HOTEL CLARIANA ADDITION
NOISE AND VIBRATION ASSESSMENT
SAN JOSÉ, CALIFORNIA

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INTRODUCTION

The approximately 0.56-acre project site is comprised of three parcels located immediately south of Santa Clara Street, between South Third Street and South Fourth Street in downtown San José. The site is currently developed with the Hotel Clariana (constructed in 1913) and a surface parking lot. The existing five-story hotel (approximately 28,425 square feet) currently has 44 guestrooms, meeting space, and retail space. As proposed, the project would expand the existing Hotel Clariana on the portion of the site used for surface parking (project site). The expansion would include 60 additional guestrooms, three penthouse suites, and restaurant. The total square footage of the expansion would be approximately 46,290. The proposed building would be approximately 68 feet tall (six-stories).

The project proposes an approximate 1,525-square foot restaurant, a 1,106-square foot pool and spa, and 1,058-square foot of fitness space on the ground floor. The restaurant would be located at the southwestern corner of the site. The pool and spa and fitness space would be located on the northeastern corner of the project site. Floors two to five would consist of guestrooms. The three residential suites would be located on the sixth floor.

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, summarizes applicable regulatory criteria, and discusses the results of the ambient noise monitoring survey completed to document existing noise conditions; 2) the General Plan Consistency Section discusses the noise and land use compatibility of the proposed project 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 upon sensitive receivers, provides a discussion of each project impact, and presents measures, where necessary, to mitigate the identified impacts to a less-than-significant level.

SETTING

Fundamentals of Environmental Noise

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

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in

acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA).* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

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

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

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA DNL. Typically, the highest steady traffic noise level during the daytime is about equal to the DNL and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA DNL with open windows and 65-70 dBA DNL if the windows are closed. Levels

of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed, those facing major roadways and freeways typically need special glass windows.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The DNL as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 50 dBA DNL. At a DNL of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the DNL increases to 70 dBA, the percentage of the population highly annoyed increases to about 25-30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between a DNL of 60-70 dBA. Between a DNL of 70-80 dBA, each decibel increase increases by about 3 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the DNL is 60 dBA, approximately 30-35 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 3 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 4 percent increase in the percentage of the population highly annoyed.

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

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

State of California

2016 California Building Code, Title 24, Part 2. The current version of the California Building Code (CBC) requires interior noise levels attributable to exterior environmental noise sources to be limited to a level not exceeding 45 dBA DNL/CNEL in any habitable room.

2016 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 2016 California Green Building Standards Code (Section 5.507.4.1 and 5.507.4.2). The sections that pertain to this project are as follows:

> **5.507.4.1 Exterior noise transmission, prescriptive method.** Wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 when the building falls within the 65 dBA L_{dn} noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway noise source, as determined by the local general plan noise element.

5.507.4.2 Performance method. For buildings located, as defined by Section 5.507.4.1, wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level ($L_{eq\ (1\text{-}hr)}$) of 50 dBA in occupied areas during any hour of operation.

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

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;

(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.

Santa Clara County

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

4.3.2.1 Noise Compatibility Policies

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

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

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

N-4 No residential or transient lodging construction shall be permitted within the 65 dB CNEL contour boundary unless it can be demonstrated that the resulting interior sound levels will be less than 45 dB CNEL and there are no outdoor patios or outdoor activity areas associated with the residential portion of a mixed use residential project or a multi unit

residential project. (Sound wall noise mitigation measures are not effective in reducing noise generated by aircraft flying overhead.)

N-5 All property owners within the Airport Influence Area who rent or lease their property for residential use shall include in their rental/lease agreement with the tenant, a statement advising that they (the tenants) are living within a high noise area and the exterior noise level is predicted to be greater than 65 dB CNEL in a manner that is consistent with current state law including AB2776 (2002).

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

N-7 Single-event noise levels (SENL) from single aircraft overflights are also to be considered when evaluating the compatibility of highly noise-sensitive land uses such as schools, libraries, outdoor theaters, and mobile homes. Single-event noise levels are especially important in the areas regularly overflown by aircraft, but which may not produce significant CNEL contours, such as the down-wind segment of the traffic pattern, and airport entry and departure flight corridors.

Table 4 - 1

NOISE COMPATIBILITY POLICIES

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

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

Source: Comprehensive Land Use Plan Santa Clara County, Norman Y Mineta San Jose International Airport, May 25, 2011, Amended November 16, 2016.

City of San José

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

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

Interior Noise Levels

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

Exterior Noise Levels

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

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

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

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

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

Normally Acceptable:

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

Conditionally Acceptable:

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

Unacceptable:

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

Source: Envision San Jose 2040 General Plan, Adopted November 1, 2011, As Amended on February 27, 2018.

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-1.9 Require noise studies for land use proposals where known or suspected loud intermittent noise sources occur which may impact adjacent existing or planned land uses. For new residential development affected by noise from heavy rail, light rail, BART or other single-event noise sources, implement mitigation so that recurring maximum instantaneous noise levels do not exceed 50 dBA L_{max} in bedrooms and 55 dBA L_{max} in other rooms.

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

EC-1.14 Require acoustical analyses for proposed sensitive land uses in areas with exterior noise levels exceeding the City's noise and land use compatibility standards to base noise attenuation techniques on expected Envision General Plan traffic volumes to ensure land use compatibility and General Plan consistency.

City of San José Municipal Code. The City's Municipal Code contains a Zoning Ordinance that limits noise levels at adjacent properties. Chapter 20.30.700 states that sound pressure levels generated by any use or combination of uses on a property shall not exceed 55 dBA at any property line shared with land zoned for residential use, except upon issuance and in compliance with a Conditional Use Permit or unless a project is located within one of the Downtown Zoning Districts. Chapter 20.100.450 of the Municipal Code establishes allowable hours of construction within 500 feet of a residential unit between 7:00 am and 7:00 pm Monday through Friday unless permission is granted with a development permit or other planning approval. No construction activities are permitted on the weekends at sites within 500 feet of a residence.

Regulatory Background – Vibration

City of San José

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

EC-2.3 Require new development to minimize vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, a 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 vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction.

Existing Noise Environment

A noise monitoring survey was made to quantify ambient noise levels at the project site and nearby receptors from Friday, November 30, 2018 through Monday, December 3, 2018. The monitoring survey included two long-term noise measurements (LT-1 and LT-2) and three short-term measurements (ST-1, ST-2, and ST-3) as shown in Figure 1. Noise measurements were made with Larson Davis Model 820 Integrating Sound Level Meters (SLMs) set at "slow" response. The sound level meters were equipped with G.R.A.S. Type 40AQ ½-inch random incidence microphones fitted with windscreens. The sound level meters were calibrated prior to the noise measurements using a Larson Davis Model CAL200 acoustical calibrator. The response of the system was checked after each measurement session and was always found to be within 0.2 dBA. No calibration adjustments were made to the measured sound levels. At the completion of each monitoring event, the measured interval noise level data were obtained from the SLM using the Larson Davis SLM utility software program. Based on the results of the noise survey, the noise environment at the site and at the nearby land uses results primarily from vehicular traffic.

Long-term noise measurement LT-1 was made approximately 25 feet west of the center of the Third Street centerline near residential mixed-use buildings west of the site and Third Street. Hourly average noise levels at this location ranged from 63 to 80 dBA L_{eq} during the day, and from 58 to 68 dBA L_{eq} at night. The day-night average noise level over the weekend ranged from 71 to 74 dBA DNL and reached 77 dBA DNL on Monday, December 23, 2018. Loud vehicles and emergency vehicle sirens produced maximum instantaneous noise levels above 100 dBA L_{max}. The daily trends in noise levels at LT-1 is shown in Figures 2-5.

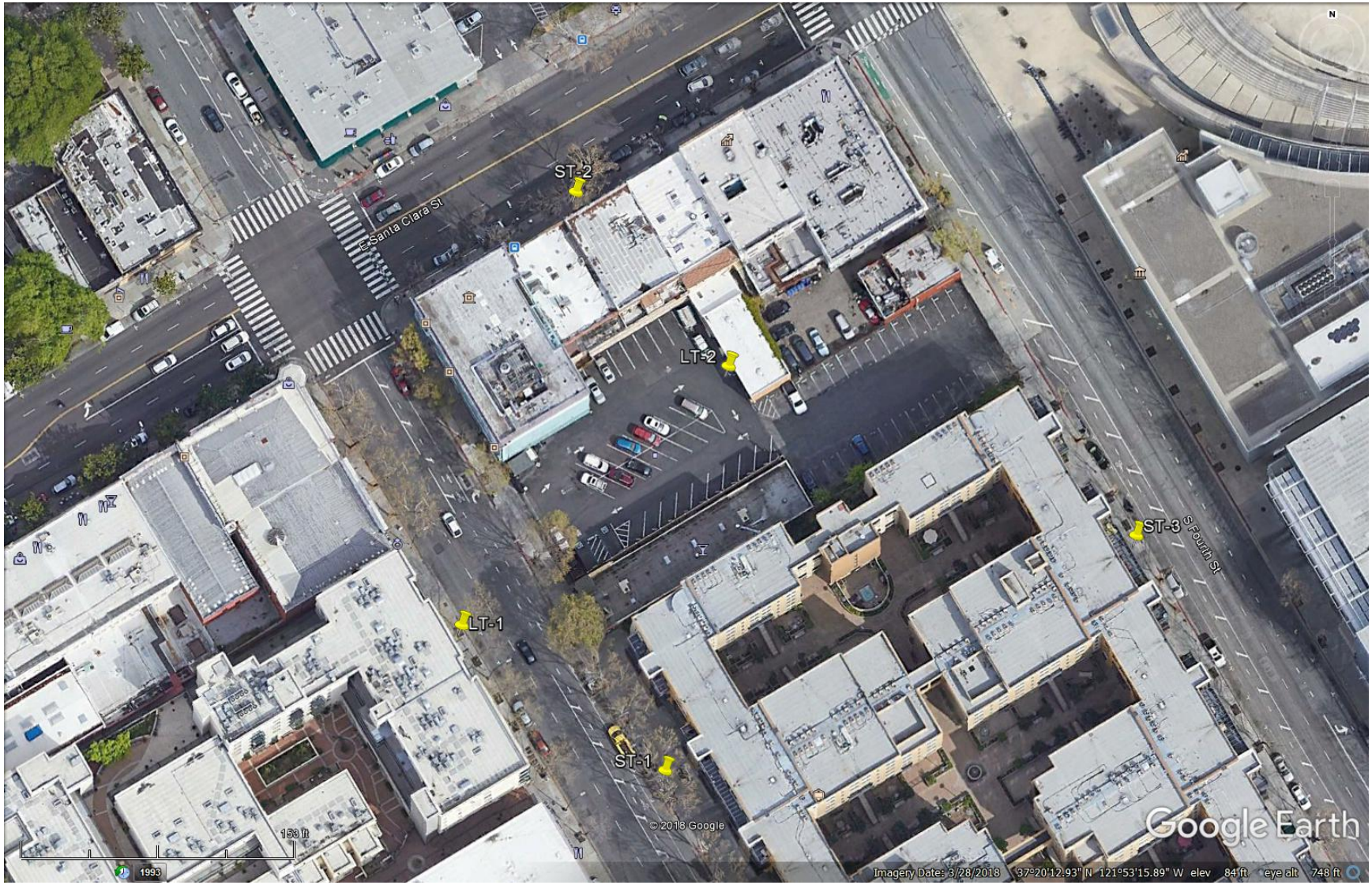
The second long-term noise measurement (LT-2) was made at the east end of the existing Hotel Clariana parking lot to represent the ambient noise environment of receptors immediately adjacent to the site but not directly exposed to traffic noise. Hourly average noise levels at this location ranged from 55 to 67 dBA L_{eq} during the day, and from 51 to 64 dBA L_{eq} at night. The day-night average noise level over the weekend ranged from 63 to 67 dBA DNL and was 65 dBA DNL on Monday, December 23, 2018. The daily trends in noise levels at LT-2 is shown in Figures 6-9.

Short-term noise measurements were made at three locations to complete the noise monitoring survey. Table 4 summarizes the results of the short-term noise measurements.

TABLE 4 Summary of Short-Term Noise Measurement Data

Noise Measurement Location, Date and Time, Notes	L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}
ST-1: ~35 ft. from the centerline of S. Third Street near residences south of the site. 11/30/18, 12:20 p.m. - 12:30 p.m. Local traffic is the dominant source of noise.	81	75	68	62	58	65
ST-2: ~40 ft. from the centerline of E. Santa Clara Street in front of A&A Gift Shop (124A E. Santa Clara Street). 11/30/18, 12:20 p.m. - 12:30 p.m. Local traffic is the dominant source of noise. Maximum noise levels due to busses and vehicles.	87	82	72	65	62	70
ST-3: ~35 ft. from the centerline of S. 4th Street near residences south of the site. 11/30/18, 1:00 p.m. - 1:10 p.m. Measurement site is opposite City Hall and parking structure. Local traffic is the dominant source of noise. Maximum noise level due to motorcycle.	89	80	70	65	59	69

FIGURE 1 Hotel Clariana Noise Measurement Locations



Source: Google Earth, 2018

Noise Levels at Noise Measurement Site LT-1
~25 feet from the Center of 3rd Street
Friday, November 30, 2018

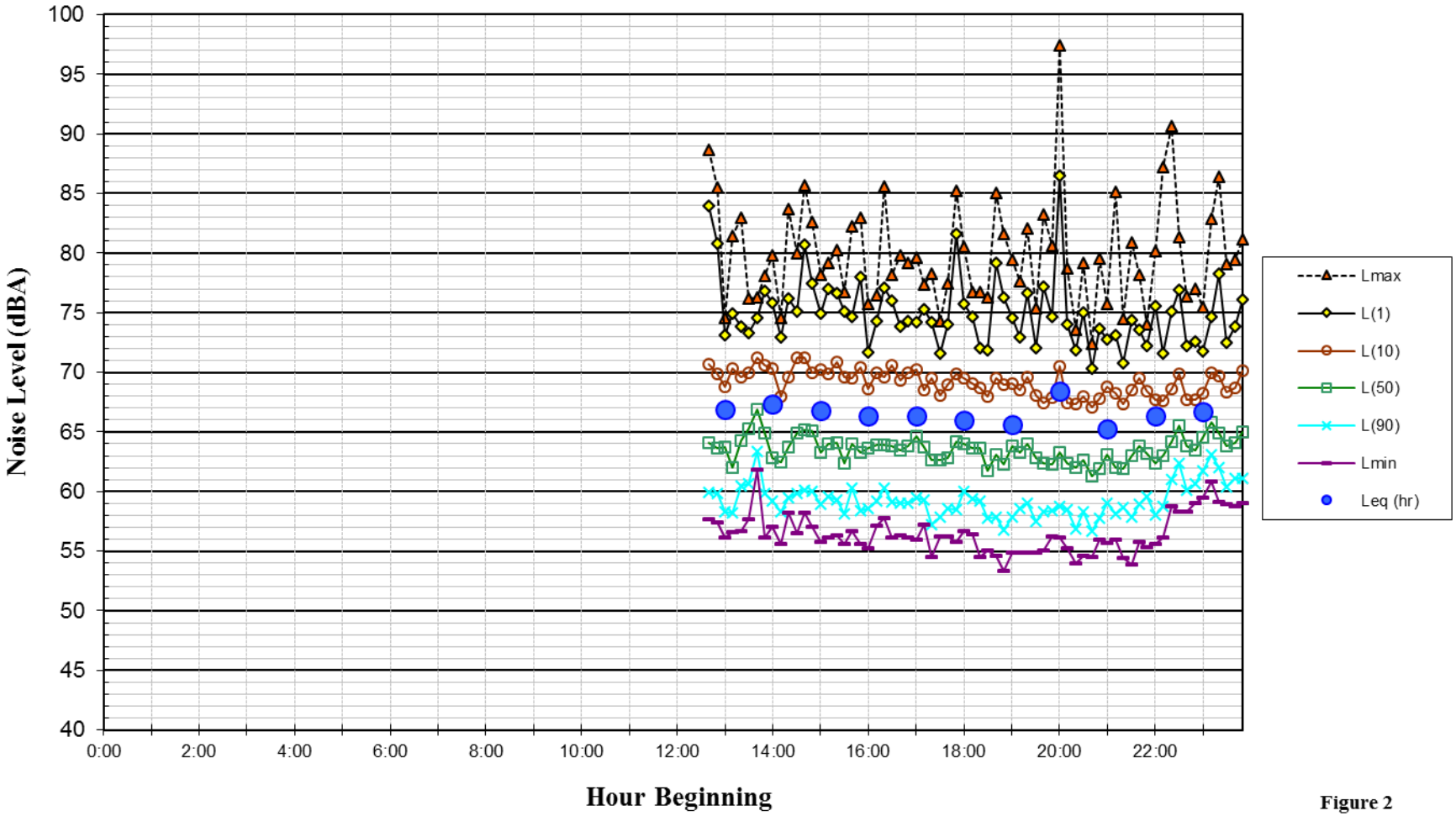
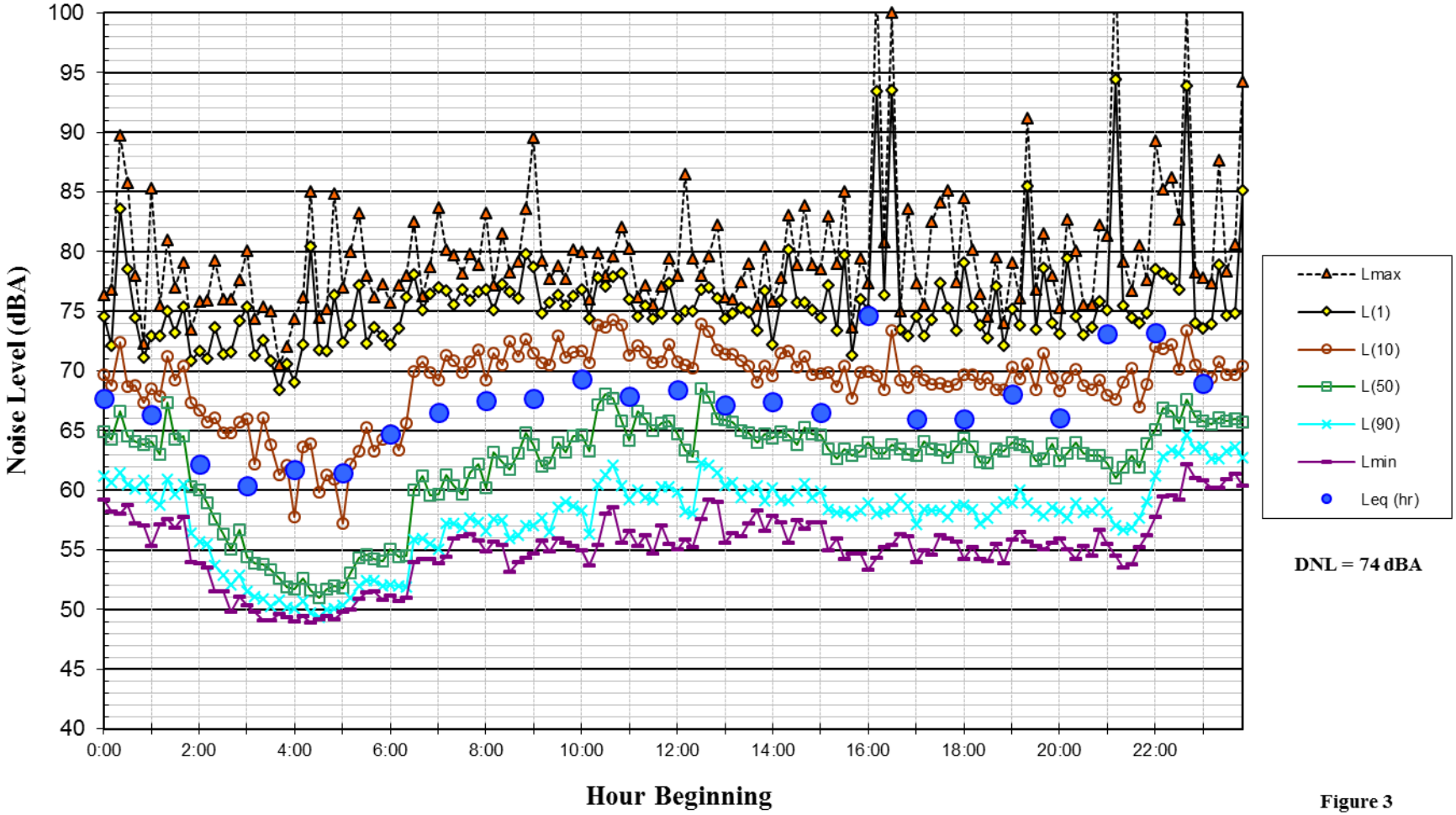


Figure 2

Noise Levels at Noise Measurement Site LT-1
~25 feet from the Center of 3rd Street
Saturday, December 1, 2018



DNL = 74 dBA

Figure 3

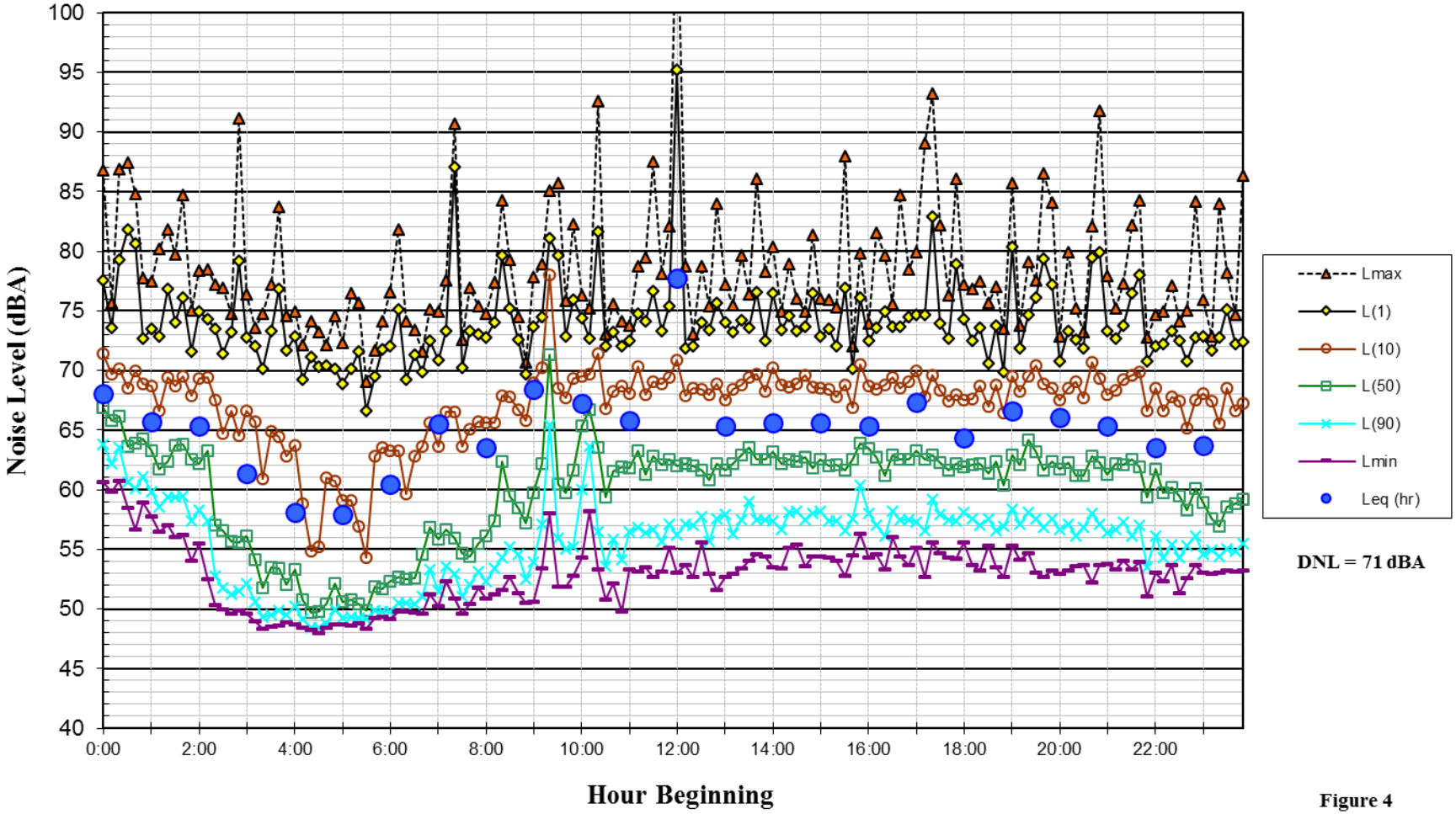
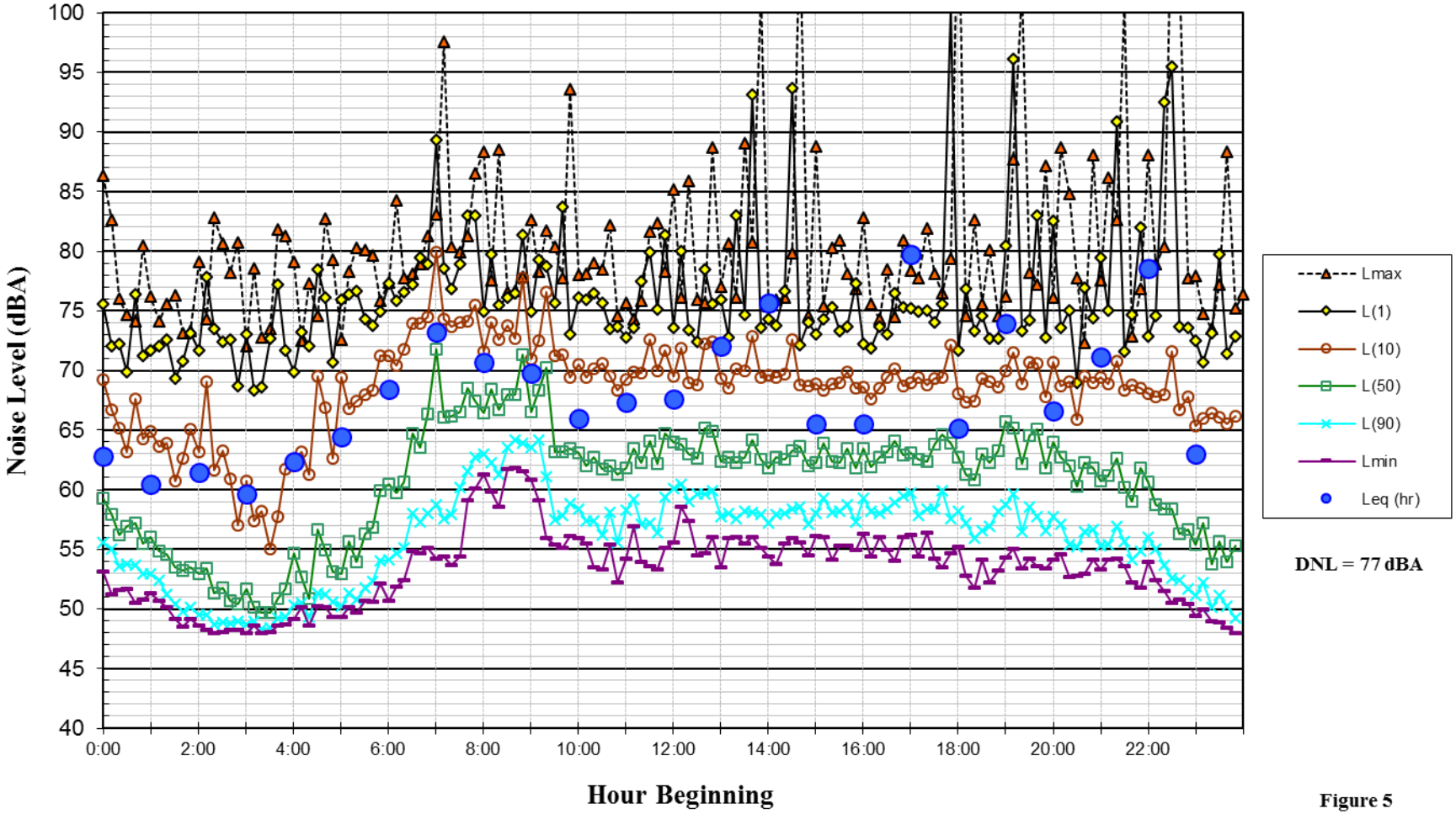

Noise Levels at Noise Measurement Site LT-1
~25 feet from the Center of 3rd Street
Sunday, December 2, 2018
Noise Level (dBA)
100
95
90
85
80
75
70
65
60
55
50
45
40
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
Hour Beginning
Lmax
L(1)
L(10)
L(50)
L(90)
Lmin
Leq (hr)
DNL = 71 dBA

Figure 4

Noise Levels at Noise Measurement Site LT-1
~25 feet from the Center of 3rd Street
Monday, December 3, 2018



DNL = 77 dBA

Figure 5

Noise Levels at Noise Measurement Site LT-2
East End of Parking Lot Near Existing Commerical Building
Friday, November 30, 2018

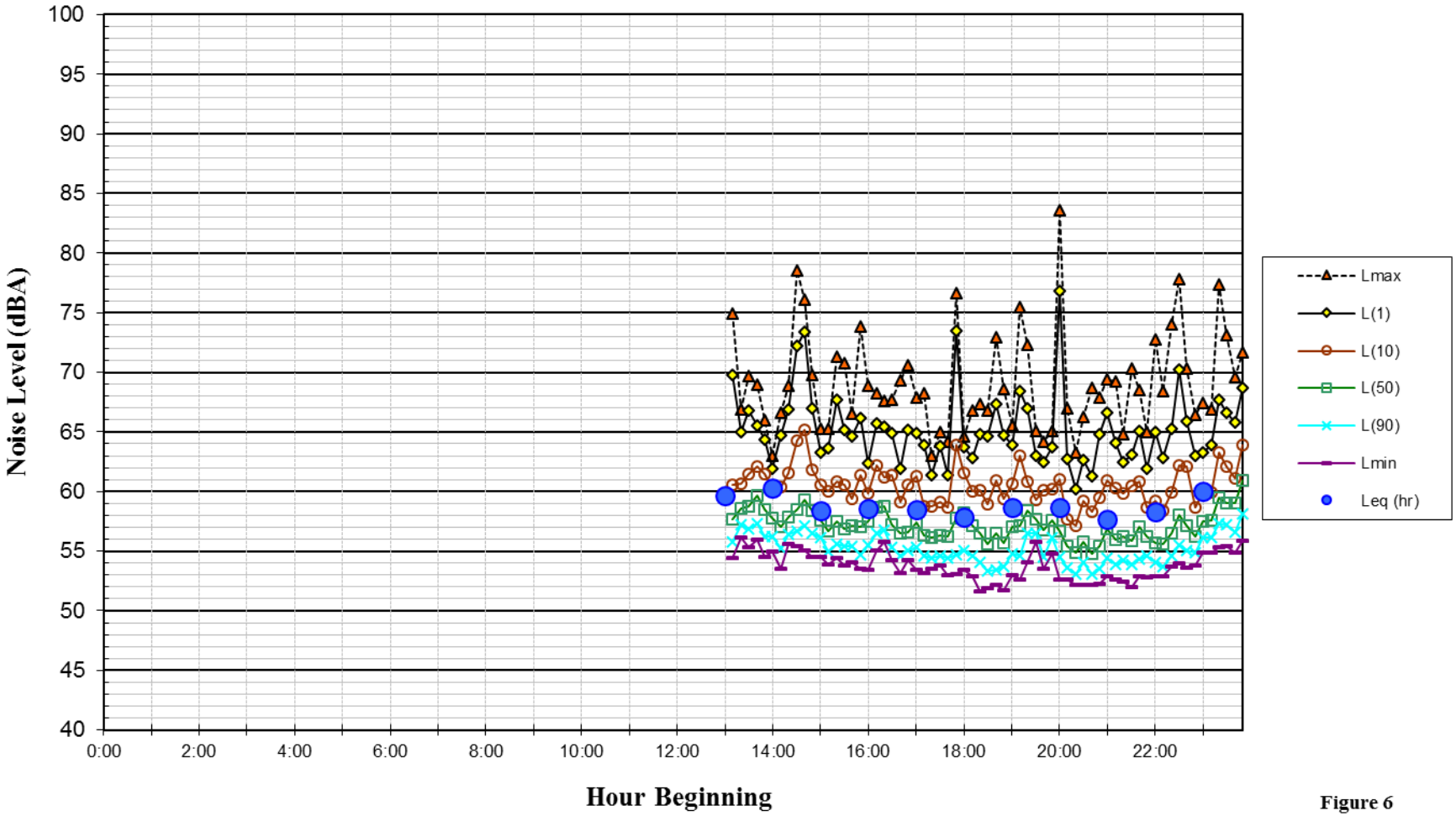
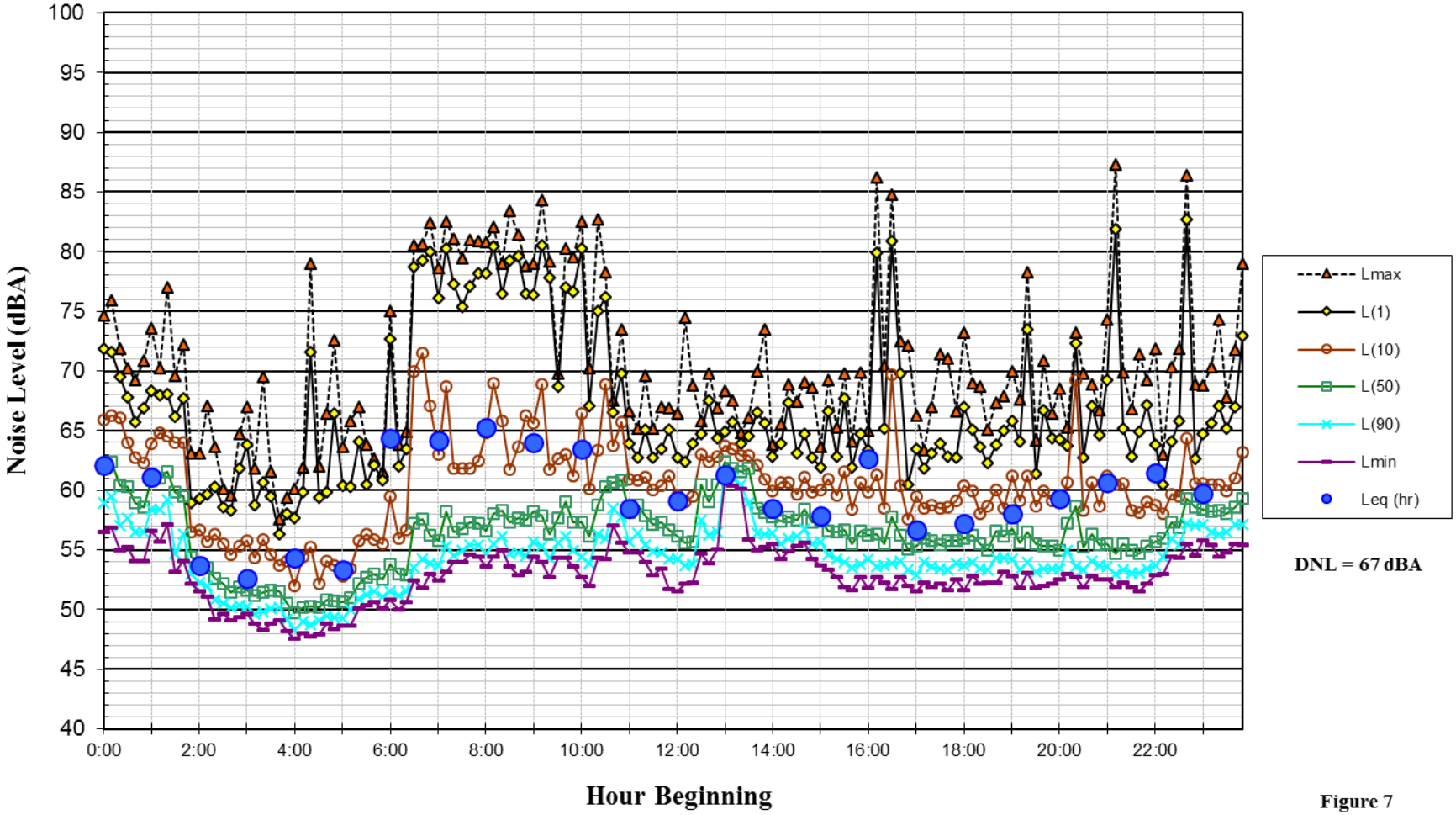


Figure 6

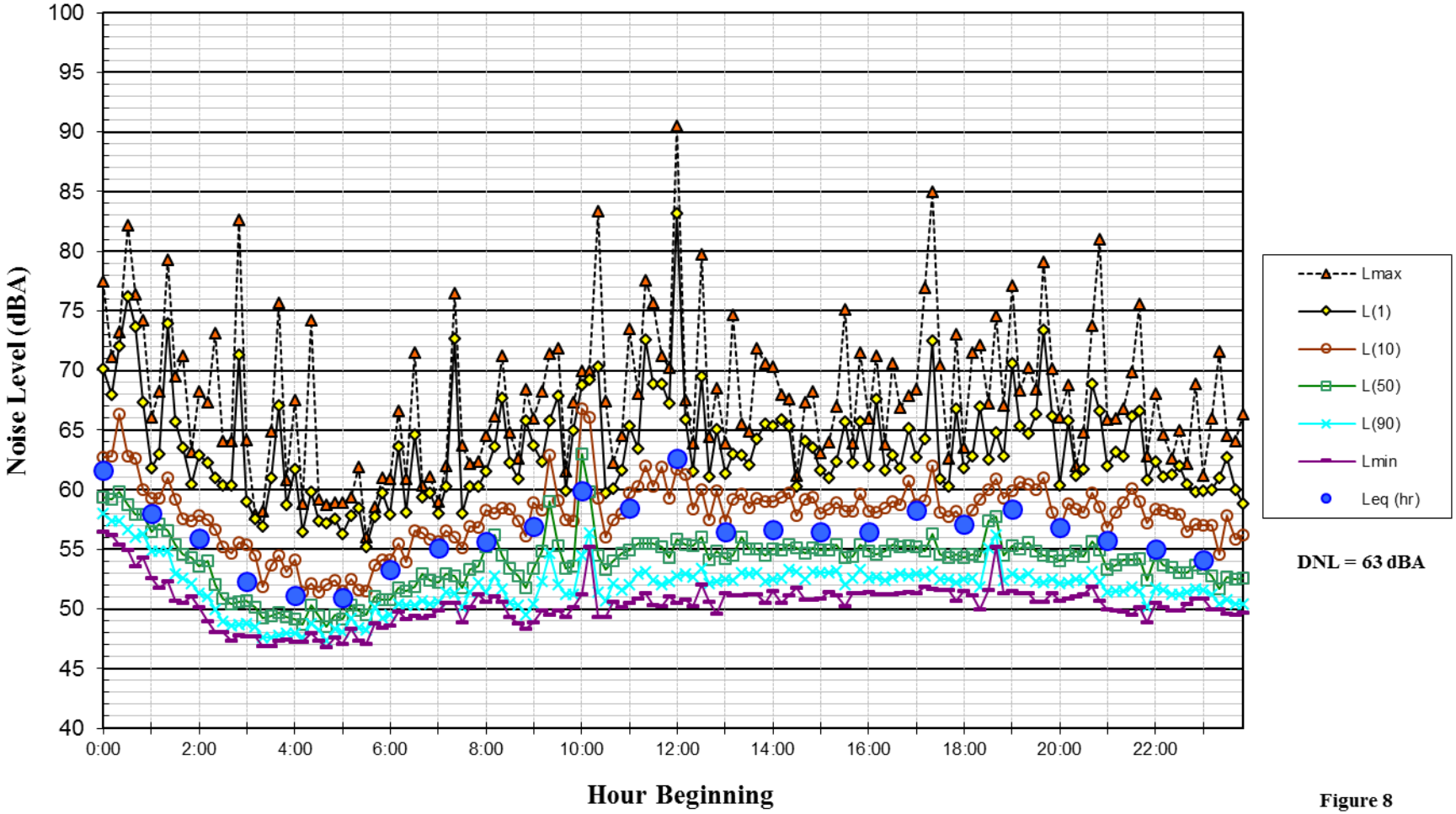
Noise Levels at Noise Measurement Site LT-2
East End of Parking Lot Near Existing Commerical Building
Saturday, December 1, 2018



DNL = 67 dBA

Figure 7

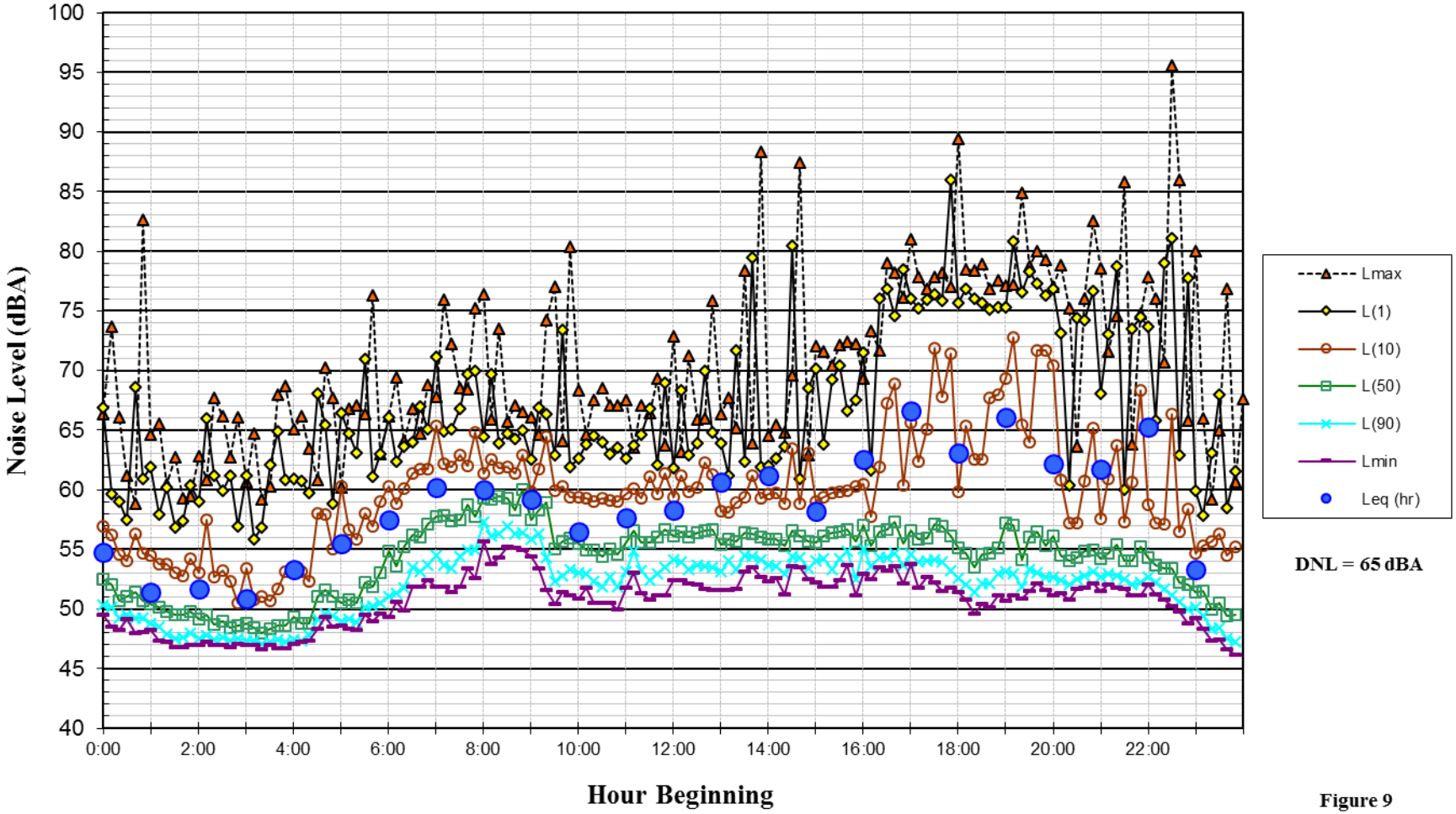
Noise Levels at Noise Measurement Site LT-2
East End of Parking Lot Near Existing Commerical Building
Sunday, December 2, 2018



DNL = 63 dBA

Figure 8

Noise Levels at Noise Measurement Site LT-2
East End of Parking Lot Near Existing Commerical Building
Monday, December 3, 2018



DNL = 65 dBA

Figure 9

GENERAL PLAN CONSISTENCY ANALYSIS – COMPATIBILITY OF PROJECT WITH NOISE ENVIRONMENT AFFECTING THE SITE

Noise and Land Use Compatibility

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

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

- The City's standard for interior noise at the proposed hotel land use is 45 dBA DNL.

The ambient noise environment at the project site ranges from 67 dBA DNL at interior portions of the property to 74 dBA DNL at the Third Street frontage. The future noise environment at the project site would continue to result primarily from traffic along the surrounding roadways and other commercial land uses in the project vicinity. Future noise exposures are anticipated to increase by up to 1 dBA DNL and range from 68 to 75 dBA DNL throughout the site.

Future Exterior Noise Environment

Based on a review of the proposed site plan, there are no sensitive common outdoor activity areas proposed as part of the project that would benefit from a lower noise level. A private balcony is proposed on the 6th level of the building adjacent to Third Street, however, the 60 dBA DNL standard for new multi-family residential projects is only applied to usable outdoor activity areas, excluding balconies and residential stoops and porches facing existing roadways.

Future Interior Noise Environment

The City of San José General Plan requires that interior noise levels be maintained at 45 dBA DNL or less. Floors two to five would consist of guestrooms. The three residential suites would be located on the sixth floor. The exterior traffic noise exposure the Third Street facade would range from 73 dBA DNL at the 6th floor to 75 dBA DNL at the 2nd floor.

Interior noise levels would vary depending upon the final design of the building (relative window area to wall area) and the selected construction materials and methods. Preliminary building plans indicate that the exterior of the building would be constructed from cement plaster or porcelain tile and aluminum framed window. Standard hotel construction with the windows and doors closed provides approximately 20 to 25 dBA of noise reduction in interior spaces. Where exterior noise levels range from 60 to 65 dBA DNL, the inclusion of adequate forced-air mechanical ventilation is often the method selected to reduce interior noise levels to acceptable levels by closing the windows to control noise. Where noise levels exceed 65 dBA DNL, forced-air mechanical

ventilation systems and sound-rated construction methods are normally required. Such methods or materials may include a combination of sound-rated windows and doors, sound-rated exterior wall assemblies, and mechanical ventilation so windows may be kept closed at the occupant's discretion.

For consistency with the General Plan the following Conditions of Approval will be implemented by the project applicant:

- Provide sound rated windows to maintain interior noise levels at acceptable levels. Preliminary calculations show that sound-rated windows with minimum STC[1] Ratings of 35 to 38 would be satisfactory for units facing Third Street. Units on the interior of the site would not have direct line of sight to Third Street or East Santa Clara Street and preliminary calculations show that sound-rated windows with minimum STC Ratings of 28 to 30 would be satisfactory.

- Provide a suitable form of forced-air mechanical ventilation, as determined by the local building official, for all guestrooms and residential suites, so that windows can be kept closed to control noise.

- A qualified acoustical specialist shall prepare a detailed analysis of interior residential noise levels resulting from all exterior sources during the final design phase of the project pursuant to requirements set forth in the General Plan and State Building Code. The study will review the final site plan, building elevations, and floor plans prior to construction and confirm building treatments necessary to reduce interior noise levels to 45 dBA DNL or lower, and address and adequately control noise from rooftop equipment on adjacent buildings, as necessary. Treatments would include, but are not limited to, sound-rated windows and doors as specified above, acoustical caulking, protected ventilation openings, etc. The specific determination of what noise insulation treatments are necessary shall be conducted on a unit-by-unit basis during final design of the project. Results of the analysis, including the description of the necessary noise control treatments, shall be submitted to the City, along with the building plans and approved design, prior to issuance of a building permit.

[1] **Sound Transmission Class (STC)** A single figure rating designed to give an estimate of the sound insulation properties of a partition. Numerically, STC represents the number of decibels of speech sound reduction from one side of the partition to the other. The STC is intended for use when speech and office noise constitute the principal noise problem.

NOISE IMPACTS AND MITIGATION MEASURES

This section describes the significance criteria used to evaluate project impacts under CEQA, provides a discussion of each project impact, and presents mitigation measures, where necessary, to provide a compatible project in relation to adjacent noise sources and land uses.

Significance Criteria

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

- **Temporary or Permanent Noise Increases in Excess of Established Standards.** A significant impact would be identified if project construction or operations would result in a substantial temporary or permanent increase in ambient noise levels at sensitive receivers in excess of the local noise standards contained in the General Plan or Municipal Code.

- **Generation of Excessive Groundborne Vibration.** A significant impact would be identified if the construction of the project would generate excessive vibration levels.

- **Exposure of Residents or Workers to Excessive Noise Levels in the Vicinity of a Private Airstrip or an Airport Land Use Plan.** A significant impact would be identified if the project would expose people residing or working in the project area to excessive noise levels in the vicinity of a private airstrip or an airport land use plan.

Impact 1: **Noise Levels in Excess of Standards.** The proposed project could generate noise levels in excess of standards established in the City's General Plan and Municipal Code at the nearby sensitive receptors. **This is a potentially significant impact.**

Temporary Construction Noise

Construction activities would occur between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday and would not occur on weekends or holidays, as outlined in the Municipal Code. All construction would be limited to allowable hours; therefore, the potential impact related to consistency with the Municipal Code would be less-than-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.

Where noise from construction activities exceeds 60 dBA L_{eq} and exceeds the ambient noise environment by at least 5 dBA L_{eq} at noise-sensitive residential uses in the project vicinity for a period exceeding one year, the impact would be considered significant. For commercial uses, a significant impact would be identified if construction noise were to exceed 70 dBA L_{eq} and

exceeds the ambient noise environment by at least 5 dBA L_{eq} for a period exceeding one year. Additionally, the City considers significant construction noise impacts to have occurred 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, according to Policy EC-1.7 of the General Plan.

Construction activities for individual projects are typically carried out in stages. During each stage of construction, there would be a different mix of equipment operating, and noise levels would vary by stage and vary within stages, based on the amount of equipment in operation and the location at which the equipment is operating. Typical construction noise levels at a distance of 50 feet are shown in Tables 5 and 6. Table 5 shows the average noise level ranges, by construction phase, and Table 6 shows the maximum noise level ranges for different construction equipment. Most demolition and construction noise falls with the range of 80 to 90 dBA at a distance of 50 feet from the source.

TABLE 5 Typical Ranges of Noise Levels at 50 Feet from Construction Sites (dBA L_{eq})

	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: United States Environmental Protection Agency, 1973, Legal Compilation on Noise, Vol. 1, p. 2-104.

TABLE 6 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

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

Notes:

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

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

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

Source: Mitigation of Nighttime Construction Noise, Vibrations and Other Nuisances, National Cooperative Highway Research Program, 1999.

Construction activities generate considerable amounts of noise, especially during earth-moving activities and during the construction of the building's foundation when heavy equipment is used. The highest noise levels would be generated during grading, excavation, and foundation construction. The hauling of excavated materials and construction materials would generate truck trips on local roadways, as well. The erection of large buildings from steel structures could also cause considerable noise for fairly long durations. The construction of the proposed project would involve grading and excavating to lay foundations, trenching, building erection, and paving. Due to the density in the immediate area and proximity to other structures, pile driving, which can cause excessive vibration, is not proposed and a mat slab foundation would be used instead.

Noise sensitive residential and commercial land uses surround the site. During project construction, construction noise levels would generally fall within the range of 78 to 89 dBA L_{eq} at the nearest receptors, and noise levels due to construction activities would well exceed 60 dBA L_{eq} at residences and 70 dBA L_{eq} at commercial buildings and ambient levels by more than 5 dBA L_{eq} over a period exceeding one year. This is a **potentially significant** impact.

Permanent Noise Increase due to Project-Generated Traffic Noise

A significant impact would result if traffic generated by the project would substantially increase noise levels at sensitive receptors in the vicinity. A substantial increase would occur if: a) the noise level increase is 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or b) the noise level increase is 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater. Residences near the project site are exposed to existing noise levels greater than 60 dBA DNL; therefore, a significant impact would occur if project-generated traffic would permanently increase noise 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 operations analysis[2] provided AM and PM traffic volumes at two study intersections in the project vicinity; 1) Third Street and San Fernando Street, and 2) Fourth Street and San Fernando Street. Turning movement data was reviewed to calculate the permanent noise increase attributable to project-generated traffic. Traffic volumes under the Existing Plus Project, Background, and Background Plus Project scenario were compared to the Existing scenario to calculate the relative increase in the hourly average traffic noise level (L_{eq}) attributable to the proposed project. The change in the DNL would be the same as the change in the peak hour L_{eq}. After analyzing the traffic volumes, traffic noise levels due to the hotel addition would increase traffic noise levels along roadways serving the site by 0 dBA DNL. Background and Background Plus Project traffic conditions are calculated to increase traffic noise along roadways serving the site by 0 to 1 dBA DNL. The project's contribution to the increased traffic noise levels is 0 dBA DNL. Traffic noise level increases in the project vicinity would not be considered substantial and would result in a **less-than-significant** impact.

Permanent Noise Increase due to Project Mechanical Equipment

High-rise structures typically include various mechanical equipment for heating, ventilation, and air-conditioning needs. At the time of this analysis, the specific mechanical equipment has not been selected, nor were specific details such as manufacturer's noise data for such equipment available. Under the City's Noise Element, noise levels produced by the operation of the mechanical equipment would be limited to 55 dBA DNL at receiving noise-sensitive land uses. Given the close proximity of noise-sensitive uses to the project site and lack of sufficient details about the mechanical equipment, mechanical rooms, and rooftop screen wall, there is the potential for noise from mechanical equipment to exceed 55 dBA DNL at noise-sensitive land uses in the immediate project vicinity. Due to the number of variables inherent in the mechanical equipment needs of the project (number and types of units, locations, size, housing, specs, etc.), the impacts of mechanical equipment noise on nearby noise-sensitive uses should be assessed during the final project design

[2] Hexagon Transportation Consultants, Inc., Hotel Clariana Addition Traffic Operations Analysis, November 28, 2018.

stage. Design planning should take into account the noise criteria associated with such equipment and utilize site planning to locate equipment in less noise-sensitive areas. Other controls could include, but shall not be limited to, fan silencers, enclosures, and mechanical screening. The final design plans should be reviewed by a qualified acoustical consultant to address any potential conflicts. This is a **potentially significant** impact.

Permanent Noise Increase due to Project Truck Deliveries

Truck deliveries for the proposed hotel would also have the potential to generate noise. The site plan does not indicate that a loading space will be provided on-site, but trucks may utilize a 75-foot on-street freight loading zone located along the west side of Third Street, across from the west project frontage. Typical noise levels generated by loading and unloading during truck deliveries would be similar to the noise levels produced by existing deliveries to the hotel, truck passbys along local roadways, and by similar commercial activities at surrounding uses. Maximum instantaneous noise levels from truck activities would therefore not increase the day-night average noise level assuming typical daytime delivery schedules. Infrequent, daytime deliveries are not anticipated to substantially increase ambient noise levels at the nearby noise-sensitive land uses resulting in a **less-than-significant** impact.

Mitigation Measure 1:

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.

A typical construction noise logistics plan would include, but not be limited to, the following measures to reduce construction noise levels as low as practical:

- Utilize 'quiet' models of air compressors and other stationary noise sources where technology exists;

- Equip all internal combustion engine-driven equipment with mufflers, which are in good condition and appropriate for the equipment;

- Locate all stationary noise-generating equipment, such as air compressors and portable power generators, as far away as possible from adjacent land uses;

- Locate staging areas and construction material areas as far away as possible from adjacent land uses;

- Prohibit all unnecessary idling of internal combustion engines;

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

The potential short-term noise impacts associated with project construction activities would be mitigated by the reasonable noise reduction measures identified above, incorporated into the construction plan and implemented during all phases of construction activity. Construction noise would be minimized to the extent feasible, reducing the noise exposure of neighboring properties to a less-than-significant level.

The following mitigation measures shall be included in the project to reduce permanent noise increases resulting from the project to a less-than-significant level:

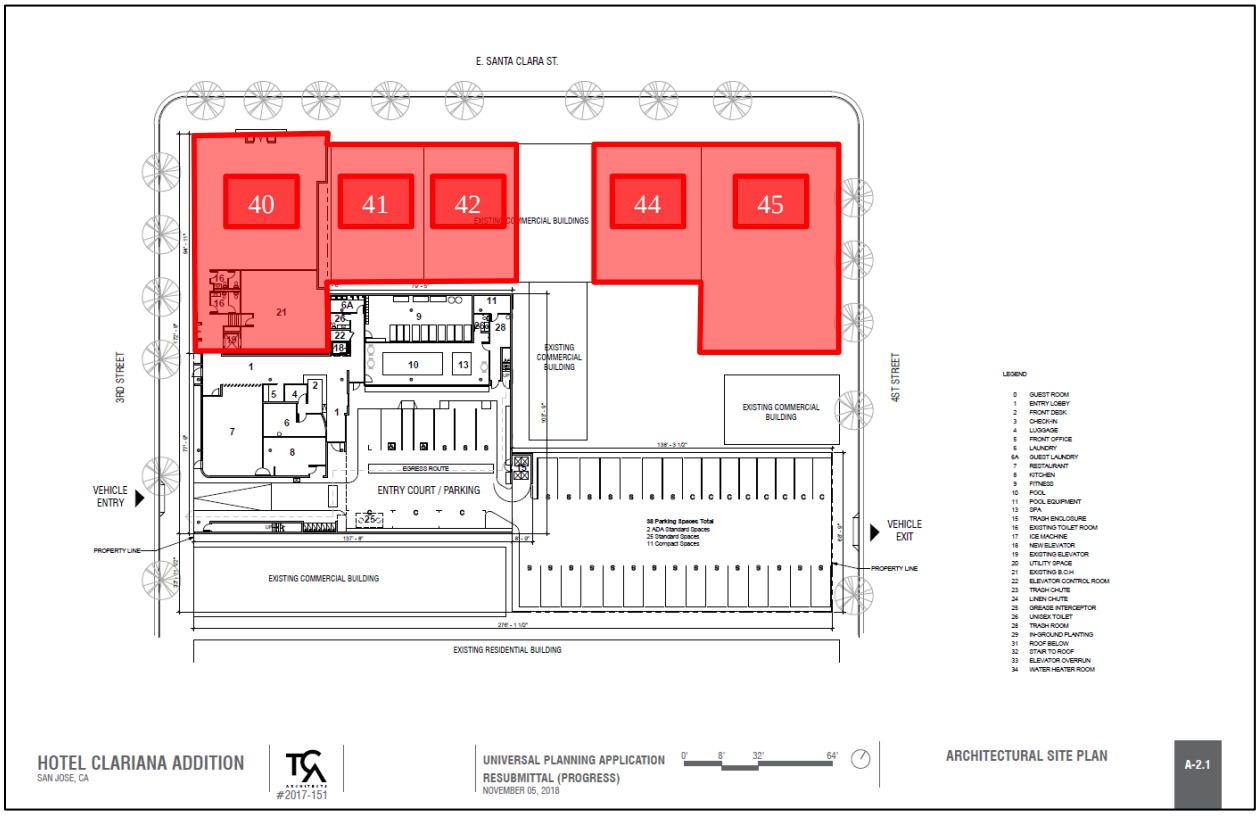
- Prior to the issuance of building permits, mechanical equipment shall be selected and designed to reduce impacts on surrounding uses to meet the City's requirements. A qualified acoustical consultant shall be retained by the project applicant to review mechanical noise as these systems are selected to determine specific noise reduction measures necessary to reduce noise to comply with the City's 55 dBA DNL noise limit at the shared property line. Feasible noise reduction measures include, but are not limited to, the selection of equipment that emits low noise levels, the placement of such equipment away from receptors, and/or the installation of noise barriers such as enclosures or parapet walls to block the line of sight between the noise source and the nearest receptors.

- Ensure that noise-generating activities, such as maintenance activities and loading/unloading activities, are limited to the hours between 7:00 am and 9:00 pm.

Impact 2: **Generation of Excessive Groundborne Vibration.** Construction-related vibration levels would exceed 0.08 in/sec PPV at adjacent historic buildings and 0.2 in/sec PPV at adjacent buildings of normal conventional construction. **This is a significant impact.**

The San Jose Historic Commercial District bounds the project site to the north and west. The district is comprised of both "contributing" and "noncontributing" buildings. Figure 10 is the project site plan in relation to existing contributing and noncontributing buildings. Historic, contributing buildings abut the site to the north at 40, 41, 42, 44, and 45 E. Santa Clara Street (these buildings are indicated in red in Figure 10). A noncontributing building is located at 43 E. Santa Clara Street, also immediately north and east of the project site. Both contributing and noncontributing buildings are located west of the site, opposite S. Third Street, at a minimum distance of 75 feet from the project site. All other buildings to the east and south of the project site are of normal conventional construction and not considered to be historic resources.

FIGURE 10 Contributing Buildings Adjoining the Project Site



Policy EC-2.3 of the City of San José General Plan establishes a vibration limit of 0.08 in/sec PPV to minimize the potential for cosmetic damage to sensitive historic structures, and a vibration limit of 0.2 in/sec PPV to minimize damage at buildings of normal conventional construction. The vibration limits contained in this policy are conservative and designed to provide the ultimate level of protection for existing buildings in San José. As discussed in detail below, vibration levels exceeding these thresholds would be capable of cosmetically damaging adjacent buildings. Cosmetic damage (also known as threshold damage) is defined as hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage is defined as hairline cracking in masonry or the loosening of plaster. Major structural damage is defined as wide cracking or the shifting of foundation or bearing walls.

Table 7 presents typical vibration levels from construction equipment at 25 feet. Jackhammers typically generate vibration levels of 0.035 in/sec PPV and drilling typically generates vibration levels of 0.09 in/sec PPV at 25 feet. Vibration levels would vary depending on soil conditions, construction methods, and equipment used. Table 7 also presents construction vibration levels at various distances from the construction equipment. Calculations were made to estimate vibration levels at distances of 5 feet from project construction areas, as well as distances of 35, 60, and 75 feet from the site to represent other nearby buildings. Vibration levels are highest close to the source, and then attenuate with increasing distance at the rate $(D_{ref}/D)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet.

TABLE 7 Vibration Levels for Construction Equipment at Various Distances

Equipment		PPV at 5 ft. (in/sec)	PPV at 25 ft. (in/sec)	PPV at 35 ft. (in/sec)	PPV at 60 ft. (in/sec)	PPV at 75 ft. (in/sec)
Clam shovel drop		**1.186**	**0.202**	**0.140**	**0.077**	0.060
Hydromill (slurry wall)	in soil	0.047	0.008	0.006	0.003	0.002
	in rock	**0.100**	0.017	0.012	0.006	0.005
Vibratory Roller		**1.233**	**0.210**	**0.145**	**0.080**	0.063
Hoe Ram		**0.523**	**0.089**	0.061	0.034	0.027
Large bulldozer		**0.523**	**0.089**	0.061	0.034	0.027
Caisson drilling		**0.523**	**0.089**	0.061	0.034	0.027
Loaded trucks		**0.446**	**0.076**	0.052	0.029	0.023
Jackhammer		**0.206**	0.035	0.024	0.013	0.010
Small bulldozer		0.018	0.003	0.002	0.001	0.001

Source: Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, Office of Planning and Environment, U.S. Department of Transportation, September 2018, as modified by Illingworth & Rodkin, Inc., February 2019.

Project construction activities, such as drilling, the use of jackhammers, rock drills and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.) may generate substantial vibration in the immediate vicinity of historic properties adjoining the site. Some activities would occur at distances of about 5 feet, and at this distance, vibration levels due to construction are conservatively calculated to reach up to 1.2 in/sec PPV, which would exceed the 0.08 in/sec PPV threshold for historic buildings and the 0.2 in/sec PPV threshold for buildings of normal conventional construction.

The US Bureau of Mines has analyzed the effects of blast-induced vibration on buildings in USBM RI 8507[3], and these findings have been applied to vibrations emanating from construction equipment on buildings[4]. As shown on Figure 11, these studies indicate an approximate 20% probability of "threshold damage" (referred to as cosmetic damage elsewhere in this report) at vibration levels of 1.2 in/sec PPV or less and no observations of "minor damage" or "major damage" at vibration levels of 1.2 in/sec PPV or less. Figure 11 presents the damage probability

3 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.

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

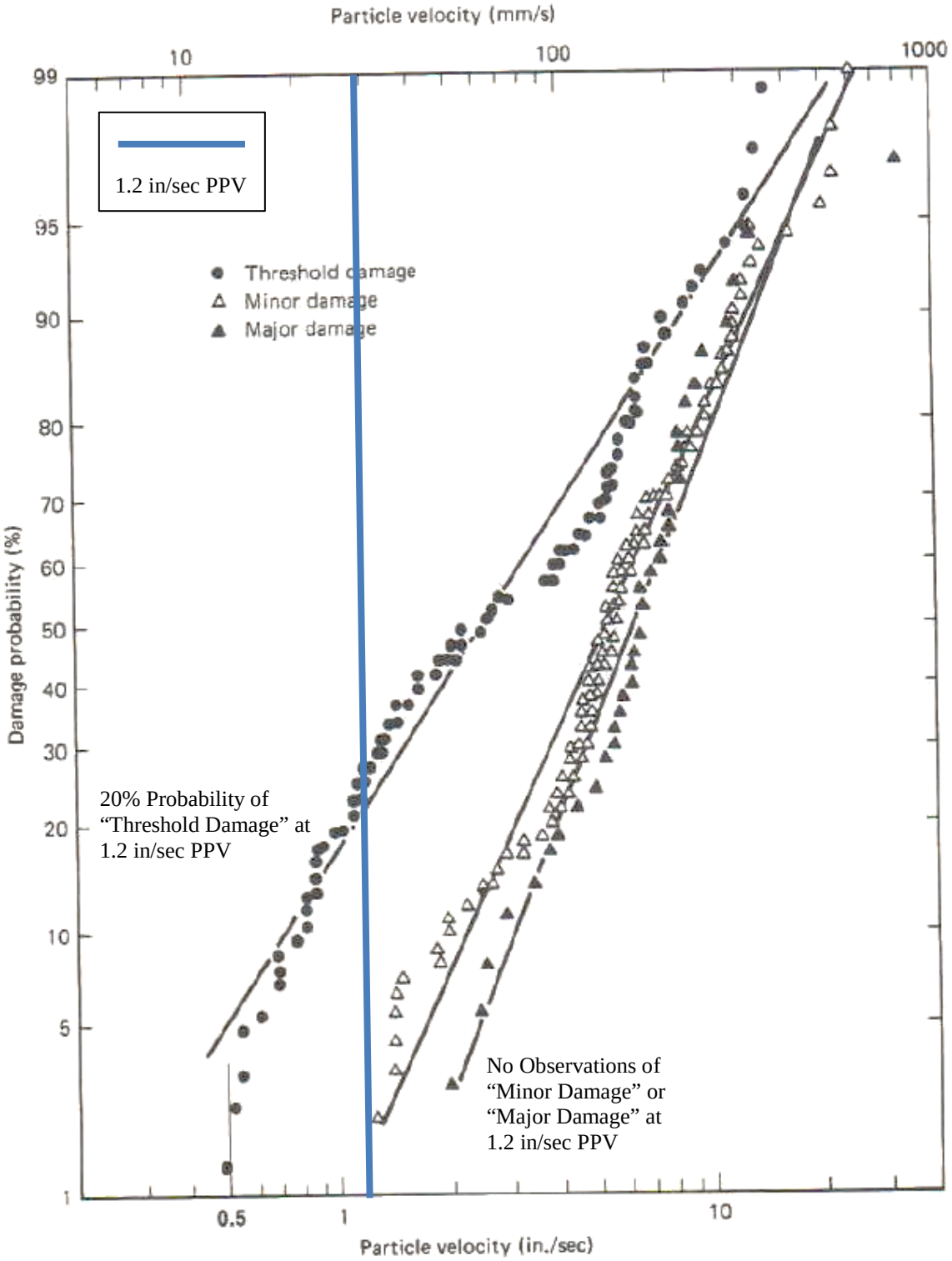
as reported in USBM RI 8507 and reproduced by Dowding assuming a maximum vibration level of 1.2 in/sec PPV. Based on these data, cosmetic or threshold damage would be manifested in the form of hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. However, minor damage (e.g., hairline cracking in masonry or the loosening of plaster) or major structural damage (e.g., wide cracking or shifting of foundation or bearing walls) to the Montgomery Hotel would not occur assuming a maximum vibration level of 1.2 in/sec PPV.

Heavy vibration generating construction equipment, such as vibratory rollers or clam shovel drops, would have the potential to produce vibration levels of 0.08 in/sec PPV or more at historic buildings within 60 feet of the project site (i.e., 40, 41, 42, 44, and 45 E. Santa Clara Street). This same equipment would have the potential to produce vibration levels of 0.2 in/sec PPV or more at buildings of normal conventional construction located within 25 feet of the project site (i.e., 43 E. Santa Clara Street, 17 S. 4th Street [Agave Taqueria & Café], 101 E. San Fernando Street [101 San Fernando Residential Building], and 32 S. 3rd Street [Liquid Restaurant and Lounge]). Project-generated vibration levels would fall below the General Plan threshold of 0.2 in/sec PPV at other surrounding conventional buildings located 30 feet or more from the project site. Neither cosmetic, minor, or major damage would occur at conventional buildings located 30 feet or more from the project site.

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

In summary, the construction of the project would generate vibration levels exceeding the General Plan threshold of 0.08 in/sec PPV at historic properties within 60 feet of the site and 0.2 in/sec PPV or more at buildings of normal conventional construction located within 25 feet of the project site. Such vibration levels would be capable of cosmetically damaging the adjacent buildings.

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., May 2018.

Mitigation Measure 2:

- Prohibit impact or vibratory pile driving. Drilled piles or mat slab foundations cause lower vibration levels where geological conditions permit their use.

- A list of all heavy construction equipment to be used for this project known to produce high vibration levels (tracked vehicles, vibratory compaction, jackhammers, hoe rams, etc.) shall be submitted to the City by the contractor. This list shall be used to identify equipment and activities that would potentially generate substantial vibration and to define the level of effort required for continuous vibration monitoring.

- Place operating equipment on the construction site as far as possible from vibration-sensitive receptors.

- Use smaller equipment to minimize vibration levels below the limits.

- Avoid using vibratory rollers and tampers near sensitive areas.

- Select demolition methods not involving impact tools.

- Modify/design or identify alternative construction methods to reduce vibration levels below the limits.

- Avoid dropping heavy objects or materials.

- A construction vibration-monitoring plan shall be implemented to document conditions at the historic properties within 60 feet of the site and conventional properties within 25 feet of the project site prior to, during, and after vibration generating construction activities. All plan tasks shall be undertaken under the direction of a licensed Professional Structural Engineer in the State of California and be in accordance with industry accepted standard methods. The construction vibration monitoring plan should be implemented to include the following tasks:

    - Identification of sensitivity to ground-borne vibration of the property. A vibration survey (generally described below) would need to be performed.

    - Performance of a photo survey, elevation survey, and crack monitoring survey for the properties within 60 feet of the site. Surveys shall be performed prior to, in regular intervals during, and after completion of vibration generating construction activities and shall include internal and external crack monitoring in the structure, settlement, and distress and shall document the condition of the foundation, walls and other structural elements in the interior and exterior of said structure.

    - Development of a vibration monitoring and construction contingency plan to identify where monitoring would be conducted, set up a vibration monitoring schedule, define structure-specific vibration limits, and address the need to conduct

photo, elevation, and crack surveys to document before and after construction. Construction contingencies would be identified for when vibration levels approach the limits.

- If vibration levels approach limits, suspend construction and implement contingencies to either lower vibration levels or secure the affected structure.

- Conduct a post-survey on the structure where either monitoring has indicated high levels or complaints of damage. Make appropriate repairs in accordance with the Secretary of the Interior's Standards where damage has occurred as a result of construction activities.

- The results of all vibration monitoring shall be summarized and submitted in a report shortly after substantial completion of each phase identified in the project schedule. The report will include a description of measurement methods, equipment used, calibration certificates, and graphics as required to clearly identify vibration-monitoring locations. An explanation of all events that exceeded vibration limits will be included together with proper documentation supporting any such claims.

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

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

Impact 3 **Exposure of Residents or Workers to Excessive Noise Levels in the Vicinity of a Private Airstrip or an Airport Land Use Plan.** The project site would not be exposed to excessive aircraft noise. This is a **less-than-significant** impact.

Mineta San José International Airport is a public-use airport located approximately 1.8 miles northwest of the project site. Future noise levels expected from aircraft are best represented by the 2027 CNEL Contours noise exposure map published as part of the Airport Master Plan. Figure 12 depicts the 65 dBA CNEL noise contour that defines the noise impact boundary for new residential development.

The Santa Clara County ALUC has jurisdiction over new land uses in the vicinity of airports and establishes 65 dBA CNEL as the maximum allowable noise level considered compatible with residential uses. CLUP Policy N-4 would prohibit residential or transient lodging within the 65 dB CNEL contour boundary unless it can be demonstrated that the resulting interior sound levels will be less than 45 dB CNEL. In addition, CLUP Policy N-5 would require all property owners within the Airport Influence Area (the 65 dB CNEL contour boundary) who rent or lease their property for residential use to disclose to the tenants that they are living within a high noise area as part of their rental/lease agreement.

The project site lies outside the 2027 65 dBA CNEL and 60 dBA CNEL noise contours shown in Figure 12. Noise levels resulting from aircraft would be less than 60 dBA CNEL at the project site and compatible with the proposed land use. This is a **less-than-significant** impact.

FIGURE 12 65 CNEL Noise Contour for SJIA (2027) Relative to Site