APPENDIX E
NOISE AND VIBRATION ASSESSMENT

RGD ACOUSTICS

Acoustical & Audiovisual Consultants

NOISE AND VIBRATION ASSESSMENT FOR:

HOTEL PROJECT – DUAL BRAND

SAN JOSE, CA

RGD Project #: 18-009

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1. Introduction

The proposed hotel project features 9-story building with three levels of underground parking structure, hotel guestrooms from the 2nd to the 8th floors, and residential units at the 8th and 9th floor. The project site is located in San Jose, bounded by Stockton Avenue to the west, West Julian Street to the north, a commercial building to the south and railroad train tracks to the east. The major noise sources at the project are vehicular traffic, railroad trains, mechanical equipment noise from the adjacent building, and aircraft.

This report quantifies the existing noise and vibration environment at the site, determines future noise and vibration levels associated with the construction and operation of the project and cumulative growth. Potential noise and vibration impacts are assessed, and where necessary, mitigation measures are presented.

2. Environmental Noise Fundamentals

Noise can be defined as unwanted sound. It is commonly measured with an instrument called a sound level meter. The sound level meter captures the sound with a microphone and converts it into a number called a sound level. Sound levels are expressed in units of decibels. To correlate the microphone signal to a level that corresponds to the way humans perceive noise, the A-weighting filter is used. A-weighting de-emphasizes low-frequency and very high-frequency sound in a manner similar to human hearing. The use of A-weighting is required by most local General Plans as well as federal and state noise regulations (e.g. Caltrans, EPA, OSHA and HUD). The abbreviation dBA is sometimes used when the A-weighted sound level is reported.

Because of the time-varying nature of environmental sound, there are many descriptors that are used to quantify the sound level. Although one individual descriptor alone does not fully describe a particular noise environment, taken together, they can more accurately represent the noise environment. The maximum instantaneous noise level (L_{max}) is often used to identify the loudness of a single event such as a car passby or airplane flyover. To express the average noise level the L_{eq} (equivalent noise level) is used. The L_{eq} can be measured over any length of time but is typically reported for periods of 15 minutes to 1 hour. The background noise level (or residual noise level) is the sound level during the quietest moments. It is usually generated by steady sources such as distant freeway traffic. It can be quantified with a descriptor called the L_{90} which is the sound level exceeded 90 percent of the time.

Type of Noise or Environment	Decibels
Recording studio	20
Soft whisper; quiet bedroom	30
Busy open-plan office	55
Normal conversation	60–65
Automobile *at 20 mph 25 ft. away*	65
Vacuum cleaner *10 ft. away*	70
Dump truck *at 50 mph 50 ft. away*	90
Gas leaf blower *at 25 ft. away*	100
Helicopter *200 ft. away*	100
Train horn *100 ft. away*	105
Claw hammer; jet takeoff *200 ft. away*	120
Shotgun *at shooter's ear*	140

To quantify the noise level over a 24-hour period, the Day/Night Average Sound Level (DNL or L_{dn}) or Community Noise Equivalent Level (CNEL) is used. These descriptors are averages like the L_{eq} except they include a 10 dB penalty during nighttime hours (and a 5 dB penalty during evening hours in the CNEL) to account for peoples increased sensitivity during these hours. The CNEL and DNL are typically within one decibel of each other.

Community Response to changes in noise levels: The potential for adverse community response tends to increase as an intrusive noise becomes more noticeable above existing background noise levels. For example, if an intrusive noise has an average level that is comparable to existing average ambient noise levels, then the intrusive sound would tend to blend in with the ambient noise. However, if the intrusive sound is significantly greater than the ambient noise then the intrusive sound would be more noticeable and potentially more annoying as it can interfere with rest, working efficiency, social interaction and general tranquility.

In environmental noise, a change in noise level of 3 dB is considered a just noticeable difference. A 5 dB change is clearly noticeable, but not dramatic. A 10 dB change is perceived as a halving or doubling in loudness (Cowen, *Handbook of Environmental Acoustics*, 1994).

Vibration is an oscillatory motion which can be described in terms of the displacement, velocity, or acceleration. Because the motion is oscillatory, there is no net movement. Displacement is the easiest descriptor to understand. For a vibrating floor, the displacement is simply the distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement.

The peak particle velocity (PPV) is the descriptor used in monitoring of construction vibration since it is related to the stresses that are experienced by buildings. Although PPV is appropriate for evaluating the potential of building damage, it is not always suitable for evaluating human response. It takes some time for the human body to

respond to vibration signals and a time averaged vibration descriptor correlates better with human response. For this reason, criteria for transit vibration is presented in terms of the root-mean-square (rms) vibration velocity and is typically shown in units of decibels referenced to 1 micro-inch per second (with the abbreviation “VdB" to reduce the potential for confusion with sound decibels).

3. Regulatory Background

3.1. State of California

3.1.1. CEQA Guidelines

In accordance with Appendix G of the *CEQA Guidelines*, a proposed project could have a significant environmental impact if it would result in:

a. exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies;

b. exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;

c. a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

d. a substantial temporary or periodic increase in ambient noise levels in the project above levels existing without the project;

e. exposure of people residing or working in the project area to excessive noise levels if the project is located within an area covered by an airport land use plan, or where such plan has not been adopted, within two miles of a public airport or public use airport; or

f. exposure of people residing or working in the project area to excessive noise levels if the project is located in the vicinity of a private airstrip.

3.1.2. California Building Code (2016)

Section 1207.4 of the 2016 California Building Code has exterior noise transmission requirements for multi-family residential dwelling units and hotel sleeping units. The code states that allowable interior noise levels attributable to exterior sources shall not exceed an L_{dn} of 45 dB in any habitable room.

3.1.3. California Green Building Standards Code (2016)

Section 5.507 of the State of California Green Building Standards Code has exterior noise transmission requirements for new nonresidential buildings. If the building will be exposed to an hourly L_{eq} of 65 dB or more, the building envelope shall be constructed to achieve an interior hourly equivalent noise level (L_{eq}) of 50 dBA in the occupied areas during any hour of operation. The aforementioned performance standard is an alternative to use of the prescriptive standard which tends to be much more restrictive for buildings exposed to normal exterior noise levels.

3.2. San Jose General Plan

The Noise Element of the City of San Jose General Plan has policies and actions to assure the appropriateness of new development with the noise environment of San Jose. The applicable actions are repeated below:

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 Jose include:

<u>Interior Noise Levels</u>

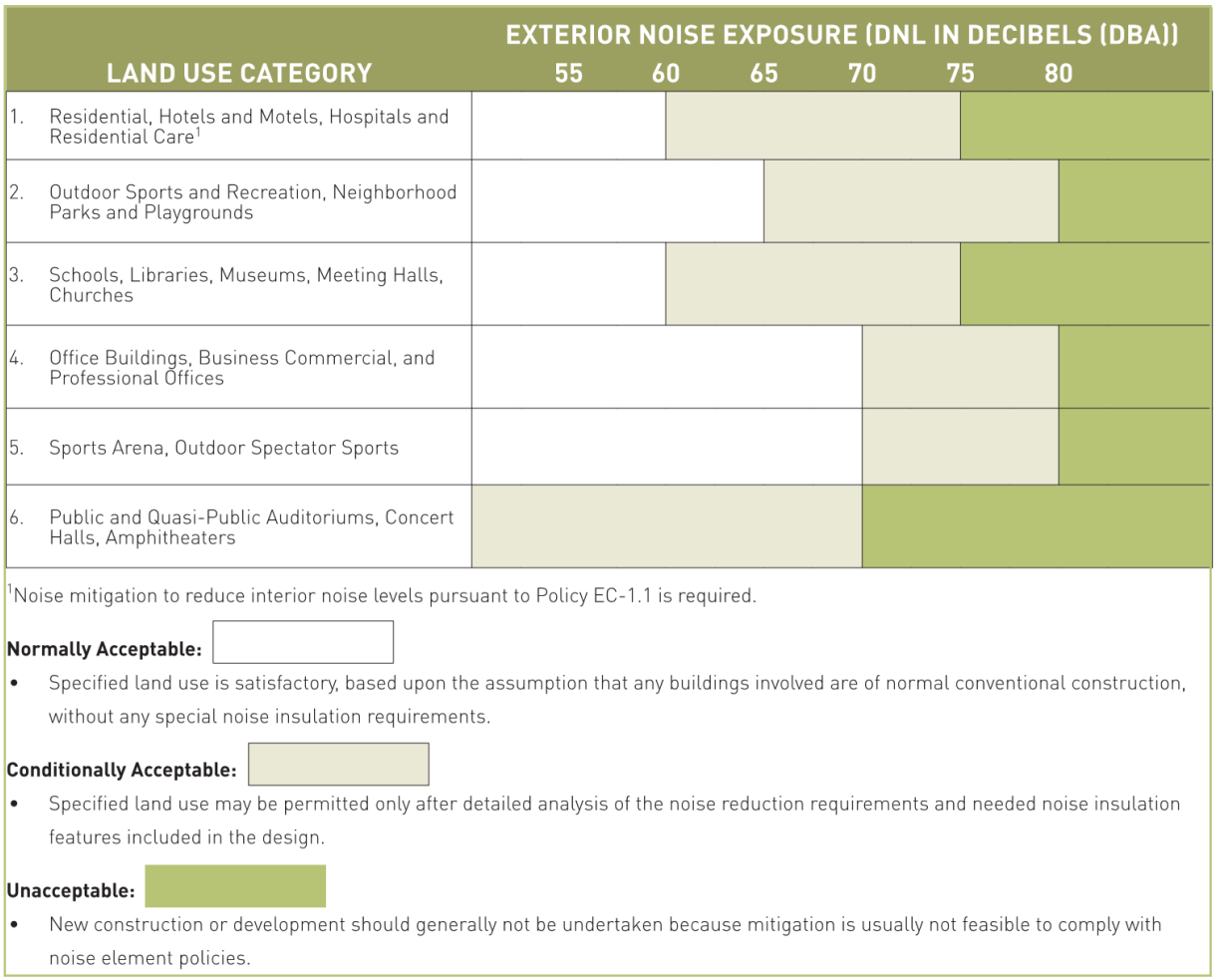
- The City's standard for interior noise levels in residences, hotels, motels, residential care facilities, and hospitals is 45 dBA L_{dn}. Include appropriate site and building design, building construction and noise attenuation techniques in new development to meet this standard. For sites with exterior noise levels of 60 dBA L_{dn} 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.

<u>Exterior Noise Levels</u>

- 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.

Figure 1: Land use Compatibility Guidelines for Community Noise in San Jose (GP Table EC-1)



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 commercial development on adjacent uses through noise standards in the City's Municipal Code.

EC-1.7 Require construction operations within San Jose 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-2.1 Near light and heavy rail lines or other sources of ground-borne vibration, minimize vibration impacts on people, residences, and businesses through the use of setbacks and/or structural design features that reduce vibration to levels at or below the guidelines of the Federal Transit Administration. Require new development within 100 feet of rail lines to demonstrate prior to project approval that vibration experienced by residents and vibration sensitive uses would not exceed these guidelines.

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 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.

3.3. City of San Jose Municipal Code

The City's Municipal Code contains a Zoning Ordinance that limits noise levels at any property line of residential, commercial, or industrial properties as shown in Table 1.

Table 1: City of San Jose Zoning Ordinance Noise Standards

Land Use Types	Maximum Noise Level in Decibels at Property Line
Residential, open space, industrial or commercial uses adjacent to a property used or zoned for residential purposes	55
Open space, commercial, or industrial use adjacent to a property used or zoned for commercial purposes or other non-residential uses	60
Industrial use adjacent to a property used or zoned for industrial or use other than commercial or residential purposes	70

The City's Municipal Code also contains a Zoning Ordinance that limits noise levels generated by stand-by/backup and emergency generators. The noise level emitted by these generators shall not exceed 55 decibels at the property line of residential properties. The standards and criteria for stand-by/ backup generators are set as follows:

1. Maximum noise levels, based upon a noise analysis by an acoustical engineer, will not exceed the applicable noise standards set forth in Title 20.80.2030.
2. Testing of generators is limited to 7 a.m. to 7 p.m., Monday through Friday.

3.4. Santa Clara County Airport Land Use Commission (ALUC)

The Santa Clara County ALUC adopted a Comprehensive Land Use Plan (CLUP) for Norman Y. Mineta San Jose International Airport. The CLUP includes airport noise exposure information and land use policies. Policies N-1 through N-7 address the noise and land use compatibility. These policies refer to the airport noise contours shown in Figure 2. Policy G-5 requires an avigation easement for projects located in the Airport Influence Area (Figure 3).

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 [Figure 4] 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 [2].

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 [Figure 4] 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.

G-5 Where legally allowed, dedication of an avigation easement to the City of San Jose shall be required to be offered as a condition of approval on all projects located within an Airport Influence Area, other than reconstruction

projects as defined in paragraph 4.3.7. All such easements shall be similar to that shown as Exhibit 1 in Appendix A.

Figure 2: Airport Noise Contours

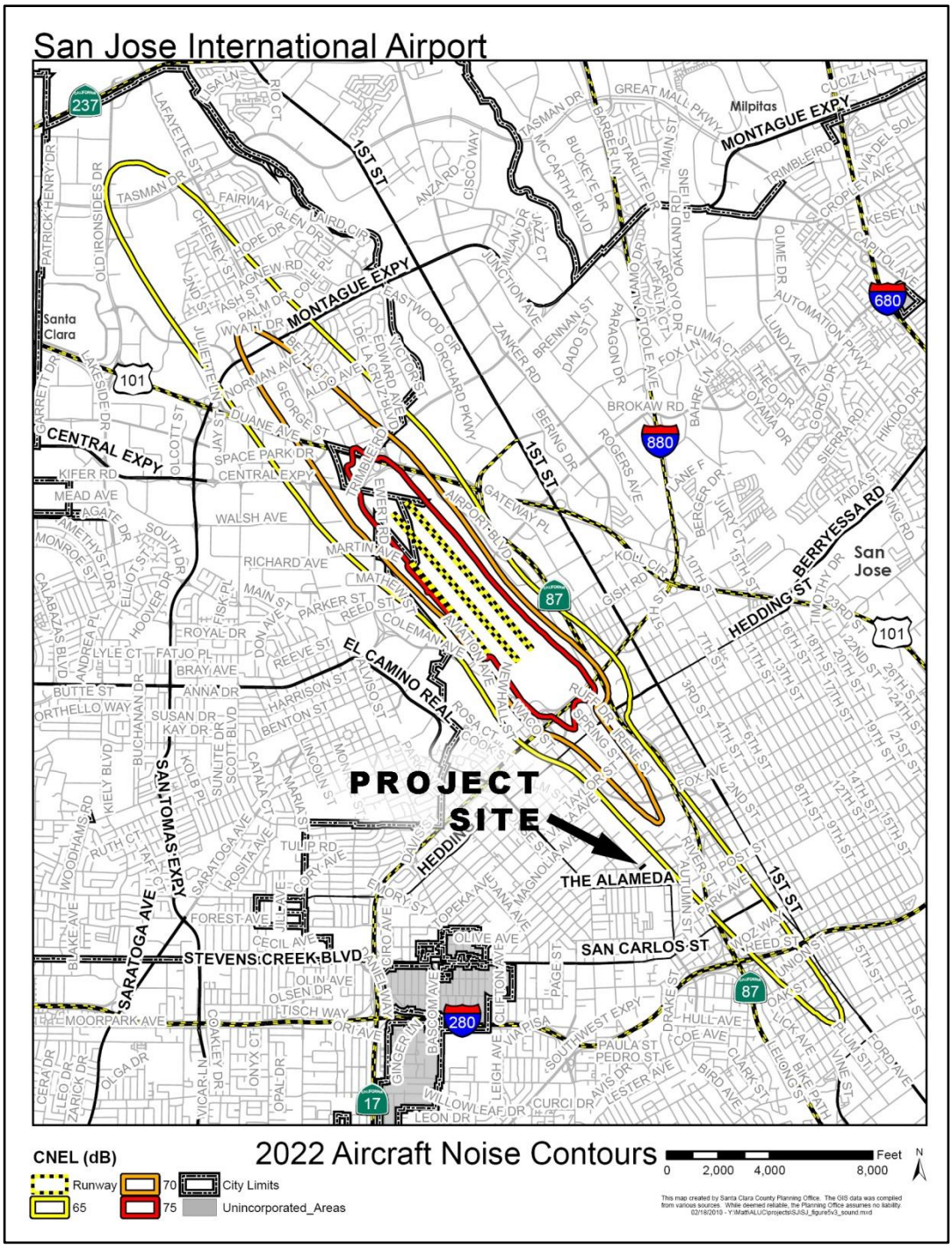


Figure 3: Airport Influence Area

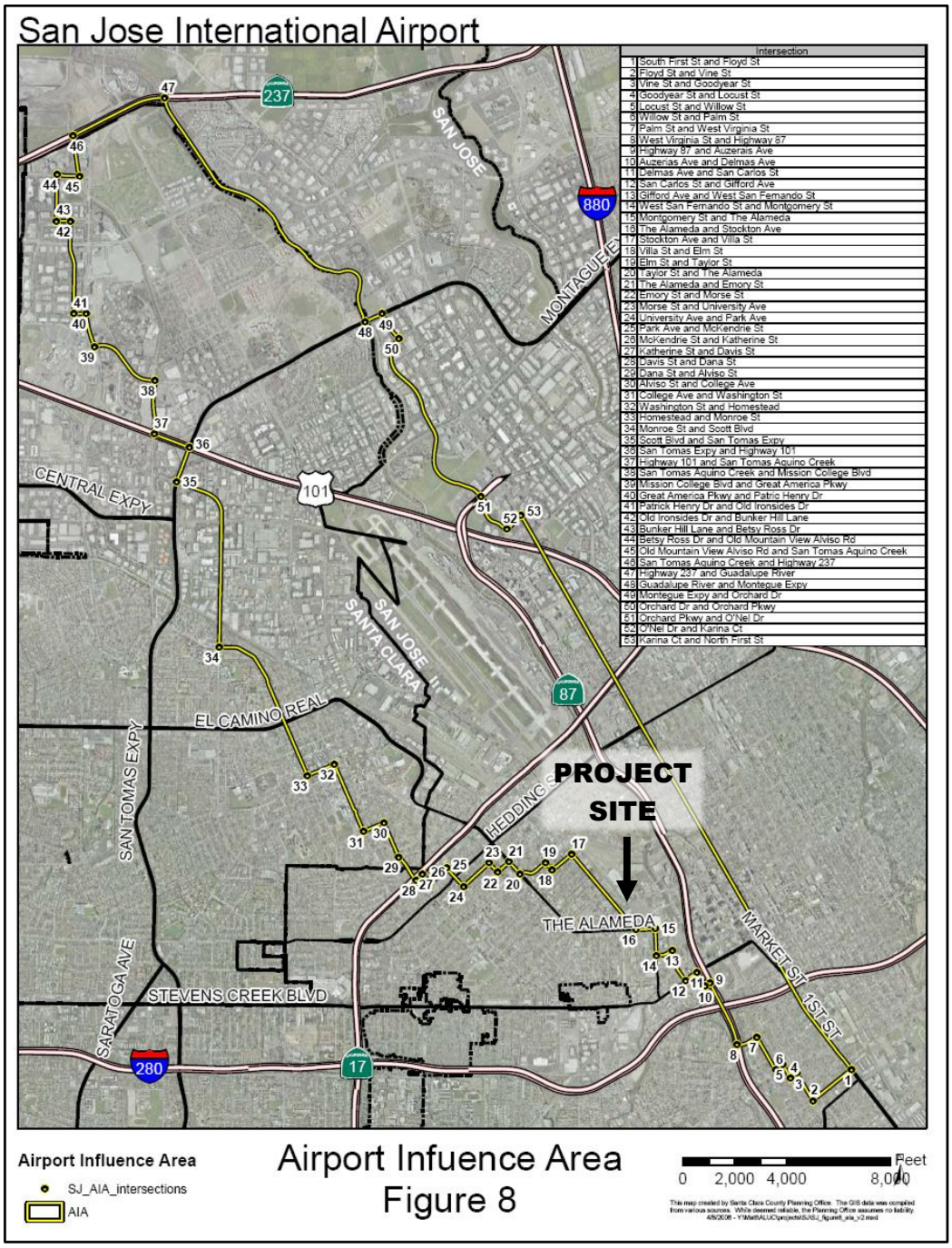


Figure 4: ALUC Noise Compatibility Policies

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

3.5. Ground-borne Vibration

Ground-borne vibration generated by train passbys can propagate into nearby buildings and cause perceptible vibration in the floors and walls of residential units. This perceptible vibration can cause annoyance to the residents. The City's General Plan Policy EC-2.1 adopts the vibration impact criteria published by Federal Transit Administration[1] (FTA). The policy requires new development within 100 feet of rail lines to demonstrate, prior to project approval, that vibration experienced by residents and vibration sensitive uses would not exceed the FTA guidelines.

The FTA vibration impact criteria were developed for assessing new transit systems near existing land use. Table 2 lists the impact levels for various land uses depending on how often the events occur. The FTA considers an impact to occur when the vibration velocity level inside a residence or hotel from frequent events (70 or more events per day) exceeds 72 VdB[2]. The impact levels are less stringent for less sensitive land uses or for fewer events per day. The FTA also provides Table 3 to help understand the human response to different levels of ground-borne vibration.

[1] *Transit Noise and Vibration Impact Assessment, Federal Transit Administration, April 2006.*

[2] *VdB – The vibration velocity level expressed in decibel re one micro-inch per second.*

Table 2: FTA Ground-borne Vibration Impact Levels

Land Use Category	Ground-borne Vibration Impact Levels		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: High sensitivity buildings (research, hospitals and manufacturing) where vibration would interfere with interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Notes:

1. "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

2. “Occasional Events” is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.

3. "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.

4. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

Table 3: Human Response to Different Levels of Ground-borne Vibration

Ground-borne Vibration Level	Human Response
65 VdB	Approximate threshold of perception for many humans.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

4. Noise and Vibration Environment

4.1. Noise Measurements

Existing noise levels were quantified by long-term, 2-day, measurements at four locations (LT-1 to LT-4) and short-term noise measurements at nine locations (ST-1 to ST-9). The noise measurement locations were chosen to document the noise exposure from rail operations, various roadways around the project site, and existing mechanical equipment noise from the adjacent building to the south. The measurement locations are shown in Figure 5.

The dominant noise sources at the project site include train passbys, local traffic, aircraft and neighboring mechanical equipment. Along the eastern portions of the site near the railroad tracks (e.g. Locations LT-1 and LT-4), the dominant noise source was train passbys. At these locations, the noise from the nearby roads and aircraft were minor compared to the train noise. Along the west façade and portions of the site near the traffic intersection (e.g. LT-3, ST-5, and ST-4), the dominant noise source was local vehicular traffic. At these locations, the noise from the trains did not significantly affect the measured average noise levels. Along the project's south property line at a height of approximately 30 feet above ground (ST-6 to ST-9), the dominant noise source was mechanical equipment from the neighboring building. At these locations, the measured noise level was relatively steady and traffic was not a significant noise source.

Figures 6 to 9 show the long-term measurement results and Table 4 shows the short-term measurement results. The noise levels shown in the charts are in terms of the hourly L_{eq}, $L_{1,}$ L_{50}, and L_{max}. At the proposed building façade closest to the train tracks, the noise from passing trains generated a typical maximum instantaneous noise level between 72 to 88 dBA. Based on our on-site observations, trains generally do not sound their horns. However, trains sounding its horn near the monitor were measured to generate typical maximum noise levels up to 93 dBA.

Figure 10 shows a histogram of the measured noise events at Location LT-4 with a maximum noise level (L_{max}) of 72 dBA or greater. Most of the events in the histogram are train passbys. Some noise events are aircraft which typically generated an L_{max} of 69 to 73 dBA. The sound of train horns were the loudest events (with an L_{max} greater than about 90 dBA). Train horns are relatively infrequent because trains are not required to sound their horn as they pass the site since it is not near an at-grade roadway crossing.

Figure 5: Noise Measurement Locations

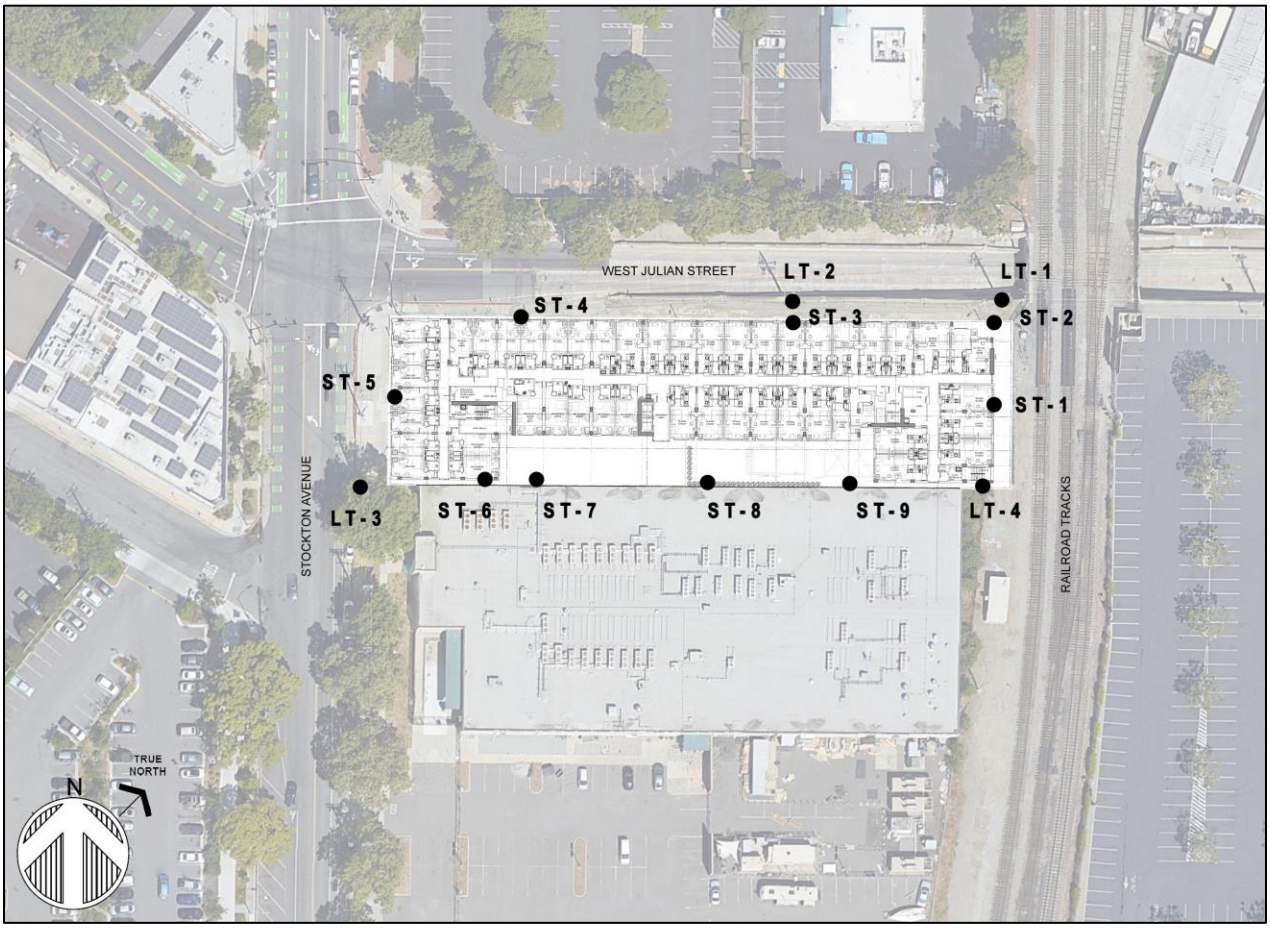


Table 4: Short Term Noise Measurements

Location		Date/Time	A-weighted Sound Level, dBA				Dominant Noise Sources
			L_{eq}	L_{10}	L_{50}	L_{90}	
ST-1	Building setback from railroad tracks, 24 feet above ground.	23 Apr 2018 1:38 PM – 2:49 PM	76	74	63	60	Trains, aircraft, traffic
ST-2	NE corner of building setback, 24 feet above ground.	25 Apr 2018 5:16 PM – 5:44 PM	71	73	65	59	Trains, aircraft, traffic
ST-3	Building setback from Julian Street approx. 114 feet from nearest train track, 24 feet above ground.	25 Apr 2018 2:59 PM – 3:14 PM	69	72	67	60	Trains, aircraft, traffic
ST-4	Building setback from Julian Street approx. 130 feet from Stockton Ave centerline, 24 feet above ground.	25 Apr 2018 4:25 PM – 4:45 PM	70	71	66	61	Traffic, trains
ST-5	Building setback from Stockton Avenue, 24 feet above ground.	25 Apr 2018 3:47 PM – 4:07 PM	68	70	66	62	Traffic, trains
ST-6	Along south property line approx. 110 feet from Stockton Ave centerline, 27 feet above ground.	23 Apr 2018 3:28 PM – 3:31 PM	69	70	69	69	Mech. equip
ST-7	Along south property line, 3 feet in front of neighboring exhaust, 5 feet above ground.	23 Apr 2018 4:59 PM – 5:00 PM	65	66	65	64	Mech. equip
ST-8	Along south property line approx. 250 feet from Stockton Ave centerline, 27 feet above ground.	23 Apr 2018 3:14 PM – 3:18 PM	69	71	67	65	Mech. equip
ST-9	Along south property line 117 feet from nearest train track, 5 feet above ground.	23 Apr 2018 2:59 PM – 3:14 PM	66	68	59	57	Mech. equip, trains
	Along south property line 117 feet from nearest train tracks, 27 feet above ground.	23 Apr 2018 2:52 PM – 2:58 PM	68	71	65	63	Mech. equip, trains

Figure 6: Long-Term Noise Measurement Results - Location LT-1
DNL 76 dBA

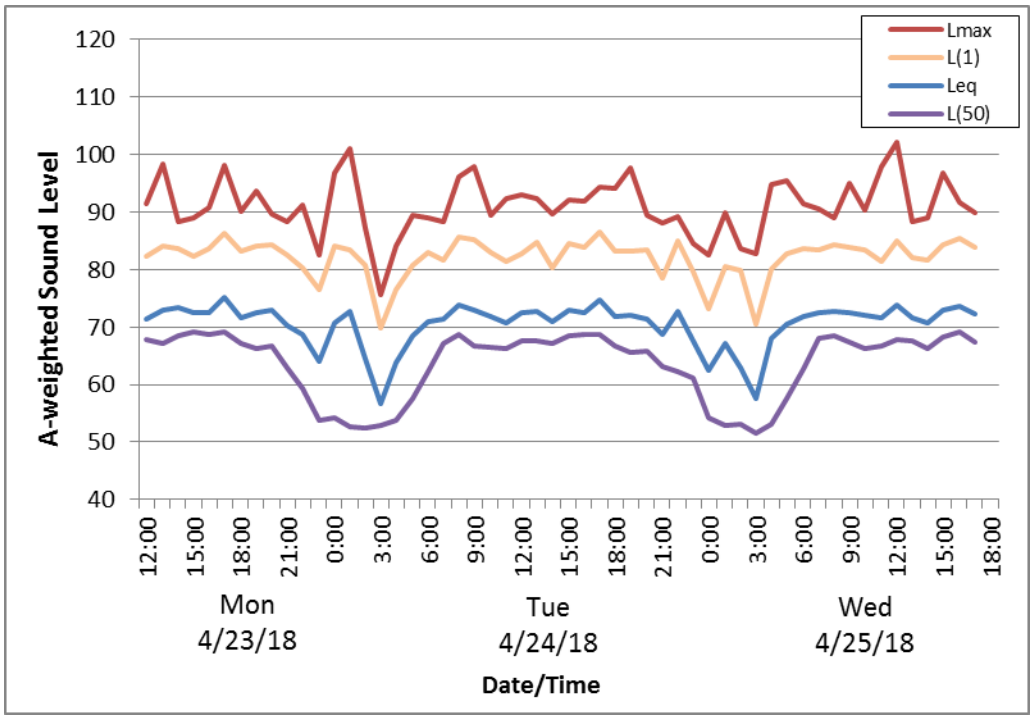


Figure 7: Long-Term Noise Measurement Results - Location LT-2
DNL 75 dBA

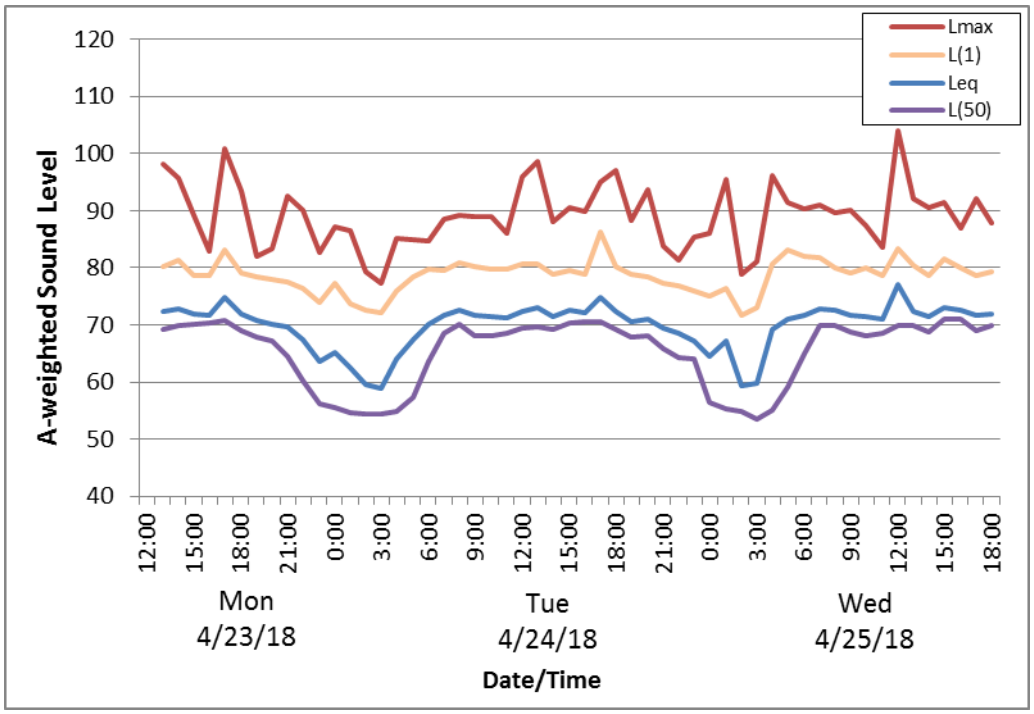


Figure 8: Long-Term Noise Measurement Results - Location LT-3
DNL 71 dBA

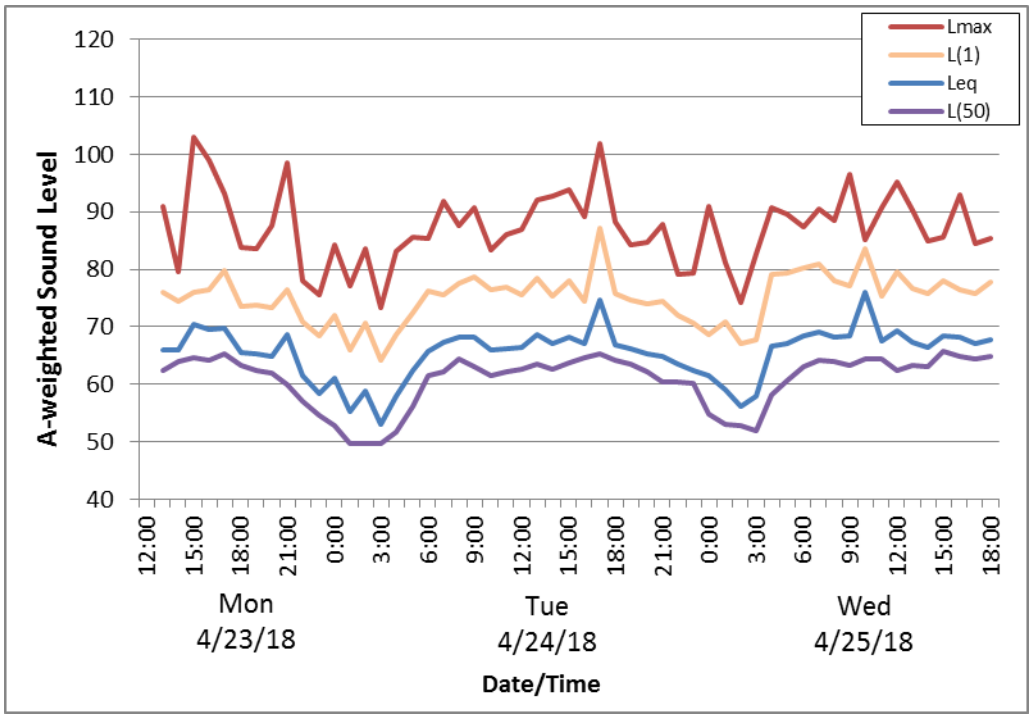


Figure 9: Long-Term Noise Measurement Results - Location LT-4
DNL 74 dBA

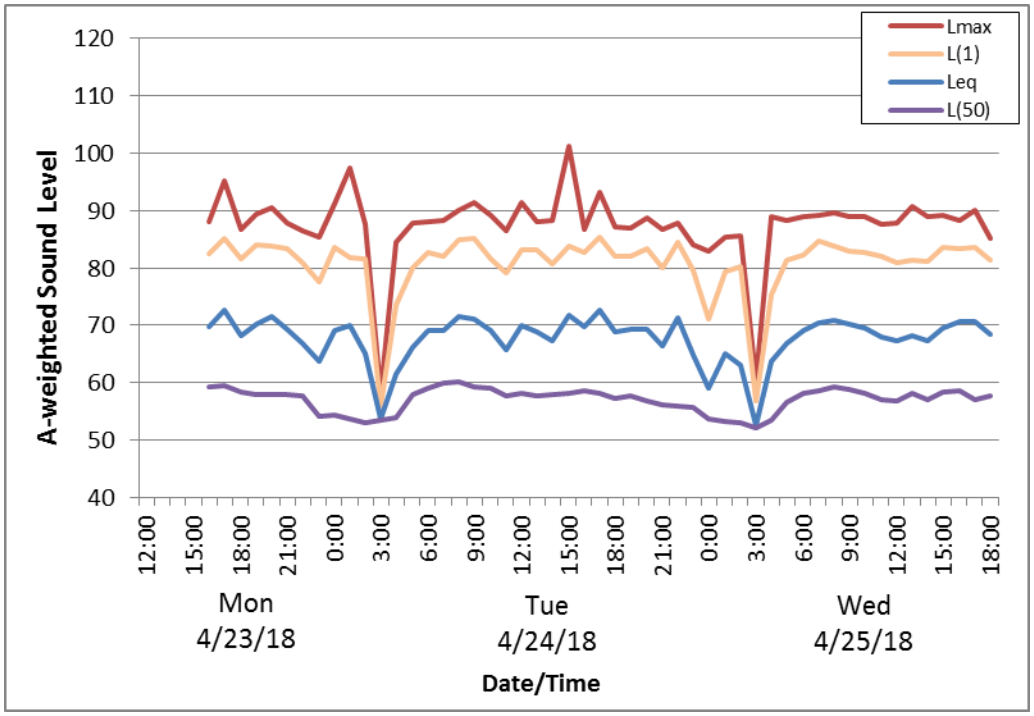
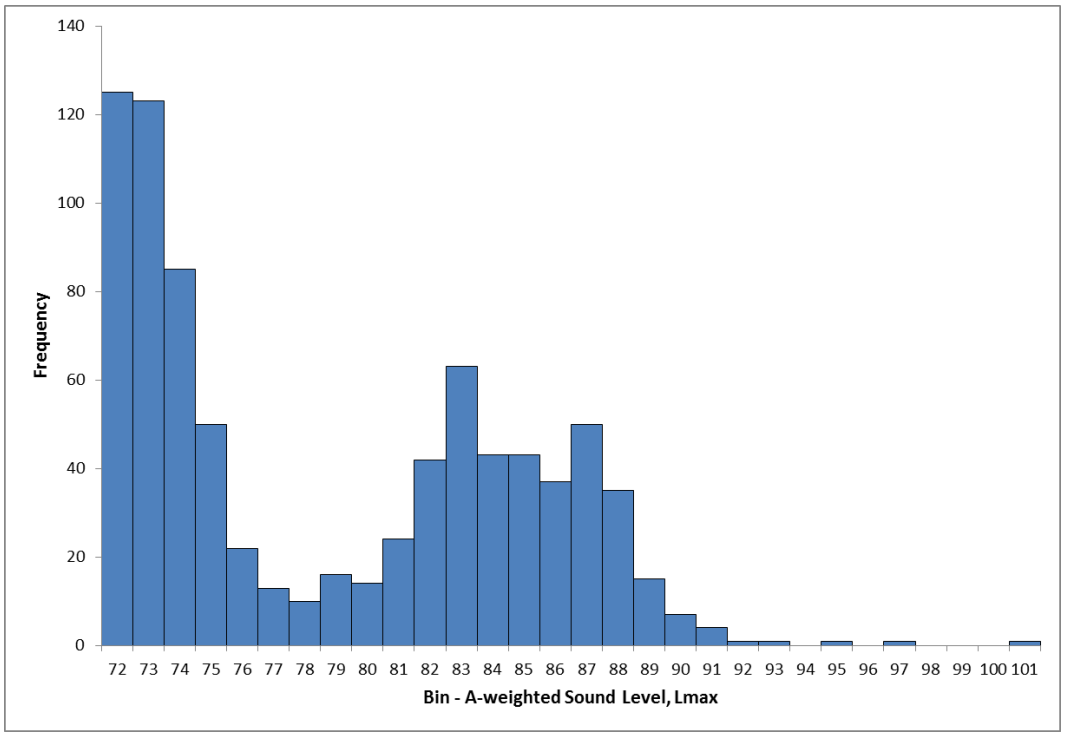


Figure 10: Histogram of Noise Events with L_{max} 72 dBA or Greater Location LT-4



4.2. Future Noise Levels due to Traffic

The project's traffic study[3] indicates an increase in future traffic volumes along West Julian Street and Stockton Avenue compared to the existing conditions. Based on these traffic volume increases, traffic noise is calculated to increase by 1 dBA or less in the future along West Julian Street and Stockton Avenue.

4.3. Future Noise Levels due to Railroad Activities

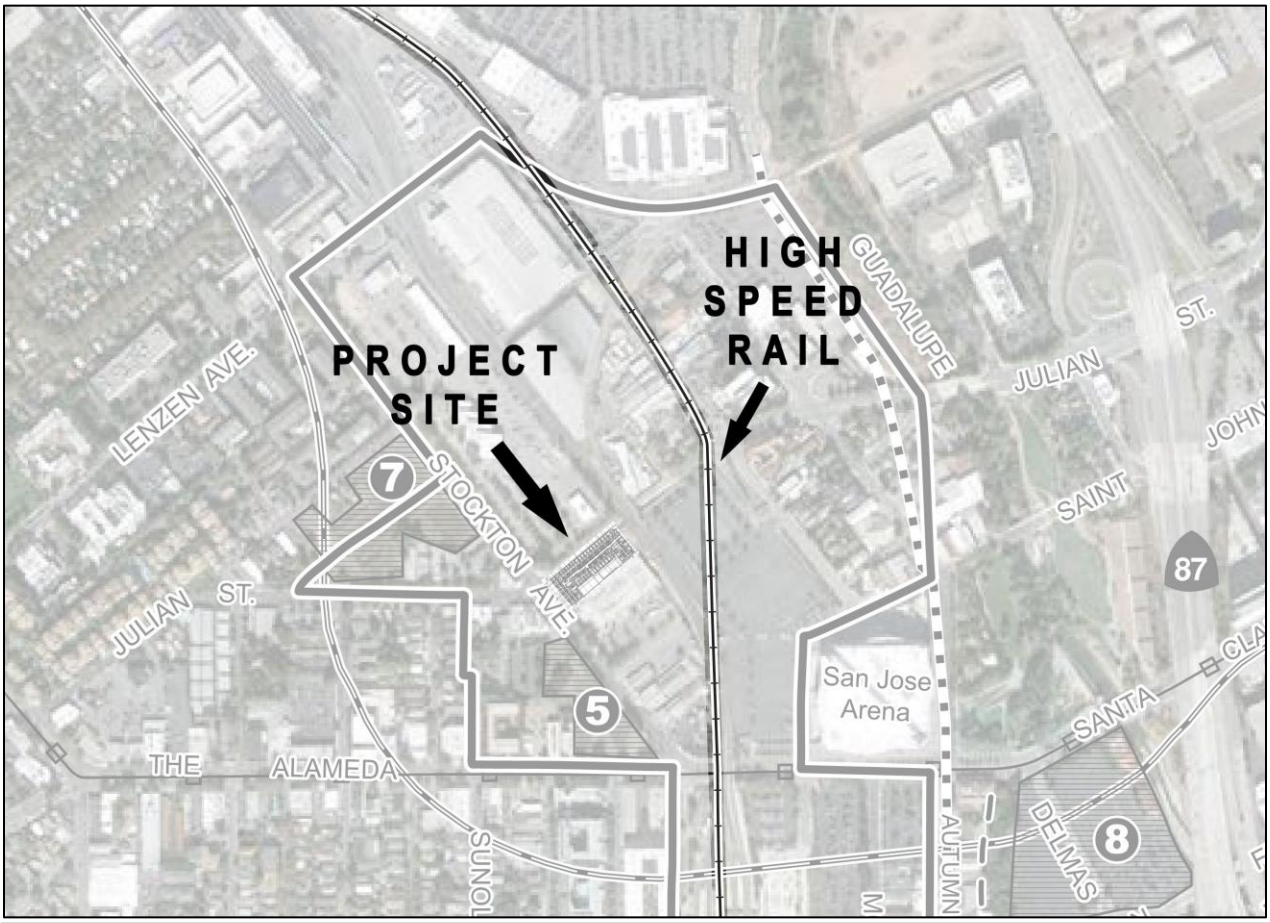
The California High Speed Rail Authority is planning for the development of a statewide high speed rail system, linking San Francisco and Los Angeles. The project site is located within the Diridon Station plan area. According to the Diridon Station Area Plan, Integrated Final Program Environmental Impact Report (DSAP FPEIR) dated August 2014, the California High Speed Train (HST) is currently proposed to operate on an elevated structure, utilizing the existing rail right-of-way from just north of Santa Clara Street to just south of Park Avenue. The average train frequency is expected to be approximately 10 trains per hour per direction traveling at speeds of 125 mph or less, although the frequency of

[3] *Akbar, Umoja. "FW: Traffic Volumes for Stockton Avenue Hotel/Condo Project" 10 July 2018. E-mail.*

pass-bys would vary thorough the day.

Figure 11 shows the project site and the proposed California HST track location. The project site is located at approximately 330 feet from the HST train tracks. Based on the California High-Speed Rail Authority's 2010 High-Speed Train Sound Fact Sheet, the DSAP FPEIR determined that maximum instantaneous noise from HSR pass-bys would be similar to or less than existing single-event sounds along the railroad corridor in the Diridon Station plan area. Since the HST alignment would be much farther from the project site than the existing freight/Caltrain alignment, the resulting increase in noise due to HST is expected to be less than 1 dBA.

Figure 11: California High Speed Rail



Source: Diridon Station Area Plan, Integrated Final Program Environmental Impact Report, Figure 1-4, August 2014

4.4. Existing and Future Aircraft Noise

The project site is located within two miles of the San Jose International Airport. Our measurements indicate that the maximum instantaneous noise from aircrafts typically range between 69 to 73 dBA. Based on the future 2022 aircraft

noise contours for the San Jose International Airport, the project site is located outside the future CNEL 65 dBA noise contour.

4.5. Existing and Future Noise Levels due to rooftop mechanical equipment at adjacent data center building.

The neighboring building is occupied by Cerulean Global Services, LLC ("Cerulean"). The building is used as a data center so there is extensive mechanical equipment for purposes such as ventilation and cooling of the interior spaces. The exterior mechanical equipment that is closest to the project site is on the roof of the building. There is also a louver on the side of the building facing the project site. Measurements at Locations ST-6 through ST-9 quantify the noise levels from the existing equipment. The sound level meter microphone was elevated above the height of the roof so the measurements represent the noise exposure of the project's upper floor units. It is assumed that the equipment operates 24-hours a day for the purpose of calculating the DNL. Location ST-7 was conducted at ground level to quantify the noise emitted by a louver on the site of the building.

According to the letter from Cerulean dated 29 March 2018[4] for informational purposes, the company has plans to increase the equipment at the site. The Cerulean letter does not provide locations of existing and potential future mechanical equipment and did not provide noise level data for the future equipment. To account for the future equipment, we have conservatively assumed that the equipment would double relative to current conditions so that the noise level would increase by 3 dBA.

4.6. Existing and Future Noise Levels due to Events at the neighboring SAP Center

The SAP Center at San Jose is located approximately 850 feet from the project site. According to the SAP Center's online calendar[5], there was a Justin Timberlake concert ("The Man of the Woods Tour") scheduled for 24 April 2018 at 7:30 PM during the measurement period. Our long-term measurements at Locations LT-1 and LT-4 included the noise levels for a day without the concert and a day with the concert. Based on the measured noise levels, the noise from the SAP Center's concert did not significantly affect the hourly L_{eq}. Any noise contribution due to auto and truck parking for the SAP Center located east of the railroad tracks was included in the noise measurements. For the purposes of this report, we are assuming noise emanating from the SAP Center at San Jose would not change substantially in the future.

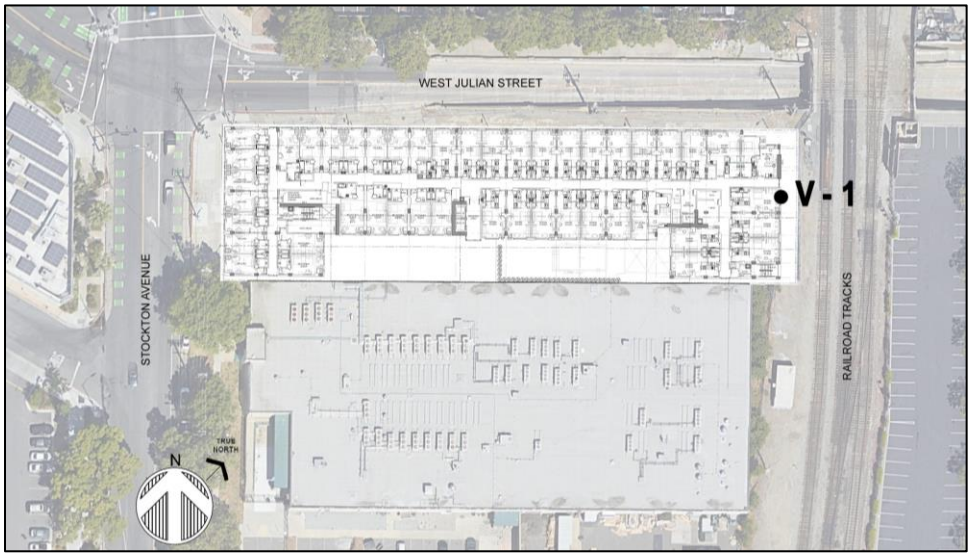
[4] *Taylor (President of Cerulean Global Services, LLC), Robert D. Received by Daven Roy, 250 Stockton Avenue, 29 Mar. 2018, San Jose, California.*

[5] *Calendar of Events,* SAP Center*, www.sapcenter.com/events/calendar*

4.7. Ground Vibration Measurements

Ground vibration measurements were made at Location V-1 on 23 April 2018 and 22 – 23 May 2018 to document the vibration levels generated by trains. Location V-1 is representative of the worst case vibration exposure because it is the closest point of the proposed building to the railroad tracks. The proposed building is 10 feet from the property line and the property line is 19 feet from the nearest track centerline. There are a total of three tracks in the railroad right-of-way. The two farther tracks are 34 and 49 feet from the property line. Therefore, the track centerlines are 29 to 59 feet from the edge of proposed building (and ground vibration measurement location V-1). Figure 12 shows the vibration measurement location.

Figure 12: Vibration Measurement Location



The measurements in April consisted of approximately 10.5 hours of data between 12 PM and 10:30 PM with 4 hours of attended on-site observations. The measurements in May consisted of approximately 22 hours of data including nighttime with 1 hour of attended on-site observations. During the attended measurements the measured ground vibration levels ranged from 68 to 86 VdB. During the long-term measurements the freight trains generated vibration levels were up to 89 VdB.

Based on our observations, the more frequent Caltrains occur on the nearest and middle tracks while the less frequent freight, Amtrak, and Ace trains generally travel on the farthest track from the site. There are discontinuities in the rails of the far track due to the presence of rail switches which can cause increased ground vibration from trains as the wheels roll over the discontinuities. In general, we observed that trains traveling on the far track generated higher vibration levels while the Caltrains generated lower vibration levels.

According to the Caltrain schedule (Effective October 1, 2017), there is a total of 92 Caltrains traveling to and from the San Jose Diridon Station throughout the day. The Caltrain passby duration is about 40-seconds while the freight trains are typically longer and have a passby duration of 2- to 4-minutes when in motion. Some freight trains stopped adjacent to the project site during the measurement period. All of the trains traveled at relatively slow speeds, about 10- to 20-mph.

5. Impact Analysis

This section evaluates the significance of environmental impact resulting from the project with respect to Appendix G of the CEQA Guidelines.

a. Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Impact 1: Land Use Compatibility

Based on the noise measurements, future traffic, and future aircraft, the noise exposure at the project building due to a combination of traffic, train, and aircraft, will be up to a DNL 75 dBA at the façade facing the railroad tracks, a DNL 73 dBA at the façade facing West Julian Street, a DNL 71 dBA at the façade facing Stockton Avenue, and a DNL 78 dBA at the south façade overlooking the adjacent building's mechanical equipment. We have included the increase in traffic noise due to future traffic and a 3 dBA factor to account for a potential increase in mechanical equipment at the adjacent building.

According to the City's Land Use Compatibility Guidelines, a noise exposure above DNL 75 dBA is considered "unacceptable" for residential and hotel development and new development "should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies". A noise exposure between DNL 70 and 75 dBA is considered "conditionally acceptable" and "specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design".

The project site is located outside of the 2022 65-dBA aircraft noise contour. The adopted Comprehensive Land Use Plan (CLUP) for Norman Y. Mineta San Jose International Airport ALUC considers the aircraft noise exposure to be "conditionally acceptable" for condominium development and generally acceptable for hotel development. Similar to the City's requirement, development in sites exposed to "conditionally acceptable" aircraft noise levels should be undertaken only after a detailed analysis of the noise reduction is made and needed insulation features included in the design. Additionally, since the project site is in the Airport Influence Area and exposed to an overall exterior noise

levels greater than 65 dB CNEL, the property owner shall include a statement in the rental/lease agreement noting the area is subject to high noise in a manner consistent with the current state law including AB2776 (CLUP Policy N-5).

This is considered less than significant with Mitigation NO-1.

Impact 2: Indoor Noise at Residential Units

The City of San Jose and the State of California require that interior noise levels in new multi-family dwellings units and hotel rooms to meet an interior noise level of L_{dn} of 45 dBA or less. In addition, for new residential development, the City's single event noise policy (General Plan Policy EC-1.9) requires that maximum instantaneous noise levels do not exceed a L_{max} of 50 dBA in bedrooms and a L_{max} of 55 dBA in other rooms. The City's single event noise policy applies to residential development; however, the project includes both residences and hotel guest rooms. Since the California Building Code includes hotels in its Residential Occupancy Classification (Section 310.3 Residential Group R-1) this analysis applies the City's General Plan Single Event Policy (EC-1.9) to the hotel guestrooms as well as the residences.

For the purposes of this analysis, the City's single-event interior noise standard is applied to a typical, loud train which is determined by calculating the average of the loudest 30 percent (L_{max30}) of the measured passbys without train horns. The train horns are not included since the trains did not normally sound their horns. The L_{max30} from trains was 87 dBA at the units closest to the tracks. Therefore, the building will need to provide noise reduction of up to 33 dBA to meet the L_{dn} 45 dBA requirement and up to 37 dBA to meet the residential maximum instantaneous noise requirement along the railroad tracks.

Along the north and west facing elevations, traffic noise is the dominant noise sources and generates a future DNL of up to 73 dBA. Therefore a noise reduction of up to 28 dBA is required to meet the City and State standard of DNL 45 dBA. Along the south side of the building the dominant noise source will be mechanical equipment at the roof and generates a DNL of up to 78 dBA. Therefore a noise reduction of 33 dBA is required to meet the City and State standard of DNL 45 dBA.

This is considered less than significant with mitigation NO-1.

Impact 3: Indoor Noise at Non-Residential Units

Meeting the California Green Building Code (CalGreen) performance standard of interior hourly L_{eq} 50 dBA at the non-residential portions of the building will generally require less noise insulation than at the residential portion of the building. The proposed building would be exposed to a peak-hourly L_{eq} of between 72 and 75 dBA on the ground floor along the roadways. Therefore, the

occupied non-residential spaces of the building (e.g. offices, meeting rooms) would need to provide a noise reduction of 25 decibels.

This is less than significant with Mitigation NO-1.

Mitigation NO-1

A detailed analysis should be prepared by a qualified acoustical consultant to determine the noise insulation requirements on a unit-by-unit basis to meet the interior noise level requirement of an L_{dn} of 45 dBA or less at the dwelling units and to meet the City's maximum instantaneous noise standard for railroad noise at the residential units and hotel guestrooms of L_{max} 50 dBA or less in bedrooms and L_{max} 55 dBA or less in other rooms. Analysis of the noise insulation requirements should also be made for the non-residential spaces such that the interior noise levels would meet the CalGreen requirement of hourly L_{eq} of 50 dBA.

Achieving these noise standards would involve the use of sound-rated windows (and/or exterior doors) and could require acoustical upgrades to the exterior wall assembly. Based on preliminary analysis, windows with a sound rating of up to STC 46 may be required to meet the typical single-event maximum instantaneous noise standard in the residential units and up to STC 36 to meet the City and State standard of L_{dn} 45 dBA or less in areas farther from the railroad tracks.

The windows in the dwelling units and guestrooms are expected to be in the closed position to meet the required interior noise level as per CBC 1207.4. This closed window condition will need to be considered by the Mechanical Engineer in their determination of the outdoor air ventilation requirements for the dwelling units and guestrooms. Specifically, if the Mechanical Engineer determines that the ventilation code for these units requires outdoor air, then natural ventilation via open windows should not be relied upon and that an alternate means of achieving outdoor air should be provided such as through mechanical ventilation. Additionally, the alternate means for achieving outdoor air must be reviewed by the Acoustical Consultant to confirm that it does not otherwise compromise the noise reduction provided by the window and wall assembly.

The preliminary design for the project includes VTAC units to provide heating and cooling. Although the VTAC units are located in a 'closet' there may need to be special design considerations to limit the sound transfer from outdoors into the dwelling unit or guestroom. These considerations include acoustically lined ducting for supply and return air and solid core gasketed access doors and should be specified in the required detailed analysis.

Impact 4: Exterior Noise at Outdoor Space

According to the City's General Plan, there is an L_{dn} 60 dBA standard for the residential components of mixed-use developments, excluding balconies facing existing roadways. The L_{dn} 60 dBA standard is for noise sources other than aircraft or elevated roadways on sites subject to aircraft overflights or adjacent to elevated roadways. As defined in the Comprehensive Land Use Plan for San Jose International Airport, outdoor activities may be adversely affected by aircraft noise for residences.

The project's primary common use area includes an outdoor pool and is located along the south property line. This space benefits from the acoustical shielding from traffic and trains provided by the neighboring building as well as the project building. The dominant noise source at the outdoor area other than aircraft is the rooftop mechanical equipment at the neighboring building. Based on our calculations, the outdoor use space would be exposed to an L_{dn} of 60 dBA or less from non-aircraft noise sources. Our analysis included a factor for acoustical reflections, geometric spreading, and the acoustical barrier effect provided by the neighboring building.

In addition to the primary common use area discussed above, the project also features a roof deck on the 9th floor and two outdoor terraces on the 1st floor. The proposed 748-square-foot roof deck is located along the south side of the building and should have a solid 5-foot railing to achieve an outdoor noise level (excluding aircraft) of L_{dn} 60 dBA. On the 1st floor, Terrace #1 is open to the public with access on both Stockton Avenue and West Julian Street and Terrace #2 is along West Julian Street, approximately 130 feet from the train tracks. Based on our analysis, Terrace #1 would be exposed to an L_{dn} of 72 dBA and Terrace #2 would be exposed to an L_{dn} of 69 dBA. At these terraces, it is impractical to use noise barriers to reduce the non-aircraft noise exposure to L_{dn} 60 dBA or less because the barriers would need to be continuous and very tall (e.g. 12 feet) and would block the intended access to the adjacent sidewalks. Although these areas would exceed the Ldn 60 dBA goal, the project would still be consistent with the General Plan Policy EC 1-1 because "some common use areas that meet the 60 dBA DNL exterior standard will be available to all residents."

This is less than significant with Mitigation NO-2.

Mitigation NO-2

Provide a 5 foot high solid railing at the edge of the roof deck closest to the neighboring building to the south.

b) Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Impact 5: Exposure to Groundborne Vibration from Railroad

The FTA's guidance manual provides a methodology to estimate future vibration levels in a building from rail vibration sources. Factors accounted for by this procedure include building structure type, building foundations type, attenuation and dispersion of vibration energy as it propagates through a building (i.e. upper floor typically experience lower vibration levels that lower floors), amplification due to resonances of floors, walls and ceilings. These factors were applied to the measured railroad ground vibration levels to calculate the interior vibration levels in the project building. Table 5 summarizes the factors that were used and indicates that the vibration levels expected in the 2nd floor guestrooms along the side of the building closest to the tracks is – 6 VdB. overall adjustment is - between the measured ground vibration levels.

Table 5: Interior Vibration Level Factors

Factor Affecting Vibration	Adjustment
Coupling to building foundation: Large masonry building on piles	- 10 VdB
Floor-to-floor attenuation: Second Floor guest rooms	- 2 VdB per floor
Amplification due to resonances of floors	+ 6 VdB
Total Adjustment	- 6 VdB

Based on the FTA methodology, the maximum vibration levels on the 2nd floor of the building, the lowest floor level with guest rooms were calculated. These vibration levels and the expected frequency in a 24-hour period are shown in Figure 13 and Table 6. The expected frequency in a day was based on the vibration measurements. The vibration levels on the floors above the second floor will be less, as will be the vibration level at locations farther from the railroad tracks.

The comparison shown in Table 6 indicates that the predicted indoor vibration levels are less than the FTA impact criteria for "frequent events" and "occasional events" of 72 VdB and 75 VdB, respectively. The calculated vibration level for "infrequent events" is predicted to be up to 83 VdB which exceeds the impact criterion of 80 VdB. This exceedance is expected to occur three times per day. It

should be noted that the events with the highest vibration levels tend to be freight train passbys. Since the FTA criteria were developed for transit trains which have a relatively brief passby duration, the FTA suggests that when assessing vibration from freight trains it is appropriate to assess the locomotive passby separately from the long duration of the railcar passby. Table 7 shows the summary of the predicted interior freight train vibration levels based the most apparent freight train passbys during the measurements. According to the FTA it is more appropriate to use the "frequent events" criterion of 72 VdB for the long duration of the passby of freight train railcars. Table 7 shows the vibration levels from the locomotive and the railcars separately. This data indicates that the railcars exceed the 72 VdB criteria nine times per day.

The vibration levels will decrease with distance from the railroad tracks and height above the ground. Therefore, the majority of the spaces in the building would have vibration level below the impact thresholds. However, some areas close to the tracks and on the lower floors are expected to be exposed to vibration levels that exceed the FTA standards. It should be noted that the FTA criteria were developed to assess the impact of new transit systems on existing land uses. This means that the use of these criteria tend to be conservative for assessing the impact of existing rail activities on new construction where the future occupants expect to experience feelable vibration.

The vibration levels on the first floor are not expected to exceed the vibration criteria for institutional uses during passenger train passbys and the freight train locomotives.

Figure 13: Histogram of Calculated Maximum Vibration Levels Of Events Greater than 60 VdB on the 2nd Floor on a Typical Day

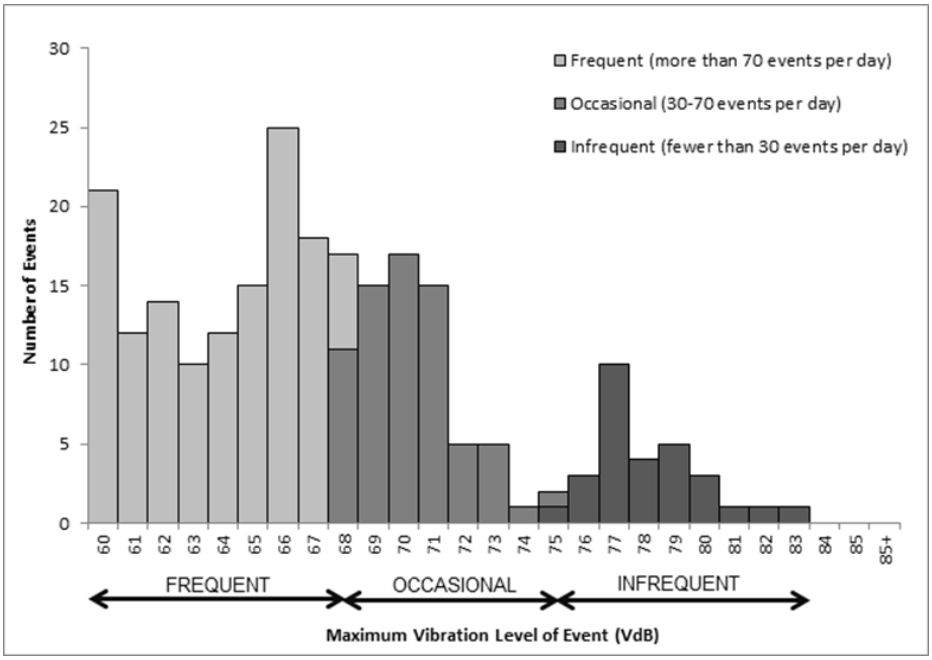


Table 6: Predicted Vibration Level Compared to FTA Impact Criteria

Impact Criterion Category	Impact Criterion Vibration Level (VdB)	Range of Predicted Vibration Levels (VdB)
Frequent Events (more than 70 events per day)	72	60 - 68
Occasional Events (30 – 70 events per day)	75	68 - 75
Infrequent Events (fewer than 30 events per day)	80	75 - 83

Table 7: Summary of Freight Train Generated Vibration Sample Levels Calculated for the 2nd Floor

Date	Time of Day	Vibration Level (VdB)		Comment
		Locomotive	Railcars	
4/23/2018	4:59 PM	77	76	---
	8:50 PM	80	68	Train stopped in front of site.
	8:57 PM	69	72	
5/22/2018	7:37 PM	81	78	---
	9:45 PM	82	81	---
	11:26 PM	80	78	With Caltrain on near track.
5/23/2018	3:35 AM	83	78	---
	1:36 PM	77	77	---
	2:27 PM	70	75	Train coming to stop near site, then going in reverse.
	2:29 PM	76	75	
	2:31 PM	73	78	---

This is less than significant with Mitigation NO-3

Mitigation NO-3

The project sponsor shall prepare a design level analysis of the railroad ground vibration levels in the project building. The study shall consider structural design features such as stiffening the floor slabs to avoid resonant frequencies below 25 Hz. If the study indicates that the FTA criteria will be exceeded the study should identify the areas of the building that are potentially affected. The owners shall disclose the potential vibration effects to residents and guests that may be affected.

Impact 6: Construction Vibration

The construction of the project is expected to generate groundborne vibration that could potentially affect nearby land uses. Table 8 presents typical vibration levels generated by various construction equipment in terms of PPV and RMS at a distance of 25 feet. Vibration generating construction activities would include demolition, excavation, grading, site preparation, paving, and building construction.

The City's General Plan Policy EC-2.3 requires new development to minimize vibration impacts to adjacent uses during demolition and construction. The policy establishes a vibration limit to minimize the potential for cosmetic damage of PPV 0.20 inch/sec for buildings of normal conventional construction and a vibration limit of 0.08 in/sec PPV for sensitive historic structures.

Vibration levels are dependent on the construction methods, soil conditions, equipment used and distance to the equipment. With the exception of the adjacent commercial building located at 250 Stockton Avenue, the nearest buildings are located more than 100 feet from the project site. Based on the FTA's methodology, vibration levels from construction equipment in Table 8 would be attenuated to a PPV of less than 0.20 inch/sec at a distance of 100 feet. Since this level is below the City's potential for cosmetic damage threshold of 0.20 inch/sec, this is considered less than significant.

The adjacent building located at 250 Stockton Avenue shares a common property line with the project site and is currently occupied by a data center business. In addition to the potential for cosmetic damage to building, it is conceivable that groundborne vibration could interfere with the operation of the computer and data storage equipment. According to the FTA's guidance manual, a vibration level of 78 VdB is the threshold for assessing vibration impacts on "computer equipment." Based on the FTA's methodology of converting between PPV and RMS, the vibration criteria of 78 VdB corresponds to approximately PPV 0.032 inch/sec. Many of the construction vibration sources listed in Table 8 generate a level greater than this threshold at a distance of 25 feet. These sources include a large bulldozer, drilling and a vibratory roller.

This is potentially significant. With the implementation of NO-4, this is considered less than significant with mitigation.

The Julian Street Underpass is addressed in the Cultural Resourses section of the project's CEQA document and for the purposes of this noise and vibration assessment is considered a historic resource. According to the Cultural Resources assessment,

> *"The design of the West Julian Street Underpass is typical of a depression-era WPA-era concrete structure and is readily recognizable as an historic structure by its materials use, the arcade design, and the original medallion. Character-defining features include the unpainted concrete formwork, extensive use of sectioned concrete railings with lancet arched openings on both sides of the roadway and along both sides of the bridge, the concrete stairways, cantilevered bents, shouldered arches under the bridge that separate the roadway and walkway, and Southern Pacific emblem on both sides of the bridge. The bridge and underpass appear to have a high level of integrity to its original design and construction."*

According to the City's General Plan policy, the vibration threshold for historic structures is a PPV of 0.08 in/sec. Many of the construction vibration sources listed in Table 8 generate a level greater than this threshold at a distance of 25 feet. These sources include a large bulldozer, drilling and a vibratory roller. It should be noted that the Underpass, particularly the railroad bridge, is currently exposed to frequent vibration from railroad trains and heavy trucks. The vibration levels generated by freight and passenger trains are likely greater than the General Plan's vibration threshold for historic structures. However, since construction grading and foundation work would be as close as 14 feet from the underpass structure, there is a potential for construction activities to exceed the thresholds for potential cosmetic damage to historic structures.

This is potentially significant. With the implementation of NO-4, this is considered less than significant with mitigation.

Table 8: Vibration Source Levels for Construction Equipment

Table 12-2. Vibration Source Levels for Construction Equipment (From measured data.[7,8,9,10])			
Equipment		**PPV at 25 ft (in/sec)**	**Approximate L_v† at 25 ft**
Pile Driver (impact)	upper range	1.518	112
	typical	0.644	104
Pile Driver (sonic)	upper range	0.734	105
	typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58
† RMS velocity in decibels (VdB) re 1 micro-inch/second			

Mitigation Measure NO-4

The project applicant shall submit a Construction Vibration Monitoring and Control Plan (Plan) prepared by an acoustical/vibration consultant, structural engineer or other appropriately qualified professional such as a historic preservation specialist for City review and approval.

The Plan shall

- Establish preconstruction baseline vibration conditions
- Identify threshold levels of ground vibration that could damage the historic structure at the Julian Street Underpass or damage or substantially interfere with activities at the 250 Stockton Street (data center). For example, General Plan Policy EC-2.1 includes, a vibration limit of 0.08 in/sec PPV to minimize the potential for cosmetic damage to historic structures and 0.20 in/sec PPV to minimize the potential for cosmetic damage at buildings of normal conventional construction. The final determination of the thresholds at which ground vibration would

significantly affect data center operations shall be based on equipment manufacturer's specifications for the actual data center equipment or other appropriate guidelines such as those published by ASHRAE[6]. Therefore, the vibration thresholds established in the Plan may differ from the General Plan or ASHRAE guidelines if the analysis conducted by the Plan preparers indicates that higher vibration levels are acceptable based on prior experience or because the structures of concern are already exposed to high vibration levels due to other sources such as railroad and roadway activity.

- Recommend means and methods of construction (to be implemented by the contractor) to limit vibration levels so they do not exceed the adopted thresholds.

- Include a protocol for monitoring vibration levels at each structure and avoid, to the extent possible, construction activities that are predicted to generate vibration levels in excess of the thresholds.

- Establish protocols for responding to the monitored vibration levels when the thresholds are exceeded. This would include stopping work and inspecting structures for damage and/or operational intereference. If there are regular exceedences of the thresholds without damage or operational interference than it may be appropriate to adjust the threshold in consultation with the Plan preparers.

- Baseline and construction period inspections of the Julian Street Underpass historic features shall be conducted as per the requirements of the Cultural Resources mitigation measures.

When Required: Prior to construction

Initial Approval: PBCE *(or another appropriate City of San Jose department)*

Monitoring/Inspection: PBCE *(or another appropriate City of San Jose department)*

c) *Would the project result in a substantial permanent increase in ambient noise levels in* the project vicinity above levels existing without the project?

[6] American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., *Structural and Vibration Guidelines for Datacom Equipment Centers - ASHRAE Datacom Series* -, 2007. According to Appendix D Vibration amplitudes at 0.07g (peak acceleration) are most likely the upper limit of vibration at the base of the datacom equipment. This level can be considered normal data center vibration and most likely will not induce any functional degradation to datacom equipment.

Impact 7: Project-Generated Traffic Noise

Traffic data from the project's traffic study were used to calculate the increase in traffic noise due to the project. The traffic study data included turning movement counts for the existing condition, the existing plus project condition, the background condition, and the background plus project conditions for the surrounding intersections. Roadway traffic volumes were calculated using these turning movement counts and compared to the existing condition. As discussed in the previous section, traffic noise is calculated to increase by 1 dBA or less in the future along West Julian Street and Stockton Avenue. This is considered a less than significant impact.

Impact 8: Project-Generated Operational Noise

The proposed project building is expected to have mechanical equipment generally associated with building ventilation/air-conditioning units, ventilation fans, but could also include an emergency engine-generator. Much of the equipment would likely be located on the rooftops of the proposed buildings, or at-grade next to the buildings. However, at the time of this report, the details and locations of the mechanical equipment are not known and therefore, calculations of specific noise levels at surrounding uses cannot be made.

The large commercial systems that are often used in this type of building can generate high noise levels and therefore, they would have the potential to increase the noise levels at nearby noise sensitive receptors. Therefore, noise from mechanical equipment is considered a potentially significant impact. However, with the implementation of Mitigation Measure NO-3, this impact would be reduced to a less than significant level. This is a less than significant impact with mitigation.

With the implementation of NO-5, this is considered less than significant with mitigation.

Mitigation NO-5

Analysis of noise from the project's mechanical equipment must be conducted to determine the noise reduction measures needed, if any, to meet the City of San Jose Municipal Code Zoning Ordinance Noise Standards (Table 1).

d) Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Impact 9: Temporary Construction Noise

The specifics of the project construction are not known at this time. It is likely that the construction equipment will include excavators, backhoes, cranes, graders, trenchers, dump trucks, loaders, compactors, bulldozers, pavers, concrete trucks, air compressors, pneumatic equipment, roller compaction equipment, hand compaction equipment and other heavy machinery. The foundation is anticipated to a concrete mat slab with concrete shear walls. Soil-cement columns or drilled displacement piles may be utilized below the foundation. The shoring/retaining wall system may be designed as soil mixed walls which are constructed in-situ using specialized auger equipment. Construction is not expected to require pile driving. The overall construction period is expected to be 28 months.

Table 7 presents typical construction equipment noise levels at a reference distance of 50 feet. The noisier activities tend to occur during the grading and foundation phases of construction. The later construction phases of the building would generally generate lower noise levels when the construction activities occur indoors.

Table 7: Typical Construction Equipment Noise Levels

Equipment	L_{max} (dBA) at 50 feet
Air Compressor	81
Backhoe	80
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	85
Paver	89
Pneumatic Tool	85
Pump	76
Roller	74
Saw	76
Scraper	89
Truck	88

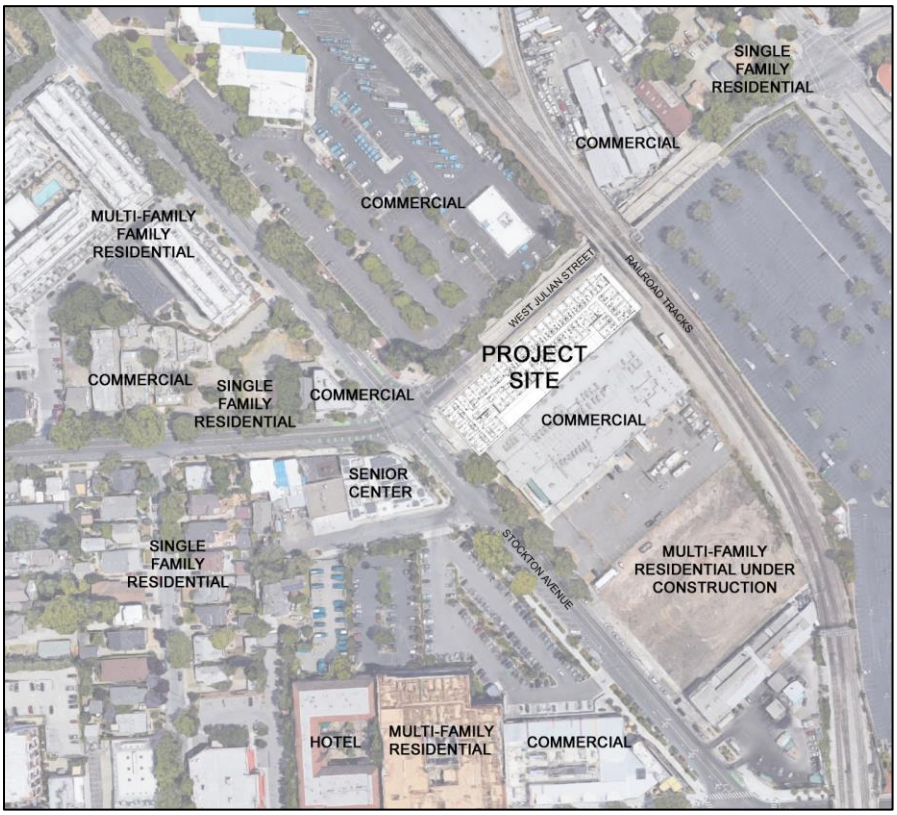
Source: Federal Transit Administration Manual, Construction Equipment Noise Emission Levels, 2006

Based on a typical construction equipment noise source level of 85 dBA at 50 feet, the calculated noise levels at the nearest surrounding land uses are shown in Table 8. Figure 14 shows the surrounding land uses. Two distances were used to calculate a noise level range at the receiving land use based on the distance between the receiver and the project building footprint. A distance of 10 feet is used when the project building extends up to the property line. These noise levels will temporarily increase noise levels at the surrounding land uses.

Table 8: Typical Construction Equipment Noise Levels at Receivers

Receiver	Ref. Typical Construction Equipment Level, dBA	Ref. Dist. ft	Distance to Receiver, ft	Calculated Typical Noise Level, dBA
Senior care to the west	85	50	105 to 465	66 to 79
Multi-family residential homes to the northwest	85	50	365 to 626	63 to 68
commercial to the northeast	85	50	158 to 526	65 to 75
single family residential homes to the east	85	50	561 to 913	60 to 64
commercial to the south	85	50	10 to 100	79 to 99
Multi-family residential homes to the southwest	85	50	378 to 732	62 to 67

Figure 14: Surrounding Land Uses



Standard building construction would typically reduce exterior noise levels shown in Table 8 by 25 decibels indoors. For the neighboring commercial building to the south, the acoustic attenuation provided by the exterior wall assembly is expected to be greater than 25 decibels since there are no windows facing the project site.

This impact is less than significant with mitigation Measure NO-6.

Mitigation Measure NO-6

In order to minimize disruption and potential annoyance during construction, the following is recommended: 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.

- Construction activities, including the maintenance and warming of equipment, shall be limited to Monday through Saturday, and non-City holidays, between the hours of 7:00 AM and 7:00 PM except otherwise approved by the City.
- All construction equipment shall be equipped with mufflers and sound control devices (e.g., intake silencers and noise shrouds) that are in good condition and appropriate for the equipment.
- Maintain all construction equipment to minimize noise emissions.
- Stationary equipment shall be located on the site so as to maintain the greatest possible distance to the sensitive receptors.
- Unnecessary idling of internal combustion engines should be strictly prohibited.
- Residential uses within 500 feet and commercial or office uses within 200 feet of the project site shall be notified of the construction schedule in writing.
- The construction contractor shall provide the name and telephone number an on-site construction liaison. In the event that construction noise is intrusive to the community, the construction liaison shall investigate the source of the noise and require that reasonable measures be implemented to correct the problem

e) For a project located within 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, would the project expose people residing or working in the project area to excessive noise levels?

Impact 10: San Jose International Airport Noise

The project is located within two miles of the Norman Y. Mineta San Jose International Airport. According to the Santa Clara County Airport Land Use Commission's adopted Comprehensive Land Use Plan, the project site is located outside the future aircraft noise contour of CNEL 65 dB. This is considered less than significant.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. The project is not located within the vicinity of a private airstrip.

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