TERRAINE SITE
MIXED-USE PROJECT
NOISE AND VIBRATION ASSESSMENT

San José, California

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INTRODUCTION

The project proposes a new mixed-use development at the southwest corner of Terraine Street and Bassett Street in San José, California. The 1.57-acre project site is vacant. The project proposes to construct two residential building towers on a shared podium with one subterranean level. Both towers would share the subterranean level and first level of the building, which would contain parking, mechanical rooms, four retail spaces, lobbies, and landscaped areas. The 356,015 square feet (sf) residential tower would contain amenities on the 2nd floor and residential units from the 2nd to the 18th level, with a total of 346 units. The second building on the podium will be constructed as a 11-story parking garage with 621 parking spaces, including 84 electric vehicle parking spaces. This building will feature a future plan for conversion into a 296,064-sf office building. No changes would occur to the residential structure or central connecting podium. Construction is expected to begin in May 2024 and will be completed by July 2026. The parking garage conversion is expected to begin in May 2034 and be completed by August 2035. The project is within the San José Downtown Strategy 2040 Plan area.

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 the intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales 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 p.m. to 10:00 p.m.) and a 10 dB addition to nocturnal (10:00 p.m. to 7:00 a.m.) noise levels. The *Day/Night Average Sound Level* (*DNL* or L_{dn}) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA DNL. Typically, the highest steady traffic noise level during the daytime is about equal to the DNL and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12 to 17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57 to 62 dBA DNL with open windows and 65 to 70 dBA DNL if the windows are closed. Levels of 55 to 60 dBA are common along collector streets and secondary arterials, while 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 DNL 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 DNL. At a DNL of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the DNL increases to 70 dBA, the percentage of the population highly annoyed increases to about 25 to 30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between a DNL of 60 to 70 dBA. Between a DNL of 70 to 80 dBA, each 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 DNL is 60 dBA, approximately 30 to 35 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 3 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 4 percent increase in the percentage of the population highly annoyed.

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, Santa Clara County, and the City of San José. The State CEQA Guidelines, Appendix G, are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. A summary of the applicable regulatory criteria is provided below.

Federal Government

Federal Transit Administration. The Federal Transit Administration (FTA) has identified construction noise thresholds in the *Transit Noise and Vibration Impact Assessment Manual*,[1] which limit daytime construction noise to 80 dBA L_{eq} at residential land uses, 85 dBA L_{eq} at commercial and office uses, and to 90 dBA L_{eq} at industrial land uses.

State of California

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:

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

(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.

2022 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.

2022 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 2022 California Green Building Standards Code (Section 5.507.4.1 and 5.507.4.2). The sections that pertain to this project are as follows:

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

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

Santa Clara County

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

4.3.2.1 Noise Compatibility Policies

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

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

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

N-6 Noise level compatibility standards for other types of land uses shall be applied in the same manner as the above residential noise level criteria. Table 4-1 presents acceptable noise levels for other land uses in the vicinity of the Airport.

Table 4 - 1

NOISE COMPATIBILITY POLICIES

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

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

Source: Comprehensive Land Use Plan Santa Clara County, Norman Y. Mineta San José International Airport, May 25, 2011, Amended May 23, 2019.

City of San José

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

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

Interior Noise Levels

- The City's standard for interior noise levels in residences, hotels, motels, residential care facilities, and hospitals is 45 dBA DNL. Include appropriate site and building design, building construction and noise attenuation techniques in new development to meet this standard. For sites with exterior noise levels of 60 dBA DNL or more, an acoustical analysis following protocols in the City-adopted California Building Code is required to demonstrate that development projects can meet this standard. The acoustical analysis shall base required noise attenuation techniques on expected Envision General Plan traffic volumes to ensure land use compatibility and General Plan consistency over the life of this plan.

Exterior Noise Levels

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

    - For new multi-family residential projects and for the residential component of mixed-use development, use a standard of 60 dBA DNL in usable outdoor activity areas, excluding balconies and residential stoops and porches facing existing roadways. Some common use areas that meet the 60 dBA DNL exterior standard will be available to all residents. Use noise attenuation techniques such as shielding by buildings and structures for outdoor common use areas. On sites subject to aircraft overflights or adjacent to elevated roadways, use noise attenuation techniques to achieve the 60 dBA DNL standard for noise from sources other than aircraft and elevated roadway segments.

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

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

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

Normally Acceptable:

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

Conditionally Acceptable:

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

Unacceptable:

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

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

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

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

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

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

EC-1.6 Regulate the effects of operational noise from existing and new industrial and commercial development on adjacent uses through noise standards in the City's Municipal Code.

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

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

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

EC-1.11 Require safe and compatible land uses within the Norman Y. Mineta San José International Airport noise zone (defined by the 65 CNEL contour as set forth in State law) and encourage aircraft operating procedures that minimize noise.

Regulatory Background – Vibration

City of San José

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

EC-2.3 Require new development to minimize continuous vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, including ruins and ancient monuments or building that are documented to be structurally weakened, a continuous vibration limit of 0.08 in/sec PPV (peak particle velocity) will be used to minimize the potential for cosmetic damage to a building. A continuous vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction. Equipment or activities typical of generating continuous vibration include but are not limited to: excavation equipment; static compaction equipment; vibratory pile drivers; pile-extraction equipment; and vibratory compaction equipment. Avoid use of impact pile drivers within 125 feet of any buildings, and within 300 feet of historical buildings, or buildings in poor condition. On a project-specific basis, this distance

of 300 feet may be reduced where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction. Transient vibration impacts may exceed a vibration limit of 0.08 in/sec PPV only when and where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction.

Existing Noise Environment

The project site is located southwest of the Bassett Street/Terraine Street intersection in the City of San José. The project site is currently vacant and is bound by State Route 87 (SR 87) to the west, Bassett Street to the north, Terraine Street to the east, and an existing office development to the south. Existing residential buildings are located to the east, opposite Terraine Street, and to the north, opposite Bassett Street. The Department of Family and Children Services and other office buildings are located west of the project site, opposite SR 87.

The noise environment at the site and in the surrounding area results primarily from traffic noise generated by SR 87, which is an elevated roadway adjoining the project site. Local traffic along surrounding roadways and nearby Julian Street and Coleman Avenue, as well as intermittent jet aircraft associated with San José Mineta International Airport, also contribute to the noise environment.

A noise monitoring survey consisting of two long-term (LT-1 and LT-2) and three short-term (ST-1 through ST-3) noise measurements was conducted at the project site between Wednesday, July 19, 2023, and Friday, July 21, 2023. All measurement locations are shown in Figure 1.

Long-term noise measurement LT-1 was made along Terraine Street, approximately 20 feet west of the centerline. LT-1 was also approximately 320 feet from the centerline of the nearest through lane along SR 87. LT-1 was installed on a streetlight, approximately 12 feet above the ground. While LT-1 was slightly elevated above the ground, there may be some shielding from the elevated SR 87 structure. Hourly average noise levels at LT-1 typically ranged from 66 to 72 dBA L_{eq} during daytime hours (7:00 a.m. and 10:00 p.m.) and from 55 to 68 dBA L_{eq} during nighttime hours (10:00 p.m. and 7:00 a.m.). The day-night average noise level was 71 dBA DNL on Thursday, July 20, 2023. The daily trend in noise levels at LT-1 is shown in Figures A1 through A3 of Appendix A.

Long-term noise measurement LT-2 was made along Bassett Street, halfway between the elevated SR 87 structure and Terraine Street. LT-2 was approximately 20 feet south of the centerline of Bassett Street and approximately 185 feet from the centerline of the nearest through lane along SR 87. Similar to LT-1, LT-2 would be partially shielded from the elevated SR 87 structure. Hourly average noise levels at LT-2 typically ranged from 65 to 72 dBA L_{eq} during daytime hours and from 56 to 69 dBA L_{eq} during nighttime hours. The day-night average noise level was 71 dBA DNL on Thursday, July 20, 2023. The daily trend in noise levels at LT-2 is shown in Figures A4 through A6 of Appendix A.

Short-term noise measurements ST-1 through ST-3 were made on Wednesday, July 19, 2023, between 11:00 a.m. and 11:50 a.m. At each short-term location, noise level measurements were made at two heights: five feet and 24 feet above the ground. The elevated short-term measurements captured the direct line-of-sight noise levels for the expressway, representative of elevated receptors. The five-foot high measurements, which were made concurrently with the 24-foot high measurements, would not only represent the existing noise environment of the ground-level receptors, but could also be used to calculate the attenuation of the elevated structure at the ground-level. Table 4 summarizes the noise measurement results measured at each site.

ST-1 was made at the westernmost building façade of the proposed building, approximately 75 feet from the centerline of the nearest through lane of SR 87 and approximately 75 feet south of the centerline of Bassett Street. The dominant noise source at ST-1 was traffic noise along ST 87. At a height of five feet, traffic noise from SR 87 produced noise levels ranging from 64 to 68 dBA, while SR 87 generated noise levels of 64 to 78 dBA at a height of 24 feet. Additionally, a jet flyover produced noise levels of 78 dBA at both heights during ST-1. The 10-minute L_{eq} measured at ST-1 was 67 dBA at five feet high and 71 dBA at 24 feet high.

ST-2 was made near the southern façade of the proposed building, approximately 245 feet from the centerline of the nearest through lane of SR 87 and approximately 100 feet west of the centerline of Terraine Street. Traffic SR 87 dominated the noise environment at ST-2. Typical traffic noise levels along SR 87 ranged from 62 to 65 dBA at a height of five feet and from 63 to 73 dBA at a height of 24 feet. During the ST-2 measurement, a helicopter flyover generated noise levels of 71 dBA at a height of five feet and of 73 dBA at a height of 24 feet. General aviation produced noise levels of 72 to 73 dBA. The 10-minute L_{eq} measured at ST-2 was 65 dBA at five feet high and 68 dBA at 24 feet high.

ST-3 was made along the eastern façade of the proposed building, halfway between the northern and southern boundaries of the project site. ST-3 was approximately 300 feet from the centerline of the nearest through lane of SR 87 and approximately 40 feet west of the centerline of Terraine Street. Expressway traffic SR 87 dominated the noise environment at ST-3, with noise levels ranging from 63 to 66 dBA at the five-foot-height and from 60 to 74 dBA at the 24-foot-height. Jet aircraft produced noise levels of 73 to 74 dBA. The 10-minute L_{eq} measured at ST-3 was 65 dBA at five feet high and 67 dBA at 24 feet high.

TABLE 4 Summary of Short-Term Noise Measurements (dBA)

Noise Measurement Location	Date, Time	Height, ft	Measured Noise Level, dBA					
			L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}
ST-1: western façade of proposed building	7/19/2023, 11:00-11:10	5	78	75	68	66	63	67
		24	78	76	73	70	68	71
ST-2: southern façade of proposed building	7/19/2023, 11:20-11:30	5	72	71	67	64	61	65
		24	73	72	70	67	65	68
ST-3: eastern façade of proposed building	7/19/2023, 11:40-11:50	5	73	72	67	64	61	65
		24	74	72	69	67	65	67

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

Source: Google Earth, 2023.

PLAN CONSISTENCY ANALYSIS

Noise and Land Use Compatibility

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

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

- The City's acceptable interior noise level standard is 45 dBA DNL or less for the proposed residential land uses.

- The City's acceptable exterior noise level standard is 65 dBA DNL or less for the proposed public open spaces.

- The City's acceptable exterior noise level standard is 70 dBA DNL or less for the proposed commercial and office 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.

For purposes of this section, full project buildout is assumed, which would include the future office building conversion of the second tower.

The future noise environment at the site would continue to result primarily from vehicular traffic along SR 85 and local roadways. The traffic study completed for the proposed projects included peak hour turning movements at six intersections in the project vicinity. Comparing the cumulative plus project traffic volumes along the local roadways to the existing traffic volumes resulted in less than a 1 dBA DNL increase under future conditions. According to the *Envision San José 2040 General Plan Comprehensive Update EIR*, the traffic noise level increase at the project site based on future volumes along SR 87 would be up to 1 dBA DNL, and the future noise levels at a distance of 75 feet from the centerline of the nearest through lane along SR 87 would be 75 dBA DNL. Assuming worst-case conditions, a future noise level increase at the project site would be 1 dBA DNL.

Future Exterior Noise Environment

The site plan shows an amenity terrace on the second level that will connect the residential tower and future office tower. The residential tower would include private balconies at each unit, which would not be subject to the City's exterior noise thresholds. Additionally, the future office tower

would include three balconies on each floor (in the northeastern corner, in the southeastern corner, and along the western façade) and a rooftop common area with a trellis.

Residential Uses

The podium-level courtyard connecting the two towers is intended for both private and public use. The private use portion would include the tenant pool area, amenity terrace, and barbeque terrace, which would be closer to the north residential tower. The center of this outdoor space would be approximately 205 feet from the centerline of the nearest through lane along SR 87. Due to the elevation of both the expressway and the podium-level outdoor area, this space would have direct line-of-sight to the traffic noise. At this distance and assuming no attenuation, the future exterior noise level at the center of the residential courtyard would be up to 69 dBA DNL. This would exceed the City's exterior noise level threshold by 9 dBA DNL. This would require measures to reduce exterior noise levels to meet the City's thresholds.

Public Outdoor Space

The public-use portion of the podium-level courtyard would include an amphitheater and a gathering area. The amphitheater would be mostly at the pad elevation as the residential podium-level courtyard uses; however, the gathering area would be at a lower elevation, with the courtyard amphitheater and other uses providing shielding from SR 87. The center of the amphitheater would be approximately 230 feet from the centerline of the nearest through lane of SR 87, and the center of the gathering area would be approximately 275 feet from the centerline of the nearest through lane of SR 87. At these distances and assuming a minimum 10 dBA attenuation for the gathering area, future exterior noise levels at the amphitheater and gathering areas would be 68 and 57 dBA DNL, respectively. This would meet the City's thresholds of 70 and 65 dBA DNL, respectively, and would not require additional measures.

Office Uses

The future office tower would include common use outdoor balconies along the western façade, facing SR 87, on each floor. The center of these balconies would be set back approximately 175 feet from the centerline of the nearest through lane of SR 87. At this distance, the balconies would be exposed to future exterior noise levels ranging from 67 to 70 dBA DNL, 1 dBA DNL attenuation would occur due to elevation over the noise source every two floors. This would meet the City's 70 dBA DNL threshold for office uses.

The balconies located on each floor in the northeastern and southeastern corners of the office building would have direct line-of-sight to Terraine Street, with the centers set back approximately 40 feet. These balconies would also have some exposure to SR 87, with minimum setbacks of 280 feet from the centerline of the nearest through lane. At these distances, future exterior noise levels would range from 63 to 66 dBA DNL, 1 dBA DNL attenuation would occur due to elevation over the noise source every two floors. This would meet the City's 70 dBA DNL threshold for office uses.

Recommended Measures to Reduce Exterior Noise Levels

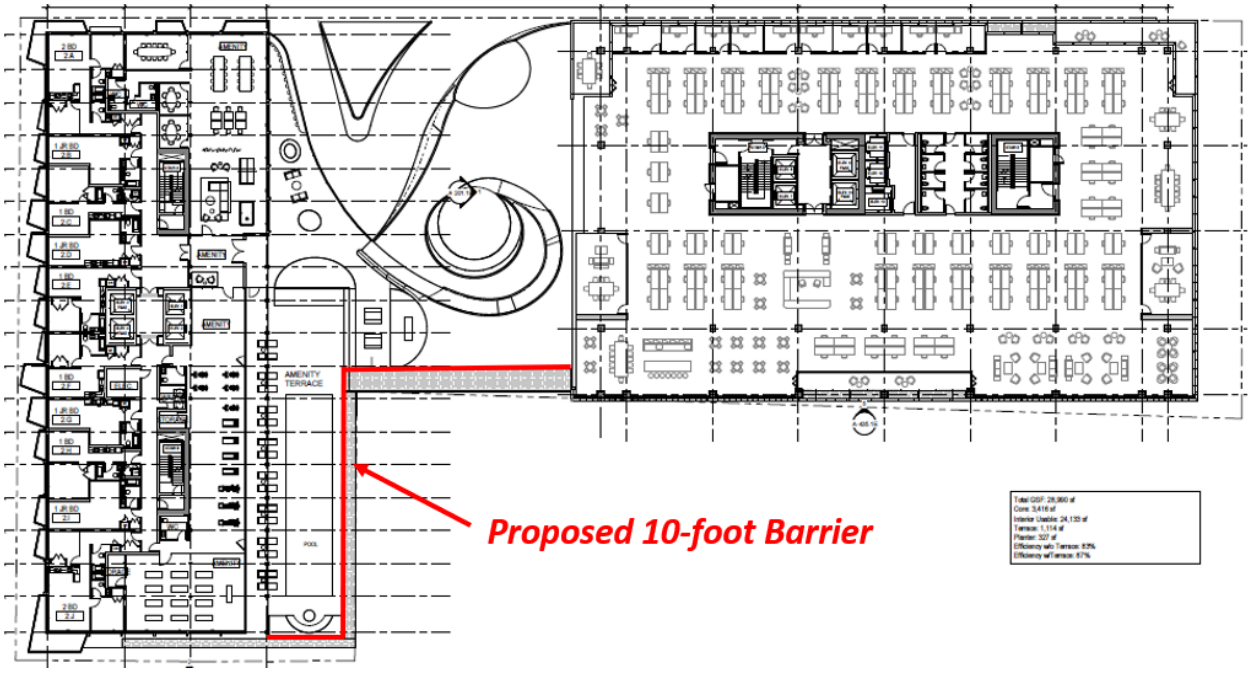
Methods available to reduce exterior noise levels at the residential podium-level courtyard would include site planning alternatives (e.g., using the proposed buildings as noise barriers), the

construction of traditional noise barriers, or a combination of the above. The optimal method for the existing site plan would be constructing barriers along the western edge of the courtyard, as shown in Figure 2.

According to the plans, some type of barrier and/or fence would be expected along the edge of the courtyard area. The total length of the proposed barrier would be approximately 210 feet. The proposed barrier would be continuous from grade to top, with no cracks or gaps, and have a minimum surface density of three lbs/ft^2 (e.g., one-inch-thick marine-grade plywood, ½-inch laminated glass, concrete masonry units (CMU)). To reduce future exterior noise levels by at least 9 dBA, a minimum barrier height of 10 feet would be required for reducing noise levels to 60 dBA DNL or less. The barrier height shall be measured relative to the elevation of the podium-level.

Final design recommendations shall be made when building designs have been finalized. An acoustical consultant shall be retained to review the final site plan and provide recommendations to reduce future exterior noise levels.

FIGURE 2 Recommended Location for the 10-foot Barrier



Future Interior Noise Environment

Residential Uses

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 DNL, 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 DNL, 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.

The residential tower would include residential units on floors two through 18. The units located along the western façade would have direct exposure to traffic noise from SR 87. These units would be set back approximately 75 feet from the centerline of the nearest through lane, and at this distance, the units located along the western building façade would be exposed to future exterior noise levels up to 75 dBA DNL. Assuming windows to be partially open for ventilation, future interior noise levels would be up to 60 dBA DNL at the residential interiors.

Units located along the northern and southern façades would also have some exposure to SR 87, with setbacks from the centerline of the nearest through lane ranging from about 75 to 290 feet. At these distances, residential units along these façades would be exposed to future exterior noise levels ranging from 66 to 75 dBA DNL. Assuming windows to be partially open for ventilation, future interior noise levels would range from 51 to 60 dBA DNL at the residential interiors.

While units located along the eastern façade would be shielded from SR 87, they would have direct exposure to traffic noise along Terraine Street, with setbacks of approximately 40 feet from the centerline. At this distance, units along the eastern façade would be exposed to future exterior noise levels up to 75 dBA DNL. Assuming windows to be partially open for ventilation, future interior noise levels would be up to 60 dBA DNL at the residential interiors.

The upper floors along each façade would be exposed to future exterior noise levels lower than those stated above, decreasing by about 1 dBA DNL every two floors.

To meet the interior noise requirements set forth by the City of San José of 45 dBA DNL, implementation of noise insulation features would be required.

Commercial and Office Uses

Ground-level commercial retail uses are proposed as part of each project site, in addition to future office uses in the second tower. The ground-level retail would front Terraine Street and Bassett Street along the eastern building façade, and offices along the eastern façade would be located on floors two through nine. With setbacks from the centerlines of each roadway being 40 and 30 feet, respectively, future daytime hourly average noise levels during operational hours at the ground-level commercial uses and the podium-level offices would range from 65 to 71 dBA L_{eq}, with future day-night average noise levels up to 69 dBA DNL.

The offices along the western building façade would be set back approximately 170 to 175 feet from the centerline of the nearest through lane of SR 87. Future daytime hourly average noise levels during operational hours at the podium-level office uses would range from 66 to 73 dBA L_{eq}, with future day-night average noise levels up to 73 dBA DNL. Offices on the upper floors would be exposed to reduced noise levels, with noise levels decreasing by about 1 dBA DNL every two floors.

Standard construction materials for commercial and office 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 DNL 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 at 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 located along the western façade would require windows and doors with a minimum rating of 38 STC with adequate forced-air mechanical ventilation to meet the interior noise threshold of 45 dBA DNL.

- **Preliminary** calculations indicate that residential units located along the eastern façade would require windows and doors with a minimum rating of 31 STC with adequate forced-air mechanical ventilation to meet the interior noise threshold of 45 dBA DNL.

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

Conditions of Approval

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 DNL or lower within the residential units and to 50 dBA $L_{eq(1\text{-}hr)}$ or lower within commercial 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) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

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

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

Impact 1a: **Temporary Construction Noise.** Existing noise-sensitive land uses would be exposed to a temporary increase in ambient noise levels for a period of longer than one year. According to the City's General Plan, this temporary noise increase would be **significant**.

Construction of the proposed project would occur Monday through Saturday 7:00 a.m. to 7:00 p.m. Construction for the residential tower and parking structure would start in early May 2024 and is expected to be completed by the end of July 2026 (26 months). Construction phases for the proposed project would include demolition, shoring/grading/excavation, below slab utility, foundation/structure, building construction, architectural coating, and site improvements. In early May 2034, construction for the conversion of the parking structure into an office building is expected to start. This construction would be completed early August 2035 (15 months) and would include demolition, building exterior, architectural coating, and site improvements phases. 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.

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

While the City of San José does not establish noise level thresholds for construction activities, this analysis uses the noise limits established by the Federal Transit Administration (FTA) to quantify the level of significance due to substantial temporary construction noise. The FTA identifies construction noise limits in the *Transit Noise and Vibration Impact Assessment Manual*.[2] During daytime hours, an exterior threshold of 80 dBA L_{eq} shall be enforced at residential land uses, 85 dBA L_{eq} shall be enforced at commercial and office land uses, and 90 dBA L_{eq} shall be enforced at industrial land uses.

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 residential and 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 of the residential building and parking structure 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. Same information for the conversion of the parking structure into an office building is summarized in Table 8.

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

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

Dig"). The usage factors represent the percentage of time that the equipment would be operating at full power.

Temporary construction noise was assessed at the receiving property lines of all existing noise-sensitive receptors in the area that would have direct exposure to the project site, which would include residential buildings to the north and to the east, offices to the south and to the west. Table 9 summarizes the hourly average noise levels calculated for all construction equipment operating simultaneously in each phase for the residential building and parking structure when the construction source level is positioned at the center of the site and propagated to the receiving property lines.

Table 10 shows construction noise levels in Table 8 propagated to the receiving property lines of the surrounding land uses, including the on-site residential tower. While these on-site receptors would not result in a significant impact from a CEQA standpoint, they would potentially be exposed to 15 months of disruption due to construction activities. The north (off-site) residences would be mostly shielded from construction activities during the conversion by the proposed on-site residential building. Conservatively, 20 dBA attenuation is applied to noise levels for this receptor in Table 10. Additionally, noise levels were propagated from the center of the proposed office building to the residential façade of the proposed on-site building since these receptors share property line boundaries with the proposed office building.

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 Due to the Proposed Residential Building and Parking Structure

Phase of Construction	Total Workdays	Construction Equipment (Quantity)	Estimated Construction Noise Level at 50 feet, dBA L_{eq}
Demolition	6 days	Tractor/Loader/Backhoe (1)[a]	80
Shoring/Grading/ Excavation	76 days	Dumper/Tender (2) Excavator (3)[a] Forklift (2) Generator Set (1) [a]	80
Below Slab Utility	27 days	Tractor/Loader/Backhoe (1) [a]	80
Foundation/ Structure	377 days	Aerial Lift (4) Air Compressor (8) Bore/Drill Rig (2) Cement & Mortar Mixer (2) Concrete/Industrial Saw (2)[a] Crane (2) Dumper/Tender (1) Excavator (2) Forklift (3) Other Material Handling Equipment (2) Plate Compactor (2) Pressure Washer (2)[a] Pump (2) Rough Terrain Forklift (2) Signal Board (1) Sweeper/Scrubber (1) Welder (4)	87

Phase of Construction	Total Workdays	Construction Equipment (Quantity)	Estimated Construction Noise Level at 50 feet, dBA L_{eq}
Building – Exterior	433 days	Aerial Lift (4) Air Compressor (4) Cement & Mortar Mixer (2) Concrete/Industrial Saw (1)[a] Crane (2) Forklift (2) Other Material Handling Equipment (2) Pressure Washer (2)[a] Welder (1)	87
Building – Interior/ Architectural Coating	477 days	Aerial Lift (4) Air Compressor (6) [a] Other Construction Equipment (2)[a]	83
Site Improvements	153 days	Paver (1)[a] Paving Equipment (1)[a]	83

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

TABLE 8 Estimated Construction Noise Levels at a Distance of 50 feet Due to Conversion of the Parking Structure into an Office Building

Phase of Construction	Total Workdays	Construction Equipment (Quantity)	Estimated Construction Noise Level at 50 feet, dBA L_{eq}
Demolition	99 days	Concrete/Industrial Saw (4)[a] Other Material Handling Equipment (6) Sweeper/Scrubber (1)[a]	83
Building – Exterior	262 days	Aerial Lift (6) Air Compressor (9) Concrete/Industrial Saw (4)[a] Forklift (4) Other Material Handling Equipment (6) Pressure Washer (2)[a] Welder (1)	87
Building – Interior/ Architectural Coating	230 days	Aerial Lift (9) Air Compressor (5) [a] Other Construction Equipment (11)[a]	83
Site Improvements	153 days	Paver (1)[a] Paving Equipment (1)[a]	83

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

TABLE 9 Estimated Construction Noise Levels Due to Residential Building and Parking Structure at the Receiving Property Lines in the Project Vicinity

Phase of Construction	Calculated Hourly Average Noise Levels, L_{eq} (dBA)			
	North Residences (230ft)	East Residences (135ft)	South Future Office (250ft)	West Offices (390ft)
Demolition	67	71	66	62
Shoring/Grading/ Excavation	71	75	70	66
Below Slab Utility	67	71	66	62
Foundation/ Structure	80	84	79	75
Building – Exterior	77	82	77	73
Building – Interior/ Architectural Coating	74	78	73	69
Site Improvements	70	75	69	65

TABLE 10 Estimated Construction Noise Levels Due to Conversion of the Parking Structure into an Office Building at the Receiving Property Lines in the Project Vicinity

Phase of Construction	Calculated Hourly Average Noise Levels, L_{eq} (dBA)				
	North Residences (325ft)	East Residences (130ft)	South Future Office (165ft)	West Offices (530ft)	Future On-Site Residences (170ft)
Demolition	53[a]	81	79	69	79
Building – Exterior	56[a]	84	82	72	82
Building – Interior/ Architectural Coating	57[a]	85	82	72	82
Site Improvements	47[a]	75	73	63	73

[a] Conservative 20 dBA attenuation was applied for intervening buildings.

As shown in Tables 7 and 8, construction noise levels would intermittently range from 80 to 87 dBA L_{eq} when noisy construction equipment is operated within 50 feet from nearby receptors. When equipment is located near the center of the project site or farther from the receiving property lines, construction noise levels would typically range from 67 to 84 dBA L_{eq} at the property lines of the nearest residential land uses and from 62 to 79 dBA L_{eq} at the nearest receiving property lines of office buildings during the construction of the residential building and parking structure. During the conversion of the parking structure into the proposed office building, construction noise levels would typically range from 47 to 85 dBA L_{eq} at the property lines of the nearest off-site residential land uses, from 63 to 82 dBA L_{eq} at the nearest receiving property lines of office buildings, and from 73 to 82 dBA L_{eq} at the nearest façade of the on-site residential building.

Considering project construction of the residential building and parking structure and during the conversion of the parking structure into an office building is expected to last for a period of more than one year, the temporary increase in noise levels would result in a significant impact, according to Policy EC-1.7 of the City's General Plan.

Mitigation Measure 1a:

Pursuant to this General Plan Policy, a construction noise logistics plan shall be prepared that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses. Project construction operations shall use best available noise suppression devices and techniques including, but not limited to the following:

- Limit construction hours to between 7:00 a.m. and 7:00 p.m., Monday through Friday, unless permission is granted with a development permit or other planning approval. No construction activities are permitted on the weekends at sites within 500 feet of a residence. Construction outside of these hours may be approved through a development permit based on a site-specific "construction noise mitigation plan" and a finding by the Director of PBCE that the construction noise mitigation plan is adequate to prevent noise disturbance of affected residential uses.

- Construct solid plywood fences to shield sensitive receptors from ground-level/below grade construction activities. A temporary eight-foot noise barrier would provide 7 dBA or more attenuation for surrounding noise-sensitive land uses when construction activities occur at the ground level or below grade.

- If legitimate complaints made by nearby residences to the north or to the east are irresolvable, erect a temporary noise control blanket barrier, where feasible, at the property line or on scaffolding just outside the proposed towers facing the residences during construction of the upper floors. This would control construction noise when activities do not occur at the ground level.

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

- Prohibit unnecessary idling of internal combustion engines.

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

- 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.

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

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

With the implementation of GP Policy EC-1.7 and the above mitigation measures, temporary construction noise levels would be reduced by up to 7 dBA at all impacted receptors. This would reduce the temporary noise level increase to below FTA thresholds throughout the duration of project construction. It should also be noted that the existing ambient noise environment at the northern and eastern boundaries of the project site reach noise levels up to 72 dBA L_{eq} at ground level receptors and up to 76 dBA L_{eq} at elevated receptors during daytime hours when construction activities would occur. Considering the noisy ambient environment, implementation of the above mitigation measures would reduce the temporary construction impact to a less-than-significant level at the noise-sensitive receptors in the vicinity.

Impact 1b: **Permanent Noise Level Increase/Exceed Applicable Standards.** The proposed project would not result in a substantial permanent noise level increase at the noise-sensitive receptors in the project vicinity. Operational noise levels generated by the proposed project would potentially exceed applicable standards established by the City of San José. This is a **potentially significant** impact.

According to Policy EC-1.2 of the City's General Plan, a significant permanent noise increase would occur if the project would substantially increase noise levels at existing sensitive receptors in the project vicinity. A substantial increase would occur if: a) the noise level increase is 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL at residences; or b) the noise level increase is 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater at residences. Noise levels at sensitive land uses exceed 60 dBA DNL; therefore, a significant impact would occur if traffic or operational noise due to the proposed project would permanently increase ambient levels by 3 dBA DNL.

Under the City's Noise Element, noise levels from nonresidential building equipment shall not exceed a noise level of 55 dBA DNL at receiving noise-sensitive land uses. While the initial tower would include residential uses, the future project would also include an office tower. Therefore, Policies EC-1.3 and EC-1.6 shall be applied to the proposed project.

The City's General Plan does not include thresholds for equipment noise generated at residential buildings or noise thresholds at receiving office land uses; however, the Municipal Code requires

mechanical equipment noise to be maintained at or below 55 dBA at receiving residential properties when operational noise is generated at residential uses. Additionally, the Municipal Code includes a noise limit of 60 dBA on receiving nonresidential uses when generated at residential or commercial/office uses.

Project Traffic Increase

The traffic study included peak hour turning movements for the existing traffic volumes and project trips at four intersections in the vicinity of the project site for the initial residential tower and parking garage and the future office building. The project trips for both project stages were added to the existing traffic volumes to generate the existing plus project scenario under both conditions. By comparing the existing plus project traffic scenarios to the existing scenario, the total contribution of both project stages to the overall noise level increase was determined to be 1 dBA DNL or less along each roadway segment in the project vicinity, as summarized in Table 11. Therefore, the project would not result in a permanent noise increase of 3 dBA DNL or more at noise-sensitive receptors in the project vicinity.

TABLE 11 Estimated Noise Level Increases of Existing Plus Project Traffic Volumes Over Existing Volumes at Receptors in the Project Vicinity

Roadway	Segment	Estimated Noise Level Increase, dBA DNL	
		Initial Project	Future Project Buildout
Terraine Street	Bassett Street to Julian Street	0	0
	Julian Street to West St. James Street	0	0
	South of West St. James Street	0	0
Coleman Avenue/Market Street	North of Julian Street	0	0
	South of Julian Street	0	0
Bassett Street	East of Terraine Street	0	0
	West of Terraine Street	0	0
Julian Street	East of Coleman Avenue/Market Street	0	0
	Coleman Avenue/Market Street to Terraine Street	0	0
St. James Street	East of Terraine Street	0	0
Julian Street/St. James Street	Terraine Street to SR 87 northbound ramps/Notre Dame Avenue	0	1
	SR 87 northbound ramps/Notre Dame Avenue to SR 87 southbound ramps/Almaden Boulevard	0	1
	West of SR 87 southbound ramps/Almaden Boulevard	0	0
Notre Dame Avenue	South of Julian Street/St. James Street	0	0
Almaden Boulevard	South of Julian Street/St. James Street	0	0

Roadway	Segment	Estimated Noise Level Increase, dBA DNL	
		Initial Project	Future Project Buildout
SR 87 northbound on-ramp	North of Julian Street/St. James Street	0	0
SR 87 southbound off-ramp	North of Julian Street/St. James Street	0	1

Mechanical Equipment

The site plan shows a ground-level mechanical room and pool room on the ground level in the northwestern corner of the building. All equipment located within these rooms would be well shielded from the surrounding receptors. Noise levels generated by this equipment would meet the City's thresholds at the receiving property lines. For all existing receptors, the noise level increase due to mechanical equipment noise would not be measurable or detectable (0 dBA DNL increase).

The proposed project would include one emergency generator, which would be located in a ground-level room along the northern façade of the residential tower. The applicant has indicated that a Cummins 900 kW Ultra Low Sulphur Diesel generator has been selected for the proposed project. This type of equipment would not typically run continuously, as it operates during emergency situations when the noise level restrictions would not typically apply. However, emergency equipment is tested monthly for a period of one hour between 7:00 a.m. and 10:00 p.m. to ensure the equipment is operating efficiently in case an emergency occurs. During the monthly testing periods, the noise level thresholds would apply. The building wall assembly would provide a conservative 20 dBA attenuation, which is assumed for this analysis.

Similar Cummins emergency generators with a 900 kW capacity generate noise levels of about 88 dBA at 23 feet. For purposes of this study, these source levels are used in the analysis. Assuming continuous operations during the one-hour testing period, the day-night average noise level at 23 feet would be 74 dBA DNL.

Table 12 summarizes the estimated noise levels generated by the testing of the emergency generator propagated to the property lines of the surrounding receptors. These include the hourly average noise levels during testing, the day-night average noise levels in the 24-hour period during testing, and the estimated noise level increase over existing conditions that would occur in the 24-hour testing period. A conservative 20 dBA attenuation is applied to all noise levels in Table 12.

Based on the estimated noise levels in Table 12, emergency generator noise levels would not exceed the City's General Plan threshold of 55 dBA DNL at existing residential receptors to the east. However, hourly average noise levels would exceed 55 dBA at the north residences. For all existing receptors, the noise level increase due to mechanical equipment noise would not be measurable or detectable (0 dBA DNL increase).

TABLE 12 Estimated Noise Levels for the Ground-Level Emergency Generator

Receptor	Distance from Center of Room, feet	Hourly L_{eq}, dBA	DNL, dBA	Noise Level Increase, dBA DNL
North Residences	70	58[a]	45[a]	0
East Residences	230	48[a]	34[a]	0
South Future Office	415	43[a]	29[a]	N/A[b]
West Office	420	43[a]	29[a]	0

[a] A conservative 20 dBA reduction was applied to the noise levels due to the building assembly.
[b] The future office building, which would be constructed near the shared property line is not an existing receptor. Therefore, the occupants would not be exposed to a noise level increase due to the proposed project.

Level 10 of the proposed parking garage would include an air-to-water heat pump, a cooling tower, heat exchangers, condenser water piping, a water treatment system, and cooling tower filters. The noise-generating equipment and typical source levels include the heat pumps (56 to 66 at 3 feet), the cooling tower (74 dBA at 50 feet), and the heat exchangers (89 dBA at 3 feet for two units). The total mechanical equipment noise on level 10 of the proposed parking garage would be 75 dBA at 50 feet. Assuming this equipment to be operating continuously each hour in a 24-hour period, the day-night average noise level would be 81 dBA DNL at 50 feet.

Additional equipment expected after the office building conversion would include two air handling units, a future cooling tower, two future heat pumps, two future heat exchangers, and future condensing water piping. Air handling units typically generate noise levels up to 62 dBA at a distance of 20 feet. When the future office equipment is added to the parking garage equipment, the combined hourly average noise level would be 78 dBA L_{eq} at 50 feet, assuming continuous operation. Assuming continuous operation over a 24-hour period, the day-night average noise level would be 84 dBA DNL at 50 feet.

The residential tower would adequately shield the north residences from the level 10 mechanical equipment. The east residential building and the existing office building to the west are five stories tall, which would result in a minimum attenuation of 9 dBA. Additionally, the site plan shows a building signage integrated into a mechanical screen along the western façade. However, the mechanical screen does not appear to be solid, and therefore, would not provide additional attenuation. The future office building to the south would be over 10 stories tall. Therefore, the elevated occupants of the future office building would have direct line-of-sight to the level 10 equipment, and no attenuation is assumed for these receptors in this analysis. Table 13 summarizes the noise levels due to level 10 parking garage equipment propagated to the property lines of the receiving land uses surrounding the site, and Table 14 summarizes the noise levels generated by level 10 future office equipment propagated to the surrounding receiving property lines. Note, the north residences are not included in Tables 13 and 14 since they would be adequately shielded from the level 10 equipment.

Based on the estimated noise levels in Tables 13 and 14, noise levels produced by the level 10 mechanical equipment would exceed the City's General Plan threshold of 55 dBA DNL at the east residences. Additionally, the Municipal Code threshold of 60 dBA DNL would be exceeded at future office receptors to the south of the site.

For all existing receptors, the noise level increase due to level 10 mechanical equipment noise would be 1 dBA DNL or less. Note, the increase calculated under the office building conversion (shown in Table 14) is compared to the existing ambient conditions. This would not be an additional increase from the 1 dBA DNL increase calculated for the residential building and parking garage scenario. Therefore, the initial project and the total project buildout would result in a total noise level increase of 1 dBA DNL over existing ambient conditions.

TABLE 13 Estimated Noise Levels for the Level 10 Mechanical Equipment for the Proposed Parking Garage

Receptor	Distance from Center of Equipment Area, feet	Hourly L_{eq}, dBA	DNL, dBA	Noise Level Increase, dBA DNL
East Residences	160	55[a]	62[a]	1
South Future Office	155	65	71	N/A[b]
West Office	495	46[a]	52[a]	0

[a] A conservative 9 dBA reduction was applied to the noise levels due to the building assembly.
[b] The future office building, which would be constructed near the shared property line is not an existing receptor. Therefore, the occupants would not be exposed to a noise level increase due to the proposed project.

TABLE 14 Estimated Noise Levels for the Level 10 Mechanical Equipment for the Future Office Building

Receptor	Distance from Center of Equipment Area, feet	Hourly L_{eq}, dBA	DNL, dBA	Noise Level Increase, dBA DNL
East Residences	160	58[a]	65[a]	1[c]
South Future Office	155	68	74	N/A[b]
West Office	495	49[a]	55[a]	0

[a] A conservative 9 dBA reduction was applied to the noise levels due to the building assembly.
[b] The future office building, which would be constructed near the shared property line is not an existing receptor. Therefore, the occupants would not be exposed to a noise level increase due to the proposed project.
[c] This noise level increase is calculated from the existing ambient noise environment, not from the noise environment under project conditions with the residential building and parking garage. No additional noise level increase would be calculated for the office building conversion.

Heating, ventilation, and air conditioning (HVAC) units are typically part of residential buildings. For the proposed project, these units would be located on the roof of the residential building. Noise levels produced by residential HVAC units typically range from 53 to 63 dBA at 3 feet during operation. These types of units typically cycle on and off continuously during daytime and nighttime hours. Assuming up to 10 units would be located in the same vicinity, noise levels would typically be up to 73 dBA L_{eq} at 3 feet, assuming continuous operation.

Table 15 summarizes the hourly average noise levels and the day-night average noise levels at the property lines of each receiving land use. Due to the elevation of the rooftop equipment, each of the surrounding land uses would have a minimum attenuation of 10 dBA. This takes into account the elevated receptors in each of the surrounding existing and future buildings, as well as the intervening project parking garage/office building.

Based on the estimated noise levels in Table 15, noise levels produced by the residential rooftop mechanical equipment would not exceed the City's General Plan or Municipal Code thresholds at the surrounding receptors. For all existing receptors, the noise level increase due to residential rooftop mechanical equipment noise would not be measurable or detectable (0 dBA DNL increase).

TABLE 15 Estimated Noise Levels for the Level 10 Mechanical Equipment

Receptor	Distance from Center of Equipment Area, feet	Hourly L_{eq}, dBA	DNL, dBA	Noise Level Increase, dBA DNL
North Residences	65	36[a]	43[a]	0
East Residences	85	34[a]	40[a]	0
South Future Office	365	21[a]	28[a]	N/A[b]
West Office	360	21[a]	28[a]	0

[a] A conservative 10 dBA reduction was applied to the noise levels due to the building assembly.
[b] The future office building, which would be constructed near the shared property line is not an existing receptor. Therefore, the occupants would not be exposed to a noise level increase due to the proposed project.

Truck Loading and Unloading

Loading areas would be located on the ground levels of the residential tower and parking garage/future office building within the structures. All noise generated by truck loading and unloading activities would be well shielded from the surrounding receptors. Noise levels generated by loading and unloading activities would meet the City's thresholds at the receiving property lines. For all existing receptors, the noise level increase due to truck loading and unloading noise would not be measurable or detectable (0 dBA DNL 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 1 dBA DNL or less at all existing noise-sensitive receptors surrounding the project site. Therefore, the proposed project would not result in a substantial increase over existing ambient noise levels in the project vicinity. Operational noise levels produced by the emergency generator and produced at level 10 of the future office building would potentially exceed 55 dBA DNL at the nearest residential receptors. Therefore, this would be a potentially significant impact.

Additionally, the proposed project would exceed the City's Municipal Code noise limit of 60 dBA DNL at the property line of the adjoining office use. However, this would not result in a significant impact under CEQA.

Mitigation Measure 1b:

The final design plans for project mechanical equipment should be reviewed by a qualified acoustical consultant to address any potential conflicts with the General Plan or Municipal Code. The City's standard permit condition shall be implemented as a condition of approval for the proposed project. The standard permit condition states the following:

> A detailed acoustical study shall be prepared during final building design to evaluate the potential noise generated by building mechanical equipment and demonstrate the necessary noise control to meet the City's 55 dBA DNL goal at receiving residential property lines and to meet the reasonable design goal of 70 dBA DNL at the property line of the adjoining office use. Reducing mechanical equipment noise by up to 14 dBA to meet the City's 60 dBA DNL standard would not be reasonably achievable; however, a design goal of 70 dBA DNL, which is based on the ambient noise levels at sites adjoining SR 87 being 71 dBA DNL, would be a reasonable performance standard. Noise control features such as sound attenuators, baffles, and barriers shall be identified and evaluated to demonstrate that mechanical equipment noise would not exceed 55 dBA DNL at receiving residential property lines surrounding the project site or 70 dBA DNL at receiving office/commercial property lines surrounding the project site. The noise control features identified by the study shall be incorporated into the project prior to issuance of a building permit.

The implementation of the standard permit condition would reduce noise levels originating from the project site to a less-than-significant level.

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.

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

Table 15 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 16 also summarizes the distances to the 0.08 in/sec PPV threshold for historical buildings and to the 0.2 in/sec PPV threshold for all other buildings.

According to the City's Historic Resource Inventory,[3] the nearest historical structure is located at 181 Devine Street, which is approximately 235 feet southeast of the project site. At this distance, construction vibration levels would be below 0.02 in/sec PPV. Therefore, project construction would have no impact on the nearest historical structure. Historical buildings are not discussed further in this impact discussion.

TABLE 16 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 0.2 in/sec PPV (feet)
Clam shovel drop		0.202	59	26
Hydromill (slurry wall)	in soil	0.008	4	2
	in rock	0.017	7	3
Vibratory Roller		0.210	61	27
Hoe Ram		0.089	28	13
Large bulldozer		0.089	28	13
Caisson drilling		0.089	28	13
Loaded trucks		0.076	24	11
Jackhammer		0.035	12	6
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., November 2023.

Table 17 summarizes the vibration levels at nearest surrounding buildings. Vibration levels are highest close to the source and then attenuate with increasing distance at the rate $\left({D_{ref}}/{D}\right)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet. While construction noise levels increase based on the cumulative equipment in use simultaneously, construction vibration levels would be dependent on the location of individual pieces of equipment. That is, equipment scattered throughout the site would not generate a collective vibration level, but a vibratory roller, for instance, operating near the project site boundary would generate the worst-case vibration levels for the receptor sharing that property line. Further, construction vibration impacts are assessed based on damage to buildings on receiving land uses, not receptors at the nearest property lines. Therefore, the distances used to propagate construction

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

vibration levels (as shown in Table 17), which are different than the distances used to propagate construction noise levels (as shown in Tables 9 and 10), were estimated under the assumption that each piece of equipment from Table 16 was operating along the nearest boundary of the project sites, which would represent the worst-case scenario.

Project construction activities would potentially generate vibration levels below 0.1 in/sec PPV at the nearest buildings surrounding the site, as summarized in Table 16. This would result in no cosmetic, minor, or major damage, as described above.

Additionally, construction during the conversion of the parking garage into an office building would potentially generate vibration levels up 0.088 in/sec PPV at the future on-site residential building, which would be about 55 feet from the future office building. This would also not result in cosmetic, minor, or major damage.

Neither cosmetic, minor, or major damage would occur at buildings located in the project vicinity. 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 not generate vibration levels exceeding the General Plan threshold of 0.2 in/sec PPV at nonhistorical properties adjoining the project site. This would be a less-than-significant impact.

TABLE 17 Vibration Levels Estimated at the Nearest Structures Surrounding the Project Site

Equipment		PPV (in/sec)			
		North Residences (55ft)	East Residences (55ft)	South Office (355ft)	West Offices (360ft)
Clam shovel drop		0.085	0.085	0.011	0.011
Hydromill (slurry wall)	in soil	0.003	0.003	0.000	0.000
	in rock	0.007	0.007	0.001	0.001
Vibratory Roller		0.088	0.088	0.011	0.011
Hoe Ram		0.037	0.037	0.005	0.005
Large bulldozer		0.037	0.037	0.005	0.005
Caisson drilling		0.037	0.037	0.005	0.005
Loaded trucks		0.032	0.032	0.004	0.004
Jackhammer		0.015	0.015	0.002	0.002
Small bulldozer		0.001	0.001	0.000	0.000

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., November 2023.

Mitigation Measure 2: **None required.**

Impact 3: **Excessive Aircraft Noise.** The project sites are located 1.3 miles or more from San José Mineta International Airport, and the noise environment attributable to aircraft is considered normally acceptable under the Santa Clara County ALUC noise compatibility policies for residential land uses. This is a **less-than-significant** impact.

San José Mineta International Airport is a public-use airport located approximately 1.3 miles or more northwest of the project site. According to the City's new Airport Master Plan Environmental Impact Report,[4] the project site lies inside the 60 dBA CNEL/DNL contour line but outside the 65 dBA DNL contour line (see Figure 3). According to Policy EC-1.11 of the City's General Plan, the required safe and compatible threshold for exterior noise levels would be at or below 65 dBA CNEL/DNL for aircraft. Therefore, the proposed project would be compatible with the City's exterior noise standards for aircraft noise.

Assuming standard construction materials with forced-air mechanical ventilation for aircraft noise, as recommended above for all residential units located on the project site, the future interior noise levels resulting from aircraft would be below 45 dBA DNL. Therefore, future interior noise at the proposed building would be compatible with aircraft noise with the inclusion of forced-air mechanical ventilation. This would be a less-than-significant impact.

Mitigation Measure 3: **No further mitigation required.**

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

FIGURE 3 2037 CNEL Noise Contours for SJIA Relative to Project Site

Figure 5
Scenario 2: With Project 2037 Noise Contour Map

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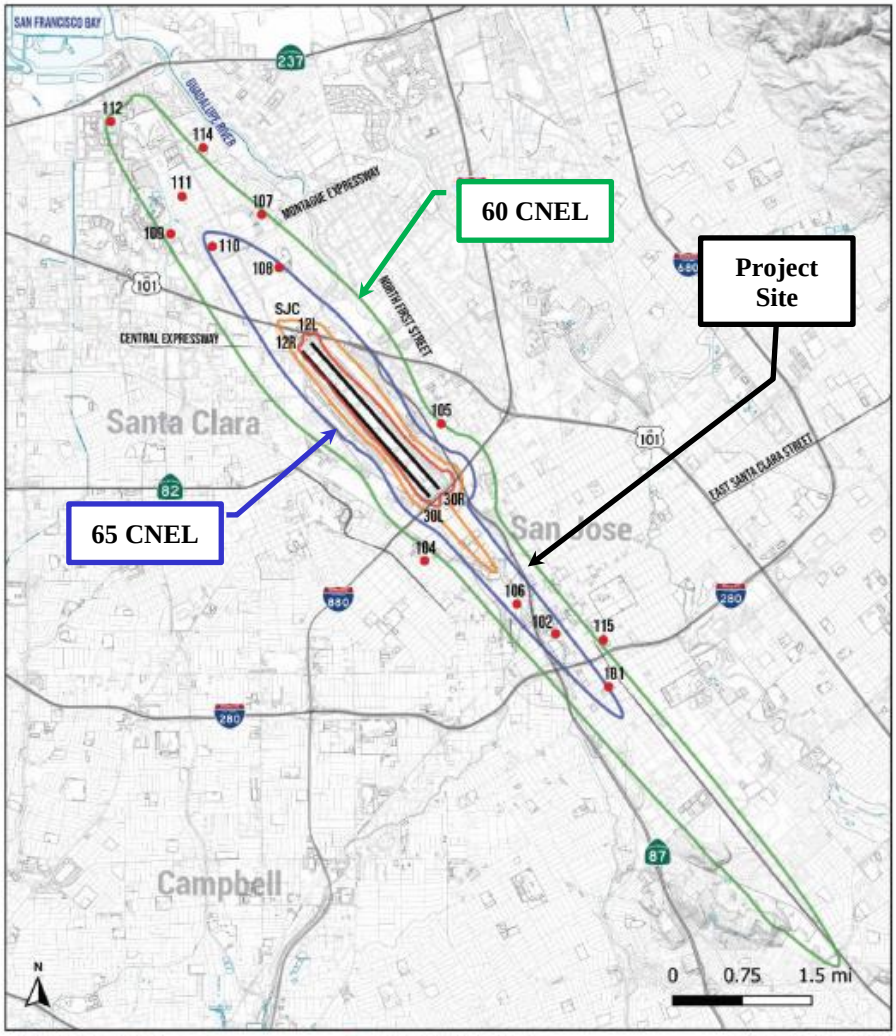

NORMAN Y. MINETA SAN JOSE INTERNATIONAL AIRPORT

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

Figure 5 Scenario 2: With Project 2037 Noise Contour Map

Source: BridgeNet International 2019

Cumulative Impacts

Cumulative noise impacts would include temporary construction noise from cumulative construction projects. From the City's website,[5] the following planned or approved projects are located within 1,000 feet of the project site:

- **Aviato –** this 18-story tower would include 803 co-living residential units and 3,800 square feet of ground-level retail and is located at 199 Bassett Street, less than 100 feet from the proposed project site. While the construction schedule for the Aviato Project has not been confirmed, this project has been approved and will likely be built before the Terraine Project. Therefore, a significant cumulative construction impact would not be assumed.

- **Arbor –** this 14-story, 512,031 square-foot commercial and office building would be constructed at 255 West Julian Street, which is the adjoining office development to the south (identified in this report as the south office building). While the construction schedule for the Arbor Project has not been confirmed, this project has been approved and will likely be built before the Terraine Project. Therefore, a significant cumulative construction impact would not be assumed.

- **Silvery Towers –** this project consists of a two-towered (20 and 22 stories) mixed-use building with 643 residential units and 30,228 square feet of retail space. This project site is located at 188 West Saint James Street, approximately 655 feet southeast of the project site, and is currently under construction. Since this project will be constructed before the proposed project, a significant cumulative construction impact would not occur.

All other planned or approved projects would be more than 1,000 feet from the project site, which would not share receptors with the proposed project. Therefore, there would not be a cumulative construction impact.

For a substantial permanent cumulative noise increase to occur, two qualifications must be met: 1) if the cumulative plus project traffic volumes result in a noise level increase at sensitive receptors of 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or of 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater, compared to existing traffic volumes; and 2) if the cumulative plus project traffic volumes result in a 1 dBA DNL or more noise level increase compared to the increase calculated for the cumulative (no project) conditions, which would be considered a cumulatively considerable contribution to the overall traffic noise increase.

The traffic study included cumulative (no project) volumes and two cumulative (plus project) volumes for the initial project and the future project at six intersections in the vicinity of the project site. Table 18 summarizes the noise level increases calculated by comparing all three cumulative scenarios to the existing volumes (i.e., no project, initial project, and future project buildout) and the project's contribution to both cumulative plus project conditions, which is calculated by comparing the increase of the cumulative plus project conditions to the cumulative (no project) scenario. As shown in Table 18, one roadway segment would result in a noise level increase of 3

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

dBA DNL under cumulative conditions: Julian Street/St. James Street, Terraine Street to SR 87 northbound ramps/Notre Dame Avenue. Since a 3 dBA DNL increase was calculated under all three cumulative scenarios (i.e., no project, initial project, and future project buildout), however, the project's contribution would be 0 dBA DNL. Therefore, the proposed project would not make a cumulatively considerable contribution to the overall traffic noise increase. This would be a less-than-significant cumulative impact.

TABLE 18 Estimated Noise Level Increases of Cumulative and Cumulative Plus Project Traffic Volumes Over Existing Volumes at Receptors in the Project Vicinity

Roadway	Segment	Estimated Noise Level Increase Over Existing Volumes, dBA DNL			Project's Contribution	
		Cumulative (No Project)	Initial Project	Future Project Buildout	Initial Project	Future Project Buildout
Terraine Street	Bassett Street to Julian Street	0	0	0	0	0
	Julian Street to West St. James Street	0	0	0	0	0
	South of West St. James Street	0	0	0	0	0
Coleman Avenue/Market Street	North of Julian Street	1	1	1	0	0
	South of Julian Street	1	1	1	0	0
Bassett Street	East of Terraine Street	0	0	0	0	0
	West of Terraine Street	0	0	0	0	0
Julian Street	East of Coleman Avenue/Market Street	1	1	1	0	0
	Coleman Avenue/Market Street to Terraine Street	0	0	0	0	0
St. James Street	East of Terraine Street	0	0	0	0	0
Julian Street/St. James Street	Terraine Street to SR 87 northbound ramps/Notre Dame Avenue	**3**	**3**	**3**	0	0
	SR 87 northbound ramps/Notre Dame Avenue to SR 87 southbound ramps/Almaden Boulevard	2	2	2	0	0
	West of SR 87 southbound ramps/Almaden Boulevard	2	2	2	0	0
Notre Dame Avenue	South of Julian Street/St. James Street	2	2	2	0	0

Roadway	Segment	Estimated Noise Level Increase Over Existing Volumes, dBA DNL			Project's Contribution	
		Cumulative (No Project)	Initial Project	Future Project Buildout	Initial Project	Future Project Buildout
Almaden Boulevard	South of Julian Street/St. James Street	0	0	0	0	0
SR 87 northbound on-ramp	North of Julian Street/St. James Street	2	2	2	0	0
SR 87 southbound off-ramp	North of Julian Street/St. James Street	1	1	2	0	1

APPENDIX A

FIGURE A1 Daily Trend in Noise Levels for LT-1 on Wednesday, July 19, 2023

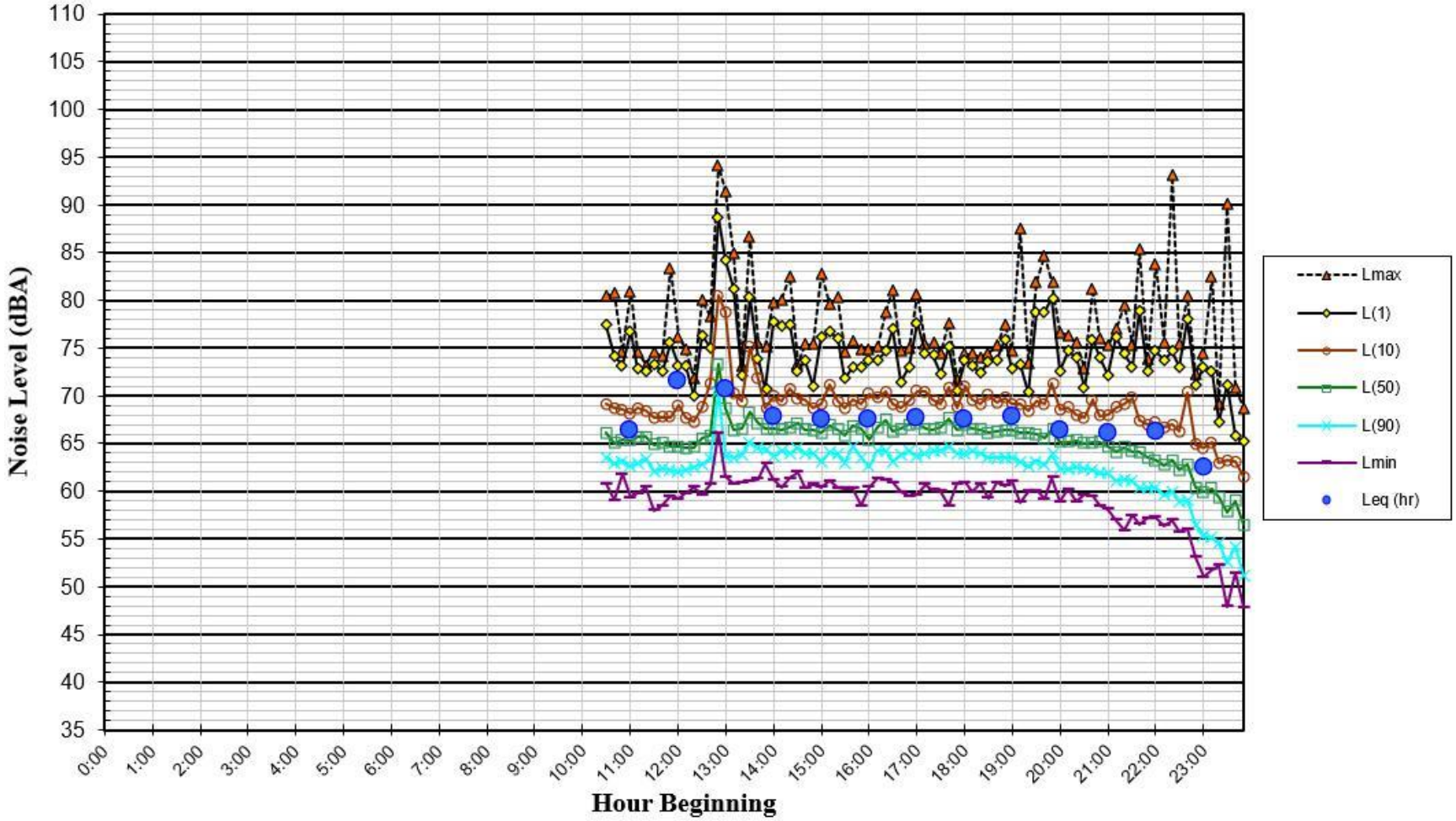

FIGURE A2 Daily Trend in Noise Levels for LT-1 on Thursday, July 20, 2023

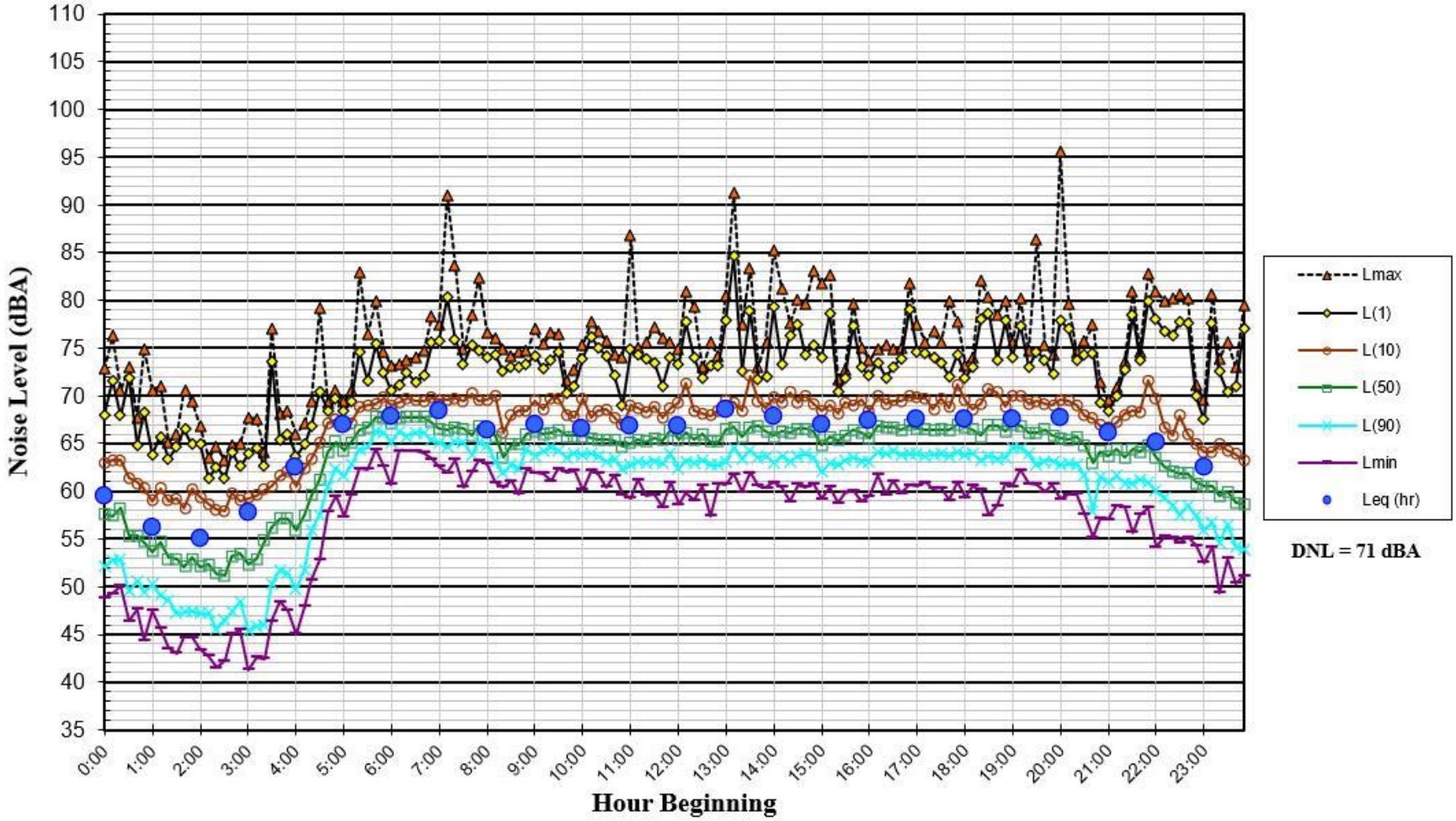

FIGURE A3 Daily Trend in Noise Levels for LT-1 on Friday, July 21, 2023

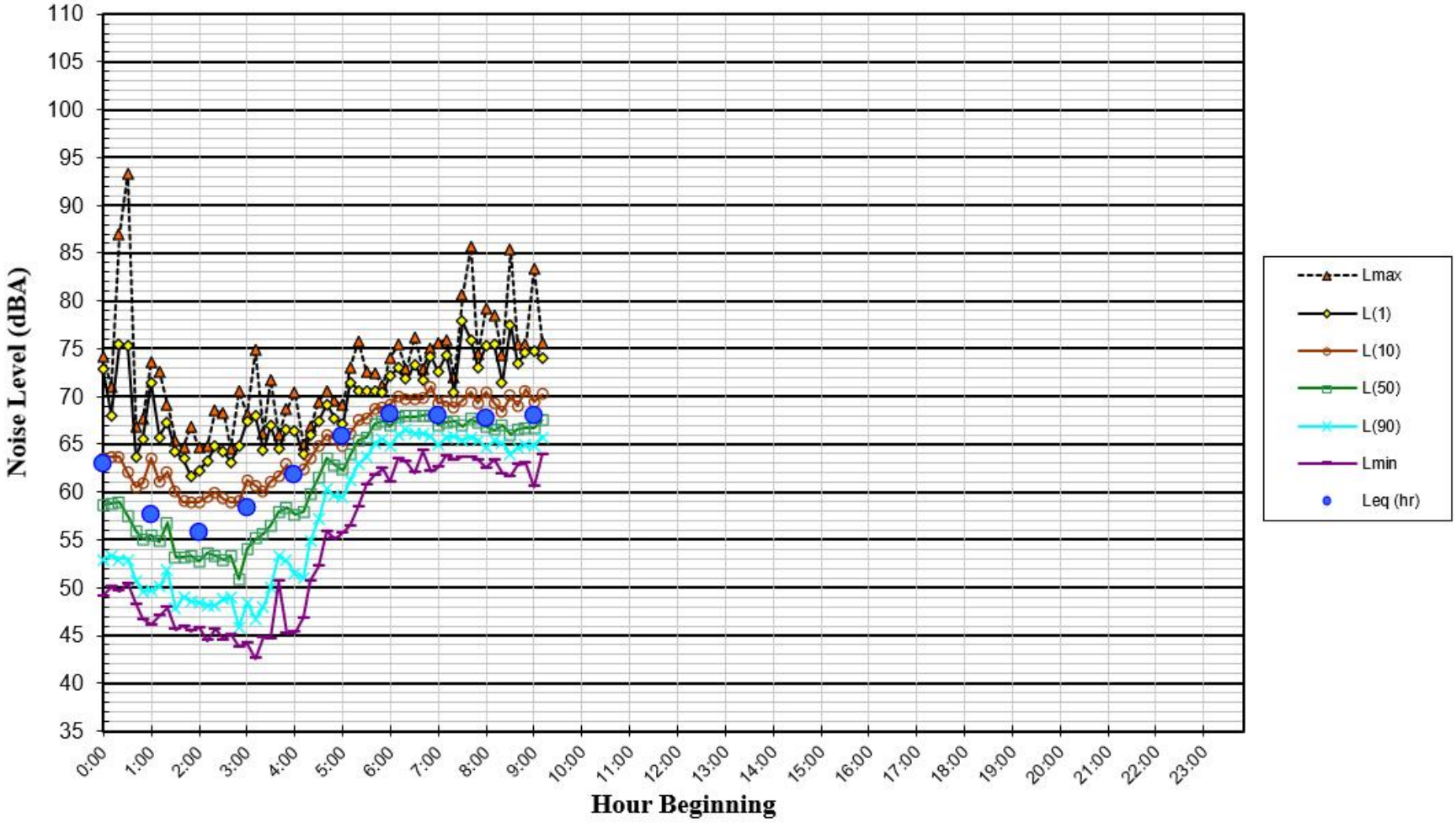

FIGURE A4 Daily Trend in Noise Levels for LT-2 on Wednesday, July 19, 2023

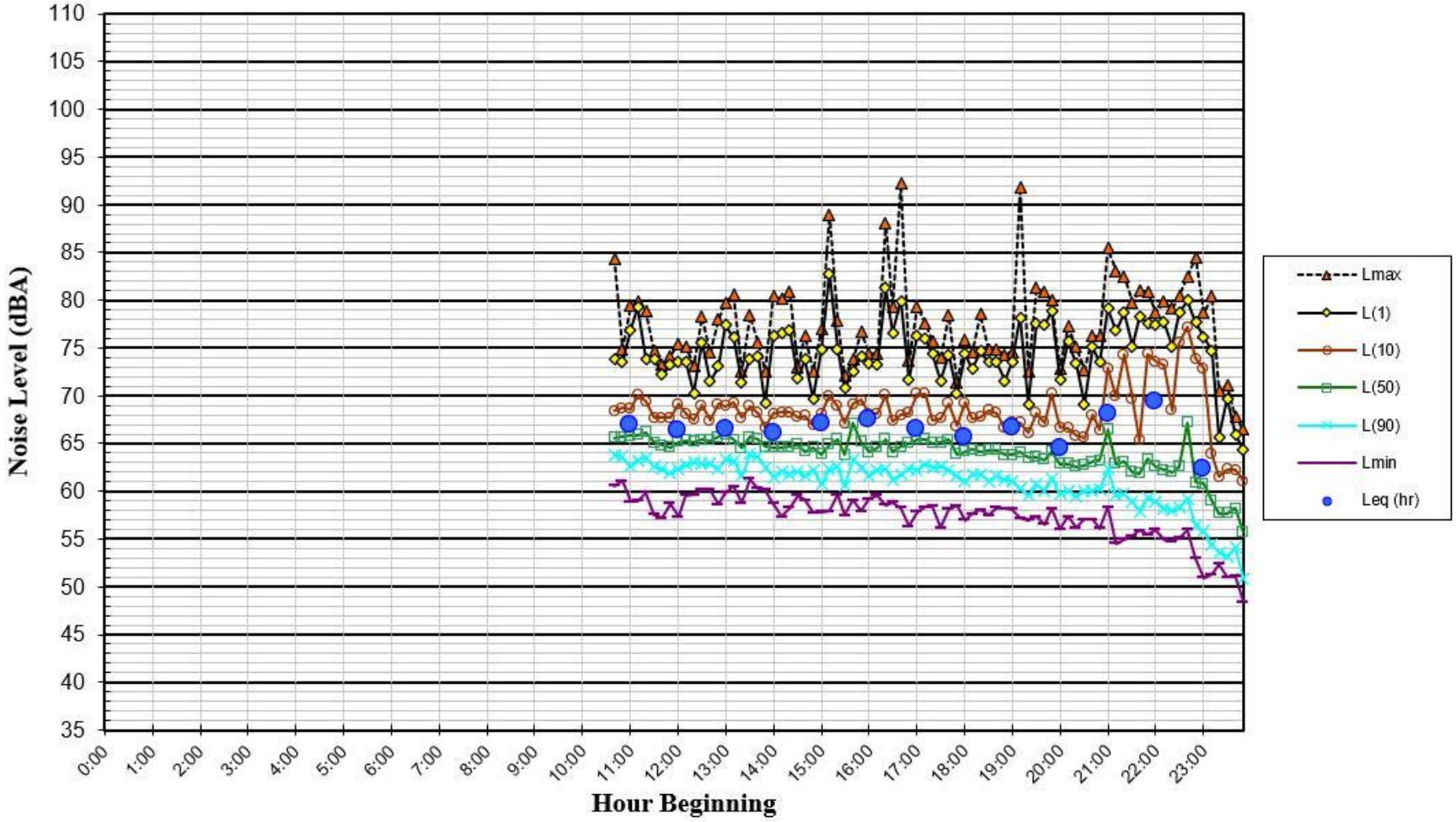

FIGURE A5 Daily Trend in Noise Levels for LT-2 on Thursday, July 20, 2023

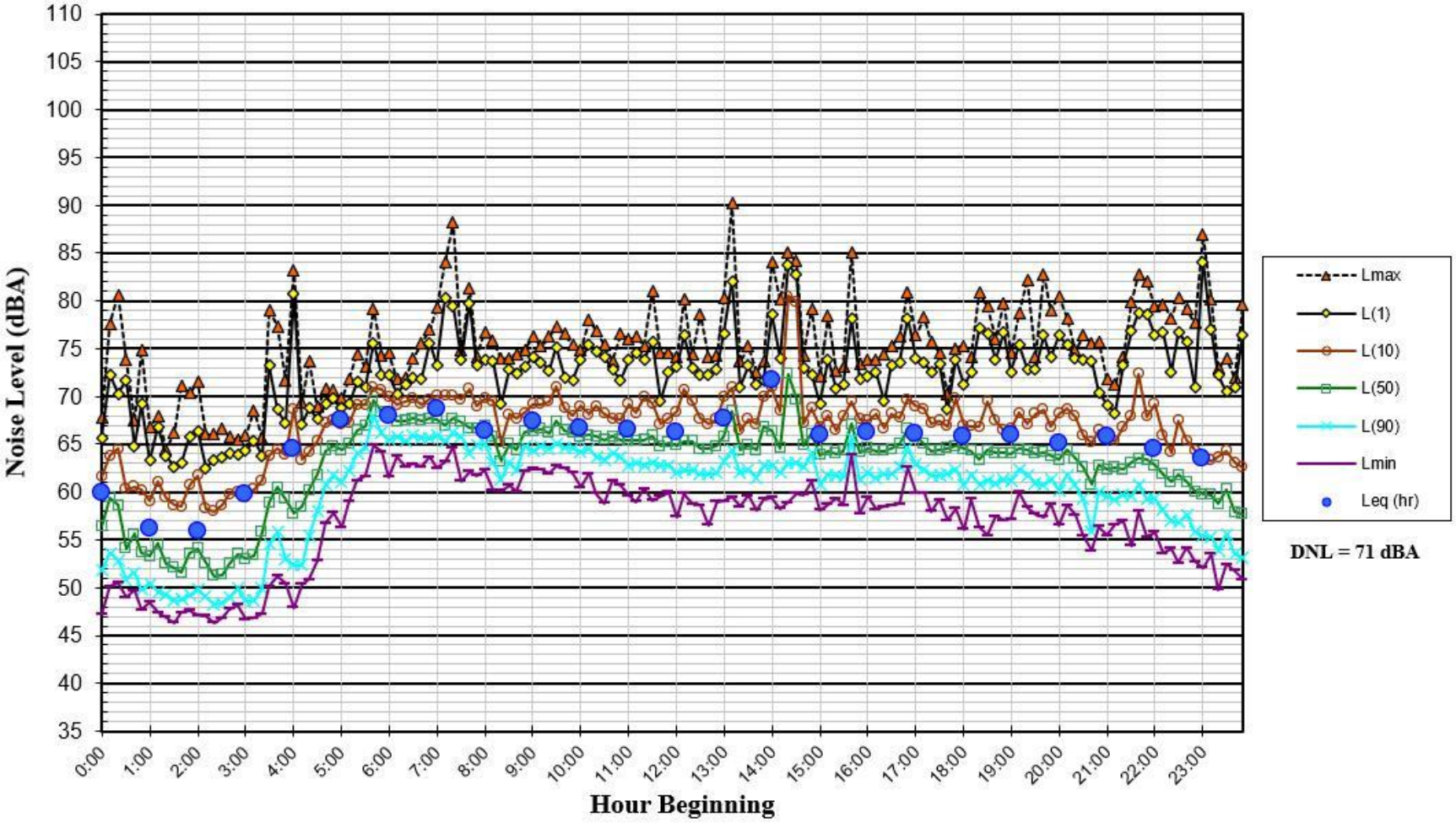

FIGURE A6 Daily Trend in Noise Levels for LT-2 on Friday, July 21, 2023