

APPENDIX G

NOISE AND VIBRATION ASSESSMENT

NORTH 27TH STREET NOISE AND VIBRATION ASSESSMENT

San José, California

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INTRODUCTION

The proposed project is a Special Use Permit to demolish a partially occupied 21,454-square-foot (sf), two-story commercial retail building and construct a new mixed-use building consisting of five floors of residential units (198 in total) over 7,118 sf of ground floor commercial and podium parking, for a total building height of 70 feet. The ground floor will have 15 parking spaces for the 3,518 sf of commercial along North 27th Street and 198 residential parking spaces in a three-level puzzle parking system. Access to the future Five Wounds Trail on the east side of the site will be provided at the southeast corner and along the south side of the proposed building.

This report evaluates the project's potential to result in significant impacts with respect to applicable California Environmental Quality Act (CEQA) guidelines. The report is divided into three sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise and groundborne vibration, summarizes applicable regulatory criteria, and discusses ambient noise conditions in the project vicinity; 2) the Plan Consistency Analysis section discusses noise and land use compatibility utilizing policies in the City's General Plan; and, 3) the Impacts and Mitigation Measures Section describes the significance criteria used to evaluate project impacts, provides a discussion of each project impact, and presents mitigation measures, where necessary, to mitigate project impacts to a less-than-significant level.

SETTING

Fundamentals of Environmental Noise

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

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA)*. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a

method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called L_{eq} . The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

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

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA 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 12-17 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 57-62 dBA DNL with open windows and 65-70 dBA DNL if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 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 25-30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between a DNL of 60-70 dBA. Between a DNL of 70-80 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 30-35 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
Jet fly-over at 1,000 feet	110 dBA	Rock band
Gas lawn mower at 3 feet	100 dBA	
Diesel truck at 50 feet at 50 mph	90 dBA	Food blender at 3 feet
Noisy urban area, daytime	80 dBA	Garbage disposal at 3 feet
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	20 dBA	Bedroom at night, concert hall (background)
	10 dBA	Broadcast/recording studio
	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

The California Environmental Quality Act (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

Federal Transit Administration's Transit Noise and Vibration Impact Assessment Manual. The Federal Transit Administration's (FTA) Transit Noise and Vibration Impact Assessment Manual includes general assessment criteria for construction noise. During daytime hours, the hourly average noise level limit is 80 dBA L_{eq} at residential land uses and 90 dBA L_{eq} at commercial and 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:

- (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.

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.

California Building Code, Cal Green Code. The State of California established exterior sound transmission control standards for new non-residential buildings, as set forth in the 2010 California Green Building Standards Code (Section 5.507.4.1 and 5.507.4.2). These standards were not altered in the 2019 revisions. Section 5.507 states that either the prescriptive (Section 5.507.4.1) or the performance method (Section 5.507.4.2) shall be used to determine environmental control at indoor areas. The prescriptive method is very conservative and not practical in most cases; however, the performance method can be quantitatively verified using exterior-to-interior calculations. For the purposes of this report, the performance method is utilized to determine consistency with the Cal Green Code. Both of 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 or additional envelope or altered 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 within the 65 dBA CNEL or L_{dn} noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway noise source, as determined by the Noise Element of the General Plan.

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 or addition envelope or altered envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level ($L_{eq(1-hr)}$) of 50 dBA in occupied areas during any hour of operation.

Santa Clara County

Santa Clara County Airport Land Use Commission Comprehensive Land Use Plan. The Comprehensive Land Use Plan (CLUP) adopted by the Santa Clara County Airport Land Use Commission contains standards for projects within the vicinity of San José 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. <u>Residential:</u> 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 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						

¹Noise 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-1.7 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 Mineta 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 at 70-80 North 27th Street in San José, California. The site is approximately 900 feet west of the center of US Highway 101 and approximately 370 feet north of the center of East Santa Clara Street. The Portuguese Band of San Jose (non-profit organization) bounds the site to the north, the future Five Wounds trail and North 28th Street bound the site to the east, a McDonald's restaurant bounds the site to the south, and several automotive repair businesses along North 27th Street bound the site to the west. The existing noise environment at the site results primarily from local vehicular traffic. Secondary sources of noise include distant traffic and aircraft.

A noise monitoring survey was performed to quantify and characterize ambient noise levels at the site and in the project vicinity between Wednesday, September 7, 2022 and Friday, September 9, 2022. The monitoring survey included two long-term noise measurements (LT-1 and LT-2) and two short-term measurements (ST-1 and ST-2), as shown in Figure 1.

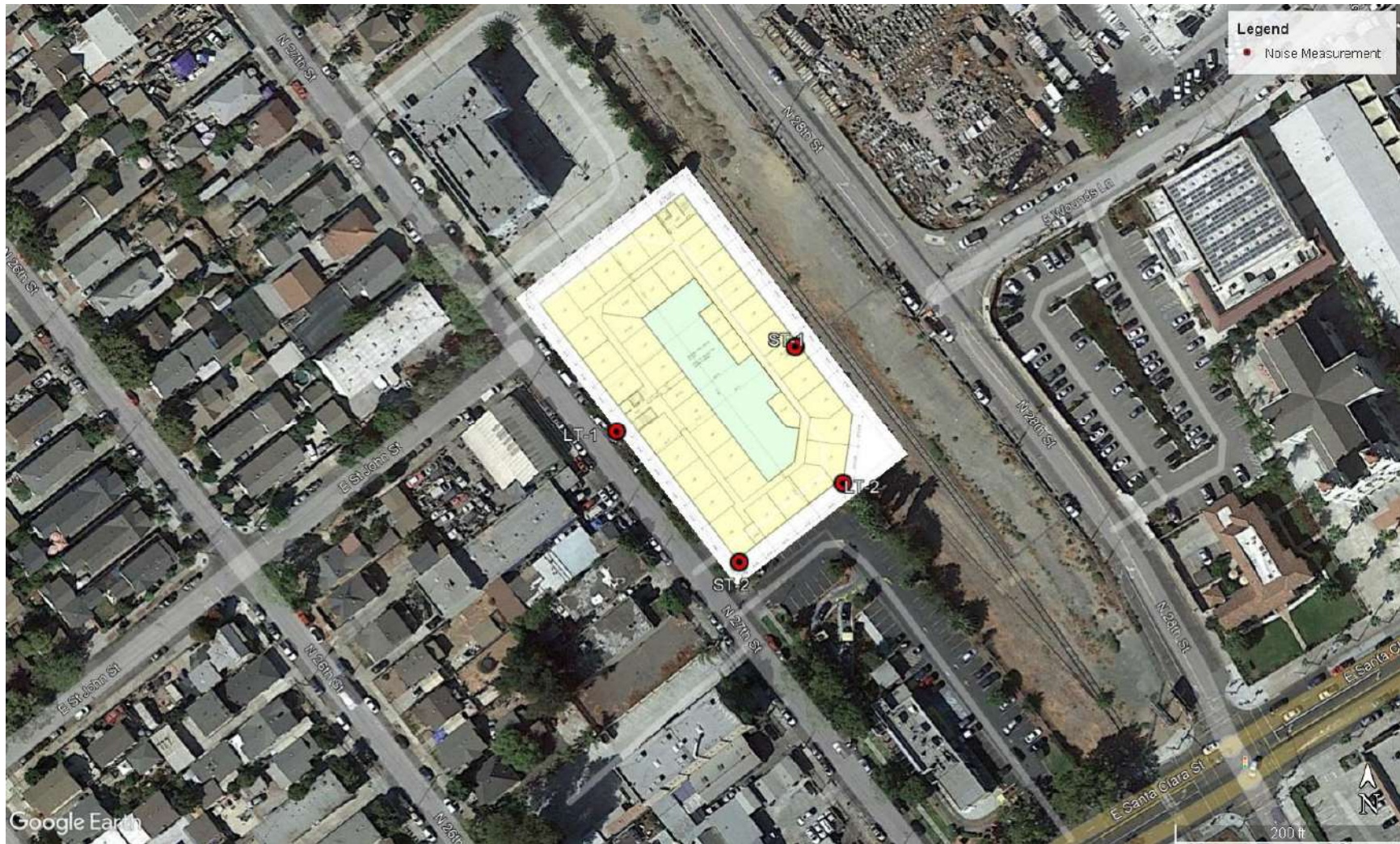
Long-term noise measurement LT-1 was made along North 27th Street, approximately 22 feet east of the centerline. This location was selected to quantify traffic noise levels and to estimate noise levels at the proposed building façade along North 27th Street. Hourly average noise levels at this location typically ranged from 56 to 62 dBA L_{eq} during the day and from 45 to 60 dBA L_{eq} at night. The day-night average noise level on Thursday, September 8, 2022 was 62 dBA DNL. The daily trend in noise levels at LT-1 is shown in Figures 2 through 4.

Long-term noise measurement LT-2 was made near the southeast corner of the site adjacent to the McDonald's drive-thru and parking lot. Hourly average noise levels at this location typically ranged from 56 to 60 dBA L_{eq} during the day and from 50 to 59 dBA L_{eq} at night. The day-night average noise level on Thursday, September 8, 2022 was 62 dBA DNL. The daily trend in noise levels at LT-2 is shown in Figures 5 through 7.

Short-term noise measurement ST-1 was made along the easternmost site boundary. This location was selected to quantify noise levels at the proposed eastern façade of the building. The 10-minute average noise level measured at this location between 11:40 a.m. and 11:50 a.m. on Wednesday, September 7, 2022 was 54 dBA L_{eq} . During the noise measurement, jets produced noise levels of approximately 53 dBA. Local traffic along North 28th Street typically produced noise levels ranging from 50 to 60 dBA, with loud vehicle generating noise levels of 67 dBA. Distant US Highway 101 noise levels were approximately 51 to 53 dBA.

Short-term noise measurement ST-2 was made at the southwest corner of the project site, approximately 35 feet east of the centerline of the roadway. This location was selected to quantify noise levels at receptors along North 27th Street, as well as noise levels at the proposed western façade of the building. The 10-minute average noise level measured at this location between 12:00 p.m. and 12:10 p.m. on Wednesday, September 7, 2022 was 58 dBA L_{eq} . During the noise measurement, jets produced noise levels ranging from 53 to 55 dBA. Local traffic noise levels produced by 12 autos and one truck ranged from 55 to 76 dBA. Table 4 summarizes the results of the short-term measurements.

FIGURE 1 Noise Measurement Locations



Source: Google Earth, 2022.

**Noise Levels at Noise Measurement Site LT-1
~22 feet from the Center of N. 27th Street
Wednesday, September 7, 2022**

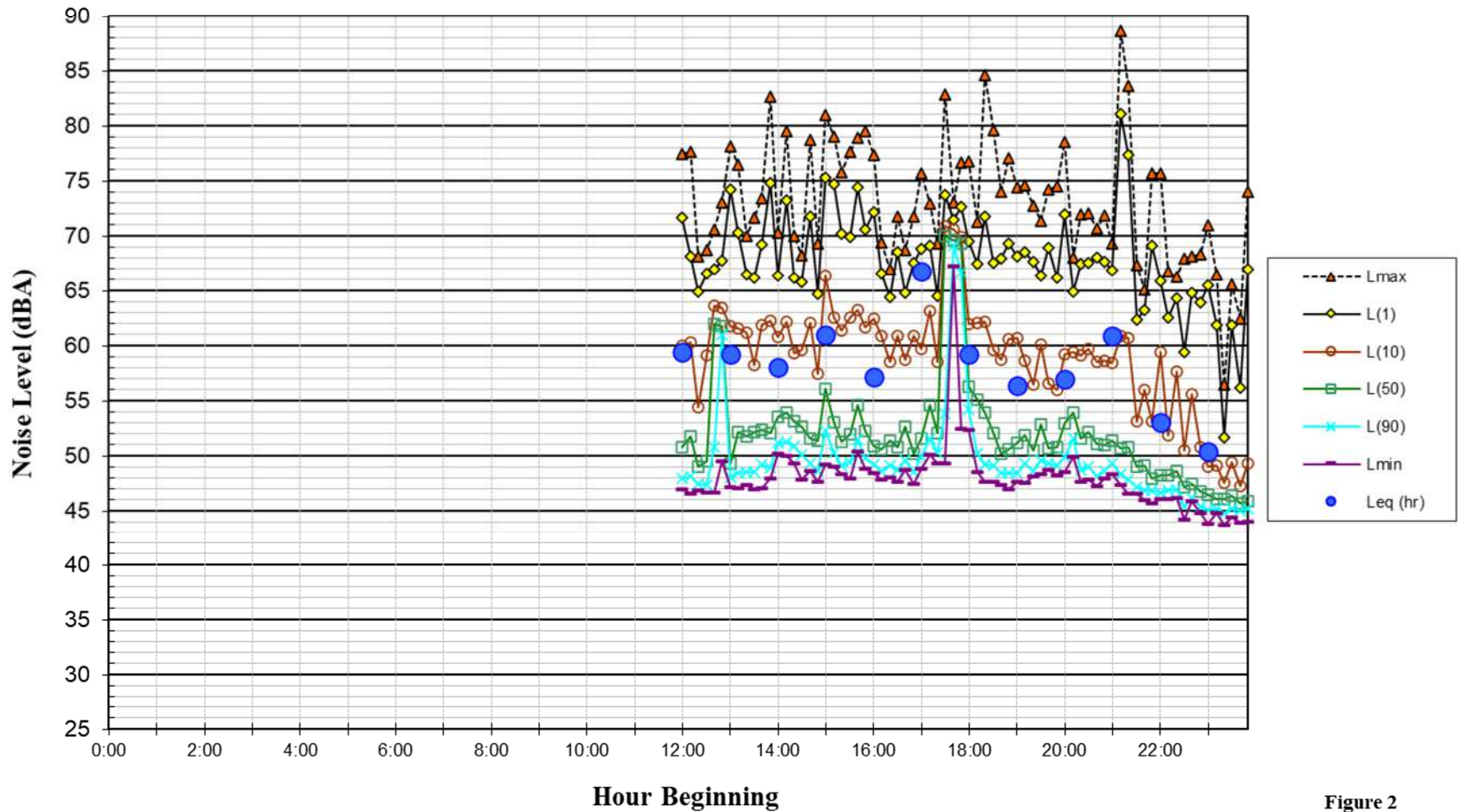


Figure 2

**Noise Levels at Noise Measurement Site LT-1
~22 feet from the Center of N. 27th Street
Thursday, September 8, 2022**

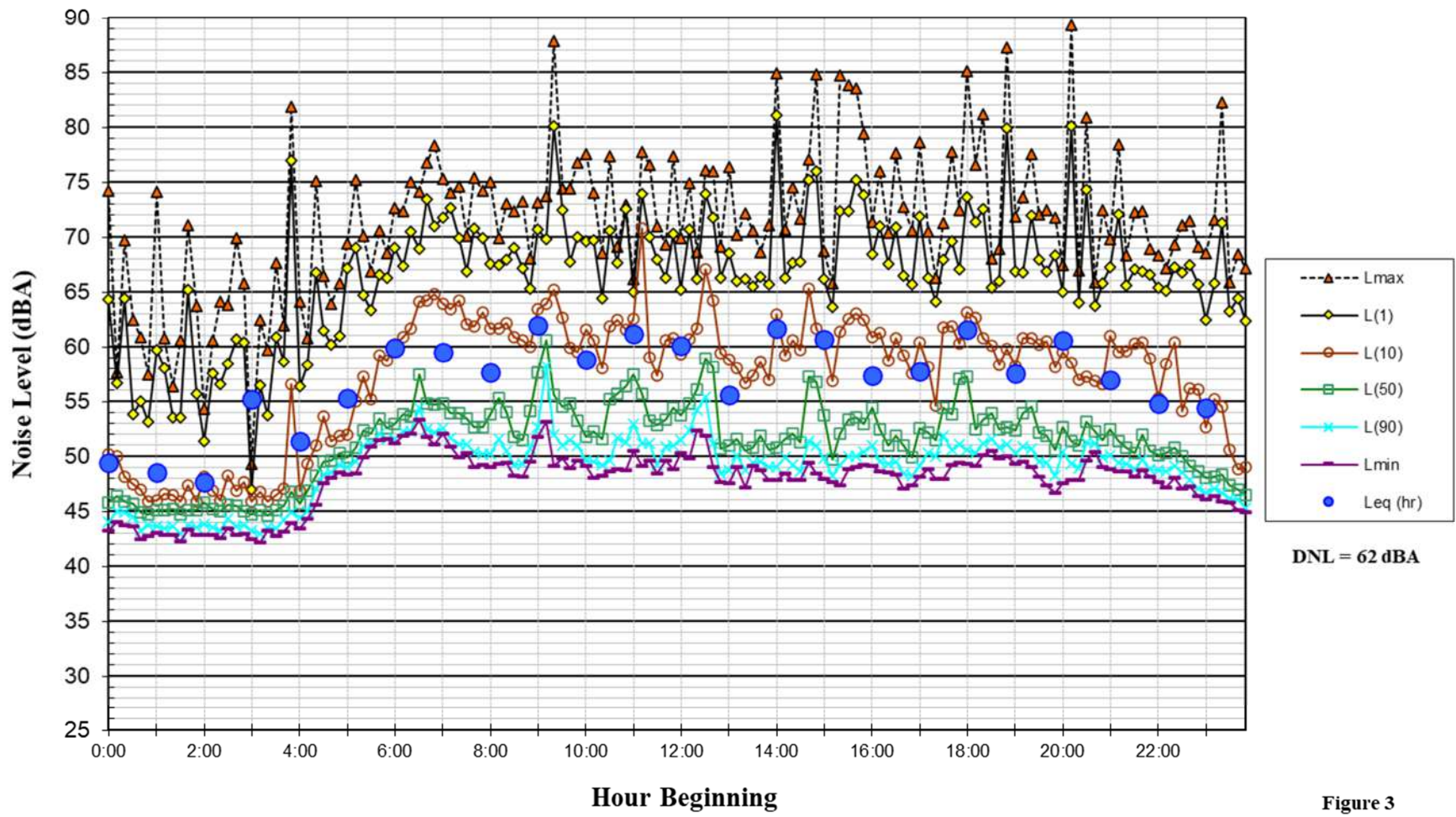


Figure 3

**Noise Levels at Noise Measurement Site LT-1
~22 feet from the Center of N. 27th Street
Friday, September 9, 2022**

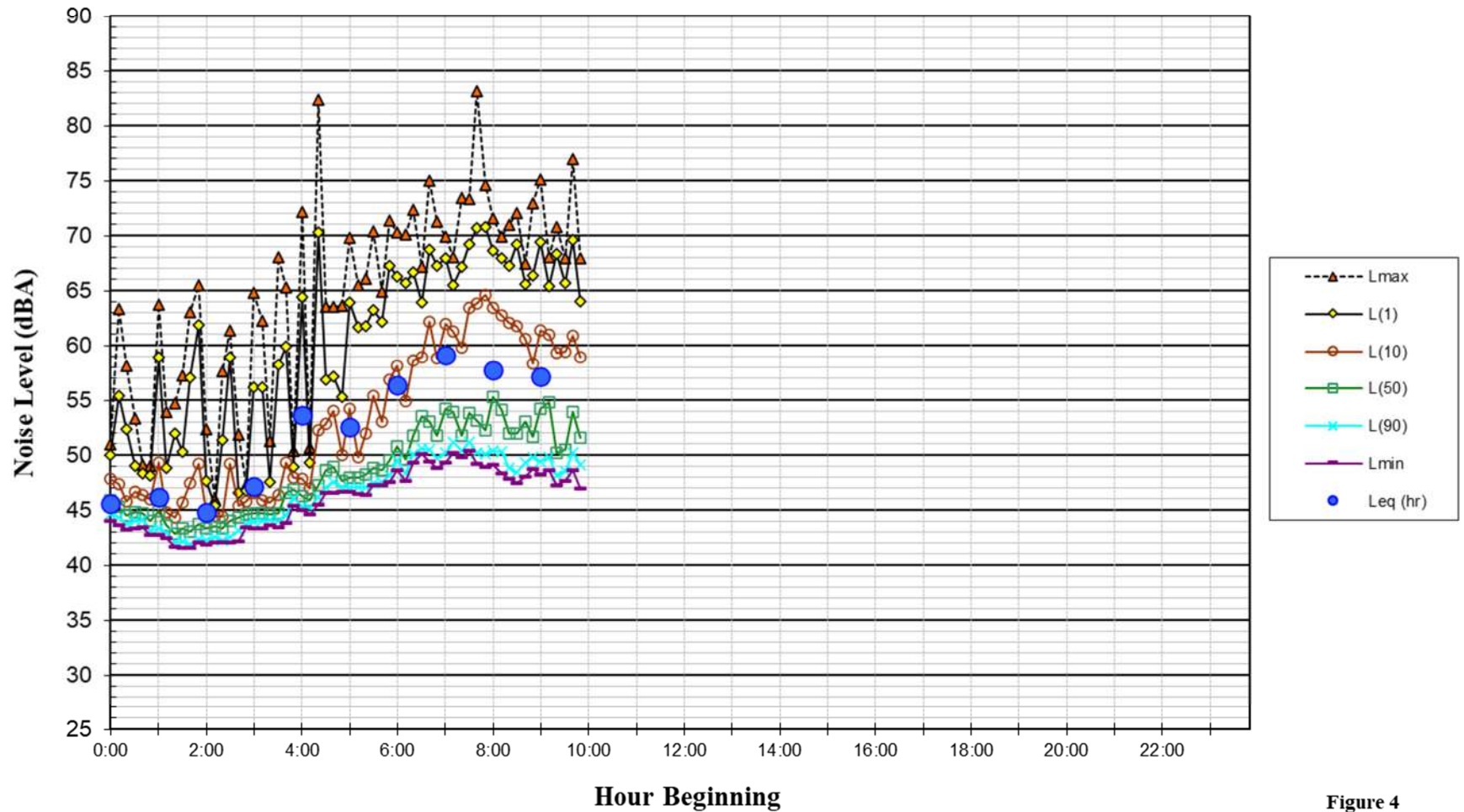


Figure 4

**Noise Levels at Noise Measurement Site LT-2
Near Southeast Corner of Site
Wednesday, September 7, 2022**

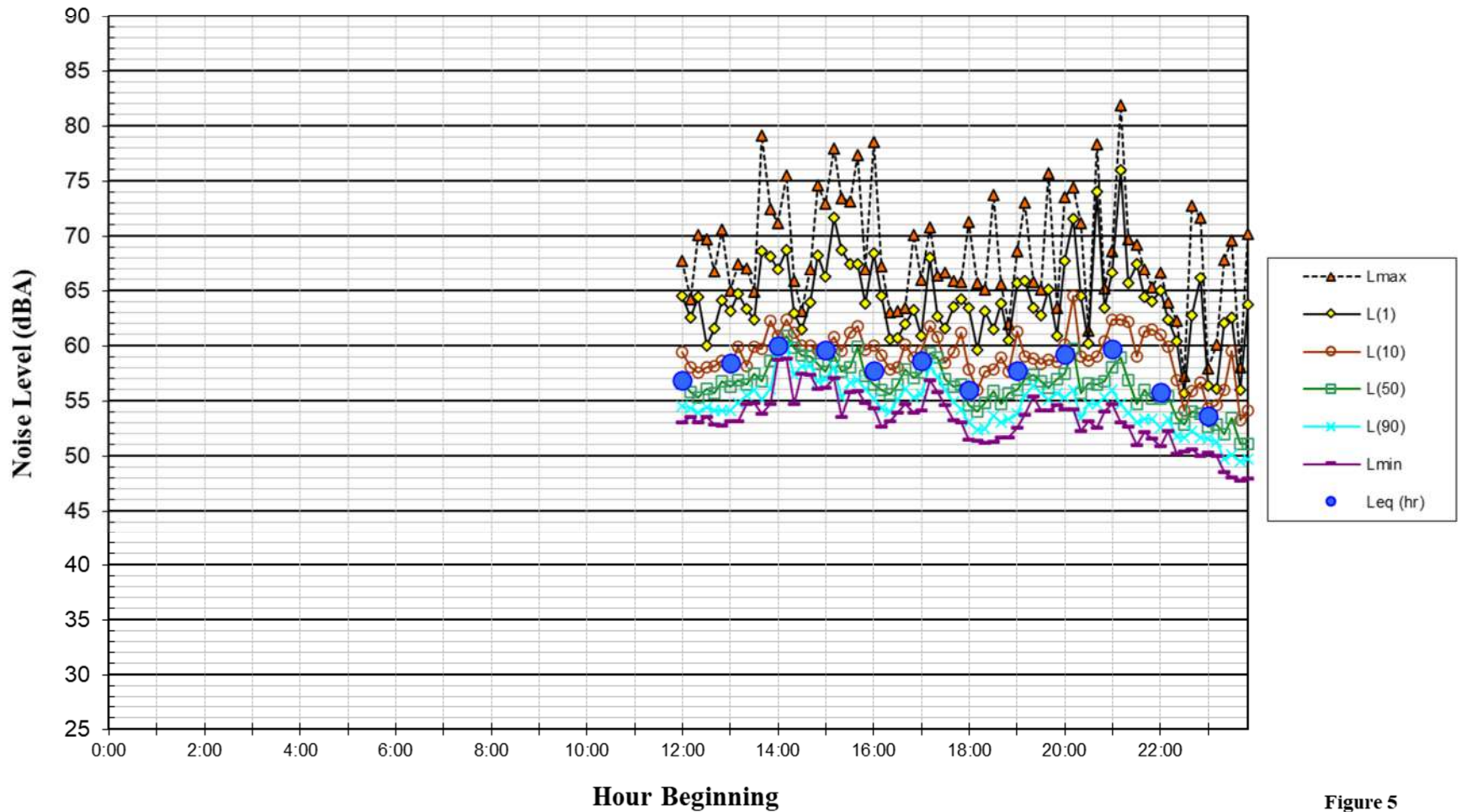
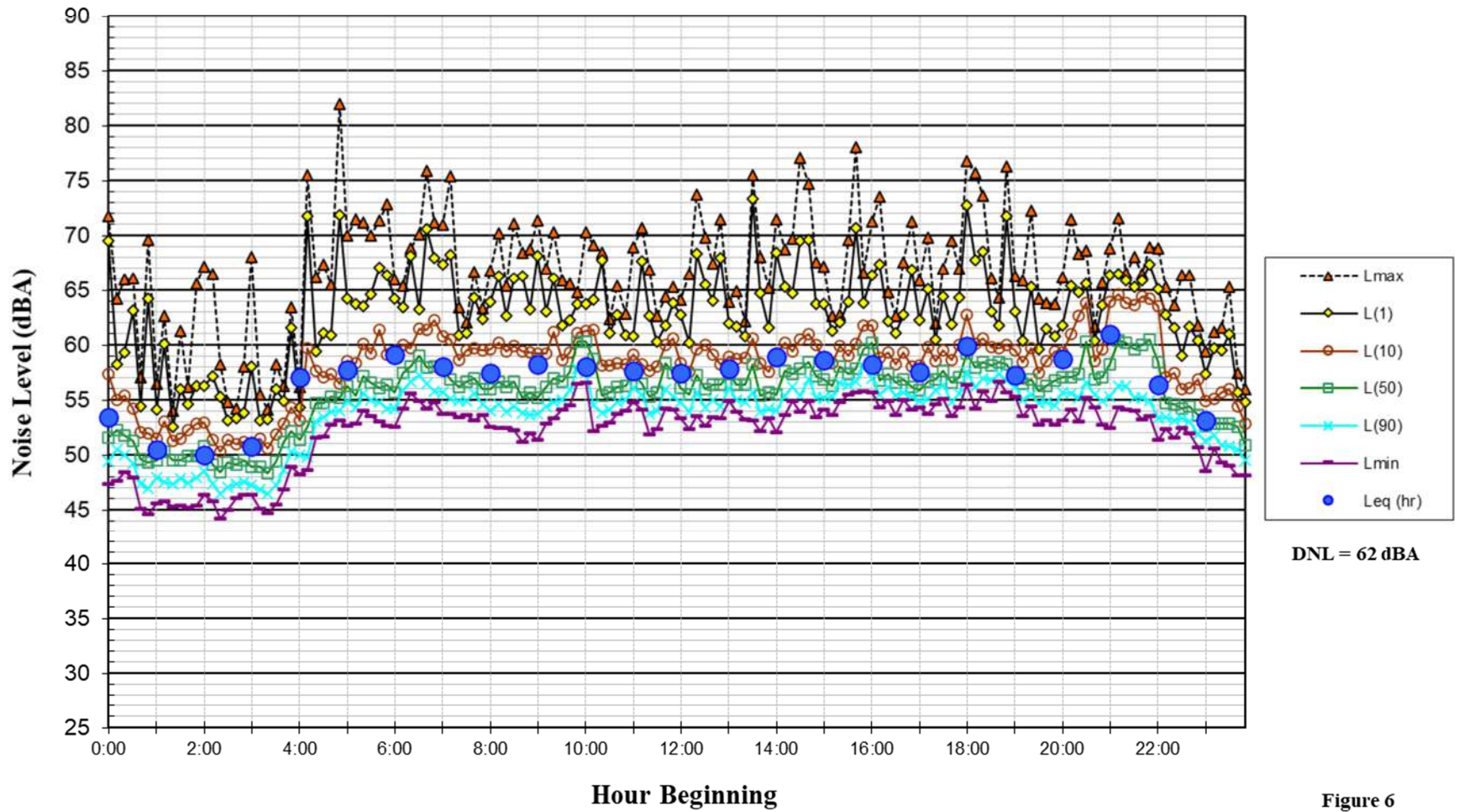


Figure 5

**Noise Levels at Noise Measurement Site LT-2
Near Southeast Corner of Site
Thursday, September 8, 2022**



DNL = 62 dBA

Figure 6

**Noise Levels at Noise Measurement Site LT-2
Near Southeast Corner of Site
Friday, September 9, 2022**

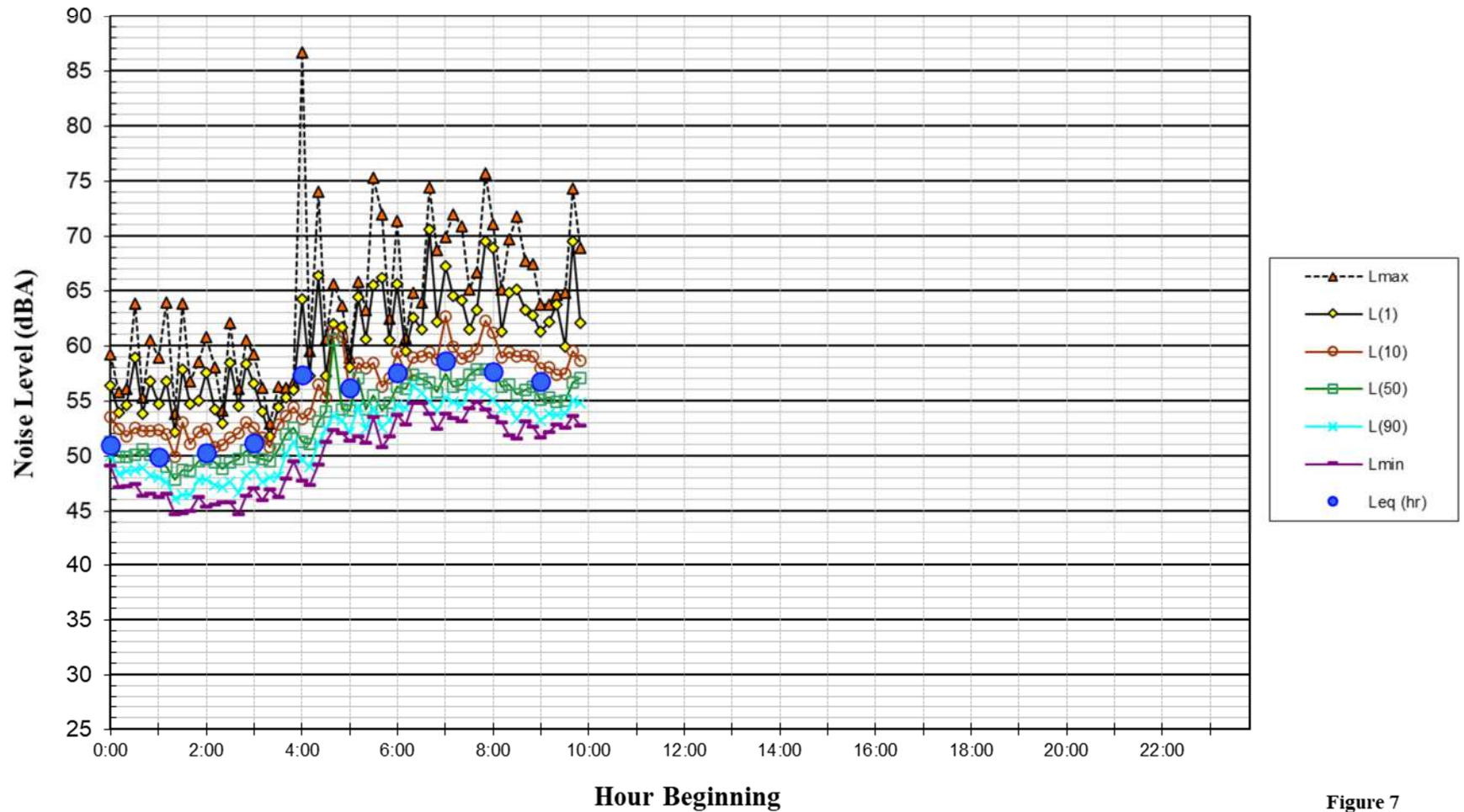


Figure 7

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

Noise Measurement Location (Date, Time)	L_{max}	L₍₁₎	L₍₁₀₎	L₍₅₀₎	L₍₉₀₎	L_{eq}
ST-1: East property line. (9/7/2022, 11:40 a.m. - 11:50 a.m.)	68	61	56	53	51	54
ST-2: Southwest corner of site. (9/7/2022, 12:00 p.m. - 12:10 p.m.)	76	69	60	53	50	58

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.

Future Exterior Noise Environment

The future noise environment at the site would continue to result primarily from vehicular traffic along nearby roadways, as well as from aircraft noise associated with Mineta San José International Airport. Traffic noise levels are anticipated to increase by up to 1 dBA DNL and would reach 63 dBA DNL along the west boundary of the building adjoining North 27th Street and near the southeast corner of the building nearest to Santa Clara Street and North 28th Street.

The project proposes a podium level courtyard that would be fully shielded from local traffic noise by the building itself. Future exterior noise levels at the podium level courtyard would be 55 dBA DNL or less assuming the acoustical shielding provided by the building. A roof deck is also proposed. Assuming the shielding provided by the 5-foot shed roofs and parapet walls, exterior noise levels at the roof deck is expected to be 58 dBA DNL or less. Exterior noise levels at the acoustically shielded residential outdoor use areas would not exceed the City’s 60 dBA DNL exterior noise standard and would be considered compatible with the proposed land use.

Future Interior Noise Environment

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.

Residential units located on floors two through six would be exposed to exterior noise levels reaching 63 dBA DNL. Interior noise levels within worst-case residential units would be 48 dBA DNL, assuming that windows are open for ventilation.

Ground floor commercial uses are proposed along the west side of the building adjacent to North 27th Street and along the east side of the building adjacent to the future Five Wounds Trail. Future exterior noise levels are calculated to reach 63 dBA DNL and 61 dBA L_{eq} during the worst hour. Standard construction materials for commercial uses would provide about 25 dBA of noise reduction in interior spaces. The inclusion of adequate forced-air mechanical ventilation systems is normally required so that windows may be kept closed at the occupant's discretion and would provide an additional 5 dBA reduction. The standard construction materials in combination with forced-air mechanical ventilation would satisfy the daytime threshold of 50 dBA $L_{eq(1-hr)}$.

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, 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 standard dual-thermal pane windows (minimum rating of 26 STC) would be sufficient to achieve the interior noise thresholds of 45 dBA DNL and 50 dBA $L_{eq(1-hr)}$.

Conditions of Approval

A qualified acoustical specialist shall prepare a detailed analysis of interior noise levels resulting from all exterior sources during the design phase pursuant to requirements set forth in the State Building Code. The study will review the final site plan, building elevations, and floor plans prior to construction and recommend building treatments to reduce residential interior noise levels to 45 dBA DNL or less and commercial interior noise levels to 50 dBA $L_{eq(1-hr)}$ or less. Treatments would include, but are not limited to, sound-rated windows and doors, sound-rated wall and window constructions, acoustical caulking, protected ventilation openings, etc. The specific determination of what noise insulation treatments are necessary shall be conducted on a unit-by-unit basis during final design of the project. Results of the analysis, including the description of the necessary noise control treatments, shall be submitted to the City, along with the building plans and approved design, prior to issuance of a building permit.

NOISE IMPACTS AND MITIGATION MEASURES

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

Significance Criteria

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

- A significant noise impact would be identified if the project would generate a substantial temporary or permanent noise level increase over ambient noise levels at existing noise-sensitive receptors surrounding the project site and that would exceed applicable noise standards presented in the General Plan at existing noise-sensitive receptors surrounding the project site.
 - A significant noise impact would be identified if construction-related noise would temporarily increase ambient noise levels at sensitive receptors. The City of San José considers large or complex projects involving substantial noise-generating activities and lasting more than 12 months significant when within 500 feet of residential land uses or within 200 feet of commercial land uses or offices. After a period of 12 months, a significant temporary noise impact would occur if construction noise levels would exceed 80 dBA L_{eq} at residential land uses near the site or 90 dBA L_{eq} at commercial land uses near the site.
 - A significant permanent noise level increase would occur if the project would result in: a) a noise level increase of 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or b) a noise level increase of 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater.
 - A significant noise impact would be identified if the project would expose persons to or generate noise levels that would exceed applicable noise standards presented in the General Plan.
- A significant impact would be identified if the construction of the project would generate excessive vibration levels at surrounding receptors. Groundborne vibration levels exceeding 0.08 in/sec PPV would have the potential to result in cosmetic damage to historic buildings, and groundborne vibration levels exceeding 0.2 in/sec PPV would have the potential to result in cosmetic damage to normal buildings.
- A significant noise impact would be identified if the project would expose people residing or working in the project area to excessive aircraft noise levels.

Impact 1a: Temporary Construction Noise. Existing noise-sensitive land uses would be exposed to a substantial temporary increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. **This is a significant impact.**

The 1.2-acre project site is currently occupied by an approximately 21,400-square-foot (sf) commercial building with associated parking surrounding the building. The project proposes to demolish the existing use to construct a 106,350-sf, 198-dwelling unit, six-story residential building that would include one level of parking on the first floor. The residential dwelling units would be found on floors two through six. The grade level parking will provide 213 parking spaces. Also on the first floor will be approximately 7,100-sf of retail space. Construction is expected to begin in January 2024 and be completed by May 2026.

Construction phases utilizing such equipment or tools would include demolition, site preparation, grading/excavation, trenching/foundation, building construction-exterior, building construction-interior/architectural coating, and paving. Foundation construction techniques involving impact or vibratory pile driving equipment, which can cause excessive noise, are not expected with the proposed project. 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.

However, the City of San José does not establish noise level thresholds for construction activities. As an alternative, this analysis uses the noise limits established by the Federal Transit Administration (FTA) to identify the potential for impacts due to substantial temporary construction noise. The FTA identifies construction noise limits in the *Transit Noise and Vibration Impact Assessment Manual*.¹ During daytime hours, an exterior threshold of 80 dBA L_{eq} shall be enforced at residential land uses and 90 dBA L_{eq} shall be enforced at commercial and industrial land uses.

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

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 65 to 88 dBA L_{eq} for residential buildings, measured at a distance of 50 feet from the center of a busy construction site. Construction-generated noise levels drop off at a rate of about 6 dBA per doubling of the distance between the source and receptor. Shielding by buildings or terrain often result in lower construction noise levels at distant receptors.

Equipment expected to be used in each construction phase are summarized in Table 7, along with the quantity of each type of equipment, the reference noise level at 50, 125, 200, and 400 feet assuming the operation of the two loudest pieces of construction equipment, and the estimated noise levels at the nearest property lines projected from the center of the construction activity by phase. Federal Highway Administration's (FHWA's) Roadway Construction Noise Model (RCNM) was used to calculate the hourly average noise levels for each phase of construction, assuming the two loudest pieces of equipment would operate simultaneously, as recommend by the FTA for construction noise evaluations. This construction noise model includes representative sound levels for the most common types of construction equipment and the approximate usage factors of such equipment that were developed based on an extensive database of information gathered during the construction of the Central Artery/Tunnel Project in Boston, Massachusetts (CA/T Project or "Big Dig"). The usage factors represent the percentage of time that the equipment would be operating at full power.

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

Equipment Category	L _{max} Level (dBA) ^{1,2}	Impact/Continuous
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 Construction Noise Levels

Phase (Work Days)	Construction Equipment (Quantity)	Calculated Hourly Average L_{eq} (dBA) at Nearest Property Lines From Operation of Two Loudest Pieces of Construction Equipment at Acoustic Center of the Site			
		Noise Level at 50 feet	West (125 feet)	North and South (200 feet)	East (400 feet)
Demolition (15 days)	Concrete/Industrial Saw (2)* Excavator (2) Rubber-Tired Dozer (1) Tractor/Loader/Backhoe (1)	86	78	74	68
Site Preparation (20 days)	Grader (2)* Rubber-Tired Dozer (1) Tractor/Loader/Backhoe (1)	84	76	72	66
Grading (18 days)	Excavator (2) Grader (2)* Rubber Tired Dozer (1) Tractor/Loader/Backhoe (1)	84	76	72	66
Trenching (24 days)	Excavator (2)* Tractor/Loader/Backhoe (2)*	82	74	70	64
Building - Exterior (250 days)	Crane (1) Forklift (2) Generator Set (1)* Tractor/Loader/Backhoe (2)* Welders (2)	82	74	70	64
Building – Interior (250 days)	Aerial Lift (1) Air Compressor (2)*	77	69	65	59
Paving (25 days)	Cement and Mortar Mixer (2)* Paver (1) Paving Equipment (1) Roller (1) Tractor/Loader/Backhoe (2)*	82	74	70	58

*Denotes two loudest pieces of construction equipment per phase

As shown in Table 7, construction noise levels would intermittently range from 77 to 86 dBA L_{eq} when activities occur approximately 50 feet from nearby receptors. Construction noise levels would not exceed 90 dBA L_{eq} at the commercial land uses that border the site to the north, west, or south. Similarly, the nearest residences to the site would be located 150 feet or further from construction activities and would not be subject to construction noise levels exceeding 80 dBA L_{eq} . However, since project construction is expected to last for a period of approximately 29 months, and considering that the project site is within 500 feet of existing residential uses and within 200 feet of existing commercial uses, this temporary construction impact would be considered significant in accordance with Policy EC-1.7 of the City's General Plan.

Mitigation Measure 1a: Pursuant to General Plan Policy EC-1.7, 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.
- 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 adjacent land uses and nearby residences.

- Designate a “disturbance coordinator” who would be responsible for responding to any complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., bad muffler, etc.) and will require that reasonable measures be implemented to current 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, Zoning Code requirements, and the above measures, the temporary construction noise impact would be **less-than-significant**.

Impact 1b: Permanent Noise Level Increase/Exceed Applicable Standards. The proposed project is not expected to cause a substantial permanent noise level increase at existing noise-sensitive land uses in the project vicinity or generate noise levels in excess of standards established in the City’s General Plan. **This is a less-than-significant impact.**

According to Policy EC-1.2 of the City’s General Plan, a significant permanent noise increase would occur if the project would increase noise levels at noise-sensitive receptors by 3 dBA DNL or more where ambient noise levels exceed the “normally acceptable” noise level standard. Where ambient noise levels are at or below the “normally acceptable” noise level standard, noise level increases of 5 dBA DNL or more would be considered significant. The City’s General Plan defines the “normally acceptable” outdoor noise level standard for the nearby residential land uses to be 60 dBA DNL. Existing ambient levels, based on the measurements made in the project vicinity, exceed 60 dBA DNL. Therefore, a significant impact would occur if the proposed project would permanently increase ambient levels by 3 dBA DNL.

Project Generated Traffic

The traffic study included peak hour turning movement data for existing, background, background plus project, and cumulative traffic conditions at six intersections in the vicinity of the project site. AM and PM peak hour traffic volumes under each of the scenarios were compared to the existing traffic volumes to conservatively estimate the project’s contribution to increased traffic noise levels. Based on these comparisons, the project would result in an increase of 1 dBA DNL or less along all roadway segments included in the traffic study, as shown in Table 8. Traffic noise level increases due to the project would not be considered substantial.

TABLE 8 PM Peak Hour Traffic Volumes and Anticipated Traffic Noise Increases Along Area Roadways

Roadway	Location	PM Peak Hour Volumes					Traffic Noise Increase (dBA)			
		Existing	Existing Plus Project	Background	Background Plus Project	Cumulative	Existing Plus Project Versus Existing	Background Versus Existing	Background Plus Project Versus Existing	Cumulative Versus Existing
Santa Clara Street	W. of US 101 SB Ramp	2005	2028	2019	2042	2064	0	0	0	0
Santa Clara Street	W. of 28 th Street	1605	1629	1621	1645	1668	0	0	0	0
Santa Clara Street	W. of 27 th Street	1575	1585	1591	1601	1624	0	0	0	0
28 th Street	N. of Santa Clara Street	276	276	276	276	327	0	0	0	1
27 th Street	N. of Santa Clara Street	122	156	122	156	156	1	0	1	1
27 th Street	N. of St. John Street	98	109	98	109	109	0	0	0	0
27 th Street	S. of St. John Street	107	140	107	140	140	1	0	1	1
St. John Street	W. of 27 th Street	41	42	41	42	42	0	0	0	0

Mechanical Equipment

Various mechanical equipment for heating, ventilation, and cooling purposes, exhaust fans, and other similar equipment would likely be located on the roof of the proposed building or within the parking garage. Noise levels received at nearby sensitive land uses would depend on system design level specifications, including the equipment location, type, size, capacity, and enclosure design. These details are typically not available until later phases of the project design and development review process. However, no equipment is anticipated for a project of this scale that would make it difficult to meet the applicable noise limits with standard noise control measures. If properly controlled, the operational noise levels produced by the project would be well below ambient noise levels produced by local vehicle traffic, and would not substantially increase the ambient noise environment at the nearest noise-sensitive receptors.

Condition of Approval

As a project condition of approval, mechanical equipment shall be selected and designed to reduce noise levels to meet City requirements at the nearby noise-sensitive land uses. A qualified acoustical consultant shall be retained to review mechanical noise as these systems are selected to determine specific noise reduction measures necessary to reduce noise to comply with the City's noise level requirements. Noise reduction measures could include, but are not limited to, selection of equipment that emits low noise levels and installation of noise barriers, such as enclosures and parapet walls, to block the line-of-sight between the noise source and the nearest receptors. Other alternate measures may be optimal, such as locating equipment in less noise-sensitive areas, such as along the building façades farthest from adjacent neighbors, where feasible.

Mitigation Measure 1b: None required.

Impact 2: Exposure to Excessive Groundborne Vibration. Vibration levels resulting from project demolition or construction would not exceed applicable vibration thresholds at nearby buildings. **This is a less-than-significant impact.**

The construction of the project may generate perceptible vibration when heavy equipment or impact tools are used. Construction phases utilizing such equipment or tools would include demolition, site preparation, grading/excavation, trenching/foundation, building construction-exterior, building construction-interior/architectural coating, and paving. Foundation construction techniques involving impact or vibratory pile driving equipment, which can cause excessive vibration, are not expected with 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 0.2 in/sec PPV shall be used to minimize damage at buildings of normal conventional construction. Cosmetic damage (also known as threshold damage) is defined as hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage is defined as hairline cracking in masonry or the loosening of plaster. Major structural damage is defined as wide cracking or the shifting of foundation or bearing walls.

The vibration limits contained in this policy are conservative and designed to provide the ultimate level of protection for existing buildings in San José.

A review of the City of San José Historic Resource Inventory² identified the Church of the Five Wounds as the nearest historic buildings in the site vicinity. The church is located at 1375 East Santa Clara Street, approximately 345 feet from the project site. The remaining buildings in the project vicinity are assumed to be of normal, conventional construction.

Vibration levels would vary depending on soil conditions, construction methods, and equipment used. Table 9 presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet and also summarizes the minimum safe setback distances to maintain in order to achieve the 0.08 in/sec PPV threshold for historical buildings and the 0.2 in/sec PPV threshold for all other buildings. Vibration levels are highest close to the source, and then attenuate with increasing distance at the rate $(D_{ref}/D)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet. Table 10 summarizes the vibration levels expected at nearby buildings.

TABLE 9 Vibration Source Levels for Construction Equipment and Minimum Safe Setbacks

Equipment	PPV at 25 ft. (in/sec)	0.08 in/sec PPV Minimum Safe Setback (feet)	0.20 in/sec PPV Minimum Safe Setback (feet)
Clam shovel drop	0.202	59	26
Hydromill (slurry wall)	in soil	0.008	2
	in rock	0.017	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., September 2022.

² City of San José Historic Resources Inventory, <https://www.sanjoseca.gov/your-government/departments/planning-building-code-enforcement/planning-division/historic-preservation/historic-resources-inventory>

TABLE 10 Calculated Vibration Levels at Nearest Buildings (in/sec PPV)

Equipment	PPV at 25 ft. (in/sec)	PPV at North/West Conventional (60 feet)	PPV at South Conventional (150 feet)	PPV at East Historic (345 feet)
Clam shovel drop	0.202	0.077	0.028	0.011
Hydromill (slurry wall)	in soil	0.008	0.003	0.001
	in rock	0.017	0.006	0.001
Vibratory Roller	0.210	0.080	0.029	0.012
Hoe Ram	0.089	0.034	0.012	0.005
Large bulldozer	0.089	0.034	0.012	0.005
Caisson drilling	0.089	0.034	0.012	0.005
Loaded trucks	0.076	0.029	0.011	0.004
Jackhammer	0.035	0.013	0.005	0.002
Small bulldozer	0.003	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., September 2022.

Groundborne vibration levels due to project construction activities would not exceed the City’s 0.08 in/sec PPV threshold at the Church of the Five Wounds, which represents the nearest historic building to the project site. All other structures in the project vicinity would be located at least 60 feet or further from the project site, and groundborne vibration levels attributable to project construction would not exceed the 0.20 in/sec PPV threshold. Neither cosmetic, minor, or major damage is expected as a result of the project at historic or conventional buildings near the project site.

At these locations, and in other surrounding areas where vibration would not be expected to cause cosmetic damage, vibration levels may still be perceptible. However, as with any type of construction, this would be anticipated and would not be considered significant, given the intermittent and short duration of the phases that have the highest potential of producing vibration (use of jackhammers and other high-power tools). By use of administrative controls, such as notifying neighbors of scheduled construction activities and scheduling construction activities with the highest potential to produce perceptible vibration during hours with the least potential to affect nearby businesses, perceptible vibration can be kept to a minimum.

Mitigation Measure 2: None required.

Impact 3: Excessive Aircraft Noise. The project site is located approximately 2.6 miles east-southeast of Norman Y. Mineta International Airport. 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.

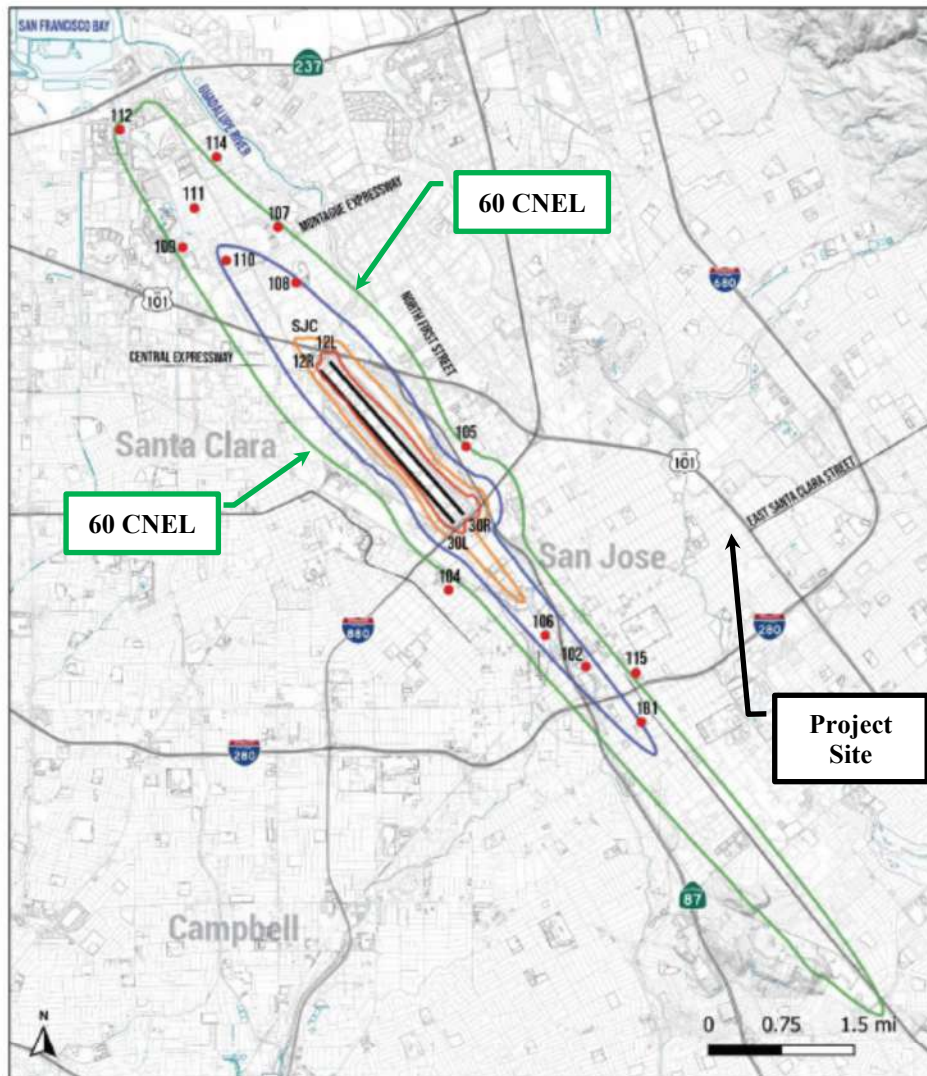
Norman Y. Mineta San José International Airport is a public-use airport located approximately 2.6 miles east-southeast of the project site. According to the City's new Airport Master Plan Environmental Impact Report,³ the project site lies outside the 60 dBA CNEL contour line (see Figure 8). Aircraft noise levels less than 65 dBA CNEL would be considered compatible at exterior use areas and within buildings proposed by the project, and this is a less-than-significant impact.

Mitigation Measure 3: None required.

³ David J. Powers & Associates, Inc., Integrated Final Environmental Impact Report, Amendment to Norman Y. Mineta San Jose International Airport Master Plan, April 2020.

FIGURE 8 2037 CNEL Noise Contours for SJIA Relative to Project Site

Figure 5
Scenario 2: With Project 2037 Noise Contour Map



- 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