4300 STEVENS CREEK BOULEVARD NOISE AND VIBRATION ASSESSMENT

San José, California

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INTRODUCTION

The project proposes a mixed-use development at 4300 Stevens Creek Boulevard in San José, California. The project proposes to demolish the three existing commercial buildings and develop the sites with three residential buildings for a total of 580 residential units and a 250-room hotel. Two of residential buildings would provide 407 market rate units, and the third residential building would provide 173 below market rate (BMR) units. Vehicle parking would be provided in a parking garage within each 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 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, the City of San José, and the City of Santa Clara. The State CEQA Guidelines, Appendix G, are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. A summary of the applicable regulatory criteria is provided below.

State of California

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

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

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

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

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

2019 California Building Cal Green Code. The State of California established exterior sound transmission control standards for new non-residential buildings as set forth in the 2019 California Green Building Standards Code (Section 5.507.4.1 and 5.507.4.2). The sections that pertain to this project are as follows:

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

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

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. 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 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 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.

City of Santa Clara General Plan. The City of Santa Clara's General Plan establishes policies to control noise within the community. Applicable goals and policies presented in the General Plan are as follows:

5.10.6-G1 Noise sources restricted to minimize impacts in the community.

5.10.6-G2 Sensitive uses protected from noise intrusion.

5.10.6-G3 Land use, development and design approvals that take noise levels into consideration.

5.10.6-P1 Review all land use and development proposals for consistency with the General Plan compatibility standards and acceptable noise exposure levels defined on Table 5.10-1.

5.10.6-P2 Incorporate noise attenuation measures for all projects that have noise exposure levels greater than General Plan "normally acceptable" levels, as defined on Table 5.10-1.

5.10.6-P3 New development should include noise control techniques to reduce noise to acceptable levels, including site layout (setbacks, separation and shielding),

building treatments (mechanical ventilation system, sound-rated windows, solid core doors and baffling) and structural measures (earthen berms and sound walls).

5.10.6-P4 Encourage the control of noise at the source through site design, building design, landscaping, hours of operation and other techniques.

5.10.6-P5 Require noise-generating uses near residential neighborhoods to include solid walls and heavy landscaping along common property lines, and to place compressors and mechanical equipment in sound-proof enclosures.

City of Santa Clara Code. The City Code establishes noise and vibration level performance standards for fixed sources. Section 9.10.40 of the City Code limits noise levels at residences to 55 dBA during daytime hours (7:00 a.m. to 10:00 p.m.) and 50 dBA at night (10:00 p.m. to 7:00 a.m.), noise levels at commercial uses to 65 dBA during daytime hours and 60 dBA during nighttime hours, and noise levels at light industrial uses to 70 dBA at any time. The noise limits are not applicable to emergency work, licensed outdoor events, City-owned electric, water, and sewer utility system facilities, construction activities occurring within allowable hours, permitted fireworks displays, or permitted heliports. The City Code does not define the acoustical time descriptor such as L_{eq} (the average noise level) or L_{max} (the maximum instantaneous noise level) that is associated with the above limits. A reasonable interpretation of the City Code would identify the ambient base noise level criteria as an average or median noise level (L_{eq}/L_{50}).

Section 9.10.230 of the City Code states construction activities are not permitted within 300 feet of residentially zoned property except within the hours of 7:00 a.m. and 6:00 p.m. on weekdays and 9:00 a.m. and 6:00 p.m. on Saturdays. No construction is permitted on Sundays or holidays.

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.

City of Santa Clara Code. Section 9.10.050 of the City Code states "It shall be unlawful for any person to operate or cause, permit, or allow the operation of, any fixed source of vibration of disturbing, excessive, or offensive vibration on property owned, leased, occupied, or otherwise controlled by such person, such that the vibration originating from such source is above the vibration perception threshold of an individual at the closest property line point to the vibration source on the real property affected by the vibration."

Existing Noise Environment

The project site is located at 4300 Stevens Creek Boulevard in San José, California. The site includes parcels on both sides of Lopina Way, between Stevens Creek Boulevard to the north and Albany Drive to the south. As shown on Figure 1, the project site is surrounded by existing commercial and residential land uses. Commercial auto dealerships adjoin the project site along the western and eastern property lines in the City of San José and are also located to the north across Stevens Creek Boulevard in the City of Santa Clara. Residential land uses are located to the south of the site, opposite Albany Drive, in the City of San José.

A noise monitoring survey was performed to quantify and characterize ambient noise levels at the site and in the project vicinity beginning on Wednesday, May 24, 2017 and concluding on Friday, May 26, 2017. The monitoring survey included four long-term noise measurements (LT-1 through LT-4) and five short-term noise measurements (ST-1 through ST-5). The noise environment at the site and at the nearby land uses results primarily from vehicular traffic along Stevens Creek Boulevard and other local streets, distant traffic on Interstate 280 (I-280), and the operation of equipment at the adjacent auto dealerships. General aviation aircraft also contribute to the noise environment.

The existing peak hour traffic volumes included in the traffic study completed for the proposed project in 2021 were compared to the existing peak hour traffic volumes from a prior version of the project from 2017. The 2021 existing peak hour volumes are calculated to result in noise levels within 1 dBA of the noise levels due to 2017 peak hour traffic volumes. Since the difference is less than 1 dBA, the monitoring survey completed in 2017 would adequately and conservatively represent the existing noise environment at the site in 2021.

Long-term noise measurement LT-1 was made near the midpoint of the eastern site boundary. This location was selected to quantify the noise environment produced by the Oak Tree Mazda auto dealership. During this noise measurement, sounds from the auto dealership's wash station, repair bay, and air compressor were audible. Hourly average noise levels at this location typically ranged

from 61 to 66 dBA L_{eq} during the day and from 57 to 62 dBA L_{eq} at night. The day-night average noise level on Thursday, May 25, 2017 was 67 dBA DNL. The daily trend in noise levels at LT-1 is shown in Figure 2.

Long-term noise measurement LT-2 was made near the midpoint of the western site boundary adjacent to Stevens Creek Volkswagen. At this noise measurement location, sounds produced by the auto dealership's wash station, repair bay, and loudspeaker were audible. Hourly average noise levels typically ranged from 59 to 71 dBA L_{eq} during the day and from 50 to 65 dBA L_{eq} at night. The day-night average noise level from Wednesday, May 24, 2017 through Friday, May 26, 2017 was 69 dBA DNL. The daily trend in noise levels at LT-2 is shown in Figure 3.

Long-term noise measurement LT-3 was made behind 4340 Stevens Creek Boulevard, approximately 35 feet north of the Albany Drive centerline. This location was selected to quantify the noise environment along Albany Drive near the closest residential receptors to the project site. Hourly average noise levels at this location typically ranged from 61 to 73 dBA L_{eq} during the day and from 53 to 64 dBA L_{eq} at night. The day-night average noise level on Thursday, May 25, 2017 was 68 dBA DNL. The daily trend in noise levels at LT-3 is shown in Figure 4.

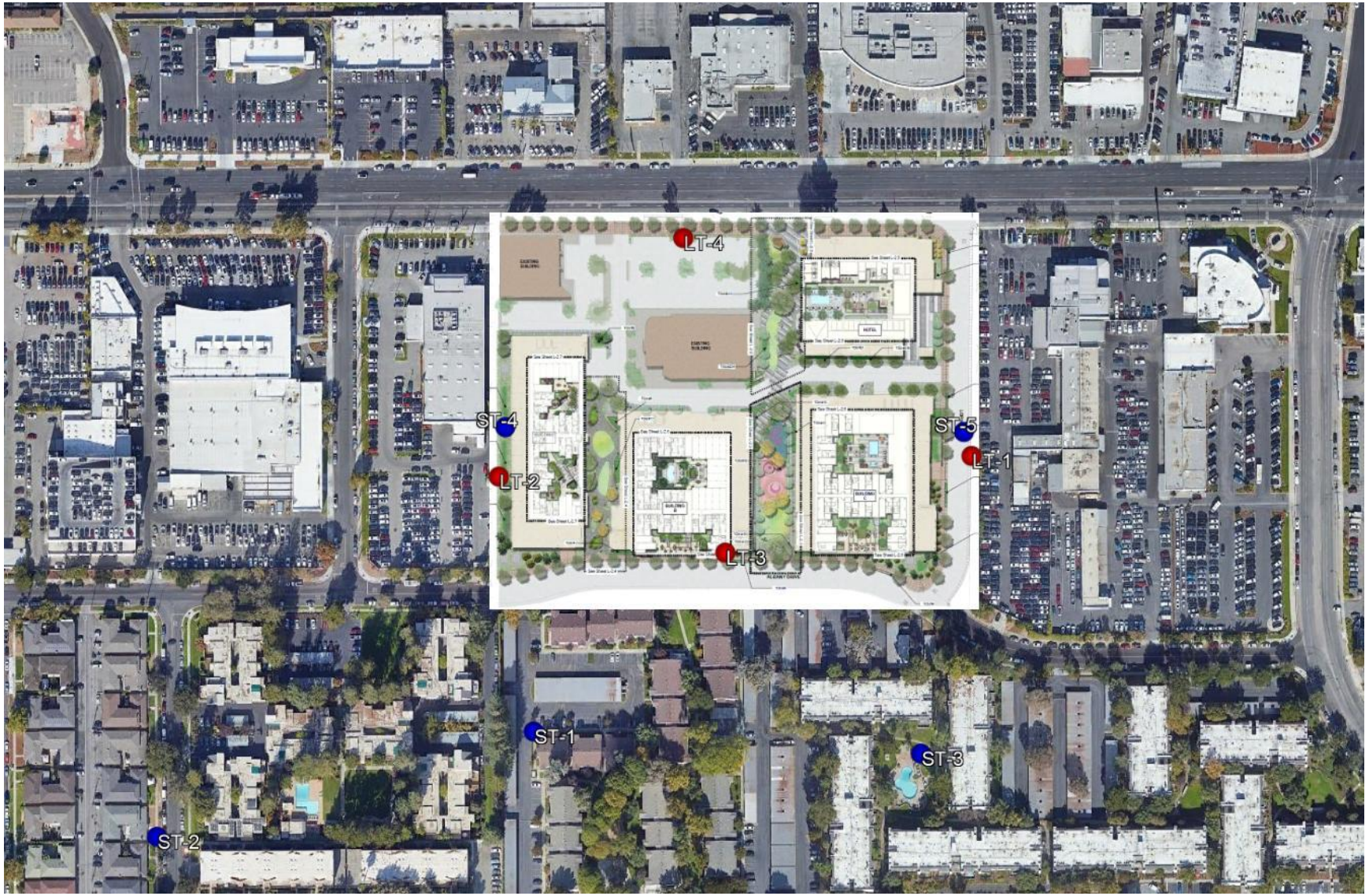
Long-term noise measurement LT-4 was made in front of 4360 Stevens Creek Boulevard, approximately 70 feet south of the Stevens Creek Boulevard centerline, in order to quantify the noise environment produced by vehicle traffic along the roadway. Hourly average noise levels at this location typically ranged from 67 to 76 dBA L_{eq} during the day and from 56 to 65 dBA L_{eq} at night. The day-night average noise level on Thursday, May 25, 2017 was 72 dBA DNL. The daily trend in noise levels at LT-4 is shown in Figure 5.

Short-term noise measurements were made to identify sources of noise and quantify the variation in noise levels in the project vicinity. Table 4 summarizes the results of the short-term noise measurements. During these measurements, the sky was overcast, winds were light at 3-4 mph, and temperatures were in the low 60's °F. Noise from traffic on I-280 was audible at all short-term measurement locations. During some of the short-term measurements, airplanes and equipment produced varying maximum instantaneous noise levels. Airplanes passing overhead produced maximum noise levels ranging from 61 to 67 dBA L_{max}. Various equipment at the auto dealerships produced maximum noise levels ranging from 60 to 81 dBA L_{max}. Air compressors generated noise levels ranging from 60 to 62 dBA L_{max}, PA announcements produced noise levels ranging from 56 to 63 dBA L_{max}, pneumatic wrenches produced noise levels up to 64 dBA L_{max}, and car wash blower-dryer produced noise levels ranging from 75 to 81 dBA L_{max}.

TABLE 4 Summary of Short-Term Noise Measurement Data

Noise Measurement Location	L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}
ST-1: Park Kiely Apartments, Building M. 5/26/2017, 11:00 a.m. – 11:10 a.m.	64	61	59	56	55	57
ST-2: In front of 309 Auburn Way. 5/26/2017, 11:20 a.m. – 11:30 a.m.	68	65	62	59	56	60
ST-3: Park Kiely Apartments, Pool Area. 5/26/2017, 11:40 a.m. – 11:50 a.m.	67	62	59	58	56	58
ST-4: Along west boundary of site near LT-2. 5/26/2017, 12:00 p.m. – 12:10 p.m.	82	82	81	62	59	75
ST-5: Along east boundary of site near LT-1. 5/26/2017, 12:20 p.m. – 12:30 p.m.	64	63	59	57	56	57

FIGURE 1 4300 Stevens Creek Boulevard Noise Measurement Locations



Source: Google Earth, 2021.

FIGURE 2 Daily Trend in Noise Levels for LT-1 from Wednesday, May 24, 2017 through Friday, May 26, 2017

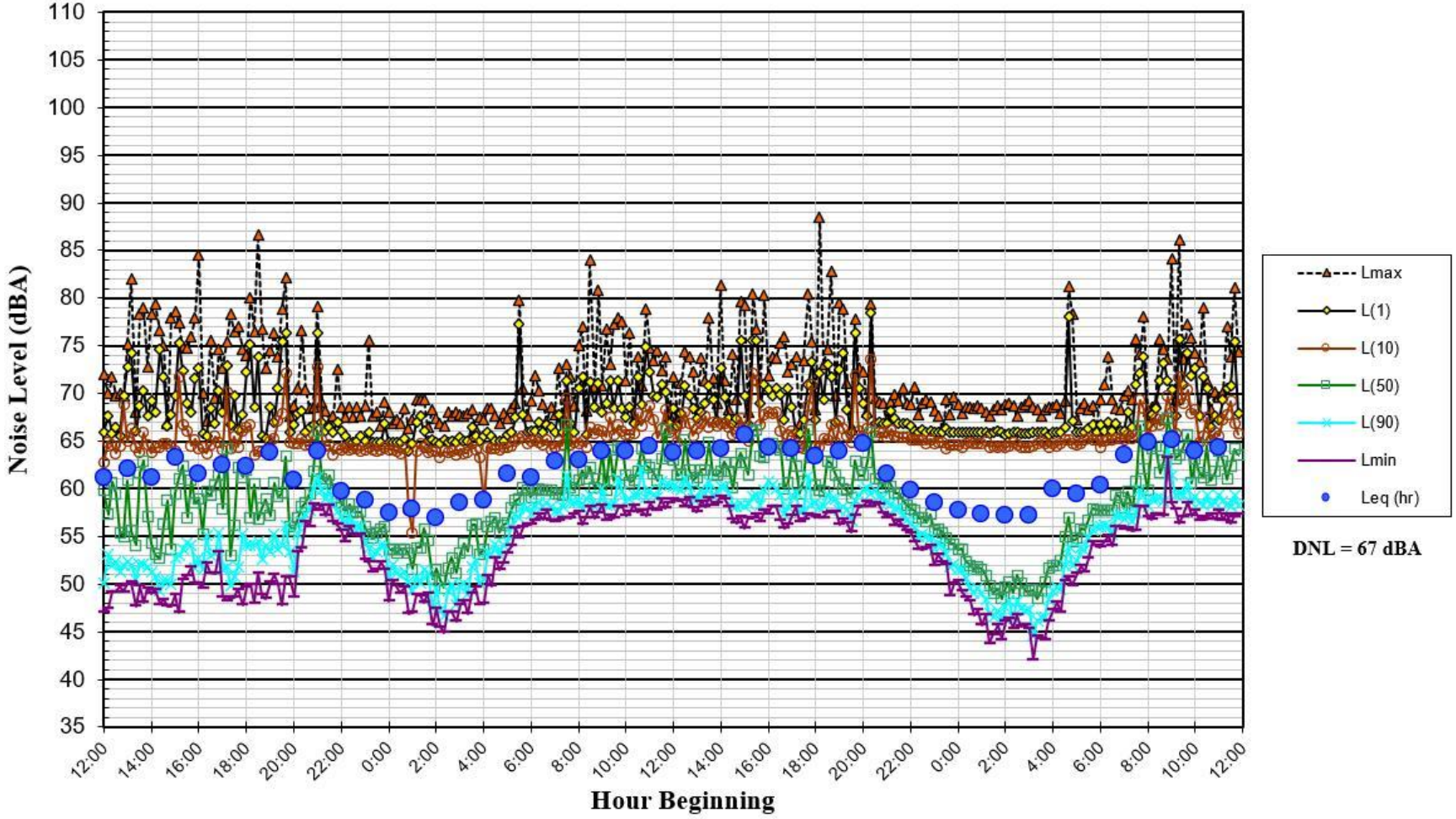


FIGURE 3 Daily Trend in Noise Levels for LT-2 from Wednesday, May 24, 2017 through Friday, May 26, 2017

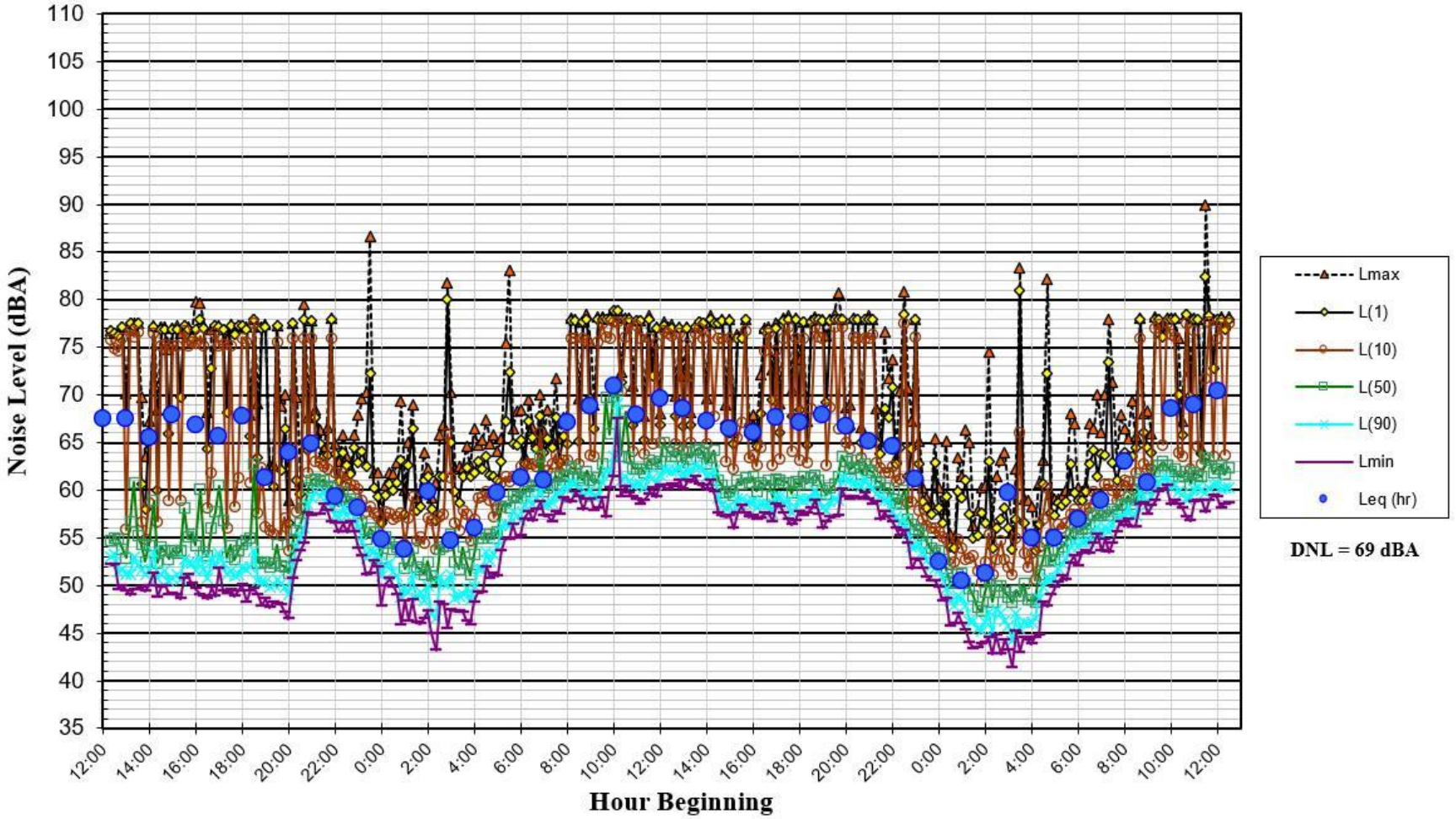


FIGURE 4 Daily Trend in Noise Levels for LT-3 from Wednesday, May 24, 2017 through Friday, May 26, 2017

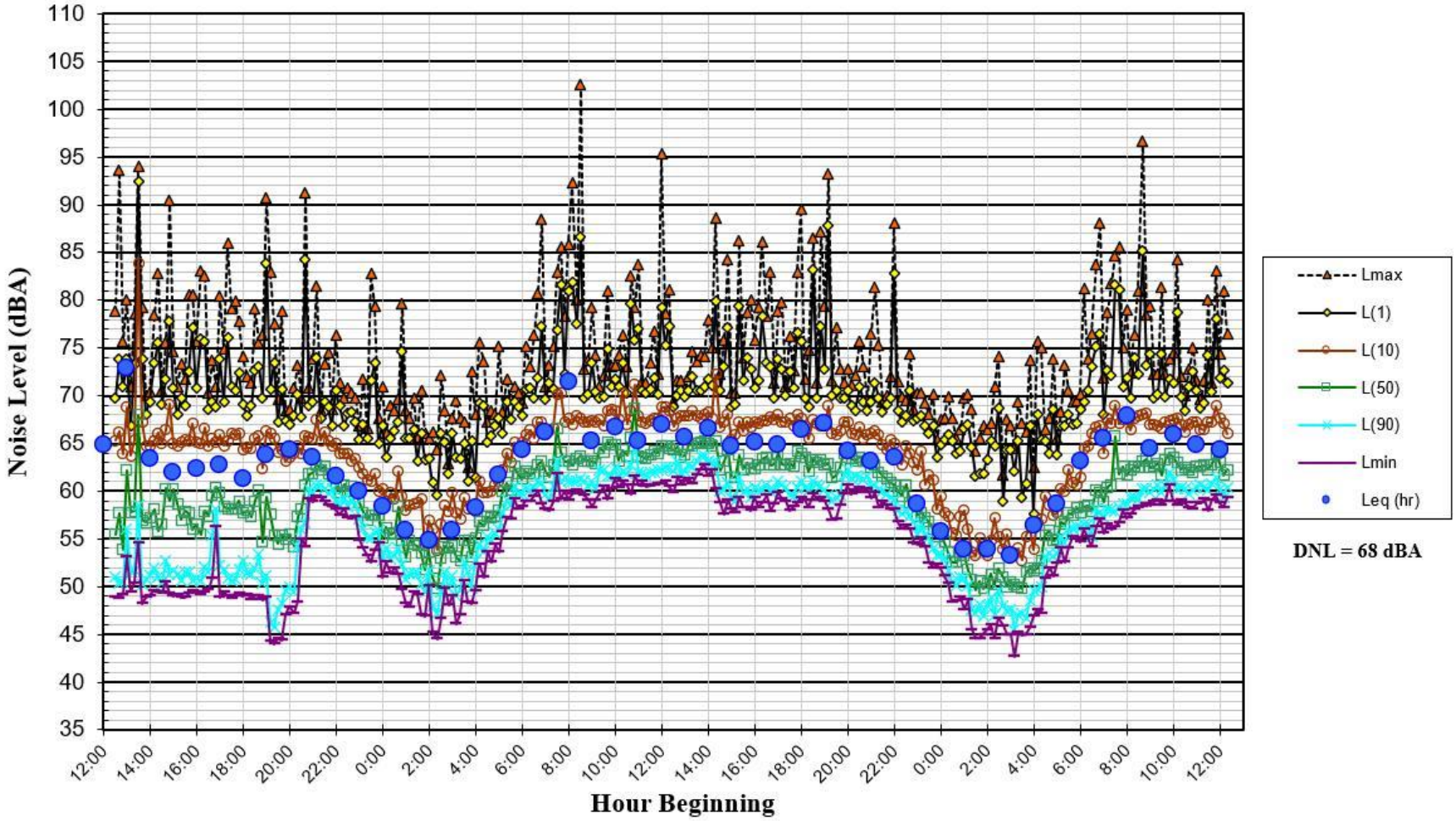
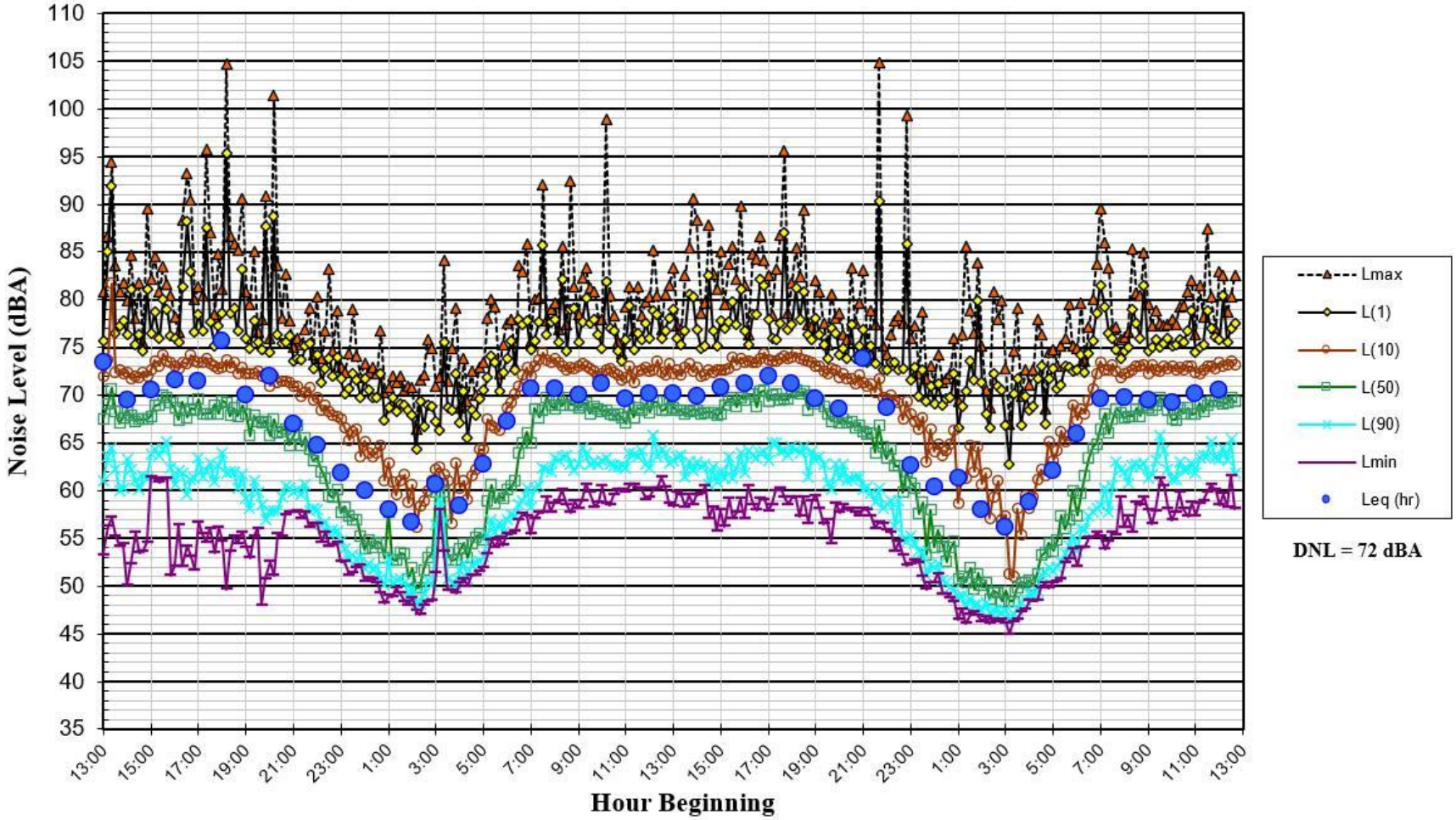


FIGURE 5 Daily Trend in Noise Levels for LT-4 from Wednesday, May 24, 2017 through Friday, May 26, 2017



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, which would include hotels.

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

- The City's acceptable exterior noise level standard is 65 dBA DNL or less for the proposed neighborhood parks or playgrounds.

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

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

The future noise environment at the site would continue to result primarily from vehicular traffic along Stevens Creek Boulevard and Albany Drive. According to the traffic study completed for the proposed project, the traffic noise level increase attributable to the proposed project would be less than 1 dBA DNL at the project site. Future cumulative plus project traffic volumes were not included in the updated traffic report, completed in December 2021; however, based on the previous study completed in 2018, the cumulative plus project scenario would result in a 1 dBA DNL increase at the project site over existing traffic conditions. Based on the build-out in the project vicinity, this conservative noise level increase is assumed for future worst-case conditions.

Future Exterior Noise Environment

The proposed project includes three common use park areas, which are located between the buildings; multiple courtyards and roof decks at the proposed residential buildings; and a courtyard, meeting room patio, and two outdoor seating areas located at the proposed hotel.

<u>Neighborhood Parks</u>
Three common use park areas are shown on the site plan, dated April 7, 2021. The first park is located between the proposed hotel and the existing building that will remain under future project conditions. This park would be on the northern part of the project site, and the center of the park

would be approximately 190 feet from the centerline of Stevens Creek Boulevard. At this distance and assuming partial shielding from the existing and proposed buildings on either side of the park, the future exterior noise levels would be 66 dBA DNL.

The other two parks are located between the proposed residential buildings on the southern part of the project site. The center of the park located between Buildings A and B would be approximately 165 feet north of the centerline of Albany Drive, and the center of the park located between Buildings B and C would be approximately 155 feet north of the centerline of Albany Drive. At these distances and with partial shielding from the surrounding buildings, the future exterior noise levels would be 55 to 56 dBA DNL.

The future noise levels at the centers of both parks in the southern portion of the project site would meet the City's normally acceptable threshold of 65 dBA DNL for neighborhood parks; however, future noise levels at the center of the park in the northern portion of the project site would exceed the normally acceptable threshold by 1 dBA DNL. The purpose of neighborhood parks is to be open and accessible for public use. Since the future exterior noise levels would only exceed the normally acceptable threshold by 1 dBA DNL and would fall within the conditionally acceptable threshold, implementation of further measures to reduce noise levels would not be recommended for this use, assuming approval by the City of San José.

Residential Land Uses

The site plan for Building A, which located in the southwestern corner of the project site, shows two courtyards located on level 2 along the eastern building façade. Both courtyards would be surrounded by the proposed building on the north, west, and south sides and would also receive partial shielding from the proposed Building B to the east. The centers of both courtyards would be adequately shielded from traffic noise along Albany Drive and Stevens Creek Boulevard. The centers of these courtyards would have future exterior noise levels below 50 dBA DNL.

Plans for Buildings B and C show two courtyards on level 3. The northern courtyards at both buildings would be completely surrounded by the respective buildings and, therefore, adequately shielded from all surrounding traffic noise. The second courtyards at both buildings would be located along the southern building façades facing Albany Drive. The center of the courtyard at Building B would be approximately 50 feet north of the centerline of the roadway, and the center of the courtyard at Building C would be approximately 65 feet from the centerline. Each courtyard would be partially shielded by the buildings on the east, west, and north, as well as by the elevation of the courtyards above the ground. The future exterior noise levels at the centers of each southern courtyard at Buildings B and C would be at or below 50 dBA DNL.

Additionally, Building B has two roof decks located on level 6. These roof decks are located on either side of the courtyard in the southeastern and southwestern corners of Building B. The centers of both roof decks are approximately 50 feet from the centerline of Albany Drive. With partial shielding from the elevation of the roof decks, future exterior noise levels would be 51 dBA DNL at the centers of both roof decks.

Building C plans also show two roof decks on level 4, two roof decks on level 6, and two roof decks on level 7. Each of these roof decks is located in the southeastern and southwestern corners of the building, adjacent to the southern courtyard. The centers of both level 4 roof deck are approximately 40 feet from the centerline of Albany Drive, while the centers of the level 6 roof decks are 55 feet from the centerline and the level 7 roof decks are 75 feet from the centerline. With partial shielding from the elevation of the roof decks, future exterior noise levels would be at or below 56 dBA DNL at the centers of all Building C roof decks.

The future noise levels at the centers of all outdoor use areas associated with the residential component of the proposed project would meet the City's normally acceptable threshold of 60 dBA DNL.

Hotel Use

The proposed hotel includes a courtyard pool area accessible for occupants of the hotel only. This common use area would be subject to the exterior noise threshold of 60 dBA DNL established for residential uses. This level 2 courtyard would be surrounded by the proposed hotel on the northern, southern, and eastern sides of the courtyard. Based on the orientation of the courtyard, the majority of this area would be well-shielded from traffic noise along Stevens Creek Boulevard. While noise levels would be up to 63 dBA DNL at the edge of this space, future exterior noise levels would be at or below 52 dBA DNL at the center of the courtyard where most extended outdoor activities would occur. This would meet the City's 60 dBA DNL threshold for hotel uses.

Commercial Land Uses

The ground-level uses of the proposed hotel would consist of commercial office and retail uses, which would be subject to the City's 70 dBA DNL threshold at common outdoor areas. The restaurant/café located in the northwestern corner of the hotel would include an outdoor dining area. The center of this dining area would be approximately 115 feet from the centerline of the Stevens Creek Boulevard. Future exterior noise levels at the center of this space would be 68 dBA DNL.

The business center located in the southwestern corner of the hotel would have a meeting room patio. The center of this outdoor use area would be approximately 235 feet from the centerline of Stevens Creek Boulevard. Future exterior noise levels at the center of this space would be 63 dBA DNL.

The retail component located in the northeastern corner of the hotel would have an outdoor seating area, the center of which would be approximately 100 feet from the centerline of Stevens Creek Boulevard. Future exterior noise levels at the center of this space would be 70 dBA DNL.

The future noise levels at the centers of all outdoor use areas associated with the commercial component of the proposed project would meet the City's normally acceptable threshold of 70 dBA DNL.

Future Interior Noise Environment

Residential Land Uses

Interior noise levels would vary depending upon the design of the buildings (relative window area to wall area) and the selected construction materials and methods. 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.

All three residential buildings are located on the southern portion of the project site, with the southern façades of each building set back approximately 30 to 80 feet from the centerline of Albany Drive. At these distances, residential units located along the southern building façades would be exposed to future exterior noise levels ranging from 65 to 70 dBA DNL. Assuming windows to be partially open, future interior noise levels in these units would range from 50 to 55 dBA DNL.

The northern façades of Buildings B and C would be mostly shielded from the existing building along Stevens Creek Boulevard and the proposed hotel. However, the northern façade of Building A would be approximately 235 feet from the centerline of Stevens Creek Boulevard and would have some direct exposure. At this distance, the units along the northern façade of Building A would be exposed to future exterior noise levels would be up to 66 dBA DNL. Assuming windows to be partially open, future interior noise levels in these units would be up to 51 dBA DNL.

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.

Hotel Use

Standard commercial hotel construction provides approximately 20 to 25 dBA of exterior-to-interior noise reduction, assuming windows are closed. For exterior noise environments ranging from 65 to 70 dBA DNL, interior noise levels can typically be maintained below 45 dBA DNL with the incorporation of an adequate forced-air mechanical ventilation system in each hotel room, allowing the windows to be closed. In noise environments of 70 dBA DNL or greater, a combination of forced-air mechanical ventilation and sound-rated construction methods are often necessary to meet the interior noise level limit.

Hotel rooms located along the northern façade nearest Stevens Creek Boulevard would be set back from the centerline of the roadway by approximately 75 feet. At this distance, the rooms facing Stevens Creek Boulevard would be exposed to future exterior noise levels up to 73 dBA DNL.

Assuming windows to be closed, future interior noise levels in these rooms would be up to 53 dBA DNL.

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 Land Uses

Ground-level commercial retail and office uses would be subject to the State's Cal Green Code requirements for interior spaces during hours of operation, which usually occur during daytime hours. The nearest building façade for these nonresidential uses would be set back approximately 75 feet from the centerline of Stevens Creek Boulevard. At this distance, daytime hourly average noise levels at the ground level of the building exterior would range from 68 to 76 dBA L_{eq}, with day-night average noise levels of 73 dBA DNL.

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

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 and hotel interiors:

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

- Preliminary calculations indicate that residential units along the southern building façades of Buildings A, B, and C would require windows and doors with a minimum rating of 30 STC with adequate forced-air mechanical ventilation to meet the interior noise threshold of 45 dBA DNL.

- Preliminary calculations indicate that hotel rooms along the northern building façade of proposed hotel would require windows and doors with a minimum rating of 35 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

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

NOISE IMPACTS AND MITIGATION MEASURES

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

Significance Criteria

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

- A significant noise impact would be identified if the project would generate a substantial temporary or permanent noise level increase over ambient noise levels at existing noise-sensitive receptors surrounding the project site and that would exceed applicable noise standards presented in the General Plan 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.

    - 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 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 temporary increase in ambient noise levels for a period of more than one year; however, with the implementation of the City's Standard Permit Condition, this temporary noise increase would be reduced to a **less-than-significant** level**.**

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.

The noise-sensitive residences to the south of the project site would have existing daytime ambient noise levels similar to the noise levels ranging from 61 to 73 dBA L_{eq}, as measured at LT-3. The commercial receptors to the east, to the west, and to the north of the project site would have existing daytime ambient noise levels similar to the data collected at LT-1, LT-2, and LT-4, respectively. Average hourly noise levels during construction hours range from 61 to 66 dBA L_{eq} at commercial receptors to the east, from 59 to 71 dBA L_{eq} at commercial receptors to the west, and from 67 to 76 dBA L_{eq} at commercial receptors to the north, respectively.

Construction activities generate considerable amounts of noise, especially during earth-moving activities when heavy equipment is used. The construction of the proposed project would involve demolition of the existing buildings located at the site, excavation and grading, trenching, and building construction. 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.

Construction activities for individual projects are typically carried out in 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. 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 mostly 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.

A detailed list of equipment expected to be used during each phase of project construction was provided for this analysis and is summarized in Table 7. 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 every piece of equipment would operate simultaneously, which would represent the worst-case scenario. 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.

For each phase, the worst-case hourly average noise level was estimated at the property line of each surrounding land use. For overall construction noise levels, multiple pieces of equipment used simultaneously would add together creating a collective noise source. While every piece of equipment per phase would likely be scattered throughout the site, the noise-sensitive receptors surrounding the site would be subject to the collective noise source generated by all equipment operating at once. Therefore, to assess construction noise impacts at the receiving property lines of noise-sensitive receptors, the collective worst-case hourly average noise level for each phase was positioned at the geometrical center of the site and propagated to the nearest property line of the surrounding land uses. These noise level estimates are also shown in Table 7. Noise levels in Table 7 do not assume reductions due to intervening buildings or existing barriers.

TABLE 5 Construction Equipment 50-Foot Noise Emission Limits

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

Notes:

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

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

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

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

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

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

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

TABLE 7 Estimated Construction Noise Levels at Nearby Land Uses

Phase of Construction	Time Duration	Construction Equipment (Quantity)	Calculated Hourly Average Noise Levels, L_{eq} (dBA)							
			Ambient Noise Levels = 61 to 73 dBA L_{eq}		Ambient Noise Levels = 61 to 66 dBA L_{eq}		Ambient Noise Levels = 59 to 71 dBA L_{eq}		Ambient Noise Levels = 67 to 76 dBA L_{eq}	
			South Res. (195ft)		East Comm. (390ft)		West Comm. (400ft)		North Comm. (400ft)	
			Level, dBA	Exceeds Ambient by 5 dBA or more?	Level, dBA	Exceeds Ambient by 5 dBA or more?	Level, dBA	Exceeds Ambient by 5 dBA or more?	Level, dBA	Exceeds Ambient by 5 dBA or more?
Demolition	1/3/2023-2/10/2023	Concrete/Industrial Saw (1) Excavator (3) Rubber-Tired Dozer (2)	75	No	69	No	68	No	68	No
Site Preparation	2/11/2023-3/10/2023	Rubber-Tired Dozer (3) Tractor/Loader/Backhoe (4)	76	No	70	No	70	No	70	No
Grading/ Excavation	3/11/2023-5/12/2023	Excavator (2) Grader (1) Rubber-Tired Dozer (1) Scraper (2) Tractor/Loader/Backhoe (2)	76	No	70	No	70	No	70	No
Trenching/ Foundation	3/11/2023-5/12/2023	Tractor/Loader/Backhoe (1) Excavator (1)	70-77[a]	No	64-71[a]	Yes	64-71[a]	No	64-71[a]	No
Building – Exterior	5/13/2023-4/11/2025	Crane (1) Forklift (3) Generator Set (1) Tractor/Loader/Backhoe (3) Welder (1)	74	No	68	No	68	No	68	No
Building – Interior/ Architectural Coating	4/12/2025-5/30/2025	Air Compressor (1)	62	No	56	No	56	No	56	No
Paving	5/31/2025-7/18/2025	Paver (2) Paving Equipment (2) Roller (2) Tractor/Loader/Backhoe (2)	75	No	69	No	69	No	69	No

[a] Range of levels reflects the trenching/foundation phase only and during the overlapping period with the grading/excavation phase.

As shown in Table 7, ambient levels at the surrounding uses would potentially be exceeded by 5 dBA L_{eq} or more at the eastern commercial property line during the overlapping period of grading/excavation phase and the trenching/foundation phase. Project construction is expected to last for a period of approximately 31 months. Since project construction would last for a period of more than one year 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.

Policy EC-1.7 of the City's General Plan would be enforced as part of the conditions of approval. Policy EC-1.7 states the following:

> Construction operations within the City will be required to use available noise suppression devices and techniques and continue to 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.

Additionally, the City requires that reasonable noise reduction measures be incorporated into the construction plan and implemented during all phases of construction activity as part of their Standard Permit Condition. The following measures shall be included as part of the proposed project construction:

- 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.

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

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

- Prohibit unnecessary idling of internal combustion engines.

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

- 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.

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

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

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

With the implementation of GP Policy EC-1.7, Municipal Code requirements, and the City's Standard Permit Conditions, the temporary construction noise impact would be reduced to a less-than-significant level.

Mitigation Measure 1a: No further mitigation required.

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

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 new nonresidential building equipment shall not exceed a noise level of 55 dBA DNL at receiving noise-sensitive land uses. Noise-sensitive receptors surrounding the site would include existing residences south of the site, opposite Albany Drive. Additionally, the City's Municipal Code limits noise levels from new residential and commercial uses to 55 dBA DNL at existing residential uses and to 60 dBA DNL at existing commercial uses, which are located to the north, to the east, to the west, and at the existing on-site medical buildings. While exceeding the Municipal Code thresholds would not constitute a significant CEQA impact, these thresholds should be used during the final design phase of the project to control noise at existing receptors in the project vicinity.

Additionally, the commercial land uses north of Stevens Creek Boulevard would be subject to the City of Santa Clara's Municipal Code noise limits of 65 dBA L_{eq} during daytime hours and 60 dBA L_{eq} during nighttime hours.

Project Traffic Increase

The traffic study included peak hour turning movements for the existing traffic volumes and project trips at 16 intersections in the vicinity of the project site. The peak hour project trips were added to the existing traffic volumes to establish the existing plus project traffic scenario. By comparing the existing plus project traffic scenario to the existing scenario, the project's contribution to the overall noise level increase would not be measurable or detectable (0 dBA DNL increase).

Mechanical Equipment

Multi-family residential buildings and hotels with ground-level commercial uses typically require various mechanical equipment to meet the ventilation needs of the buildings. The roof plans of for each of the residential buildings show condensers and exhaust fans. The roof plan of the hotel shows mechanical screening. While specific equipment is not identified on the roof of the hotel, similar condenser and exhaust fan equipment would be expected. Additionally, each building shows mechanical, electrical, and boiler rooms on the ground level, which would be located in the parking garages and would be well shielded from the surrounding receptors.

Typical air conditioning condenser units for multi-level residential buildings range from about 56 to 66 dBA L_{eq} at a distance of 3 feet. These rooftop units would be clustered together in pairs, with both units operating simultaneously at any given time. Assuming both units would be operating continuously for a 24-hour period, the combined noise level would be up to 69 dBA at 3 feet. The

roof plans show the center of these units set back from the edges of the residential buildings facing receptors by a minimum of 30 feet and from the edge of the hotel by a minimum of 10 feet.

When operating at full speed, typical noise levels for exhaust fans at buildings of this size would be up to 76 dBA at a distance of 5 feet and up to 65 dBA at 5 feet when operating at 35% speed; however, the fans in the typical residential and hotel buildings would almost always run below 35% speed and generate noise levels even lower. Assuming worst-case conditions, the exhaust fan would operate at 35% speed continuously for a 24-hour period. When combined with the condenser units, worst-case noise levels for the rooftop equipment would be 68 dBA at 5 feet.

The setbacks of the equipment combined with the elevation of the roofs above the surface would provide partial shielding for all receptors, on and off site. Table 8 summarizes the distances to the nearest surrounding receptors and the estimated noise levels generated by the rooftop equipment at the property lines of the receptors.

TABLE 8 Estimated Operational Noise Levels for Rooftop Equipment, Propagated to the Property Lines of the Nearest Receptors

Source Location	Receptor	Distance from Edge of Building	Hourly L_{eq}, dBA	DNL, dBA	Noise Level Increase, dBA DNL
Building A	South Residences	70 feet	45	51	0
	West Commercial	35 feet	51	57	0
	On-Site Medical Building	55 feet[a]	47	53	0
Building B	South Residences	55 feet	47	53	0
	On-Site Medical Building	50 feet[a]	48	54	0
Building C	South Residences	55 feet	47	53	0
	East Commercial	55 feet	47	53	0
	On-Site Medical Building	70 feet[a]	45	51	0
Hotel	East Commercial	55 feet	47	53	0
	On-Site Medical Building	80 feet[a]	44	50	0
	North Commercial	135 feet	39	46	0

[a] Distances to the on-site receptors were made from the edge of the proposed buildings to the façade of the nearest medical building.

Hourly average noise levels and day-night average noise levels for all proposed buildings would not exceed the 55 dBA at the property lines of the nearest residences or 60 dBA at the property lines of the nearest off-site commercial or at the building façade of the nearest on-site medical building located in San José. Additionally, the City of Santa Clara's daytime and nighttime thresholds would not be exceeded at the property lines of the nearest commercial land uses located north of Stevens Creek Boulevard. For all receiving receptors, the noise level increase due to mechanical equipment noise would not be measurable or detectable (0 dBA DNL increase).

At the time of this analysis, the specific mechanical equipment had not been selected, nor were specific details such as manufacturer's noise data for such equipment available. When final design plans are available, the plans should be reviewed by a qualified acoustical consultant to address any potential conflicts with the General Plan or Municipal Code of the City of San José and the Municipal Code for the City of Santa Clara. The City's standard permit condition shall be implemented as 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, as well as the 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime thresholds for the City of Santa Clara at the commercial land uses north of Stevens Creek Boulevard. 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 noise-sensitive locations around the project site or exceed 60 dBA L_{eq} at commercial uses north of Stevens Creek Boulevard. The noise control features identified by the study shall be incorporated into the project prior to issuance of a building permit.

Truck Loading and Unloading

The site plan for the proposed hotel shows a loading zone on the ground level along the eastern building façade. While delivery and trash pickup times and the frequency of these events were not provided at the time of this study, it is assumed that these events would occur during daytime hours, at most two to three times per week. Typical noise levels generated by loading and unloading of truck deliveries would be similar to noise levels generated by truck movements on existing local roadways and by similar activities at surrounding uses. These infrequent deliveries are not anticipated to substantially increase ambient noise levels at the nearby noise-sensitive land uses. Truck deliveries occurring at the proposed project site are not expected to generate levels exceeding 55 dBA L_{eq} or existing ambient conditions at the nearby residences. The noise level increase due to truck delivery activities 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 not substantially increase ambient noise levels in the project vicinity. Further, operational noise levels would not exceed 55 dBA DNL at the nearest noise-sensitive receptors with the incorporation of the City's standard permit code as a condition of approval. This is a less-than-significant impact.

Mitigation Measure 1b: No mitigation required .

Impact 2: Exposure to Excessive Groundborne Vibration. Construction-related vibration levels could potentially exceed applicable vibration thresholds at nearby sensitive land uses. **This is a 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. With no known historical buildings near the project site, a significant impact would occur if nearby buildings were exposed to vibration levels in excess of 0.2 in/sec PPV. The vibration limits contained in Policy EC-2.3 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 9 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 9 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.

TABLE 9 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., December 2021.

Table 10 summarizes the vibration levels at each of the surrounding buildings in the project vicinity. Vibration levels are highest close to the source and then attenuate with increasing distance at the rate $\left({}^{D_{ref}}/_{D}\right)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet. While construction noise levels increase based on the cumulative equipment in use simultaneously, construction vibration levels would be dependent on the location of individual pieces of equipment. That is, equipment scattered throughout the site would not generate a collective vibration level, but a vibratory roller, for instance, operating near the project site boundary would generate the worst-case vibration levels for the receptor sharing that property line. Further, construction vibration impacts are assessed based on damage to buildings on receiving land uses, not receptors at the nearest property lines. Therefore, the distances used to propagate construction vibration levels (as shown in Table 10), which are different than the distances used to propagate construction noise levels (as shown in Table 7), were estimated under the assumption that each piece of equipment from Table 9 was operating along the nearest boundary of the project site, which would represent the worst-case scenario.

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 of the historical buildings adjoining the project site to the west. Due to the close proximity of the buildings to the west of the project site (about 25 feet) and the on-site medical buildings (about 20 feet), the City's threshold would potentially be exceeded when heavy objects are dropped near the boundary of the construction site or when vibratory rollers are used near the boundary of the construction site.

A study completed by the US Bureau of Mines analyzed the effects of blast-induced vibration on buildings in USBM RI 8507.[1] The findings of this study have been applied to buildings affected by construction-generated vibrations.[2] As reported in USBM RI 8507[1] and reproduced by Dowding,[2] Figure 6 presents the damage probability, in terms of "threshold damage," "minor damage," and "major damage," at varying vibration levels. Threshold damage, which is described as cosmetic damage in this report, would entail hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage would include hairline cracking in masonry or the loosening of plaster, and major structural damage would include wide cracking or shifting of foundation or bearing walls.

As shown in Figure 6, maximum vibration levels of 0.2 in/sec PPV or lower would result in virtually no measurable damage, while levels of 0.3 in/sec PPV would result in less than a 5% chance of cosmetic damage and no minor or major damage.

Heavy vibration-generating construction equipment would have the potential to produce vibration levels of 0.2 in/sec PPV or more at nonhistorical buildings within 25 feet of the project site.

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

In summary, the construction of the project would generate vibration levels exceeding the General Plan threshold of 0.2 in/sec PPV at nonhistorical buildings within 25 feet of the construction boundary. This would be considered a significant impact.

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

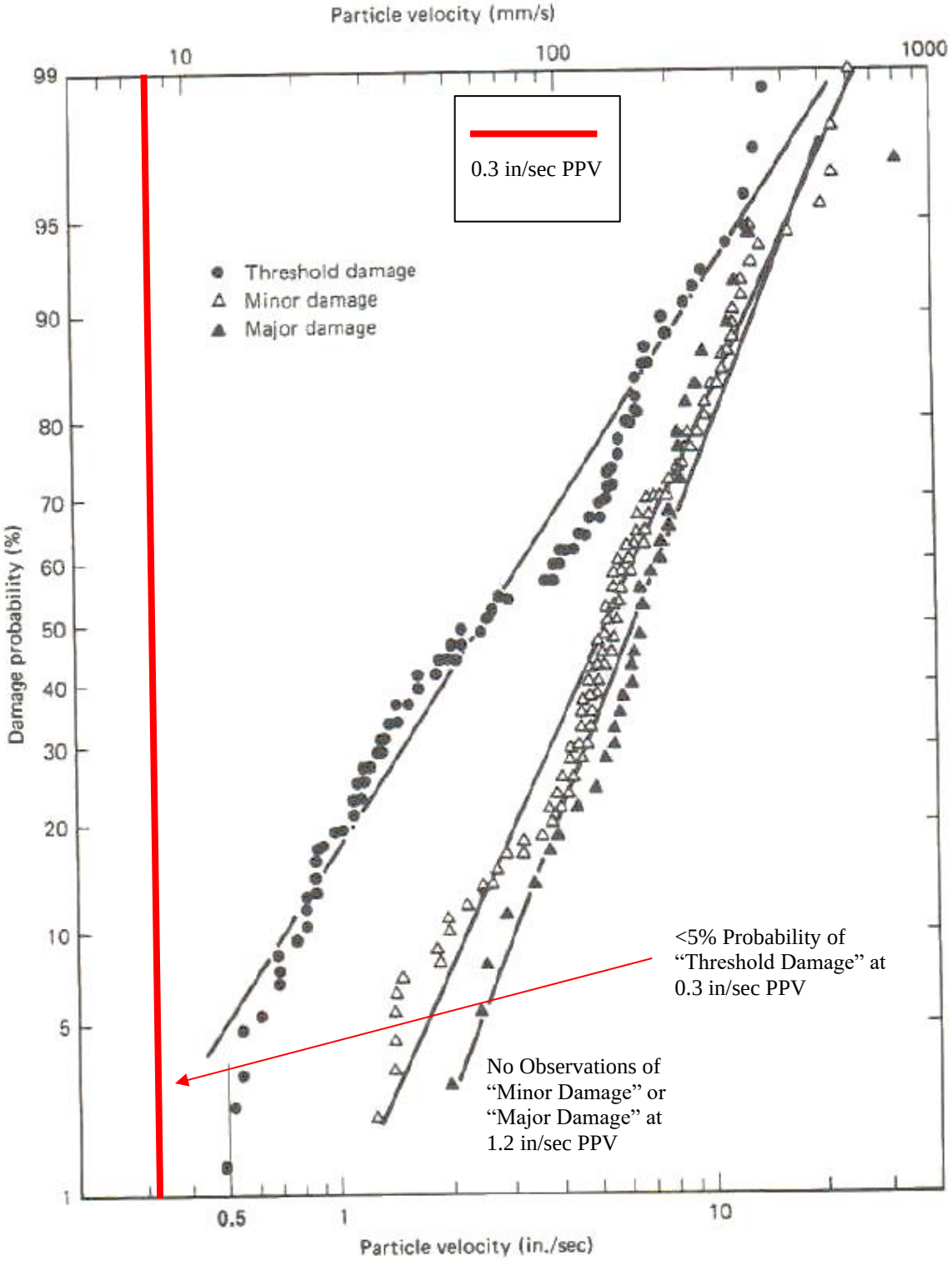
[2] Dowding, C.H., Construction Vibrations, Prentice Hall, Upper Saddle River, 1996.

TABLE 10 Vibration Source Levels for Construction Equipment

Equipment		PPV (in/sec)				
		West Commercial Buildings (25ft)	**South Residential Buildings (80ft)**	**East Commercial Buildings (60ft)**	**North Commercial Buildings (180ft)**	**On-Site Medical Buildings (20ft)**
Clam shovel drop		**0.202**	0.056	0.077	0.023	**0.258**
Hydromill (slurry wall)	in soil	0.008	0.002	0.003	0.001	0.010
	in rock	0.017	0.005	0.006	0.002	0.022
Vibratory Roller		**0.210**	0.058	0.080	0.024	**0.268**
Hoe Ram		0.089	0.025	0.034	0.010	0.114
Large bulldozer		0.089	0.025	0.034	0.010	0.114
Caisson drilling		0.089	0.025	0.034	0.010	0.114
Loaded trucks		0.076	0.021	0.029	0.009	0.097
Jackhammer		0.035	0.010	0.013	0.004	0.045
Small bulldozer		0.003	0.001	0.001	0.0003	0.004

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., December 2021.

FIGURE 6 Probability of Cracking and Fatigue from Repetitive Loading



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

Mitigation Measure 2:

The following measures are recommended to reduce vibration impacts from construction activities:

- Prohibit the use of heavy vibration-generating construction equipment, such as vibratory rollers or excavation using clam shell or chisel drops, within 30 feet of any adjacent building.

- Designate a person responsible for registering and investigating claims of excessive vibration. The contact information of such person shall be clearly posted on the construction site.

- The above vibration plan shall be submitted to the Supervising Planner at PBCE prior to issuance of a grading plan.

The implementation of these mitigation measures would reduce the impact to a less-than-significant level.

Impact 3: **Excessive Aircraft Noise.** The project site is located more than 3.5 miles from Norman Y. Mineta International Airport. The noise environment attributable to aircraft is considered normally acceptable under the Santa Clara County ALUC noise compatibility policies. **This is a less-than-significant impact**.

Norman Y. Mineta San José International Airport is a public-use airport located approximately 3.6 miles northeast 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/DNL contour line (see Figure 7). 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 aircrafts. Therefore, the proposed project would be compatible with the City's exterior noise standards for aircraft noise.

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

Mitigation Measure 3: **None required.**

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

FIGURE 7 2037 CNEL Noise Contours for SJIA Relative to Project Site

Figure 5
Scenario 2: With Project 2037 Noise Contour Map

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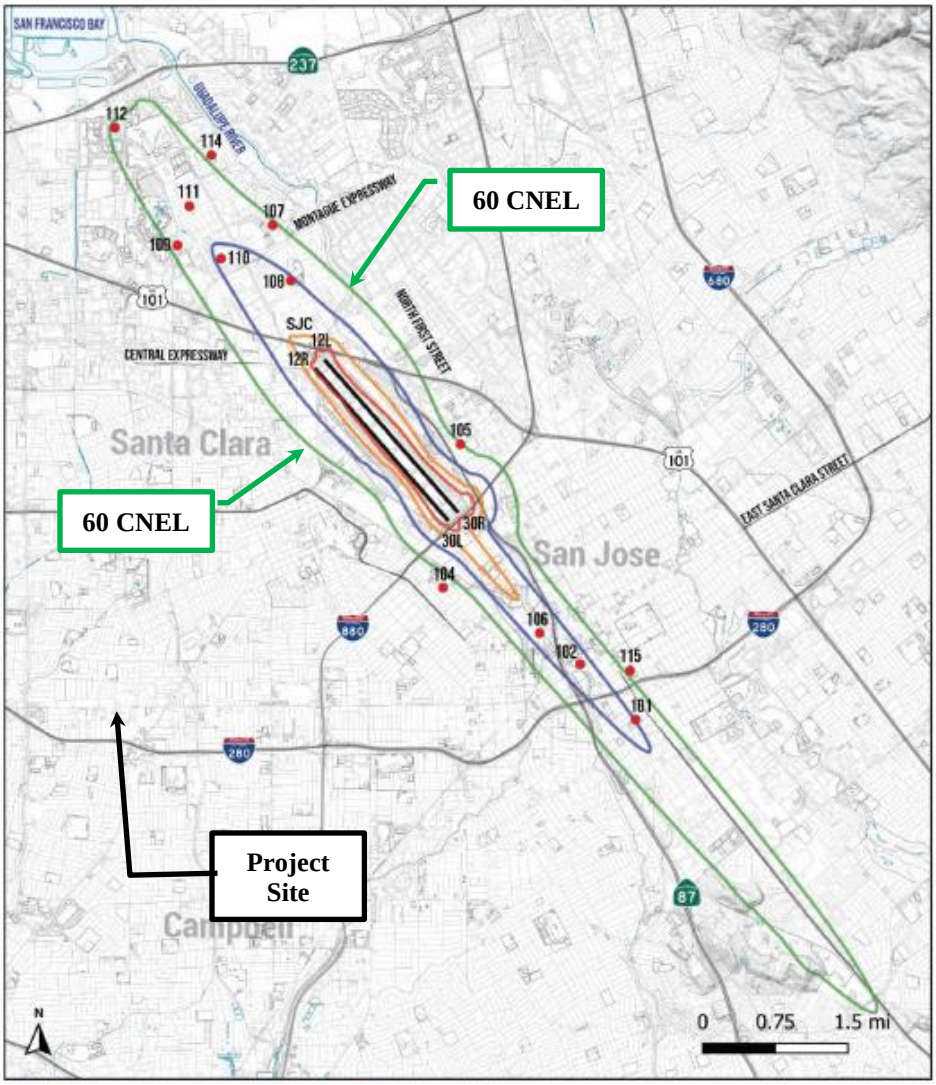

NORMAN Y. MINETA SAN JOSE INTERNATIONAL AIRPORT

- 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. Cumulative traffic noise volumes were not included in the most recent traffic study, completed in December 2021. Therefore, cumulative traffic noise increases due to the proposed project is not assumed for this study.

From the City's website,[4] there are no planned or approved projects located within 1,000 feet of the proposed project. Therefore, no cumulative noise impacts would occur due to the proposed project.

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