550 EAST BROKAW
NOISE AND VIBRATION ASSESSMENT

San José, California

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INTRODUCTION

Seven new eight-story office towers are proposed at 550 East Brokaw Road in San José, California. The applicant proposes to demolish the existing commercial building and surface parking lot located at the project site and construct approximately 1,622,310 square feet of leasable office space, 427,145 square feet of enclosed mechanical space and service areas, and 1,647,920 square feet of structured parking consisting of 5,386 parking spaces divided between a nine-story garage and a 10-story garage. The office campus layout would consist of one standalone tower ("Tower 2") and three pairs of towers joined at the podium level (Towers 1a and 1b as "Tower 1," Towers 3a and 3b as "Tower 3," and Towers 4a and 4b as "Tower 4"). The first two floors, and portions of floors three through eight, would be dedicated to these commercial and amenity spaces. Tower construction would also include an outdoor terrace on the seventh floor of each tower. The towers would be configured around a central pedestrian network to encourage campus connectivity.

This report evaluates the project's potential to result in significant noise and vibration 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 existing noise conditions in the project vicinity; 2) the General Plan Consistency 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 measures, where necessary, to mitigate the impacts of the project on sensitive receptors in the vicinity.

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* (L_{dn} or *DNL*) 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.

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 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.

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, September 2013.

Regulatory Background - Noise

The State of California, Santa Clara County, and the City of San José have established regulatory criteria that are applicable in this assessment. The State CEQA Guidelines, Appendix G, California Building Code, Santa Clara County Airport Land Use Commission Comprehensive Land Use Plan, and the City of San Jose General Plan are used to assess the potential significance of impacts. A summary of the applicable regulatory criteria is provided below.

State CEQA Guidelines. 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; or

(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.

Pursuant to recent court decisions, the impacts of site constraints, such as exposure of the proposed project to excessive levels of noise and vibration, are not included in the Impacts and Mitigation Section of this report. These items are discussed in a separate section addressing the project's consistency with the policies set forth in the City's General Plan.

CEQA does not define what noise level increase would be considered substantial. Typically, an increase in the DNL noise level resulting from the project at noise sensitive land uses of 3 dBA or greater would be considered a significant impact when projected noise levels would exceed those considered acceptable for the affected land use. An increase of 5 dBA DNL or greater would be considered a significant impact when projected noise levels would remain within those considered acceptable for the affected land use.

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 2010 California Green Building Standards Code (Section 5.507.4.1 and 5.507.4.2). These standards were not altered in the 2019 revisions. Section 5.507 states that either the prescriptive (Section 5.507.4.1) or the performance method (Section 5.507.4.2) shall be used to determine environmental control at indoor areas. The prescriptive method is very conservative and not practical in most cases; however, the performance method can be quantitatively verified using exterior-to-interior calculations. For the purposes of this report, the performance method is utilized to determine consistency with the Cal Green Code. Both of the sections that pertain to this project are as follows:

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

Santa Clara County Airport Land Use Commission Comprehensive Land Use Plan. The Comprehensive Land Use Plan 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

Policy N-3 Noise impacts shall be evaluated according to the Aircraft Noise Contours presented on Figure 5 (2022 Aircraft Noise Contours).

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.

    - For single family residential uses, use a standard of 60 dBA DNL for exterior noise in private usable outdoor activity areas, such as backyards.

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.

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 San José International Airport noise zone (defined by the 65 CNEL contour as set forth in State law) and encourage aircraft operating procedures that minimize noise.

Regulatory Background – Vibration

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

EC-2.3 Require new development to minimize continuous vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, including ruins and ancient monuments or building that are documented to be structurally weakened, a continuous vibration limit of 0.08 in/sec PPV (peak particle velocity) will be used to minimize the potential for cosmetic damage to a building. A continuous vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction. Equipment or activities typical of generating continuous vibration include but are not limited to: excavation equipment; static compaction equipment; vibratory pile drivers; pile-extraction equipment; and vibratory compaction equipment. Avoid use of impact pile drivers within 125 feet of any buildings, and within 300 feet of historical buildings, or buildings in poor condition. On a project-specific basis, this distance of 300 feet may be reduced where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction. Transient vibration impacts may exceed a vibration limit of 0.08 in/sec PPV only when and where warranted by a technical study by a qualified professional that

verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction.

Existing Noise Environment

The project site is shown in Figure 1. The site is surrounded by commercial and light industrial uses, with the nearest noise-sensitive receptors located approximately 1,600 feet to the east (residences) and 2,555 feet to the southwest (hotel). The existing noise environment at the project site results primarily from vehicular traffic along Interstate 880 (I-880) and East Brokaw Road. Local traffic along the other surrounding roadways, stationary noise sources from the surrounding commercial and light industrial properties, and aircraft associated with Mineta San José International Airport operations would also affect the ambient noise environment.

Due to Shelter-in-Place restrictions implemented by the State of California[1] at the time of this study, traffic volumes along the surrounding roadways were substantially lower and not representative of typical conditions; therefore, a noise monitoring survey was not completed to document ambient noise levels during this time period.

In order to establish the environmental baseline for the project, noise data contained in the City of San José General Plan were reviewed. A review of these data indicates that the noise environment in the project vicinity is primarily the result of vehicular traffic along I-880 and East Brokaw Road. In 2008, I-880 produced a noise level of approximately 81 dBA DNL at 75 feet from the near direction of travel, while East Brokaw Road produced a noise level of approximately 71 dBA DNL at 75 feet from the near direction of travel.[2] The General Plan noise contour information shows that noise levels at boundaries of the site typically range from 65 to 75 dBA DNL, as shown in Figure 2. While noise levels are expected to increase by 1 dBA DNL along I-880 by the year 2035, noise levels are not projected to measurably increase along East Brokaw Road by 2035.

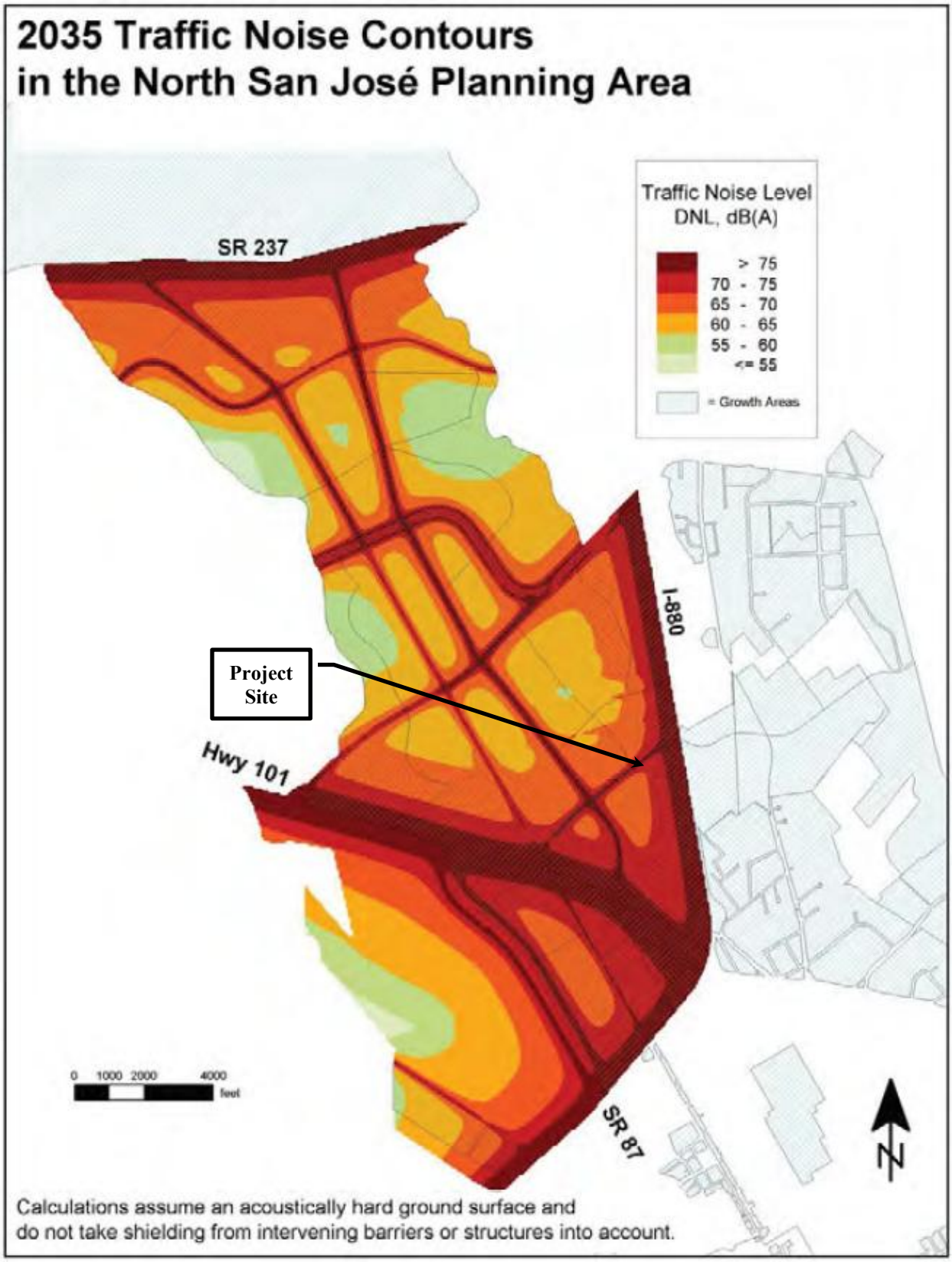
Additionally, *Illingworth & Rodkin, Inc.* made noise measurements in January 2019 for a nearby industrial site located at 1605 Industrial Avenue.[3] As part of this assessment, a long-term noise measurement was made at the nearest multi-family residential area, located approximately 1,600 feet to the east of the project site, and would represent the ambient noise environment at the nearest noise-sensitive receptors. This long-term measurement (LT) was made approximately 170 feet west of the centerline of Oakland Road. Hourly average noise levels at this location typically ranged from 61 to 67 dBA L_{eq} during the day and from 55 to 65 dBA L_{eq} at night. Between 8:00 a.m. and 10:30 a.m. on Friday, January 4, 2019, the noise environment was higher than typically observed throughout the previous days of monitoring. This was likely due to landscaping activities at the park in the vicinity of the sound level meter or starting vehicles parked near the meter. The day-night average noise level was 68 dBA DNL at LT, and the daily trends in noise levels are shown in Figures A1 through A3 of the Appendix.

[1] Cal. Exec. Order No. N-33-20, (Mar. 19, 2020).
[2] Illingworth & Rodkin, Inc., "Envision San Jose 2040 General Plan Comprehensive Update Environmental Noise Assessment," December 2010.
[3] Illingworth & Rodkin, Inc., "Industrial Avenue Redevelopment Project Noise and Vibration Assessment," June 27, 2019.

FIGURE 1 550 East Brokaw Road Project Site and Surrounding Area

Source: Google Earth 2020.

FIGURE 2 Project Site in Relation to 2035 General Plan Noise Contours



PLAN CONSISTENCY ANALYSIS

The impacts of site constraints, such as exposure of the proposed project to excessive levels of noise, are not considered under CEQA. This section evaluates the Noise and Land Use Compatibility of the project to determine consistency with the policies set forth in the City's General Plan.

Consistency Analysis Thresholds

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 thresholds for exterior and interior spaces included in the General Plan policies are summarized below for the proposed project:

- For common use outdoor areas at commercial land uses, the exterior noise threshold would be 70 dBA DNL.

Additionally, the State of California establishes interior noise limits for all nonresidential land uses as follows:

- 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.

Noise and Land Use Compatibility

The future noise environment at the project site would continue to result primarily from vehicular traffic along I-880 and East Brokaw Road. A traffic report was completed for the proposed project in September 2020 by *Hexagon Transportation Consultants, Inc*. While the traffic study indicated that the proposed project would produce a 1 dBA DNL noise level increase along East Brokaw Road when compared to the existing traffic volumes, the traffic study did not provide information related to future traffic volumes. Therefore, to estimate future traffic noise levels, a review of the traffic volumes contained in the *Draft Program EIR for the Envision San José 2040 General Plan,*[3] was made. By the year 2035, a noise level increase along I-880 of 1 dBA DNL would occur, while no measurable increase along East Brokaw Road was calculated in the General Plan Update EIR. Therefore, a 1 dBA DNL increase is assumed throughout the project site by the year 2035.

Future Exterior Noise Environment

According to the site plan dated July 24, 2020, ground-level common use areas would be located in the northwestern corner of the project site (ground-level amphitheater terrace), on the interior of the project site between the buildings (ground-level picnic and work area), and along the eastern boundary south of Building 3B (ground-level main square open plaza). Figure 3 shows each of these outdoor use areas. Additionally, each proposed building includes entrance terraces on level 2 and three terraces on level 7. Figures 4 through 10 show the proposed balconies at the individual buildings. It is assumed that each of these balconies would be common use outdoor use areas where extended usage could occur.

Ground-Level Amphitheater Terrace

This outdoor use area is proposed in the northwestern corner of the project site, just south of East Brokaw Road. The proposed buildings would shield this outdoor space from traffic noise along I-880; however, there would be direct exposure to traffic noise along East Brokaw Road. The center of the amphitheater terrace would be set back approximately 155 feet from the centerline of East Brokaw Road. At this distance, the future exterior noise levels would be 70 dBA DNL. This would meet the City's commercial use exterior noise threshold.

Ground-Level Picnic and Work Area

On the interior of the project site, surrounded by the proposed office buildings, there would be a picnic area with work pods and outdoor meeting space. This area would be mostly shielded from traffic noise along I-880 and East Brokaw Road. At the center of this space, the future exterior noise levels would be 62 dBA DNL, which would be below the City's 70 dBA DNL threshold.

Ground-Level Main Square Open Plaza

The outdoor space located between Buildings 3B and 4B along the eastern boundary of the project site would be shielded from traffic noise along East Brokaw Road and partially shielded from traffic noise along I-880. At the center of this space, the future exterior noise levels would be 65 dBA DNL. This would meet the City's 70 dBA DNL threshold.

FIGURE 3 Ground-Level Site Plan

Terraces at Building 1A

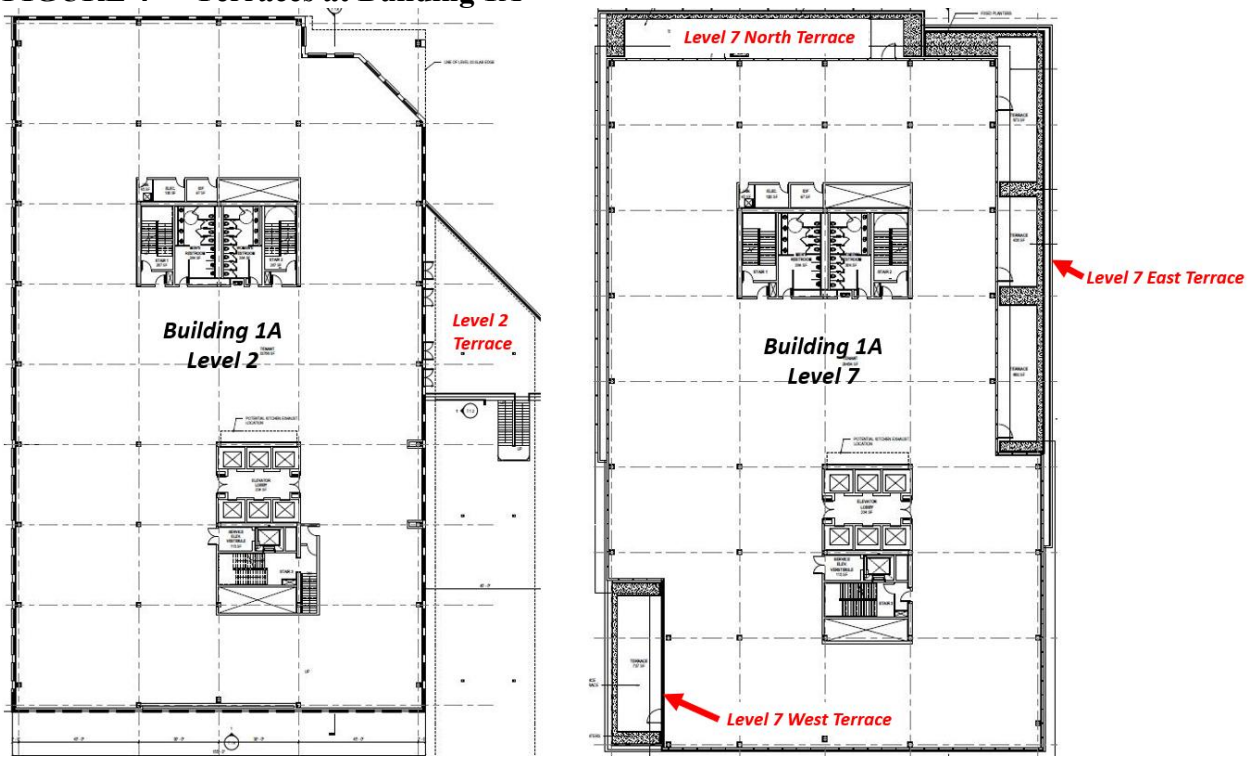
Building 1A is located in the northwestern corner of the project site and would be mostly shielded from traffic along I-880. However, this building would have direct line-of-sight to East Brokaw Road, with setbacks ranging from 235 feet along the northern façade to 500 feet along the southern façade.

As shown in Figure 4, the level 2 entrance terrace is located along the eastern building façade, with the center of the terrace set back approximately 360 feet from the centerline of East Brokaw Road. With partial shielding from the proposed buildings, the future exterior noise levels at the level 2 terrace would be 57 dBA DNL.

The terraces on level 7 are located along the northern, eastern, and western façades, as shown in Figure 4. The north terrace would have future exterior noise levels of 65 dBA DNL, due to direct line-of-sight to East Brokaw Road. The east terrace would be partially shielded due to the project buildings; therefore, the future exterior noise levels at the east terrace would be 57 dBA DNL. The west terrace would be located in the southwestern corner of the building. As shown in the figure, this terrace would be partially shielded from East Brokaw Road by the intervening building façade. However, this outdoor use area would be exposed to local traffic noise along Junction Avenue, with setbacks of approximately 60 feet from the centerline of the roadway. The future exterior noise levels at the west terrace would be 64 dBA DNL.

Future exterior noise levels at the outdoor use areas located at Building 1A would meet the City's 70 dBA DNL threshold.

FIGURE 4 Terraces at Building 1A



Terraces at Building 1B

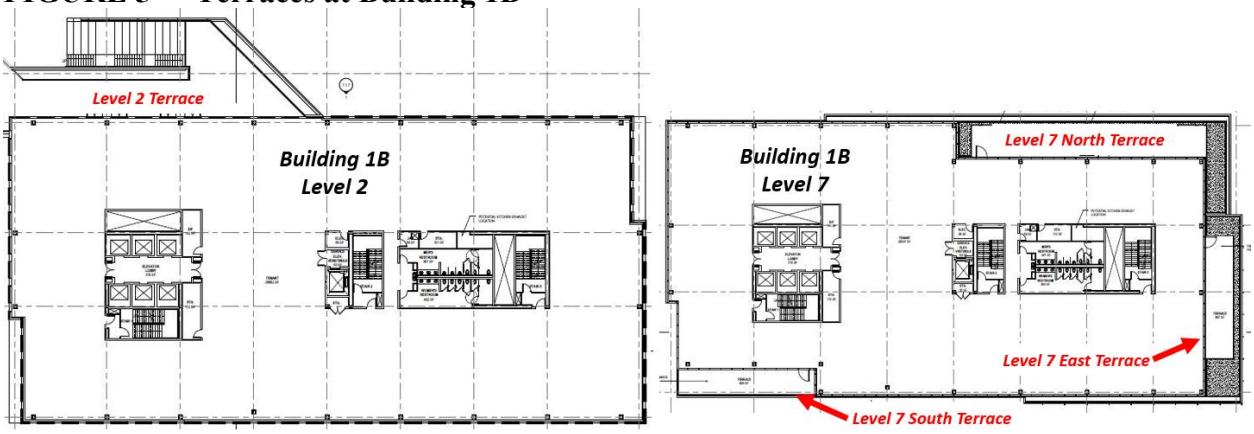
Building 1B is located on the interior of the project site and would be surrounded by project buildings. This building and all associated outdoor use areas would be mostly shielded from surrounding traffic noise sources, such as I-880 and East Brokaw Road.

The level 2 entrance terrace shown in Figure 5 is located along the northern building façade. This terrace would be set back from the centerline of East Brokaw Road by approximately 335 feet, with Building 2 providing shielding. The future exterior noise levels at the level 2 terrace would be 58 dBA DNL.

The terraces on level 7 are located along the northern, eastern, and southern façades, as shown in Figure 5. The north terrace would have future exterior noise levels of 58 dBA DNL. The east terrace would be exposed to noise from the entrance driveway to the project site, as well as some noise from East Brokaw Road. The future exterior noise levels at the east terrace would be 61 dBA DNL. The south terrace would be located in the southwestern corner of the building. As shown in the figure, this terrace would be exposed to some direct traffic noise along an on-site service driveway. With partial shielding, the future exterior noise levels at the south terrace would be 61 dBA DNL.

Future exterior noise levels at the outdoor use areas located at Building 1B would meet the City's 70 dBA DNL threshold.

FIGURE 5 Terraces at Building 1B



Terraces at Building 2

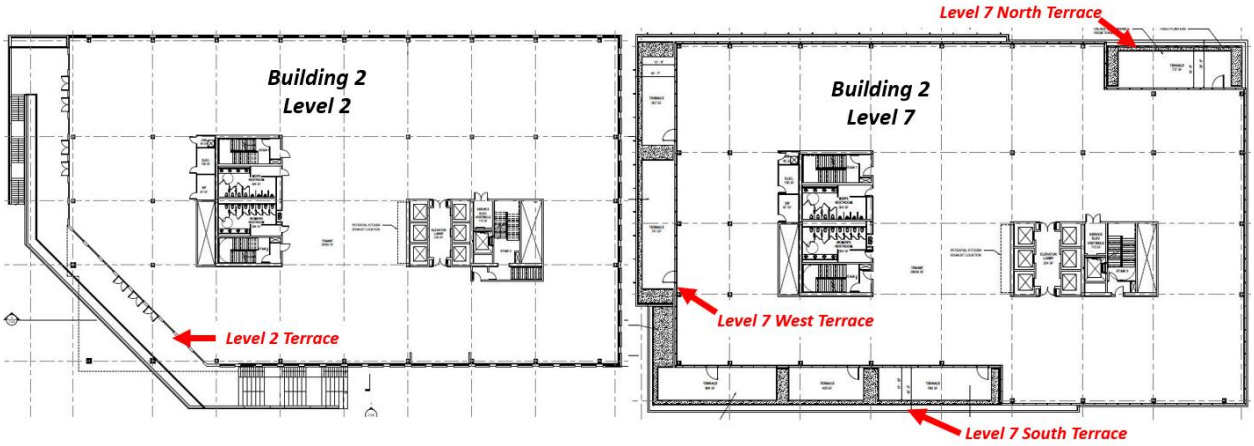
Building 2 is located along the northern boundary of the project site and would have direct line-of-sight to East Brokaw Road, with setbacks ranging from 90 feet along the northern façade to 260 feet along the southern façade.

As shown in Figure 6, the level 2 entrance terrace runs along the western façade, wrapping around to the southern façade. This terrace would be partially shielded from East Brokaw Road by the proposed building. With partial shielding from the proposed building, the future exterior noise levels at the level 2 terrace would be 66 dBA DNL.

The terraces on level 7 are located along the northern, western, and southern façades, as shown in Figure 6. The north terrace would have future exterior noise levels of 68 dBA DNL, due to direct line-of-sight to East Brokaw Road. The elevation of the terrace would provide partial shielding. The west terrace would be partially shielded due to the proposed building; therefore, the future exterior noise levels at the west terrace would be 64 dBA DNL. The south terrace would be located in the southwestern corner of the building and would be mostly shielded from East Brokaw Road traffic noise. The future exterior noise levels at the south terrace would be 57 dBA DNL.

Future exterior noise levels at the outdoor use areas located at Building 2 would meet the City's 70 dBA DNL threshold.

FIGURE 6 Terraces at Building 2



Terraces at Building 3A

Building 3A is located in the northeastern corner of the project site and would have direct line-of-sight to East Brokaw Road, with setbacks ranging from 85 feet along the northern façade to 235 feet along the southern façade. Due to the existing buildings on the adjacent property to the east being only two stories tall and the elevated nature of I-880, the eastern and southern façades of Building 3A would be exposed to I-880 traffic noise. The nearest façade would be approximately 565 feet from the centerline of the nearest through lane.

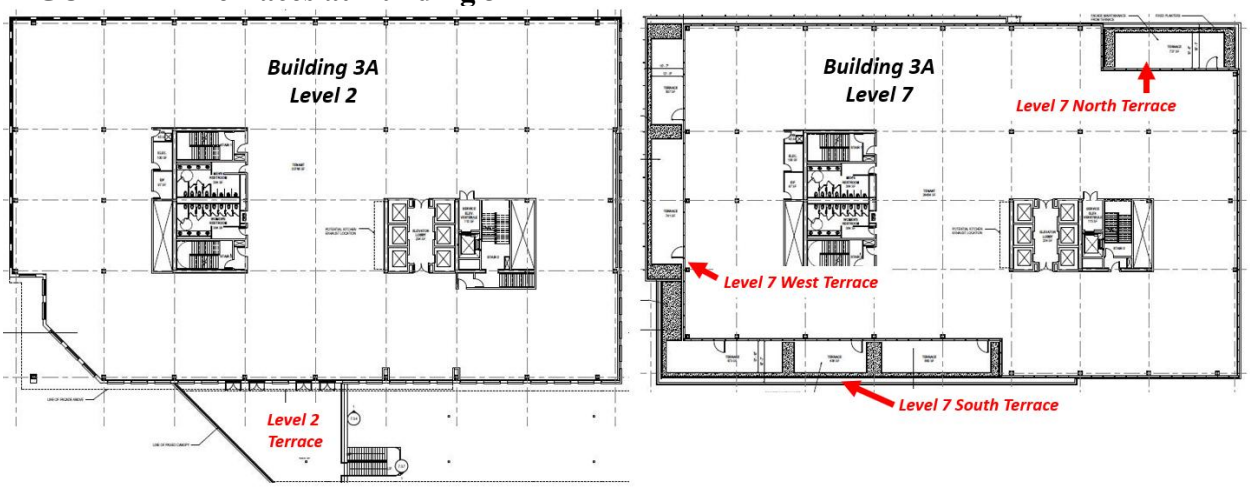
As shown in Figure 7, the level 2 entrance terrace is located along the southern façade. This terrace would be mostly shielded from East Brokaw Road traffic. Due to the orientation of Building 3B, this terrace would also be mostly shielded from I-880. The future exterior noise levels at the level 2 terrace would be 63 dBA DNL.

The terraces on level 7 are located along the northern, western, and southern façades, as shown in Figure 7. The north terrace, which is located in the northeastern corner of the building would have future exterior noise levels of 68 dBA DNL, due to direct line-of-sight to East Brokaw Road. The west terrace would be partially shielded from East Brokaw Road and completely shielded from I-880 due to the proposed building. While this terrace would have direct exposure to the entrance driveway on-site, the future exterior noise levels at the west terrace would be 64 dBA DNL. The south terrace would be located in the southwestern corner of the building and would be mostly

shielded from East Brokaw Road traffic noise, while having some direct exposure to I-880. The future exterior noise levels at the south terrace would be up to 68 dBA DNL.

Future exterior noise levels at the outdoor use areas located at Building 3A would meet the City's 70 dBA DNL threshold.

FIGURE 7 Terraces at Building 3A



Terraces at Building 3B

Building 3B is located along the eastern boundary of the project site, just south of Building 3A. The eastern and southern façades of this building would have direct exposure to I-880, with the nearest façade be set back approximately 415 feet from the centerline of the nearest through lane.

As shown in Figure 8, the level 2 entrance terrace is located along the western façade. This terrace would be shielded from I-880, and due to the orientation of Building 3A, this terrace would also be mostly shielded from East Brokaw Road. The future exterior noise levels at the level 2 terrace would be 57 dBA DNL.

The terraces on level 7 are located along the eastern, western, and southern façades, as shown in Figure 8. The east terrace, which is located in the northeastern corner of the building would have direct line-of-sight to I-880. The future exterior noise levels at the east terrace would be 69 dBA DNL. The west terrace would be mostly shielded from both I-880 and East Brokaw Road. While this terrace would have direct exposure to the entrance driveway on-site, the future exterior noise levels at the west terrace would be up to 61 dBA DNL. The south terrace would be located in the southeastern corner of the building and would have direct line-of-sight to I-880. The future exterior noise levels at the south terrace would be 70 dBA DNL.

Future exterior noise levels at the outdoor use areas located at Building 3B would meet the City's 70 dBA DNL threshold.

FIGURE 8 Terraces at Building 3B

Terraces at Building 4A

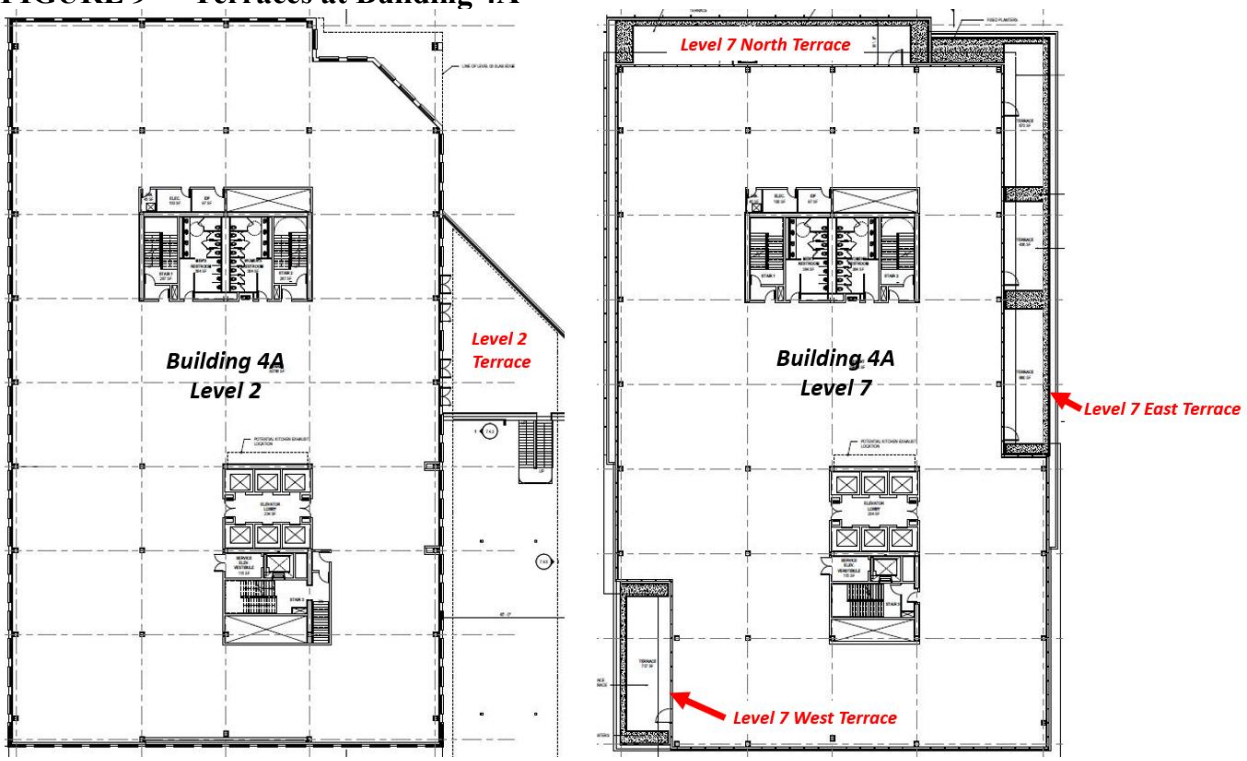
Building 4A is located on the interior of the project site and would be surrounded by project buildings. This building and all associated outdoor use areas would be mostly shielded from surrounding traffic noise sources, such as I-880 and East Brokaw Road. The nearest building façade would be approximately 380 feet from the centerline of the nearest through lane of I-880 southbound.

The level 2 entrance terrace shown in Figure 9 is located along the eastern building façade. With partial shielding from I-880, the future exterior noise levels at the level 2 terrace would be 64 dBA DNL.

The terraces on level 7 are located along the northern, eastern, and western façades, as shown in Figure 9. The north terrace would be mostly shielded from I-880 and would be set back from the centerline of East Brokaw Road by more than 600 feet. The future exterior noise levels at the north terrace would be 66 dBA DNL. The east terrace would be exposed to some noise I-880. The future exterior noise levels at the east terrace would be 69 dBA DNL. The west terrace would be mostly shielded from I-880. The future exterior noise levels at the west terrace would be 53 dBA DNL.

Future exterior noise levels at the outdoor use areas located at Building 4A would meet the City's 70 dBA DNL threshold.

FIGURE 9 Terraces at Building 4A



Terraces at Building 4B

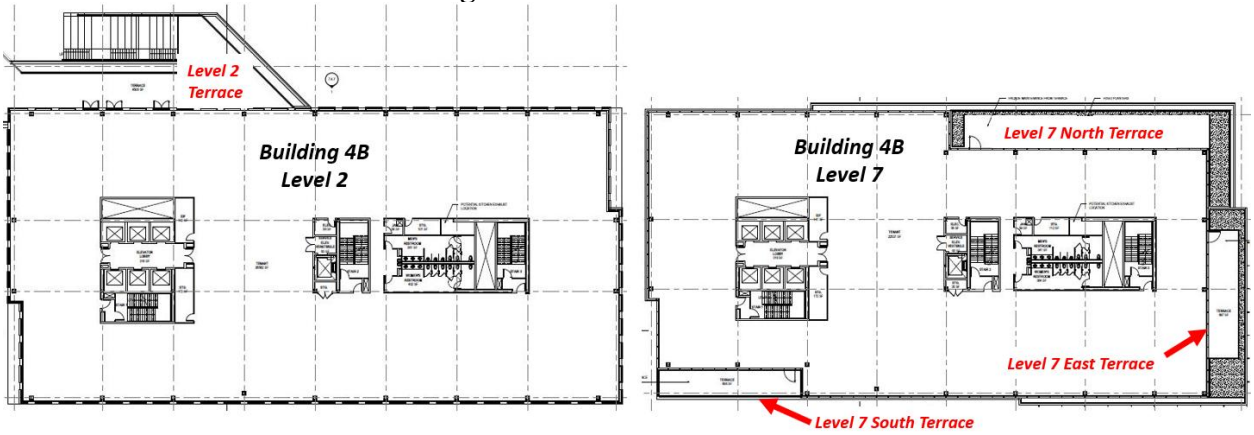
Building 4B is located in the southeastern corner of the project site, east of Building 4A. The eastern and southern façades of this building would have direct exposure to I-880, with the nearest façade be set back approximately 115 feet from the centerline of the nearest through lane.

As shown in Figure 10, the level 2 entrance terrace is located along the northern façade. This terrace would be partially shielded from I-880. The future exterior noise levels at the level 2 terrace would be 64 dBA DNL.

The terraces on level 7 are located along the northern, eastern, and southern façades, as shown in Figure 10. The north terrace, which is located in the northeastern corner of the building would have direct line-of-sight to I-880, with partial shielding from the building. The future exterior noise levels at the north terrace would be 69 dBA DNL. The east terrace would have direct exposure to I-880. The future exterior noise levels at the east terrace would be up to 78 dBA DNL. The south terrace would be located in the southwestern corner of the building and would have direct exposure to I-880. The future exterior noise levels at the south terrace would be 76 dBA DNL.

Future exterior noise levels at the level 2 and level 7 terraces along the northern building façade of Building 4B would meet the City's 70 dBA DNL threshold, while the level 7 terraces located along the eastern and southern façades would exceed the City's threshold by up to 8 dBA DNL.

FIGURE 10 Terraces at Building 4B



All ground-level outdoor use areas would be exposed to future noise levels at or below the City's 70 dBA DNL threshold. Additionally, all office terraces located at Buildings 1A, 1B, 2, 3A, 3B, and 4A would be at or below the threshold. Two level 7 terraces located along the eastern and southern façades of Building 4B would exceed the threshold be 8 and 6 dBA, respectively. Options to reduce future exterior noise levels are discussed below.

Recommended Measures to Reduce Exterior Noise Levels

Methods available to reduce exterior noise levels at the level 7 terraces on the eastern and southern façades of Building 4B include site planning alternatives (e.g., relocation of the terraces to other façades and using the proposed buildings as noise barriers), the construction of traditional noise barriers, or a combination of the above. Both terraces could be relocated to the northern or western building façades of Building 4B. Assuming these would not be feasible, the only other method to reduce noise levels would be a noise barrier. However, to reduce noise levels by 6 to 8 dBA, minimum barrier heights of six to eight feet would be required. Since each floor is 10 feet tall, this would not be optimal.

Due to the small size of these terraces and the fact that over 90% of the proposed outdoor use areas associated with this project would meet the City's normally acceptable threshold, the City could allow these terraces on a conditionally acceptable basis. While the future exterior noise levels at these two terraces exceed the City's normally acceptable threshold of 70 dBA DNL, both would meet the City's conditionally acceptable threshold of 80 dBA DNL. Occupants would have plenty of other outdoor use area options on-site that would meet normally acceptable noise level threshold; so, allowing two terraces under the conditionally acceptable threshold would be the recommended course recognizing the unreasonableness of noise control options.

Conditions of Approval

Prior to the issuance of any building permit, the project applicant shall ensure all outdoor use areas achieve future exterior noise levels at or below the City's "normally acceptable" threshold of 70 dBA DNL at the center of the spaces where reasonably achievable. For common outdoor use areas where 70 dBA DNL is not reasonably achievable, such as the level 7 terraces of Building 4B

located along the eastern and southern façades, measures should be incorporated to achieve reasonable "conditionally acceptable" noise levels at the centers of the outdoor use spaces.

Future Interior Noise Environment

Standard construction materials for commercial uses typically provide about 25 dBA of noise reduction in interior spaces. The inclusion of adequate forced-air mechanical ventilation systems is normally required so windows may be kept closed at the occupant's discretion and would provide an additional 5 dBA reduction.

Typically, the peak hourly average noise level measured during daytime hours is within 1 dBA of the day-night average noise level when the dominant noise source is a major expressway, such as I-880. Based on the day-night average noise level contours shown above in Figure 2, the project site would result in noise levels between 70 and 75 dBA DNL by the year 2035. Therefore, the peak hourly average noise level would range from 70 to 75 dBA L_{eq} during daytime hours when the office buildings would be occupied. Assuming a 25 dBA exterior-to-interior noise level reduction from standard construction materials in combination with forced-air mechanical ventilation, the future interior noise levels at each of the on-site office buildings would be at or below 50 dBA $L_{eq(1\text{-}hr)}$ during the hours of operation. This would satisfy the Cal Green Code.

Spaces where lower noise levels would be desired, such as conference rooms, may benefit from additional noise control in order to meet a lower, more desirable interior noise level. Additional noise control could be accomplished by selecting higher sound-rated windows (STC 34 to STC 38 along exterior façades).

Conditions of Approval

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

NOISE IMPACTS AND MITIGATION MEASURES

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.

    - 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 project-generated traffic 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 0.2 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.** Commercial office buildings located within 200 feet of the project site would be exposed to a temporary increase in ambient noise levels due to project construction activities for a period of more than 1 year. **This would be a significant impact**.

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 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.

Existing residences are located approximately 1,600 feet east of the project site and would be represented by the LT measurement made in January 2019, which had daytime noise levels of 61 to 67 dBA L_{eq}. The commercial buildings immediately surrounding the site would be represented by the noise contours presented in the City's General Plan. Typically, peak daytime noise levels are within 1 dBA of the day-night average noise levels; therefore, the existing ambient noise environment at the commercial land uses surrounding the site would range from 65 to 75 dBA L_{eq} during daytime hours. Due to the close proximity to U.S. Highway 101, the same hourly average noise levels would represent the ambient environment at the nearest hotel, which is approximately 2,555 feet from the project site.

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 4) from the equipment. Table 5 shows the average noise level ranges, by construction phase. Hourly average noise levels generated by construction are about 75 to 89 dBA L_{eq} for a commercial office development and about 71 to 89 dBA L_{eq} for a parking structure, both 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.

TABLE 4 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

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/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 5 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.

Project construction is expected to be completed in four phases, details of which are summarized in Table 6.

TABLE 6 Construction Phasing Information for the Proposed Project

Phase	Office Square Footage	Parking Garage Square Footage	Stalls	Surface Parking Removed	Site Area Affected (square footage)	Start Date	Duration (months)
Phase 1	576,190		1,307 (surface only)		858,191 (entire site)	October 2023	23
Phase 2	576,190	934,180	3,067	545	507,692	October 2025	23
Phase 3	320,855	499,618	1,623	658	445,180	October 2027	23
Phase 4	576,190	214,122	696		175,705	October 2029	23

A detailed list of equipment expected to be used during each phase of construction was provided by the applicant. According to the equipment list provided, stages of construction for Phases 1, 2, and 3 would include demolition, site preparation, grading/excavation, trenching/foundations, building exterior, building interior/architectural coating, and paving. Phase 4 would not include the demolition stage; however, the equipment expected to be used within each stage would be the same for all four phases. The equipment expected for each stage of construction 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. Assuming all equipment shown in each construction stage would be operating simultaneously, which would represent the worst-case construction scenario, hourly average noise levels would range from 75 to 86 dBA L_{eq} for Phases 1 through 4 of the proposed project at a distance of 50 feet.

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 stage of construction 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 during each phase of construction, the collective worst-case hourly average noise level for each stage was centered at the geometrical center of the active construction site and propagated to the nearest property line of the surrounding land uses. As mentioned above, the nearest residential land uses are located 1,600 feet east of the project site, and the nearest hotel is located 2,555 feet southwest of the project site. Assuming no attenuation from intervening

buildings, the residences would be exposed to temporary construction noise ranging from 42 to 52 dBA L_{eq} during Phases 1 through 4, which would be below the ambient noise levels of 61 to 67 dBA L_{eq}. The hotel would be exposed to temporary construction noise ranging from 38 to 49 dBA L_{eq}, assuming no attenuation from intervening buildings. This would be below the ambient noise levels of 65 to 75 dBA L_{eq}.

For the existing commercial uses surrounding the project site, Table 7 summarizes the noise levels expected to occur during each stage of construction, with the geometrical center of the construction site positioned at the center of the entire site. However, proximity to the active construction activities would determine the temporary noise exposure at the receiving properties, and activities occurring at specific buildings near property lines shared with the surrounding commercial uses would generate higher noise levels, there may also be times when completed on-site buildings would provide shielding for off-site receptors. The temporary construction noise levels in Table 7 reflect typical levels to be expected at the nearby receptors. Note that the storage facility to the south of the project site is not identified as a noise-sensitive receptor. Noise levels in Table 7 do not assume reductions due to intervening buildings or existing barriers.

As shown in Table 7, ambient levels at the surrounding commercial uses are not expected to be exceeded by 5 dBA L_{eq} or more during project construction. However, project construction would last for a period of more than one year and would be located within 200 feet of existing commercial office buildings; therefore, the proposed project would be considered a significant temporary noise impact.

TABLE 7 Detailed List of Construction Equipment Expected During Each Stage of Construction

Stage of Construction	Number of Days	Construction Equipment (Quantity)	Estimated Hourly Average Noise Level at 50 feet							
			Ambient Noise Levels = 65 to 75 dBA L_{eq}							
			North Commercial (560 feet)		East Commercial (365 feet)		South Commercial (305 feet)		West Commercial (610 feet)	
			L_{eq}, dBA	Exceeds Ambient by 5 dBA or more?	L_{eq}, dBA	Exceeds Ambient by 5 dBA or more?	L_{eq}, dBA	Exceeds Ambient by 5 dBA or more?	L_{eq}, dBA	Exceeds Ambient by 5 dBA or more?
Demolition	60 days	Excavator (2) Tractor/Loader/Backhoe (2)	64	No	67	No	69	No	63	No
Site Preparation	20 days	Tractor/Loader/Backhoe (1)	59	No	63	No	64	No	58	No
Grading/ Excavation	40 days	Excavator (1) Grader (1) Tractor/Loader/Backhoe (1)	63	No	67	No	69	No	63	No
Trenching/ Foundation	40 days	Tractor/Loader/Backhoe (1) Excavator (1)	61	No	64	No	66	No	60	No
Building – Exterior	200 days	Crane (1) Forklift (1) Tractor/Loader/Backhoe (1) Welder (2)	61	No	64	No	66	No	60	No
Building – Interior/ Architectural Coating	160 days	Air Compressor (1) Aerial Lift (1)	54	No	57	No	59	No	53	No
Paving	40 days	Paver (1) Paving Equipment (1) Roller (1) Tractor/Loader/Backhoe (1) Cement and Mortar Mixer (1)	65	No	68	No	70	No	64	No

Mitigation Measure 1a:

Reasonable regulation of the hours of construction, as well as regulation of the arrival and operation of heavy equipment and the delivery of construction material, are necessary to protect the health and safety of persons, promote the general welfare of the community, and maintain the quality of life. The Municipal Code requires that reasonable noise reduction measures be incorporated into the construction plan and implemented during all phases of construction activity. In accordance with Policy EC-1.7, a construction noise logistics plan should be developed for the proposed project.

The potential short-term noise impacts associated with construction of the project would be mitigated by the implementation of General Plan Policy EC-1.7. This policy states:

> 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.

The following standard noise control measures shall be implemented:

- Construction will be limited 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 200 feet of any commercial use. 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.

- The contractor shall use "new technology" power construction equipment with state-of-the-art noise shielding and muffling devices. All internal combustion engines used on the project site shall be equipped with adequate mufflers and shall be in good mechanical condition to minimize noise created by faulty or poorly maintained engines or other components.

- The unnecessary idling of internal combustion engines shall be prohibited.

- Staging areas and stationary noise-generating equipment shall be located as far as possible from noise-sensitive receptors, such as residential uses (a minimum of 200 feet).

- The surrounding neighborhood shall be notified early and frequently of the construction activities.

- A "noise disturbance coordinator" shall be designated to respond to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaints (e.g., beginning work too early, bad muffler, etc.) and institute reasonable measures warranted to correct the problem. A telephone number for the disturbance coordinator would be conspicuously posted at the construction site.

Implementation of Mitigation Measure 1a would ensure the project includes a construction noise logistics plan as required by General Plan Policy EC-1.7 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. Consistent with the findings of the General Plan FEIR, implementation of the construction noise logistics plan would reduce the impact of project construction to a **less-than-significant** level.

Impact 1b: **Permanent Noise Level Increase.** The proposed project is not expected to cause a substantial permanent noise level increase at the existing residential land uses in the project vicinity. **This is a less-than-significant impact.**

According to Policy EC-1.2 of the City's General Plan, a significant permanent noise increase would occur if the project would increase noise levels at noise-sensitive receptors by 3 dBA DNL or more where ambient noise levels exceed the "normally acceptable" noise level standard. Where ambient noise levels are at or below the "normally acceptable" noise level standard, noise level increases of 5 dBA DNL or more would be considered significant. The City's General Plan defines the "normally acceptable" outdoor noise level standard for the residential land uses to be 60 dBA DNL. Existing ambient levels at the nearest residential uses east of the project site would exceed 60 dBA DNL, according to the January 2019 measurements;[3] further, the General Plan contours indicate a noise environment exceeding 60 dBA DNL at the nearest hotel southwest of the project site. Therefore, a significant impact would occur if traffic due to the proposed project would permanently increase ambient levels by 3 dBA DNL. For reference, a 3 dBA DNL noise increase would be expected if the project would double existing traffic volumes along a roadway.

The traffic study included peak hour turning movements for the existing traffic volumes at 36 intersections in the project vicinity. The traffic study also included peak hour project trips, which when added to the existing volumes produced the existing plus project peak hour turning movements. By comparing the existing plus project traffic scenario to the existing scenario, the project's contribution to the overall noise level increase was determined to be 2 dBA DNL or less along all roadway segments in the project vicinity. Therefore, the project would not result in a permanent noise increase of 3 dBA DNL or more at noise-sensitive receptors in the project vicinity. This is a less-than-significant impact.

Mitigation Measure 1b: **None required.**

Impact 1c: **Noise Levels in Excess of Standards.** The proposed project is not expected to generate noise in excess of standards established in the City's General Plan at the nearby nonresidential receptors. **This is a less-than-significant impact.**

Policy 1.3 of the City's General Plan establishes a noise limitation of 55 dBA DNL for new nonresidential land use developments when located adjacent to existing or planned noise-sensitive residential and public/quasi-public land uses. As previously established, the project site would be 1,600 feet or more from the nearest residential site. I-880 and other commercial and light industrial uses are located between the project site and the nearest sensitive receptors. Therefore, all operational noise generated on the project site, which would include mechanical equipment noise and truck delivery noise, would have no impact on the nearest residences or the nearest hotel.

Policy 1.6 of the City's General Plan further regulates operational noise from new commercial developments on adjacent uses, including the surrounding commercial land uses, based on noise standards in the City's Municipal Code, which limits noise to 60 dBA at the property line of adjacent nonresidential land uses. While the Municipal Code does not provide a descriptor for the noise level, it does limit noise to 55 dBA at residential property lines, which would correlate to the day-night average noise limit of Policy 1.3 of the General Plan. Therefore, it is assumed that the noise regulation at nonresidential uses would be 60 dBA DNL.

Mechanical Equipment

The site plans for proposed Buildings 1A, 1B, 3A, 3B, 4A, and 4B include electrical, pump, transformer, and emergency generator rooms on the first floor. Additionally, the roof plans show mechanical rooms, boiler rooms, chiller rooms, and cooling tower yards, which would all be surrounded by a 17-foot tall parapet wall.

The site plan for Building 2 shows a transformer room and an electrical room on the first floor, as well as a chiller room, boiler room, several mechanical rooms, and a cooling tower yard on the roof. The equipment located on the rooftop of Building 2 would also be surrounded by a 17-foot tall parapet wall.

The ground floor of parking Garage 1 shows pump rooms and an emergency generator room, while Garage 2 does not.

For each of the ground-floor mechanical equipment room, the building façades would provide a minimum reduction of 25 dBA. Noise levels generated by electrical equipment, pumps, and transformers would be adequately attenuated such that noise levels on adjacent property lines would be at or below 60 dBA DNL. The emergency generator expected to be used at Buildings 1A, 1B, 3A, 3B, 4A, and 4B, as well as Garage 1 would be the Generac Industrial Power SD500 industrial diesel generator set, which has a capacity of 500 kW. Generators of this size would typically generate noise levels up to 88 dBA at a distance of 23 feet with a weather enclosure. With the inclusion of sufficient noise control features, noise levels could be reduced to 75 dBA at 23 feet. While noise due to generator operations are typically not subject to noise regulations during an emergency, emergency generators are typically tested monthly for a period of one hour between 7:00 a.m. and 10:00 p.m. Assuming a minimum attenuation of 25 dBA due to the building façades,

the estimated hourly average noise levels and day-night average noise levels were calculated at the property lines of the nearest surrounding commercial uses for each generator room. These levels are summarized in Table 8. Both the hourly average noise level and the estimated day-night average noise level would be below the 60 dBA threshold established by the City of San José.

All rooftop equipment would either be enclosed in a room or be surrounded by a 17-foot tall parapet wall. Due to the height of these buildings and the shielding provided by the room façades and parapet wall, the mechanical equipment noise from the rooftop equipment is not expected to exceed the City's 60 dBA DNL threshold at the surrounding nonresidential properties.

TABLE 8 Estimated Operational Noise Levels for Monthly Emergency Generator Tests

Generator Room	Nearest Receptor	Weather Enclosure		Level 1 Noise Insulation		Level 2 Noise Insulation	
		L_{eq}	DNL	L_{eq}	DNL	L_{eq}	DNL
Building 1A	Comm. West (115 feet)	49	35	44	<35	36	<35
Building 1B	Comm. West (475 feet)	37	<35	<35	<35	<35	<35
Building 3A	Comm. East (60 feet)	55	41	50	36	42	<35
Building 3B	Comm. East (60 feet)	55	41	50	36	42	<35
Building 4A	Comm. South (80 feet)	52	38	47	<35	39	<35
Building 4B	Comm. South (265 feet)	42	<35	37	<35	<35	<35
Garage 1	Comm. West (115 feet)	49	35	44	<35	36	<35

Mechanical equipment noise generated at the proposed project site is not expected to exceed thresholds included in the City's General Plan or Municipal Code. This is a less-than-significant impact.

Truck Deliveries

Each of the proposed buildings show loading zones on the ground level and located within docking bays, which can be closed with bay doors. Buildings 1A, 1B, 4A, and 4B show the loading zones on the southern façade of each building. Building 2 shows the loading zone along the eastern façade. Due to the orientation of these loading zones and the other on-site project buildings, loading and unloading activities would be shielded from the surrounding nonresidential land uses and would not generate noise levels exceeding 60 dBA DNL at the shared property lines.

Buildings 3A and 3B, however, show the loading zones along the eastern building façades, which would have direct line-of-sight to the commercial property to the east. The centers of each loading zone would be approximately 85 feet from the shared property line.

Truck delivery noise would include maneuvering activities occurring at the loading docks. Due to the existing commercial land use at the project site and the surrounding area, truck pass-by activities already exist along the roadways and would be included in the ambient noise environment. Trucks maneuvering would generate a combination of engine, exhaust, and tire noise, as well as the intermittent sounds of back-up alarms and releases of compressed air associated with truck/trailer air brakes. Heavy trucks used for incoming deliveries typically generate maximum instantaneous noise levels of 70 to 75 dBA L_{max} at a distance of 50 feet. The noise level of backup alarms can vary depending on the type and directivity of the sound, but maximum noise levels are typically in the range of 65 to 75 dBA L_{max} at a distance of 50 feet. The number of truck deliveries each day is unknown at this time; however, each building has up to four loading areas for trucks. Therefore, the maximum number of truck deliveries per building in any given hour would be four. This would represent worst-case scenario. Typically, loading or unloading a truck would take up to five minutes. Assuming four truck deliveries in any given hour, the hourly average noise level at 50 feet would be 70 dBA L_{eq}. Under worst-case conditions, it is assumed that each hour during regular operational hours between 9:00 a.m. and 5:00 p.m. would result in the maximum hourly average noise level of 70 dBA L_{eq}, which would include four deliveries per hour. Therefore, the day-night average noise level at 50 feet would be 66 dBA DNL.

While the loading zones at Buildings 1A, 1B, 2, 4A, and 4B would be adequately shielded from the surrounding off-site commercial buildings, the loading zones at Buildings 3A and 3B would have direct line-of-sight to the adjacent property east of the project site. However, the loading zones in Buildings 3A and 3B would have partial shielding due to the buildings surrounding the loading zones to the north and to the south. At a distance of 85 feet from the center of the loading zone and assuming a conservative 5 dBA reduction due to the project building, the hourly average noise level would be 61 dBA L_{eq}, and the day-night average noise level would be 56 dBA DNL. This would meet the City's Municipal Code threshold for nonresidential land uses.

Based on the worst-case assumptions, the City's 60 dBA DNL threshold is not expected to be exceeded at the shared property lines of nonresidential land uses. This would be a less-than-significant impact.

Mitigation Measure 1c: None required.

Impact 2: Exposure to Excessive Groundborne Vibration due to Construction. Construction-related vibration levels resulting from activities is not expected to exceed 0.2 in/sec PPV at the surrounding sensitive land uses. **This is a less-than-significant impact.**

The construction of the project may generate perceptible vibration when heavy equipment or impact tools (e.g. jackhammers, hoe rams) are used. Construction activities would include 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 Jose 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.

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	58	26
Hydromill (slurry wall)	in soil	0.008	3	1
	in rock	0.017	6	2
Vibratory Roller		0.210	60	27
Hoe Ram		0.089	28	12
Large bulldozer		0.089	28	12
Caisson drilling		0.089	28	12
Loaded trucks		0.076	24	10
Jackhammer		0.035	12	5
Small bulldozer		0.003	1	<1

Source: Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, Office of Planning and Environment, U.S. Department of Transportation, FTA Report No. 0123, September 2018, as modified by Illingworth & Rodkin, Inc., November 2019.

Based on the inventory of historically documented buildings in the City of San José,[4] there are no historical structures located within 200 feet of the project boundary. Therefore, vibration levels exceeding 0.2 in/sec PPV at the surrounding buildings would be considered a significant impact.

Table 10 summarizes the vibration levels estimated from each boundary of the project site, which would represent the nearest location for use of vibration-generating equipment, to the façades of the nearest surrounding off-site buildings. 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

[4] http://www.sanjoseca.gov/DocumentCenter/View/35475

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.

The adjacent sites to the east and to the south have commercial buildings approximately 145 and 30 feet from the shared property lines, respectively. The storage facility to the south would not be considered a building sensitive to construction vibration. For the sensitive adjacent buildings at distances of 145 and 30 feet, vibration levels would be below 0.2 in/sec PPV, as shown in the table. Buildings located west of Junction Street and north of East Brokaw Road would be more than 80 feet from the project's boundaries, which would result in vibration levels below the City's 0.2 in/sec PPV threshold. Construction vibration levels are not expected to be perceptible at the nearest residential structures (1,600 feet east) and at the nearest hotel (2,555 feet southwest).

The City's threshold of 0.2 in/sec PPV for non-historical sensitive buildings would not be exceeded at the nearby commercial and residential buildings.

TABLE 10 Vibration Source Levels for Construction Equipment

Equipment		PPV (in/sec)			
		East Comm. (145ft)	South Comm. (30ft)	West Comm. (85ft)	North Comm. (165ft)
Clam shovel drop		0.029	0.165	0.053	0.025
Hydromill (slurry wall)	in soil	0.001	0.007	0.002	0.001
	in rock	0.002	0.014	0.004	0.002
Vibratory Roller		0.030	0.172	0.055	0.026
Hoe Ram		0.013	0.073	0.023	0.011
Large bulldozer		0.013	0.073	0.023	0.011
Caisson drilling		0.013	0.073	0.023	0.011
Loaded trucks		0.011	0.062	0.020	0.010
Jackhammer		0.005	0.029	0.009	0.004
Small bulldozer		0.0004	0.002	0.001	0.0004

Source: Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, Office of Planning and Environment, U.S. Department of Transportation, FTA Report No. 0123, September 2018, as modified by Illingworth & Rodkin, Inc., October 2020.

Typical construction equipment, as shown in Table 10, would not exceed the 0.2 in/sec PPV threshold at the nearest sensitive buildings, vibration levels have the potential to produce vibration levels of 0.2 in/sec PPV or more at the non-historical storage facility buildings adjacent to the southern boundary of the site. With the nearest storage facility building located within 10 feet of the shared property line, vibration levels would be up to 0.58 in/sec PPV.

A study completed by the US Bureau of Mines analyzed the effects of blast-induced vibration on buildings in USBM RI 8507.[5] The findings of this study have been applied to buildings affected by construction-generated vibrations.[6] As reported in USBM RI 8507[5] and reproduced by Dowding,[6] Figure 11 presents the damage probability, in terms of "threshold damage," "minor damage," and "major damage," at varying vibration levels. Threshold damage, which is described

[5] 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.
[6] Dowding, C.H., Construction Vibrations, Prentice Hall, Upper Saddle River, 1996.

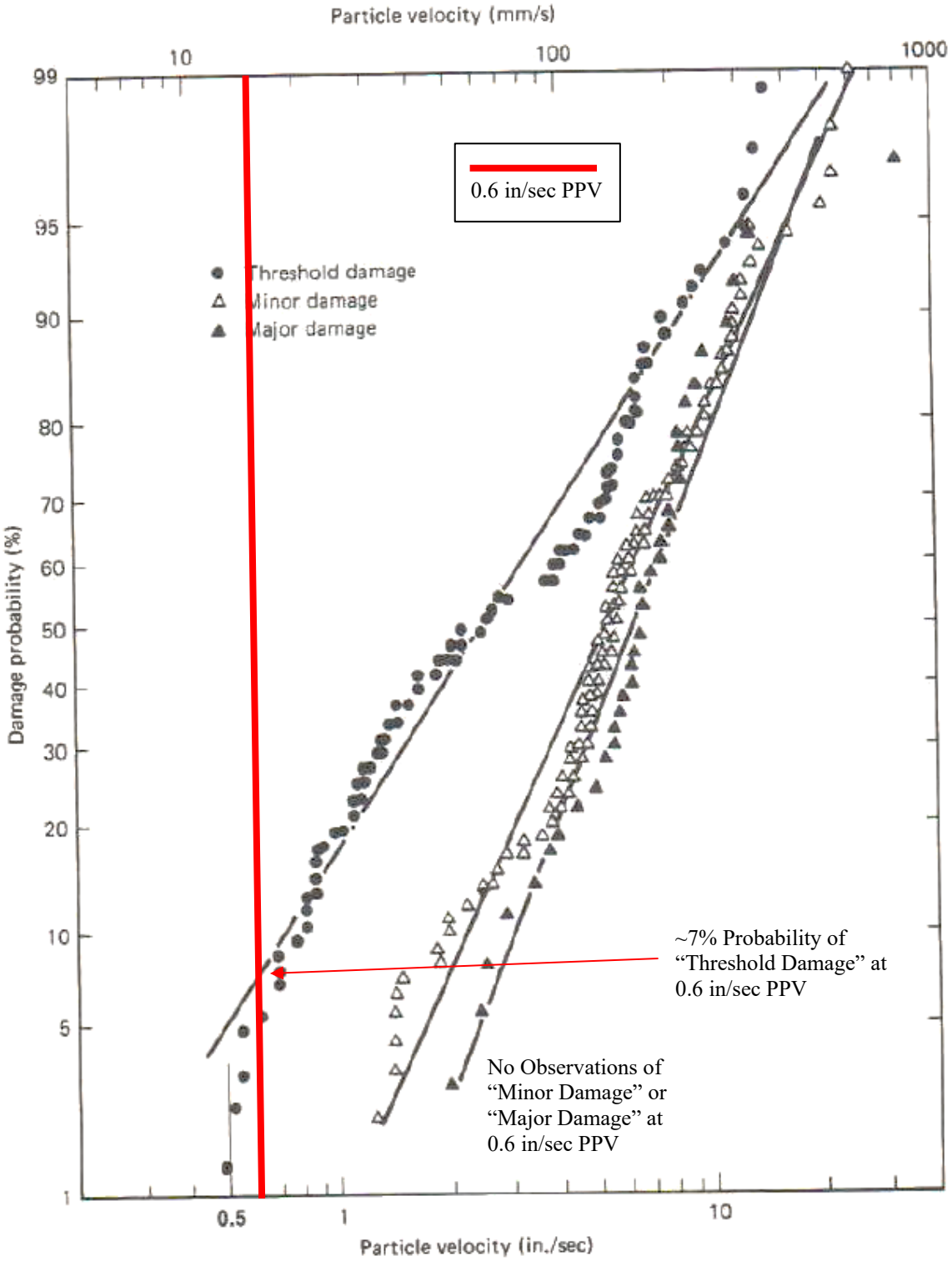
as cosmetic damage in this report, would entail hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage would include hairline cracking in masonry or the loosening of plaster, and major structural damage would include wide cracking or shifting of foundation or bearing walls. As shown in Figure 11, maximum vibration levels of 0.6 in/sec PPV would result in about 7% chance of threshold damage or cosmetic damage, while no minor or major damage would be expected.

Typical construction equipment, as shown in Table 10, would have the potential to produce vibration levels of 0.2 in/sec PPV or more at the non-historical storage facility buildings adjacent to the southern boundary of the site. However, this building would not be considered sensitive to vibration and would not result in a significant impact.

No cosmetic, minor, or major damage would occur at the sensitive conventional buildings surrounding the site. At these locations, and in other surrounding areas within 200 feet, vibration levels would potentially be perceptible. 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 less sensitive hours, perceptible vibration can be kept to a minimum. This is a less-than-significant impact.

Mitigation Measure 2: **None required.**

FIGURE 11 Probability of Cracking and Fatigue from Repetitive Loading



Source: Dowding, C.H., Construction Vibrations, Prentice Hall, Upper Saddle River, 1996, as modified by Illingworth & Rodkin, Inc., October 2020.

Impact 3: **Excessive Aircraft Noise.** The project site is located more than one mile from a public airport or public use airport and lies outside the 60 dBA CNEL airport contour. Occupants working in the project area would not be exposed to excessive aircraft noise levels with the implementation of forced-air mechanical ventilation. **This is a less-than-significant impact.**

Norman Y. Mineta San José International Airport is a public-use airport located approximately 1.35 miles southwest of the project site. According to the City's new Airport Master Plan Environmental Impact Report,[7] the project site lies outside the 60 dBA CNEL/DNL contour line (see Figure 12). 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 and below 50 dBA $L_{eq(1\text{-}hr)}$. 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.**

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

FIGURE 12 2037 CNEL Noise Contours for SJIA Relative to Project Site

Figure 5
Scenario 2: With Project 2037 Noise Contour Map

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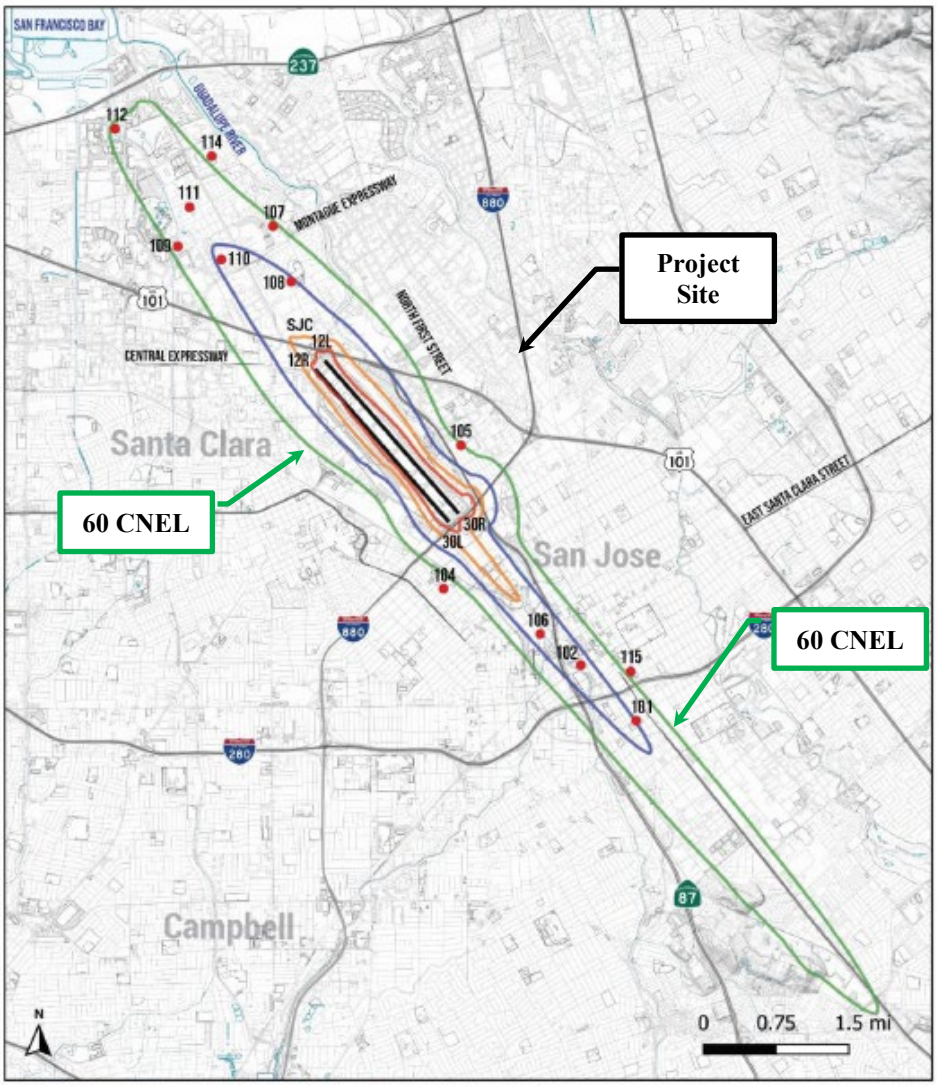

NORMAN Y. MINETA SAN JOSE INTERNATIONAL AIRPORT

- 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 volume scenarios were not included in the traffic study. Therefore, cumulative traffic noise increases due to the proposed project are not assumed at this time.

From the City's website,[8] the following planned or approved projects are located within 1,000 feet of the proposed project:

- **Supermicro** – this project is located at 750 and 780 Ridder Park Drive, which is located approximately 640 feet southeast of the project site, opposite I-880. This project is currently under construction. Construction of this project should be completed prior to construction of the 550 East Brokaw Road project. Additionally, these two project sites do not share any receptors directly impacted by temporary construction. A cumulative construction impact is not assumed.

No other planned or approved projects are located within 1,000 feet of the project site. Therefore, cumulative construction impacts would be less-than-significant.

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

Appendix A

FIGURE A1 Daily Trend in Noise Levels at LT, Wednesday, January 2, 2019

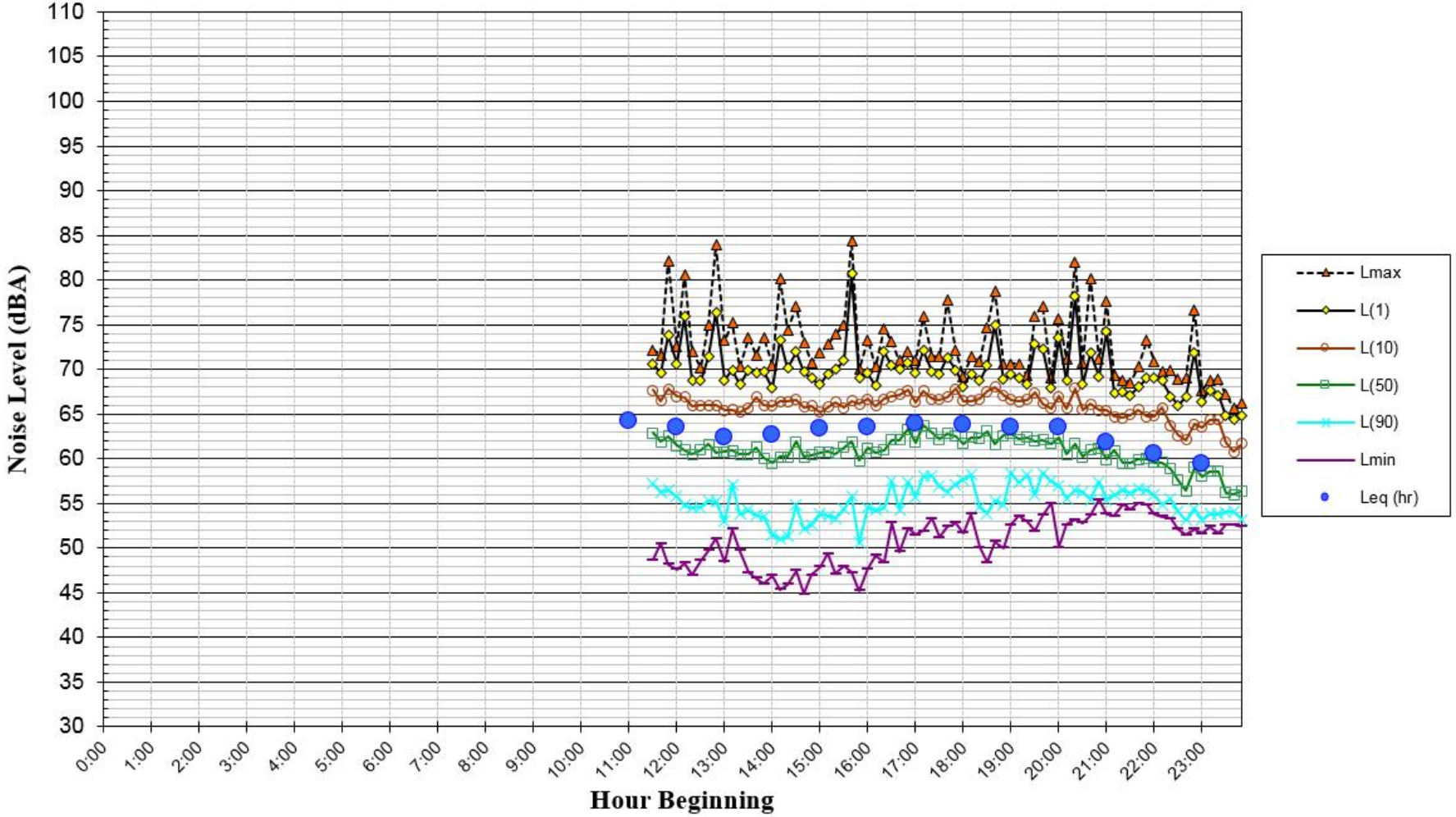

FIGURE A2 Daily Trend in Noise Levels at LT, Thursday, January 3, 2019

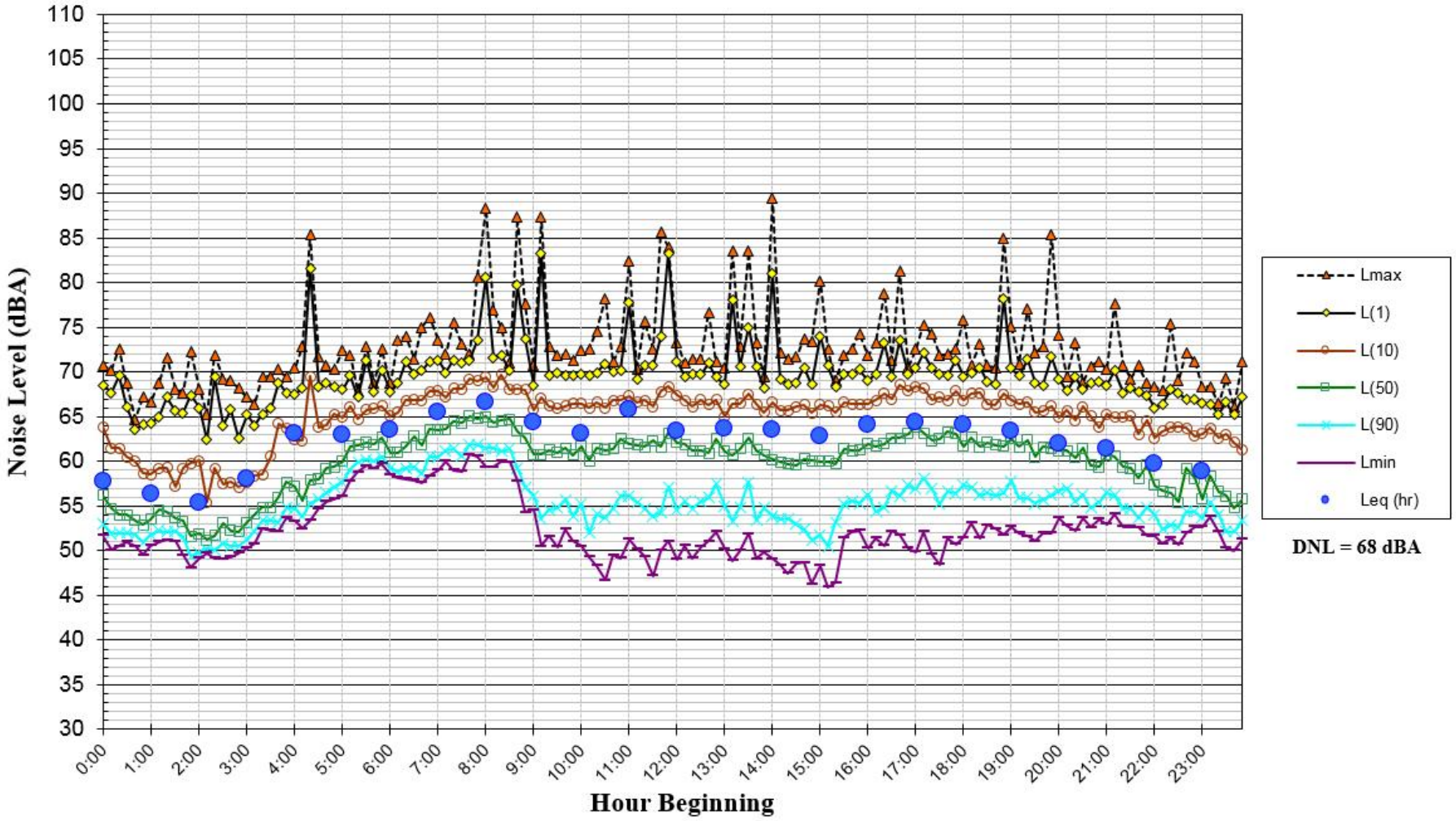

FIGURE A3 Daily Trend in Noise Levels at LT, Friday, January 4, 2019