building to the southeast, assuming a minimum 10 dBA attenuation. For all existing receptors, the noise level increase due to equipment in the mechanical yard would not be measurable or detectable (0 dBA L_{dn} increase).

The rooftop would include HVAC for the five residential units, which would consist of split-system heat pumps with single ceiling mounted slim-profile fan coil units mounted in the bathroom ceiling connected to outdoor condensing units above the main residential corridor. Noise levels generated by these types of units would be up to 62 dBA at 20 feet. Assuming up to five units operating simultaneously at any given time, hourly average noise levels would be up to 69 dBA L_{eq} at a distance of 3 feet during daytime and nighttime hours. Solar panels are also shown on the rooftop; however, this type of equipment would not generate noise levels audible at the project boundaries. Under worst-case conditions with these units cycling on and off continuously over any given 24-hour period, the day-night average noise level under worst-case conditions would be 75 dBA L_{dn} at 3 feet.

Table 10 summarizes the noise levels at the property lines of the surrounding land uses for noise generated at the rooftop equipment. Due to the elevation and the setback of the equipment from the edge of the rooftop, minimum attenuation of 20 dBA would occur at the ground-level and two-story receptors (i.e., all surrounding receptors except the future residential building to the southwest). This attenuation is incorporated into the noise levels in Table 10. The future residences to the southwest would potentially have direct line-of-sight to the rooftop equipment at the project site. Assuming no mechanical screen, no attenuation is applied to these future receptors.

TABLE 10 Estimated Operational Noise Levels due to Rooftop Residential Equipment

Receptor	Distance from Center of Nearest Rooftop Equip.	Noise Levels from Rooftop Equip., dBA	L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
West Offices	20 feet	49[a]	55[a]	0
North Residences	70 feet	38[a]	45[a]	0
East Commercial	100 feet	35[a]	35[a]	0
South Commercial	100 feet	35[a]	35[a]	0
Southwest Future Residences	105 feet	55[b]	61[b]	N/A[c]

[a] Conservative 20 dBA noise level reduction from the mechanical screening and the elevation is assumed.
[b] Conservatively, no attenuation is assumed since these future receptors would potentially have direct line-of-sight to the rooftop equipment.
[c] A noise level increase would not occur at future residences since occupants of this building would not be subject to existing conditions.

Assuming a minimum attenuation of 20 dBA from the elevation of the rooftop and the setback of the equipment, the rooftop equipment would not exceed the City's hourly average noise levels during daytime or nighttime hours at the nearest existing receptors or the day-night average noise level at the property line. Operations of the equipment would also not exceed daytime or nighttime ambient noise levels at the future residential building to the southwest, assuming no attenuation. For all existing receptors, the noise level increase due to equipment on the rooftop would not be measurable or detectable (0 dBA L_{dn} increase).

Truck Loading and Unloading

The site plan does not show a loading zone for the proposed building. Assuming worst-case conditions, truck loading and unloading activities would occur along the curbs of South Claremont Street (for office uses) and East 3rd Avenue (for residential uses), based on the lobby entrances for each land use. For all loading and unloading activities, including trash pickup, truck maneuvering would take up to five minutes. Since the measured hourly average noise levels in the project vicinity exceeded the City's thresholds in Table 7.30.040, the noise limit for all loading/unloading activities occurring for up to five minutes in any hour would be 73 dBA for the existing residences north of the project site and 79 dBA for all other existing and future receptors in the immediate vicinity.

Truck maneuvering noise would include a combination of engine, exhaust, and tire noise, as well as the intermittent sounds of back-up alarms and releases of compressed air associated with truck/trailer air brakes. Heavy trucks typically generate maximum instantaneous noise levels of 70 to 75 dBA at a distance of 50 feet. Smaller medium-sized delivery trucks typically generate maximum noise levels of 60 to 65 dBA at 50 feet. The noise level of backup alarms can vary depending on the type and directivity of the sound, but maximum noise levels are typically in the range of 65 to 75 dBA at a distance of 50 feet.

The existing residences to the north and existing commercial uses to the east would be the receptors with direct exposure to the residential lobby, while the commercial uses to the south, the future residences to the southwest, and the office to the west would have direct line-of-sight to the office lobby. Assuming one heavy truck delivery in a 24-hour period for the proposed office use and one medium truck delivery for the proposed residential use, the hourly average and day-night average noise levels generated by truck deliveries at the surrounding receptors with direct line-of-sight are summarized in Table 11.

TABLE 11 Estimated Operational Noise Levels due to Truck Deliveries

Receptor	Distance from Center of Nearest Loading Area	Noise Levels from Truck Deliveries, dBA	L_{dn}, dBA	Noise Level Increase, dBA L_{dn}
West Offices[a]	55 feet	69 to 74	50	0
Southwest Future Residences[a]	55 feet	69 to 74	50	N/A[c]
South Commercial[a]	50 feet	70 to 75	50	0
North Residences[b]	75 feet	57 to 62	37	0
East Commercial[b]	50 feet	60 to 65	40	0

[a] These receptors have direct line-of-sight to heavy truck deliveries associated with the proposed office use.
[b] These receptors have direct line-of-sight to medium truck deliveries associated with the proposed residential use.
[c] A noise level increase would not occur at future residences since occupants of this building would not be subject to existing conditions.

The nearest existing and future receptors with direct line-of-sight to truck deliveries at the office lobby would be exposed to truck maneuvering noise levels up 75 dBA, and the nearest existing receptors with direct line-of-sight to truck deliveries at the residential lobby would be exposed to truck maneuvering noise levels up to 65 dBA. These noise levels would be lower than the average ambient noise levels at the existing and future receptors. Assuming one delivery in a 24-hour period, the day-night average noise level would be up to 50 dBA L_{dn}, which meets the City's 65 dBA L_{dn} limit. For all existing receptors, the noise level increase due to truck delivery noise would not be measurable or detectable (0 dBA L_{dn} increase).

Total Combined Project-Generated Noise

The operational noise levels produced by the proposed project combined (i.e., traffic, mechanical equipment, and truck loading/unloading activities) would result in an increase of less than 1 dBA L_{dn} at all existing noise-sensitive receptors surrounding the project site. Therefore, the proposed project would not result in a substantial increase over ambient noise levels in the project vicinity. Further, operational noise levels would not exceed 65 dBA L_{dn} at the property lines or exceed ambient levels at the surrounding land uses. This is a less-than-significant impact.

Mitigation Measure 1b: No further mitigation required.

Impact 2: **Exposure to Excessive Groundborne Vibration.** Construction-related vibration levels would not exceed applicable vibration thresholds at nearby sensitive land uses. **This is a less-than-significant impact.**

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.

The California Department of Transportation recommends a vibration limit of 0.5 in/sec PPV for buildings structurally sound and designed to modern engineering standards, which typically consist of buildings constructed since the 1990s. Conservative vibration limits of 0.3 in/sec PPV has been used for buildings that are found to be structurally sound but where structural damage is a major concern (see Table 3 above for further explanation). For historical buildings or buildings that are documented to be structurally weakened, a cautious limit of 0.08 in/sec PPV is often used to provide the highest level of protection.

Two historical buildings were identified in the project vicinity: at 273 South Railroad Avenue, which adjoins the project site to the west, and at 415 South Claremont Street, which is more than 500 feet from the project site boundary. These structures would be subject to the conservative 0.08 in/sec PPV threshold. All other buildings surrounding the project site would be subject to the conservative 0.3 in/sec PPV threshold.

Table 12 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 12 also summarizes the distances to the 0.08 in/sec PPV threshold for historical buildings and to the 0.3 in/sec PPV threshold for all other buildings. Since the historical building located at 415 South Claremont Street is more than 500 feet from the project site, vibration levels would be at or below 0.008 in/sec PPV at this building, which would be well below the 0.08 in/sec PPV threshold. Therefore, this building would not be considered a sensitive receptor for construction vibration and will not be discussed further.

TABLE 12 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)	Minimum Distance to Meet 0.08 in/sec PPV (feet)	Minimum Distance to Meet 0.3 in/sec PPV (feet)
Clam shovel drop		0.202	59	18
Hydromill (slurry wall)	in soil	0.008	4	1
	in rock	0.017	7	2
Vibratory Roller		0.210	61	19
Hoe Ram		0.089	28	9
Large bulldozer		0.089	28	9
Caisson drilling		0.089	28	9
Loaded trucks		0.076	24	8
Jackhammer		0.035	12	4
Small bulldozer		0.003	2	<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., May 2022.

Table 13 summarizes the vibration levels at each of the surrounding buildings in the project vicinity. 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 the potential for damage to buildings on receiving land uses, not at receptors at the nearest property lines. Therefore, the distances used to propagate construction vibration levels (as shown in Table 13), which are different than the distances used to propagate construction noise levels (as shown in Table 8), were estimated under the assumption that each piece of equipment from Table 12 was operating along the nearest boundary of the project site, which would represent the worst-case scenario.

Use of such equipment as vibratory rollers or dropping heavy objects near the western boundary of the project site may generate substantial vibration in the immediate vicinity of the historical building adjoining the project site to the west. As shown in Table 12, the 0.08 in/sec PPV threshold would potentially be exceeded within about 60 feet of the surrounding buildings, and due to the close proximity of the buildings to the west of the project site (about 40 feet), these activities used along the shared property line would potentially exceed the 0.08 in/sec PPV threshold, as shown in Table 13. Additionally, the non-historical structure just north of the historical building, which also adjoins the project site to the west, would be within 10 feet of the shared property line and would potentially be exposed to vibration levels exceeding the 0.3 in/sec PPV threshold when heavy objects are dropped near the property line or when vibratory rollers are used near the property line.

A study completed by the US Bureau of Mines analyzed the effects of blast-induced vibration on buildings in USBM RI 8507.[1] The findings of this study have been applied to buildings affected by construction-generated vibrations.[2] As reported in USBM RI 8507[1] and reproduced by Dowding,[2] Figure 3 presents the damage probability, in terms of "threshold damage," "minor damage," and "major damage," at varying vibration levels. Threshold damage, which is described as cosmetic damage in this report, would entail hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage would include hairline cracking in masonry or the loosening of plaster, and major structural damage would include wide cracking or shifting of foundation or bearing walls.

As shown in Figure 3, maximum vibration levels of 0.2 in/sec PPV or lower would result in virtually no measurable damage, while levels of 0.6 in/sec PPV would result in about an 8% chance of threshold or cosmetic damage and no minor or major damage. No minor or major damage would be expected at the historical buildings or nonhistorical buildings immediately adjoining the project site.

Heavy vibration-generating construction equipment would have the potential to produce vibration levels of 0.08 in/sec PPV or more at historic buildings within 60 feet of the project site and of 0.3 in/sec PPV or more at nonhistorical buildings within 25 feet of the project site.

Neither cosmetic, minor, or major damage would occur at historical or conventional buildings located 60 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.

In summary, the construction of the project would generate vibration levels exceeding 0.08 in/sec PPV at historic properties within 60 feet of the site and exceeding 0.2 in/sec PPV at the nonhistorical building within 25 feet of the project site. This would be considered a potentially significant impact.

[1] Siskind, D.E., M.S. Stagg, J.W. Kopp, and C.H. Dowding, Structure Response and Damage Produced by Ground Vibration form Surface Mine Blasting, RI 8507, Bureau of Mines Report of Investigations, U.S. Department of the Interior Bureau of Mines, Washington, D.C., 1980.

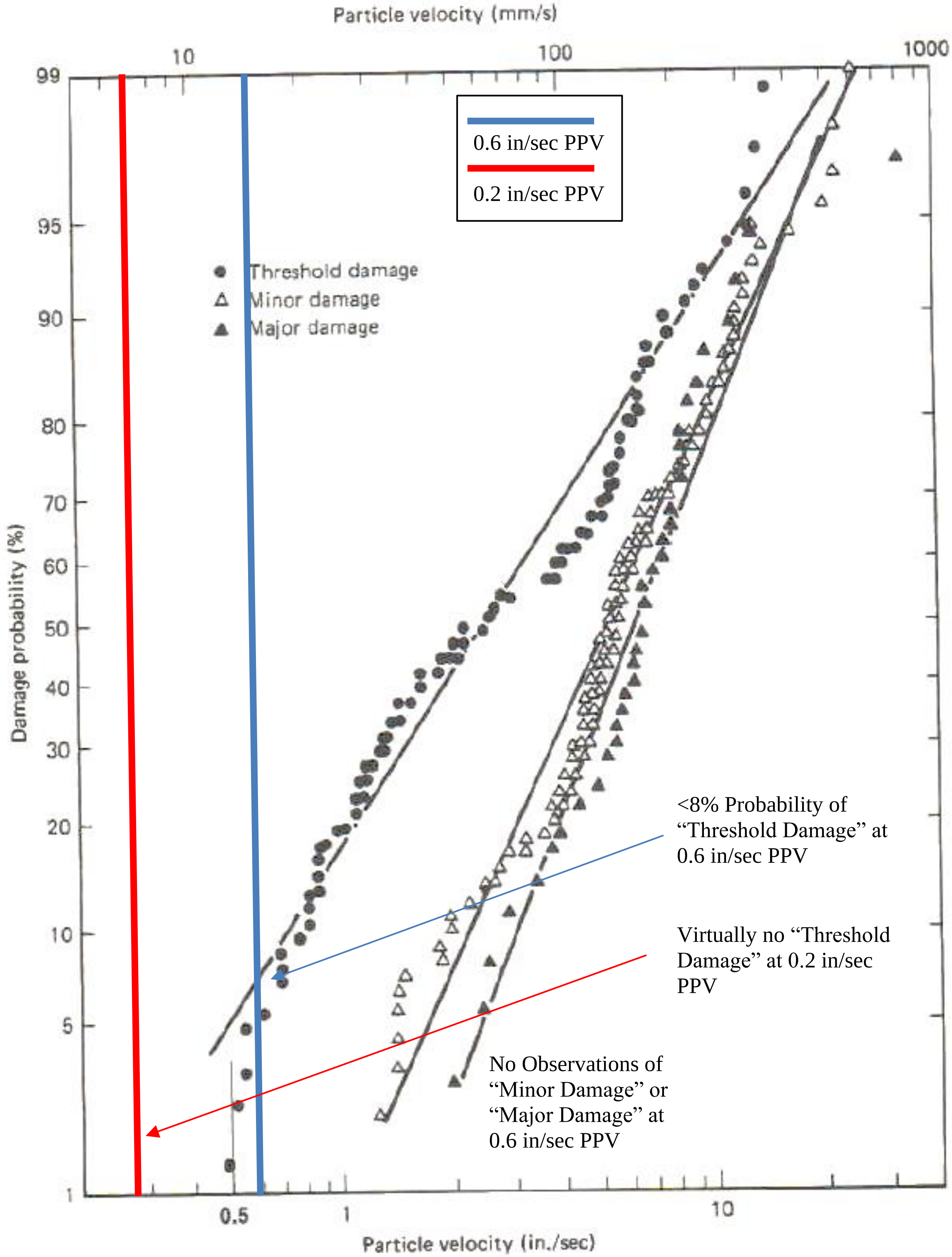
[2] Dowding, C.H., Construction Vibrations, Prentice Hall, Upper Saddle River, 1996.

TABLE 13 Vibration Source Levels for Construction Equipment

Equipment		PPV (in/sec) Estimated at Nearest Building Façades Surrounding the Project Site					
		273 S. Railroad Ave. Historical Buildings (40ft)	West Office Buildings (10ft)	North Res. Building (60ft)	East Comm. Buildings (115ft)	South Comm. Building (65ft)	Southwest Res. Building (70ft)
Clam shovel drop		**0.120**	**0.553**	0.077	0.038	0.071	0.065
Hydromill (slurry wall)	in soil	0.005	0.022	0.003	0.001	0.003	0.003
	in rock	0.010	0.047	0.006	0.003	0.006	0.005
Vibratory Roller		**0.125**	**0.575**	0.080	0.039	0.073	0.068
Hoe Ram		0.053	0.244	0.034	0.017	0.031	0.029
Large bulldozer		0.053	0.244	0.034	0.017	0.031	0.029
Caisson drilling		0.053	0.244	0.034	0.017	0.031	0.029
Loaded trucks		0.045	0.208	0.029	0.014	0.027	0.024
Jackhammer		0.021	0.096	0.013	0.007	0.012	0.011
Small bulldozer		0.002	0.008	0.001	0.001	0.001	0.001

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., May 2022.

FIGURE 3 Probability of Cracking and Fatigue from Repetitive Loading



Source: Dowding, C.H., Construction Vibrations, Prentice Hall, Upper Saddle River, 1996.

Mitigation Measure 2:

The applicant shall implement a construction vibration monitoring plan to document conditions prior to, during, and after vibration generating construction activities. All monitoring plan tasks shall be undertaken under the direction of a licensed Professional Engineer in the State of California. Initial placement of sensors, data, and corrective actions to be reviewed by a licensed Professional Structural Engineer in the State of California in accordance with industry-accepted standard methods. The construction vibration monitoring plan shall be submitted to the Building Division subject to the satisfaction of the Community Development, or his/her designee, prior to issuance of any demolition, grading, or building permits (whichever occurs first) and shall include:

- A description of measurement methods, equipment used, calibration certificates, and graphics as required to clearly identify vibration-monitoring locations .

- A list of all construction equipment to be used and the anticipated time of duration shall be submitted by the contractor. This list shall be used to identify equipment and activities that would potentially generate substantial vibration and to define the level of effort required for continuous vibration monitoring.

- Document conditions at all structures located within 60 feet of construction prior to, during, and after vibration generating construction activities. Perform a photo survey, elevation survey, and crack monitoring survey prior to any construction activity, at the end of each phase of construction, and after project completion, and shall include internal and external crack monitoring in structures, settlement, and distress, and shall document the condition of foundations, walls and other structural elements in the interior and exterior of said structures.

- Document conditions at all structures located within 60 feet of construction prior to, during, and after vibration generating construction activities. Perform a photo survey, elevation survey, and crack monitoring survey prior to any construction activity, at the end of each phase of construction, and after project completion, and shall include internal and external crack monitoring in structures, settlement, and distress, and shall document the condition of foundations, walls and other structural elements in the interior and exterior of said structures.

- A plan to identify structures where and when monitoring would be conducted. Construction contingencies shall be identified for when vibration levels approach applicable limits .

- The applicant or their designated contractor shall identify a “disturbance coordinator” responsible for registering and investigating claims of excessive vibration. The disturbance coordinator shall determine the cause of the complaint and shall require that measures be implemented to reduce the vibration impact. The applicant or their designated contractor shall 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.

- Additionally, the construction vibration monitoring plan shall include, but not be limited to, the following measures:
    - Use of clam shovels and vibratory rollers shall be prohibited within 60 feet of the buildings located at 273 South Railroad Street. Alternatively, a Caterpillar model CP433E vibratory compactor or smaller model may be used such that vibration levels would not exceed applicable vibration limits.
    - Alternative methods for breaking up existing pavement, such as a pavement grinder, shall be used instead of dropping objects within 60 feet of adjacent buildings.
    - If vibration levels approach limits, suspend construction and implement contingency measures to either lower vibration levels or secure the affected structures.

Implementation of these measures would reduce the vibration activities during construction by limiting the use of heavy vibration-generating equipment and requiring alternative approaches to ground disturbing activities. Accordingly, the project would have a less-than-significant impact from generation of groundborne vibration.

Impact 3: **Excessive Aircraft Noise.** The project site is located about 3.7 miles from the San Francisco International Airport. The noise environment attributable to aircraft is considered normally acceptable. This is a **less-than-significant** impact.

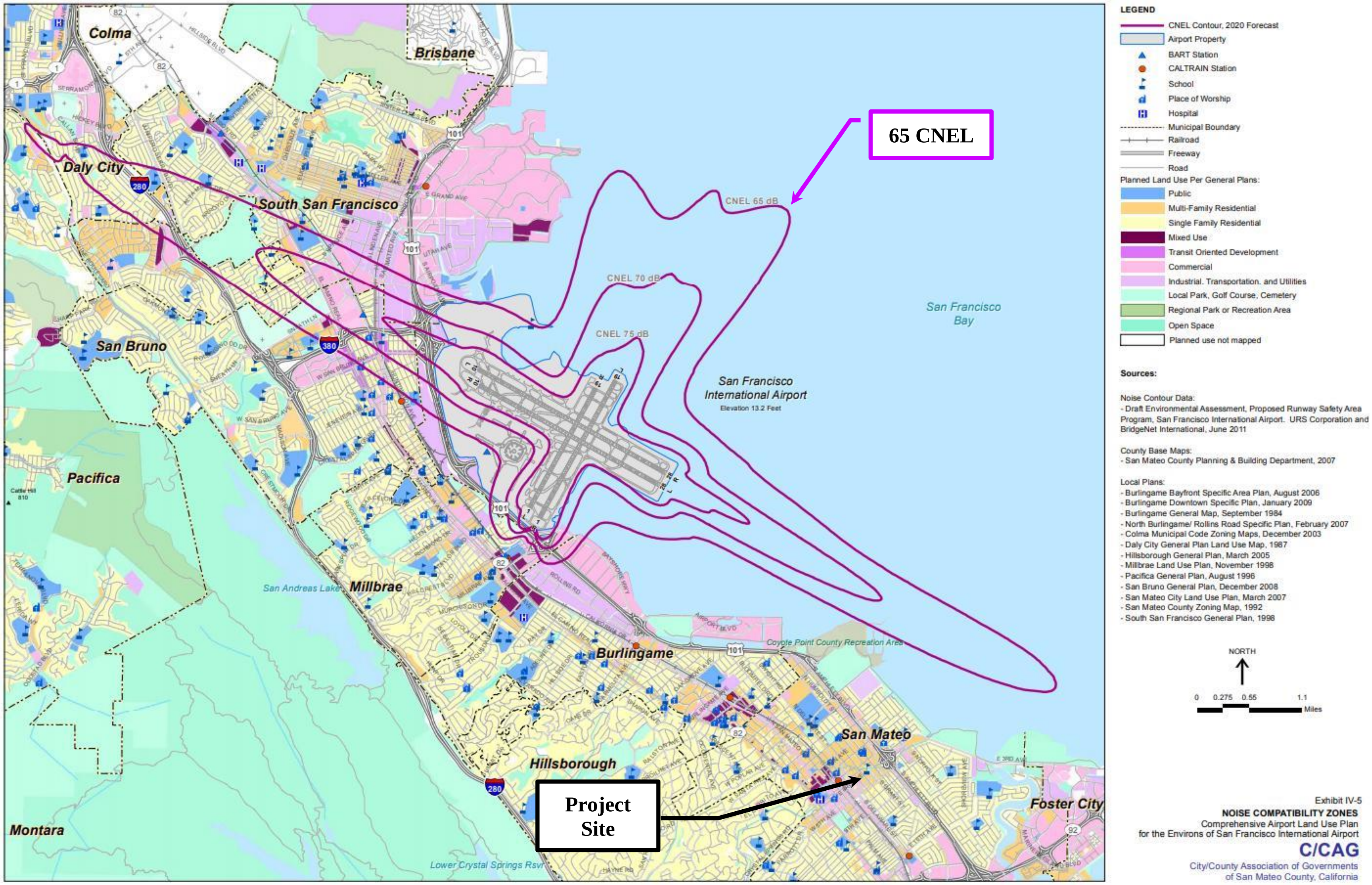
The San Francisco International Airport is a public-use airport located approximately 3.7 miles northwest of the project site. According to the *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport*,[3] the project site lies well outside the 65 dBA CNEL/L_{dn} noise contour (see Figure 4), and the required safe and compatible threshold for exterior noise levels would be at or below 65 dBA CNEL/L_{dn} for aircrafts. Therefore, the proposed project would be compatible with the exterior noise standards for aircraft noise.

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

Mitigation Measure 3: **None required.**

[3] Ricondo & Associates, Inc. with Jacobs Consultancy and Clarion Associates, *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport*, November 2012.

FIGURE 4 2020 CNEL Noise Contours for San Francisco International Airport Relative to Project Site



Cumulative Impacts

Cumulative noise impacts would include temporary construction noise from cumulative construction projects.

A significant cumulative traffic noise impact would occur if two criteria are met: 1) if the cumulative traffic noise level increase was 3 dBA L_{dn} or greater for future levels exceeding the normally acceptable threshold; 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 L_{dn} or more attributable solely to the proposed project.

Cumulative and cumulative plus project ADT traffic volumes were included in the traffic study. When these volumes were compared to the existing ADT volumes, an increase of 1 dBA L_{dn} or less was calculated with and without the project, which would not be considered a "cumulatively considerable" contribution. Therefore, the project would not cause a significant cumulative noise increase at noise-sensitive uses in the project vicinity.

The City of San Mateo has provided the following list of project sites located within 500 feet of the proposed 435 East 3rd Avenue project site:

- **Block 21** – this project is located in the south of the East 3rd Avenue between South Claremont Street and South Delaware Street and would be less than 100 feet from the 435 East 3rd Avenue project site. This project is currently in the planning review phase and would consist of demolishing the existing buildings and constructing a six-story mixed-use building. Construction dates for this project have not been confirmed but due to the close proximity of the project site and the noise-sensitive receptors shared by both project sites (i.e., the future and existing receptors south of the project site and the existing commercial buildings in the east of the project site), a significant cumulative construction impact would potentially occur, exposing the nearby sensitive receptors to construction activities at both sites simultaneously or consecutively.

- **480 East 4th Avenue** – this project is located in the southwestern corner of the East 4th Avenue/South Claremont Street intersection and would be approximately 430 feet from the 435 East 3rd Avenue project site. This project would consist of construction of a seven-story affordable housing building with a five-story parking structure located at 400 East 5th Avenue. While this project has been approved, construction has not started. Since this project has been approved and would not share noise-sensitive receptors with direct line-of-sight to both project sites, this would not result in a cumulative construction impact.

- **406 East 3rd Avenue** – this project is located southwest of the project site, opposite East 3rd Avenue, and consists of a mixed-use building. This project is currently under construction and will be completed before 435 East 3rd Avenue starts. Future occupants of this building were considered sensitive receptors in this study. This would not result in a cumulative construction impact.

The future and existing receptors south of the project site and the existing receptors east of the project site would be considered sensitive receptors during construction activities at both Block 21 and 435 East 3rd Avenue project sites. However, due to the size of 435 East 3rd Avenue construction project, the time duration and equipment used at that site would be expected to be less than Block 21. With the implementation of construction noise and vibration mitigation measures included in the individual projects, construction noise and vibration levels would be reduced as much as possible at all surrounding sensitive receptors during construction of each individual project. Therefore, the potential cumulative construction impact would be less-than-significant.

APPENDIX

FIGURE A1 Daily Trend in Noise Levels at LT-1, Tuesday, May 17, 2022

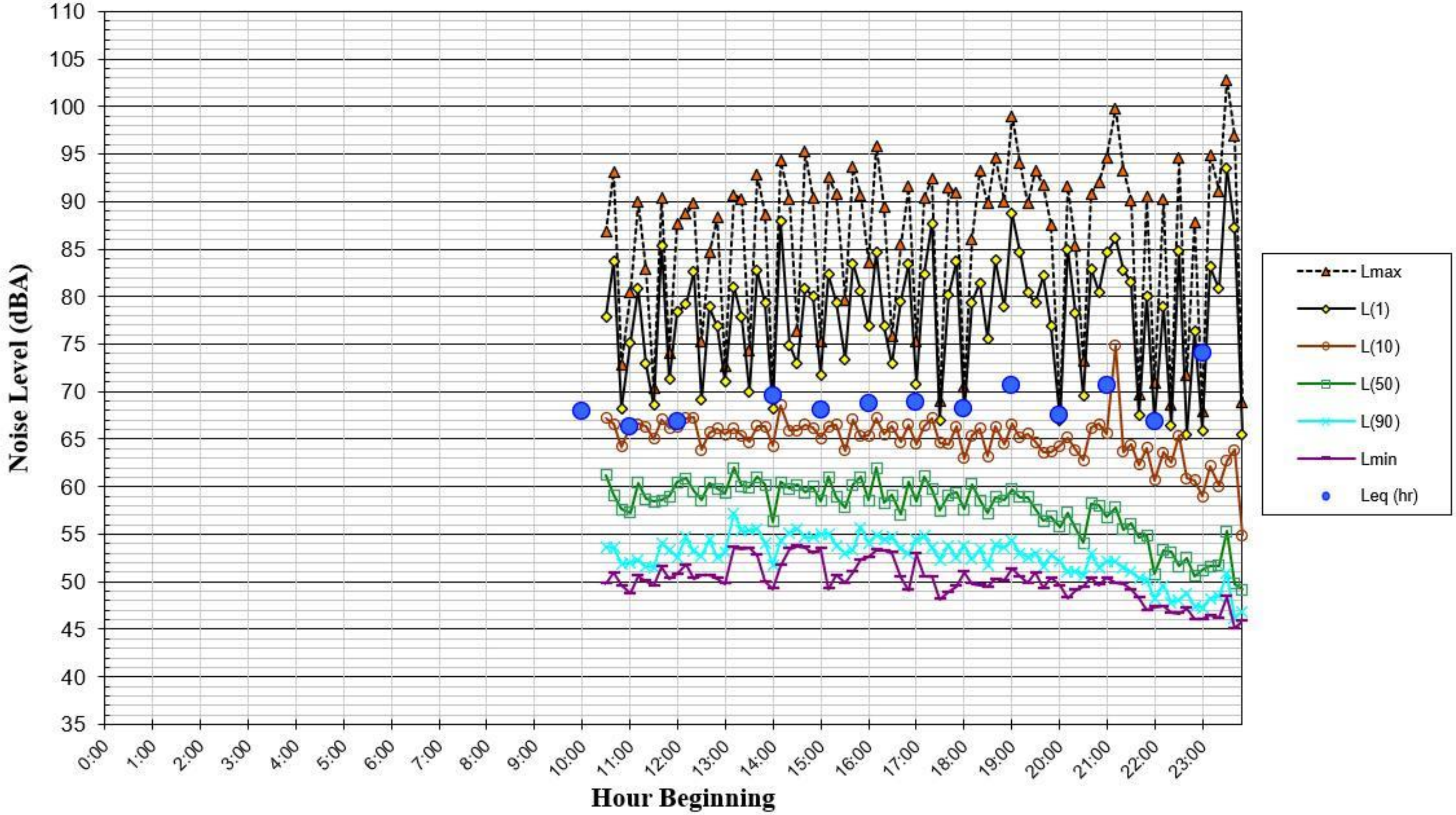


FIGURE A2 Daily Trend in Noise Levels at LT-1, Wednesday, May 18, 2022

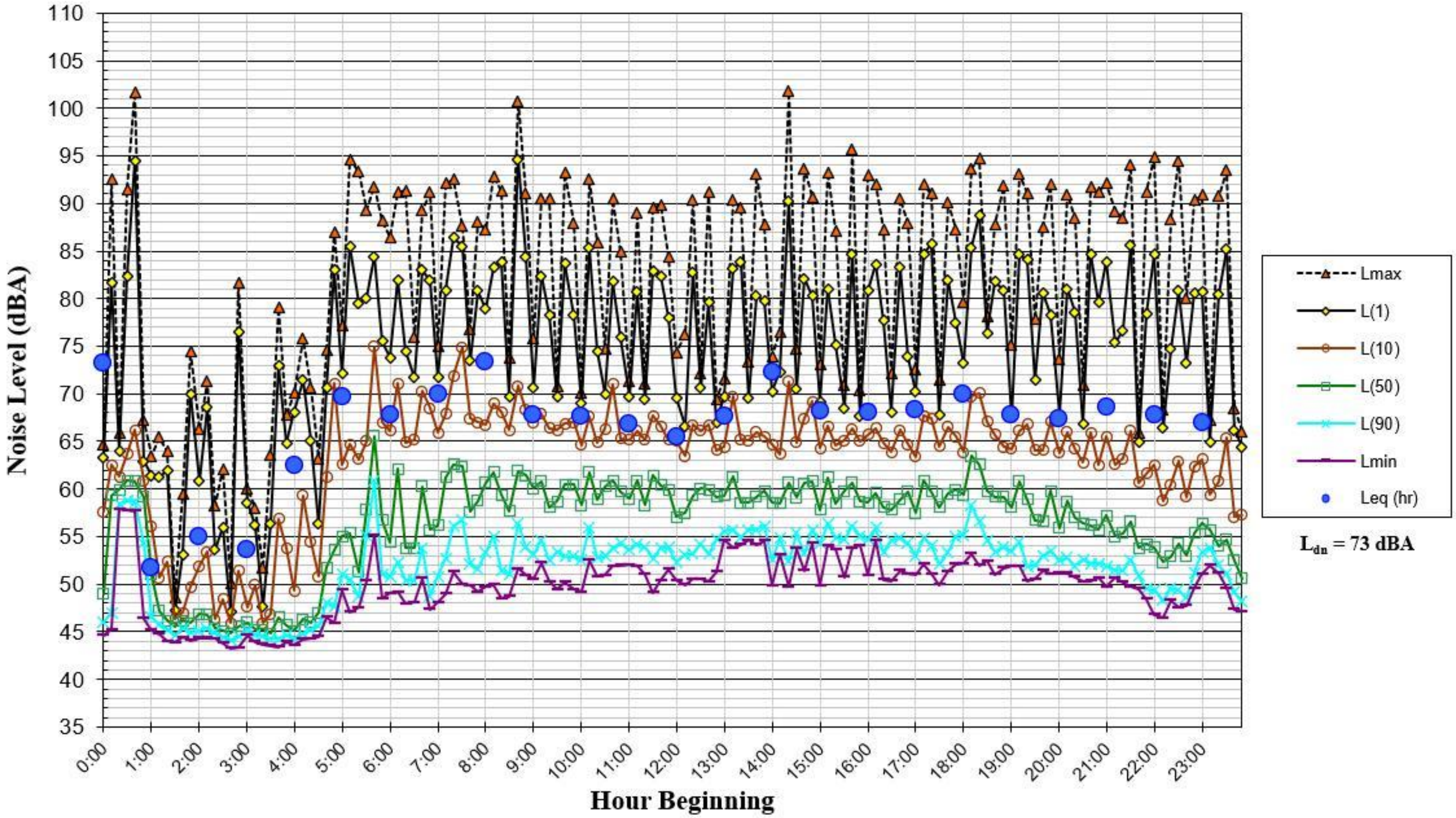


FIGURE A3 Daily Trend in Noise Levels at LT-1, Thursday, May 19, 2022

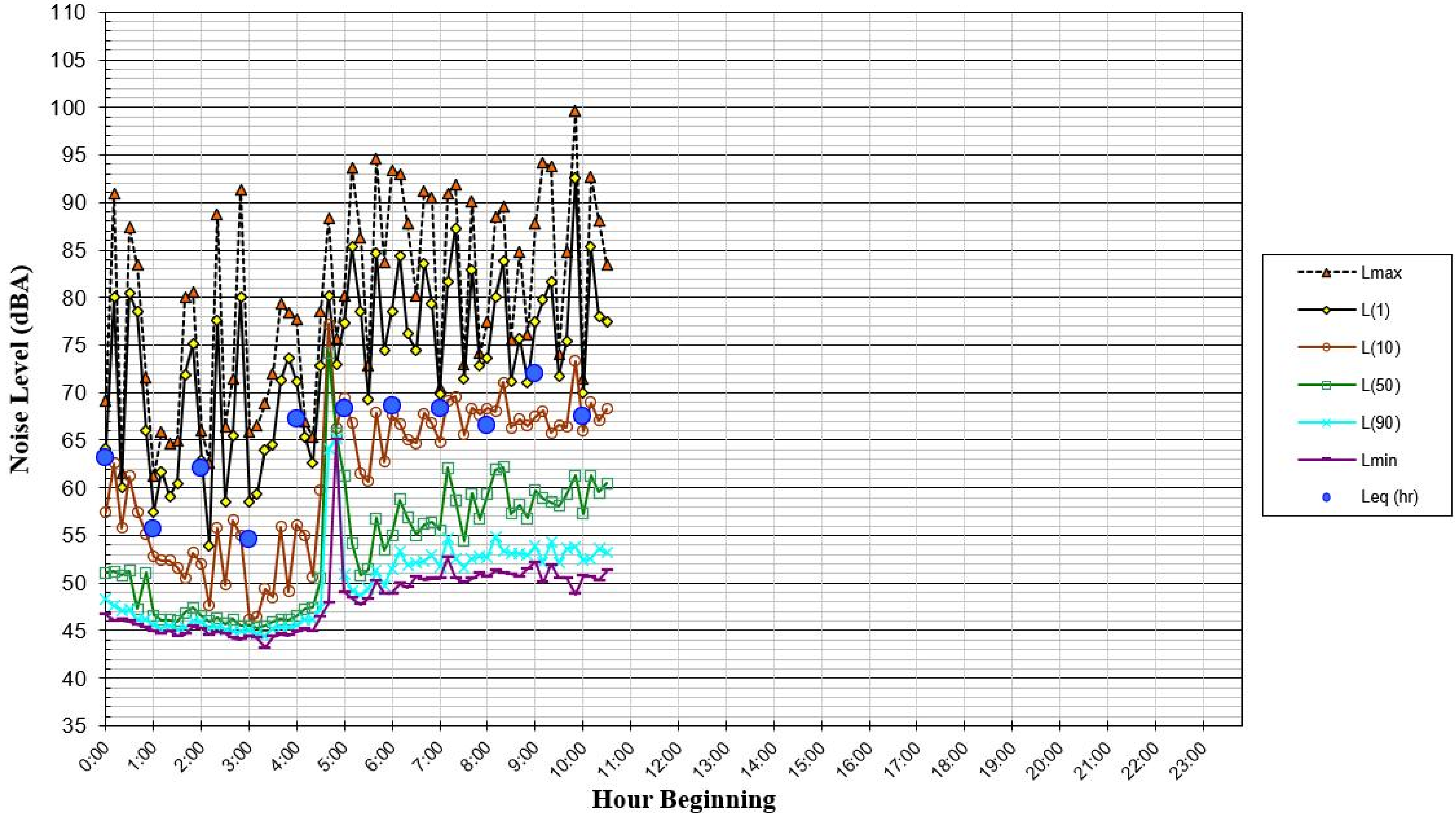


FIGURE A4 Daily Trend in Noise Levels at LT-2, Tuesday, May 17, 2022

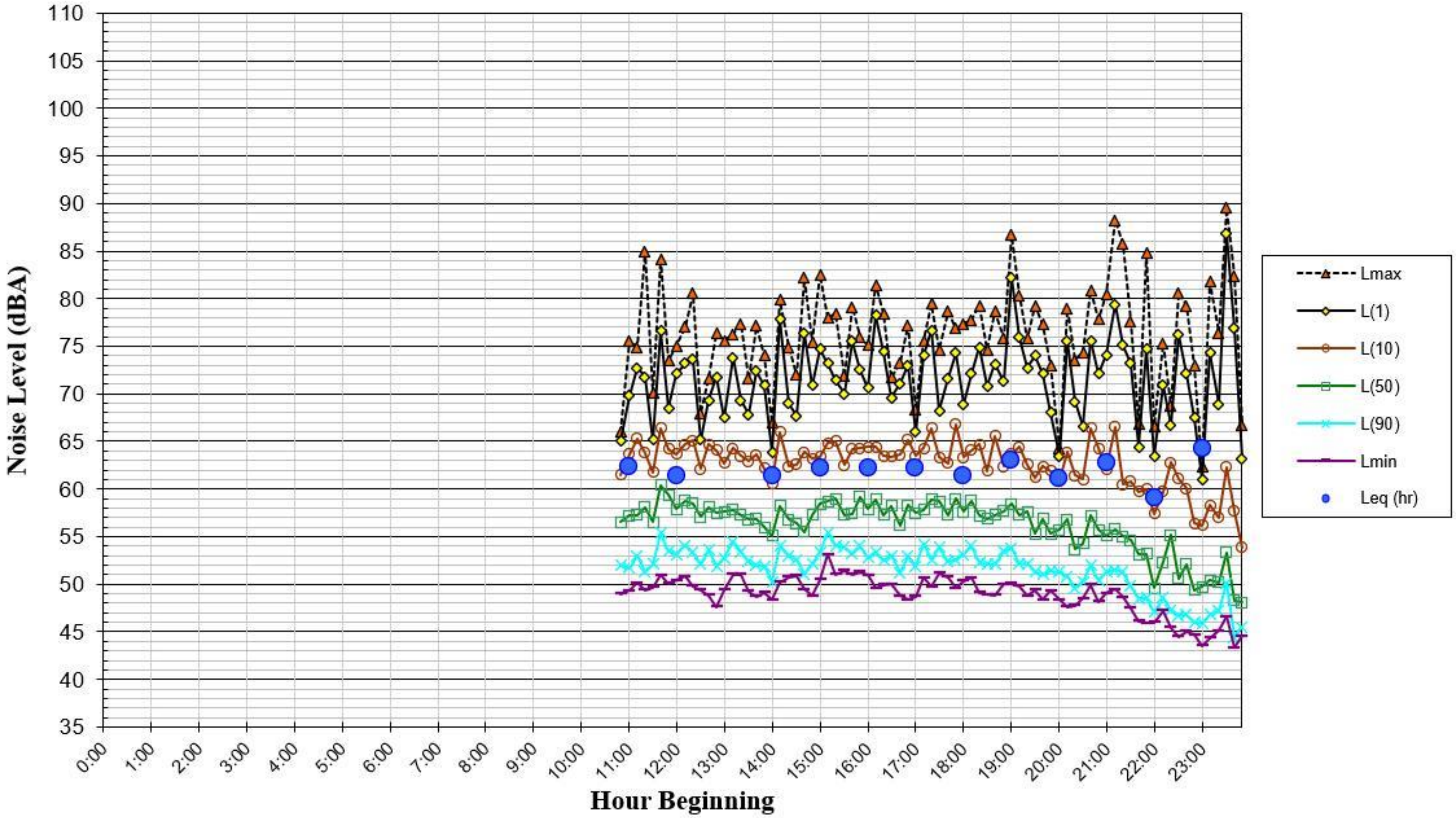


FIGURE A5 Daily Trend in Noise Levels at LT-2, Wednesday, May 18, 2022

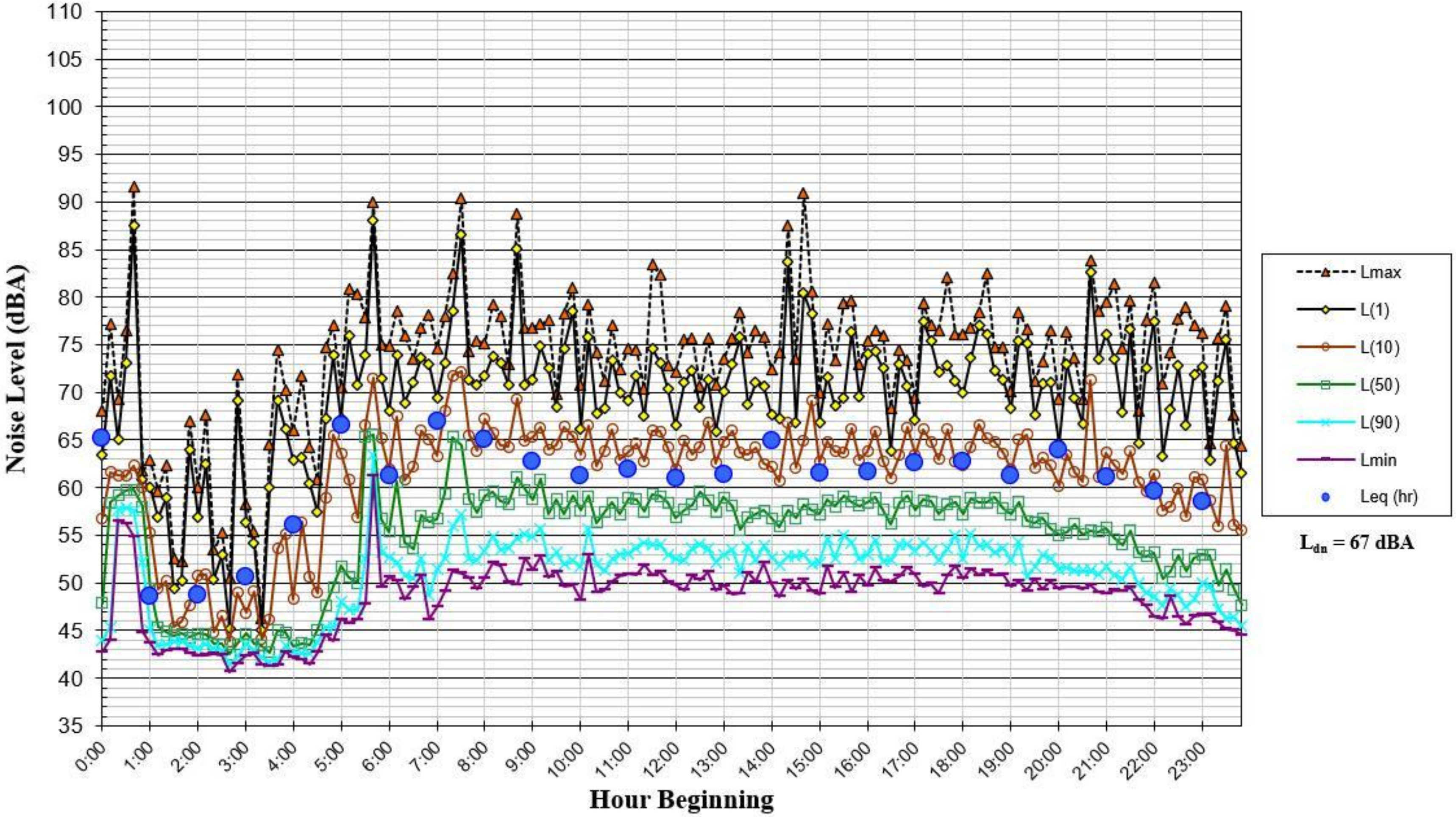


FIGURE A6 Daily Trend in Noise Levels at LT-2, Thursday, May 19, 2022