

APPENDIX B
ENVIRONMENTAL NOISE
ASSESSMENT

INITIAL ENVIRONMENTAL NOISE STUDY FOR:

Proposed Homewood Suites

San Jose, CA

RGDL Project #: 13-095

PREPARED FOR:

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DATE:

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1. Introduction

The proposed hotel project consists of 141 guest rooms in a 4 story building. The site is located at the intersection of State Route 237 and North First Street. The project site is currently exposed to noise from traffic on State Route 237 and North First Street.

This study addresses the existing and future noise with respect to the requirements of the State of California Building Code and the City of San Jose General Plan. Preliminary recommendations for sound-rated construction to meet the State of California Building Code are presented, but additional analysis will be required during the detailed architectural design phase to provide specific recommendations.

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.

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.

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.

3. Acoustical Criteria

3.1. State of California

The State of California Building Code (CBC Section 1207) requires that indoor noise levels in new multi-family housing be controlled to a DNL of 45 dBA if outdoor levels are in excess of a DNL of 60 dBA. Furthermore, if windows must be in the closed position to meet the requirement, then the building design must also specify a ventilation or air-conditioning system to provide a habitable interior environment. The ventilation system must not compromise the noise reduction provided by the façade.

3.2. San Jose

The Noise Element of San Jose General Plan (Envision 2040) has policy statements to minimize the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies. The following City policy addresses community noise levels and land use compatibility.

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

Interior Noise Levels

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

Exterior Noise Levels

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

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

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 Lmax in bedrooms and 55 dBA Lmax in other rooms.

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

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

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

Normally Acceptable:

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

Conditionally Acceptable:

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

Unacceptable:

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

4. Noise Environment

The major noise sources affecting the project site are traffic on State Route 237 and North First Street. Aircraft activity from San Jose International Airport does not contribute significantly to noise at the site. Existing noise levels were quantified by a noise measurement program. Future noise levels are based on calculations using future traffic information.

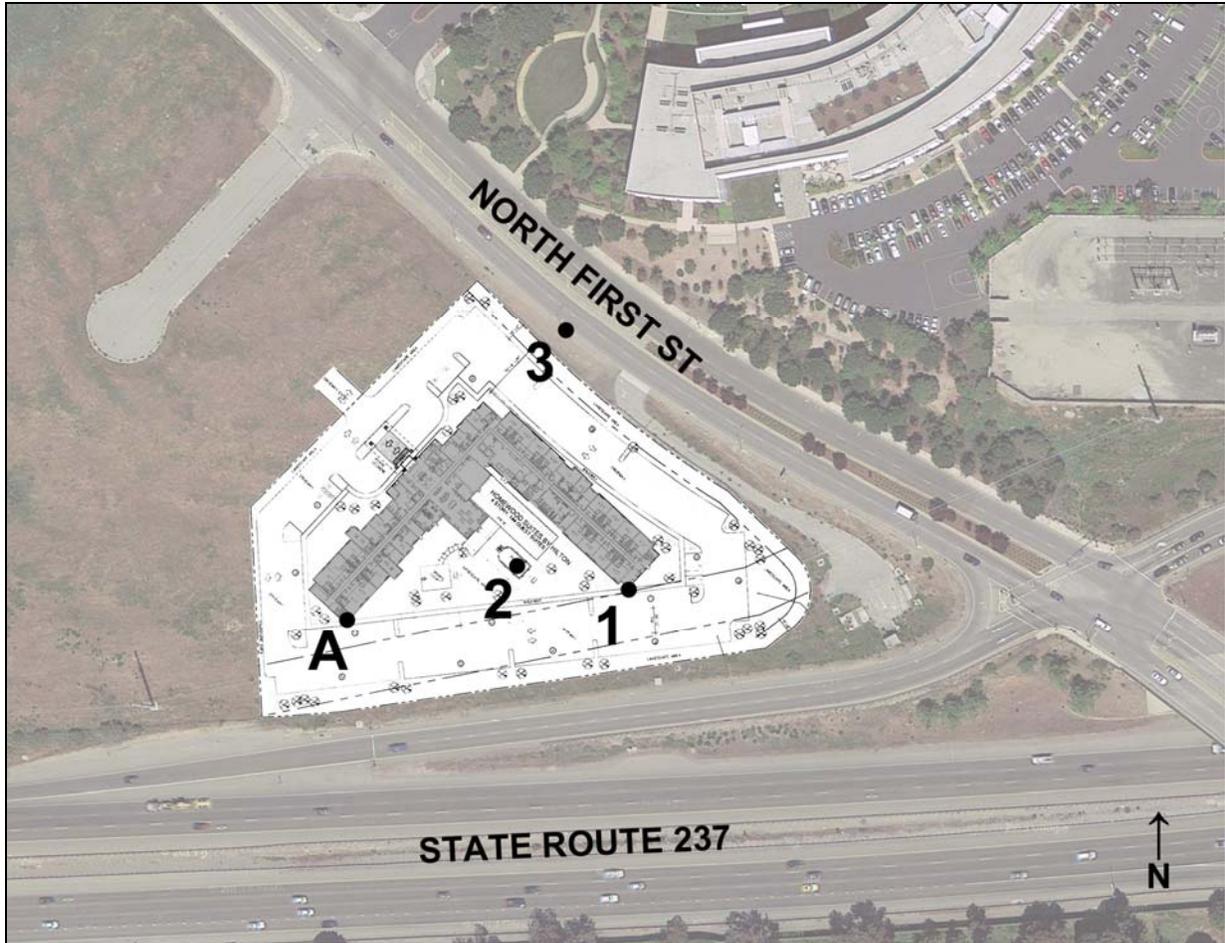
4.1. Noise Measurements

The noise measurements consisted of one continuous 44-hour noise measurement (Location A) and four short-term (15-minute) attended noise measurements at three locations (Locations 1 – 3). The noise measurement locations are shown in Figure 1.

Figure 2 plots the hourly average noise level (L_{eq}) and maximum noise level (L_{max}) measured for each 15-minute interval at Location A. The DNL measured at Location A was 76 dBA. The loudest events were buses and large trucks. The short term measurement results are summarized in Table 1.

Locations 1 and 2 represent first floor locations at the building or in the pool area. Location 3 was chosen to quantify the noise from traffic on North First Street. The location is relatively close to the roadway in order to minimize the influence of the freeway noise. Since the setback of the building is farther from the roadway than the measurement, the DNL at the façade is 6 dBA less than at the measurement location, i.e. 71 dBA.

Figure 1: Noise Measurement Locations



**Figure 2: Long-Term Noise Measurement Results at Location A
239' from centerline of SR 237, 24' above ground**

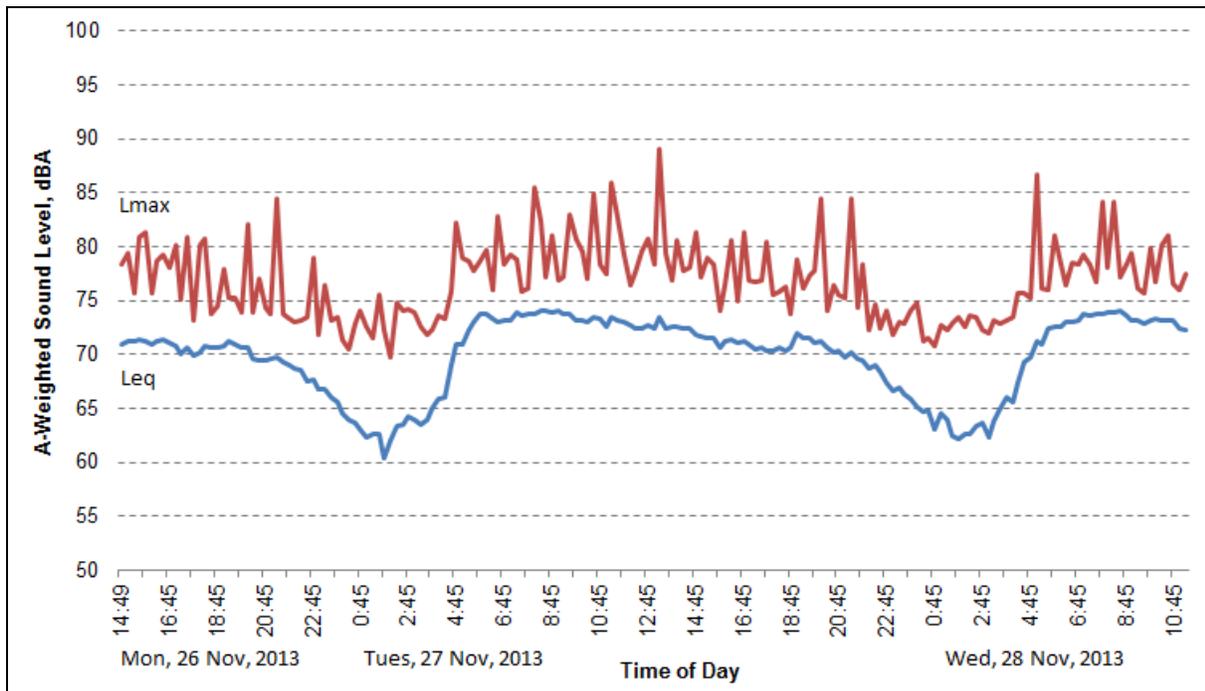


Table 1: Short-Term Noise Measurement Results

Location	Date/Time	Leq	Lmax	L10	L50	L90	DNL*
1 State Route 237 Setback of Proposed Building 5' Above Ground	11/25/2013 15:01-15:16	66	70	67	66	64	70
2 SR 237 Setback of Proposed Pool 5' Above Ground	11/25/2013 15:21-15:36	66	71	68	66	64	69**
	11/27/2013 11:09-11:24	62	68	65	62	59	
3 North First Street 41' from Center of Road 5' Above Ground	11/25/2013 15:48-16:03	72	85	76	69	64	77

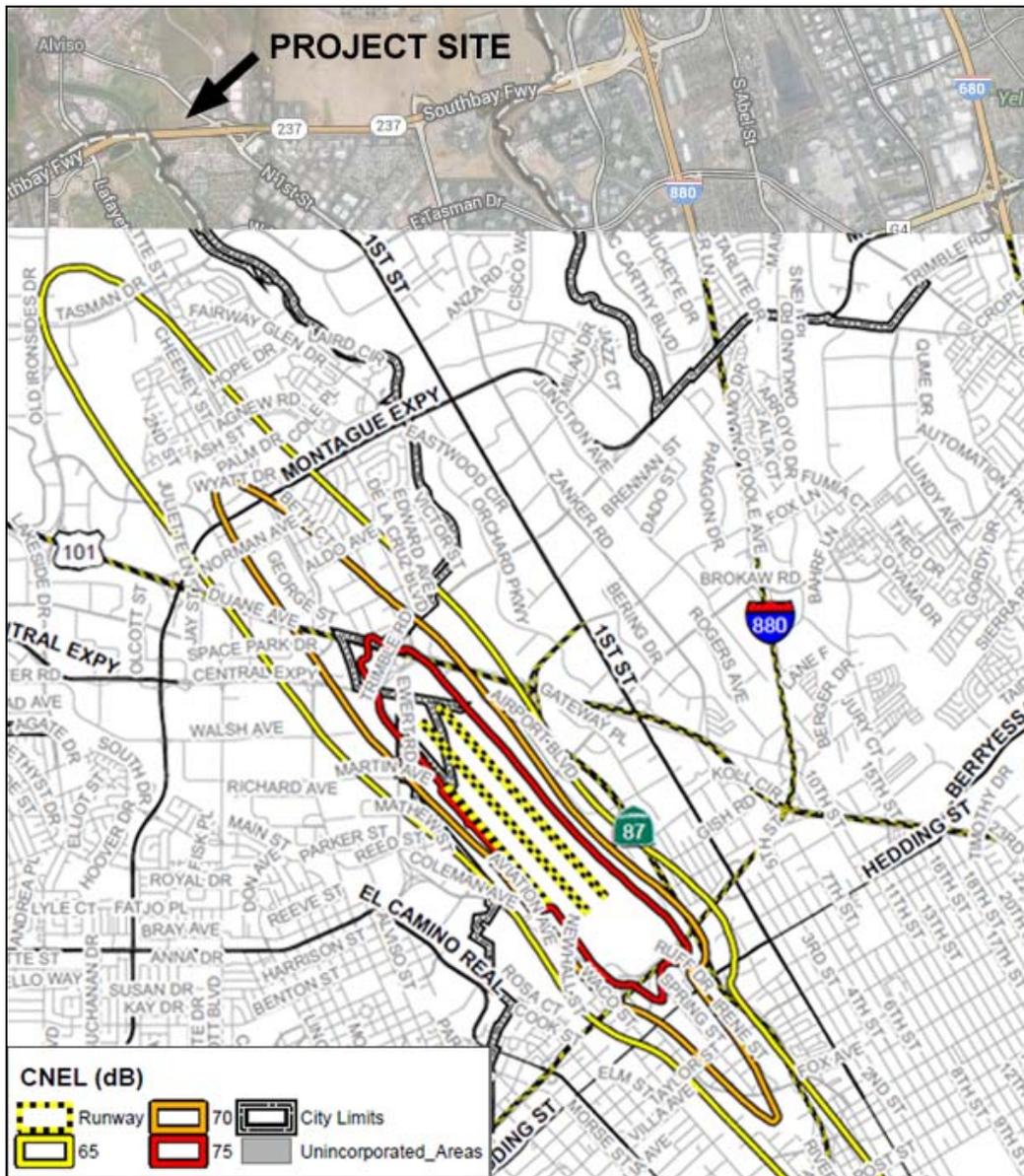
* DNL based on correlation with simultaneous measurement at long-term measurement location.

** DNL average based on two site measurements.

4.2. Airport Noise Contours

Figure 3 shows the projected airport noise contours near the project site. The project site is outside the CNEL 65 dBA contour. Based on the contours the project's noise exposure from aircraft is likely less than CNEL 60 dBA. Since the aircraft noise exposure is less than the traffic noise exposure, it is considered a minor noise source. The CNEL and the DNL are typically within 1 dBA of each other.

Figure 3: 2022 Aircraft Noise Contours – Mineta San Jose International Airport



Source: Comprehensive Land Use Plan Santa Clara County, Norman Y. Mineta San Jose International Airport, Adopted by Santa Clara County Airport Land Use Commission, May 25, 2011.

4.3. Future Noise Levels

The California Building Code requires that future noise conditions be considered when determining a building's sound attenuation requirements. To address the potential future increases in traffic noise, traffic volume projections contained in the San Jose Downtown Strategy 2000 EIR were used. These projections show a future increase in noise levels due to traffic on State Road 237, west of Interstate 880 of less than 1 dBA.

5. Analysis/Recommendations

Based on the noise measurements, the DNL at the upper floors of the proposed hotel facing State Road 237 will be 76 dBA. This noise level accounts for the future increase in traffic volumes and the distance of the hotel from SR 237. A DNL of 76 dBA is considered "unacceptable" by the guidelines of the San Jose General Plan, though this value only exceeds the "conditionally acceptable" range by 1 dBA. According to the guidelines for "unacceptable", "New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies."

The State of California and the City of San Jose require that interior noise levels in new hotels be reduced to a DNL of 45 dBA or less in habitable rooms. Therefore, the building will need to provide noise reduction of up to 31 dBA to meet this requirement.

Based on the preliminary project footprint and layout provided by Architectural Dimensions, we calculate that windows with an STC of up to 36 will be required. Rooms on the first floor and those facing away from SR 237 will require less noise control i.e., windows with lower STC ratings. This preliminary calculation assumes that exterior walls are constructed with stucco (7/8-inch cement plaster). If the exterior wall is wood or cement board siding (typically less noise reduction than stucco) then the window and/or wall may need to be acoustically upgraded to achieve the required noise reduction.

Since the windows will need to be in the closed position to meet the required interior noise level, the State Code requires that ventilation or air-conditioning systems be included in the design to provide a habitable environment. This applies to all of the guest rooms in the project. This ventilation requirement should be reviewed and addressed by the project's mechanical designer. It should be noted that the ventilation system must not compromise the sound insulation of the exterior façade. This requirement could rule out certain ventilation systems, such as "through-the-wall" air-conditioners. If a through-the-wall air-conditioner can be shown to provide adequate sound attenuation, it is likely that the window STC ratings will need to be increased to make up for the sound transfer through the air-conditioner.

The specific recommendations for sound-rated windows should be refined as the project design progresses.

Based on the noise measurements, the noise level in the pool area is DNL 69 dBA. This is greater than the City's objective of DNL 60 dBA for exterior areas in residential and most institutional land uses. If the pool area can not be relocated so that it is behind the building with respect to the freeway, a noise barrier can be used to reduce the noise levels.

Our preliminary calculations indicate that a 10 foot tall noise barrier around the pool area would be necessary to reduce the DNL to 60 dBA. A shorter wall, such as 7 to 8 feet tall would provide less reduction but could achieve a DNL of 65 dBA which is acceptable for *outdoor recreation, neighborhood parks and playgrounds* according to the City's guidelines. The barrier should extend far enough around the sides of the pool area to block the line-of-sight to the roadway.

The exact height, length and location of any proposed pool noise barrier should be refined as the project design progresses.

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