Oakland Road Rotten Robbie

San Jose, California

September 3, 2017

jcb Project # 2017-173

Prepared for:

Attn:
Mr. JR Beard
LHB & Associates
867 Pacific Street, Suite 120
San Luis Obispo, CA   93401

Prepared by:

j.c. brennan & associates, Inc.

Jim Brennan, INCE
President
Member, Institute of Noise Control Engineering (INCE)

INTRODUCTION

This report provides an analysis of potential noise impacts due to the proposed Rotten Robbie project, in the City of San Jose. The project is located at the northeast corner of Commercial Street and Oakland Road. The project is for a General Plan Land Use / Transportation Diagram Amendment from (HI) Heavy Industrial to (CIC) Combined Industrial Commercial to allow the demolition of existing facilities on site and construction an approximately 3,750 square feet one-story convenience store, 3,432 square feet auto fueling dispenser canopy, 4,813 square feet card lock fueling dispensers canopy. The project proposes approximately 6 fuel position for auto dispenser (12 pumps) and 12 (24 pumps) fuel position for cardlock fueling dispenser. Other improvements include parking lot, landscape upgrades, and installation of a covered trash enclosure. Additionally, the off-sale of alcohol and 24 hour operation is proposed as part of the project. The project site also includes a 7-foot tall masonry sound wall along a portion of the north and east property lines. The sound wall is connected to the existing sound wall between the project site and the adjacent Trailer Tel RV Park. Figure 1 shows the project location and surround land uses. the project also proposes a sound wall located at the north property line adjacent to the Trailer Tel RV Park. Figure 2 shows the proposed site plan.

Nearby noise-sensitive uses include the Trailer Tel RV Park located adjacent to the project north property line, a single family residence located approximately 250-feet to the northwest (across Oakland Road), and the White Way Motel is located approximately 165-feet from the project site at the northwest corner of Commercial Street and Oakland Road.

ENVIRONMENTAL SETTING

BACKGROUND INFORMATION ON NOISE

Fundamentals of Acoustics

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective: one person's music is another's headache.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

The decibel scale is logarithmic, not linear. In other words, two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70 dBA sound is half as loud as an 80 dBA sound, and twice as loud as a 60 dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, DNL as it is commonly referred to, and shows very good correlation with community response to noise.

The day/night average level DNL is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because DNL represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 1 lists several examples of the noise levels associated with common situations. Appendix A provides a summary of acoustical terms used in this report.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference;
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

○ Short-term Noise Monitoring Sites

△ Continuous 24-hour Noise Monitoring Site

Figure 1

Project Site Area / Noise Measurement Sites

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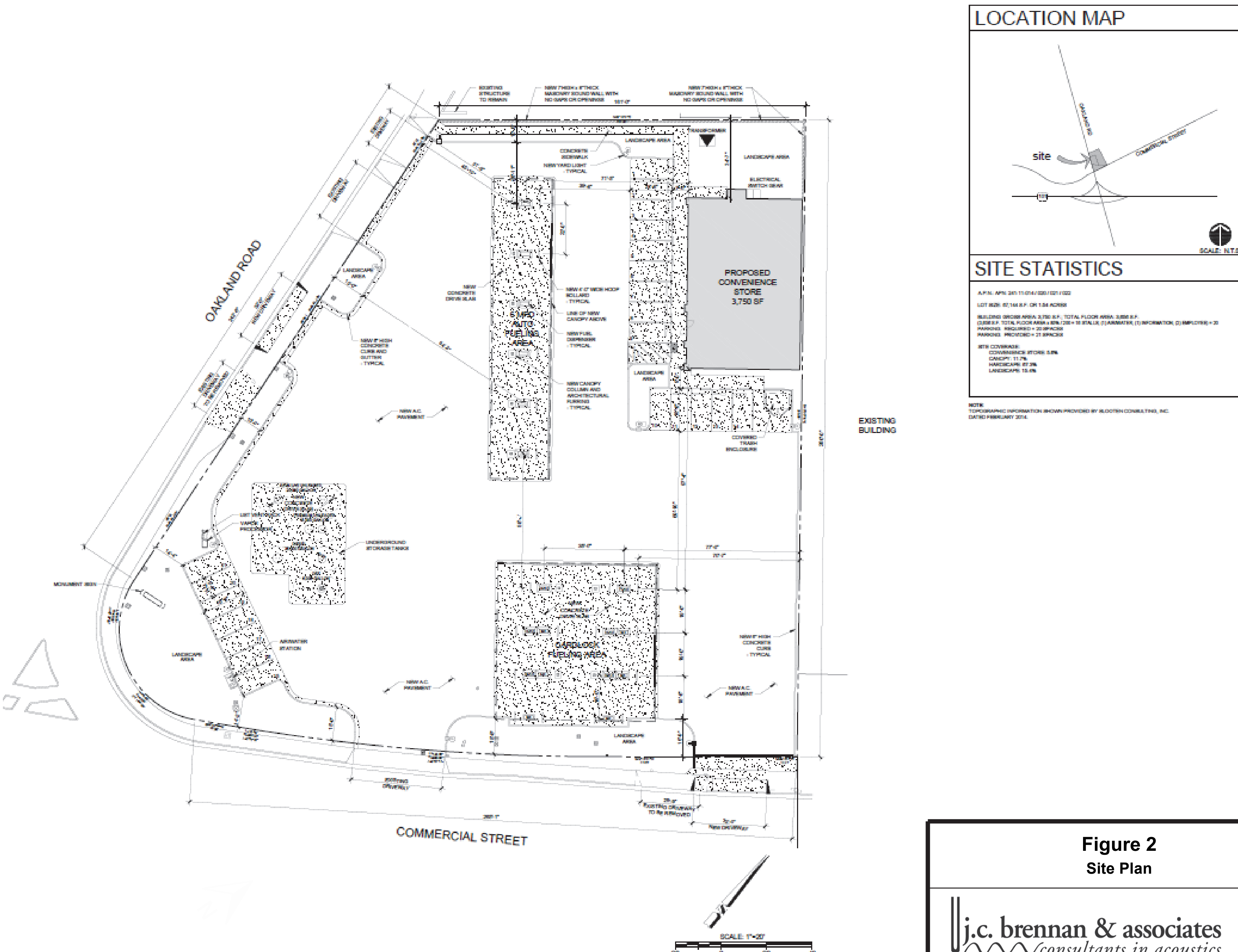

Figure 2

Site Plan

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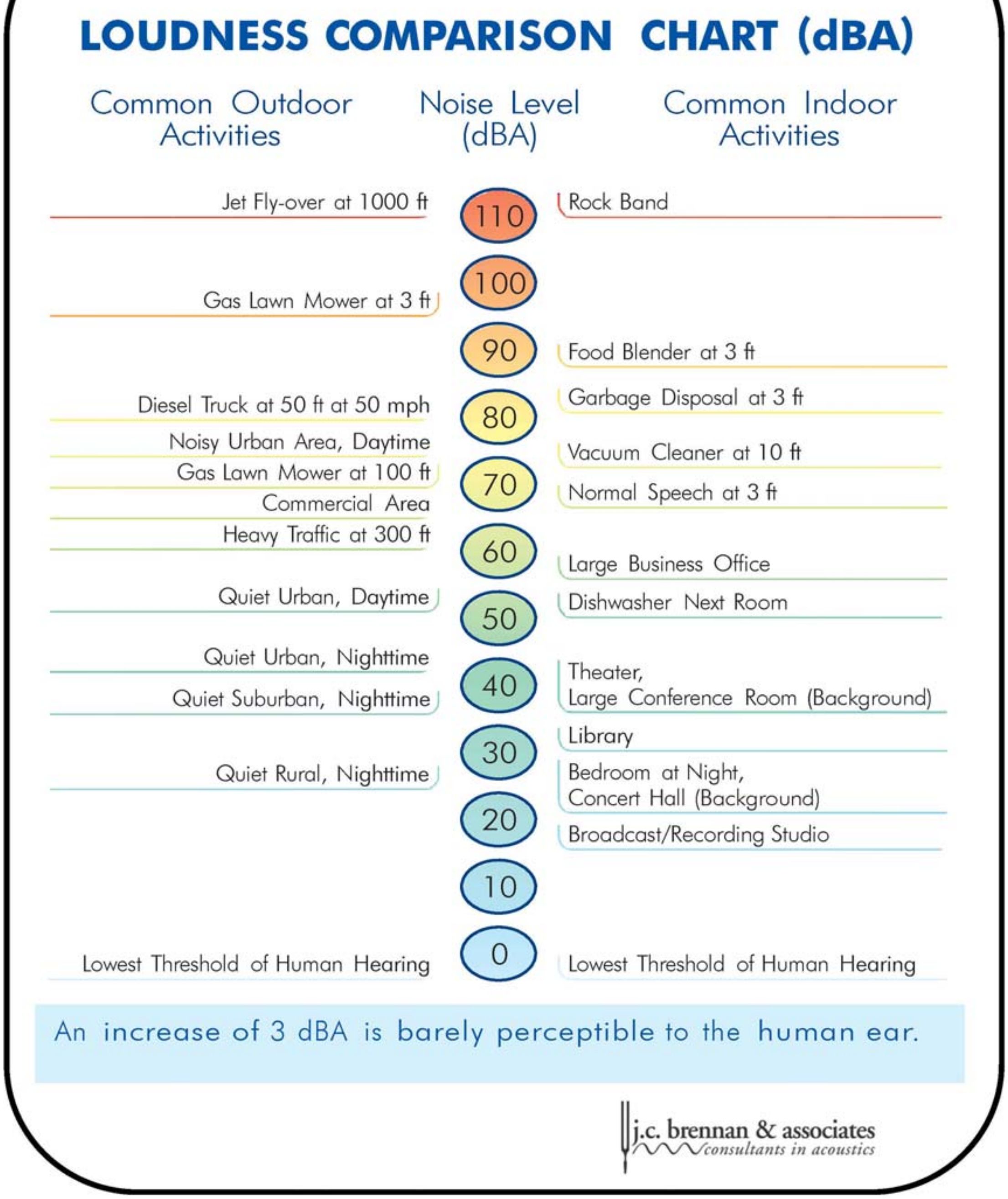
Table 1


LOUDNESS COMPARISON CHART (dBA)
Common Outdoor Activities
Noise Level (dBA)
Common Indoor Activities
Jet Fly-over at 1000 ft
110
Rock Band
100
Gas Lawn Mower at 3 ft
90
Food Blender at 3 ft
Diesel Truck at 50 ft at 50 mph
80
Garbage Disposal at 3 ft
Noisy Urban Area, Daytime
Vacuum Cleaner at 10 ft
Gas Lawn Mower at 100 ft
70
Normal Speech at 3 ft
Commercial Area
Heavy Traffic at 300 ft
60
Large Business Office
Quiet Urban, Daytime
50
Dishwasher Next Room
Quiet Urban, Nighttime
40
Theater, Large Conference Room (Background)
Quiet Suburban, Nighttime
Library
30
Quiet Rural, Nighttime
Bedroom at Night, Concert Hall (Background)
20
Broadcast/Recording Studio
10
Lowest Threshold of Human Hearing
0
Lowest Threshold of Human Hearing
An increase of 3 dBA is barely perceptible to the human ear.
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REGULATORY CONTEXT

City of San Jose 2040 General Plan

The following are policies and criteria contained in the 2040 Vision Plan which are relevant to the project.

Policy 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 DNL. Include appropriate site and building design, building construction and noise attenuation techniques in new development to meet this standard.

<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 as shown in Table EC-1 (of the General Plan) (Table 2 of this document). The acceptable exterior noise level objective is established for the City, except in environs of the San Jose 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 2
City of San Jose Community Noise Land Use Compatibility Table

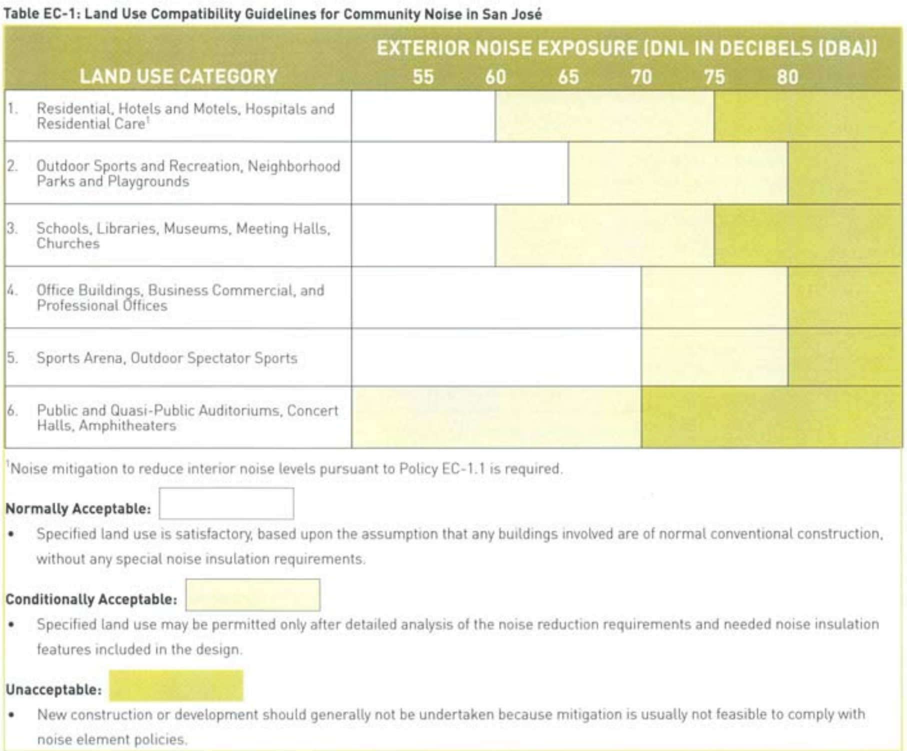


Table EC-1: Land Use Compatibility Guidelines for Community Noise in San José

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.

Policy 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 impact 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.*

Policy 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.

Policy 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.

Policy 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.

Policy EC-1.11

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

Policy 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 CONDITIONS

Sources of ambient noise in the project vicinity include roadway traffic on Oakland Road and Commercial Street, some light industrial uses adjacent to the site, and to a lesser extent, distant aircraft noise from the San Jose Airport.

EXISTING AMBIENT NOISE LEVELS

To generally quantify existing ambient noise levels in the project vicinity, continuous (24-hour) and short-term ambient noise measurements were conducted at various locations around the project site. The ambient noise measurement locations are shown on Figure 1.

Larson Davis Laboratories (LDL) Model 820 and 824 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

The sound level meters were programmed to record the hourly maximum, hourly average, and other statistical noise levels at each site during the survey. The maximum value, denoted L_{max}, represents the highest noise level measured. The average value, denoted L_{eq}, represents the energy average of all of the noise received by the sound level meter microphone during the monitoring period, and the L50 and L90 noise levels represent the sound levels exceeded 50% of the time and 90% of the time, respectively. Table 2 shows the summary of the noise measurement data. Appendix B graphically shows the continuous 24-hour and short-term measurement results.

TABLE 2
SUMMARY OF EXISTING BACKGROUND NOISE MEASUREMENT DATA

Site	Date	Measured Noise Levels, dB						
		DNL	Daytime (7am-10pm)			Nighttime (10pm-7am)		
			L_{eq}	L_{max}	L_{50}	L_{eq}	L_{max}	L_{50}
A	Feb. 14-15, 2017	61 dB	58	70	58	54	65	53
ST-1	Feb. 14, 2017	NA	57	63	49	@ 10:00 a.m.		
	Feb. 15, 2017		60	66	54	@ 1:00 p.m.		
ST-2	Feb. 14, 2017	NA	65	76	56	@10:30 a.m.		
	Feb. 15, 2017		65	76	56	@1:30 p.m.		

Source: j.c. brennan & associates, Inc., 2017

EXISTING TRAFFIC NOISE LEVELS

As a means of determining the background noise levels due to roadway traffic, j.c. brennan & associates, Inc. utilized traffic volumes published by the City of San Jose (City of San Jose, ADT Traffic Volume Nodes). The traffic volumes are used as direct inputs to the Federal Highway Administration (FHWA RD77-108) Traffic Noise Prediction Model. The model is based upon the Calveno reference noise factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. Table 3 shows the results of the predicted traffic noise levels. Appendix C provides the inputs and calculation results.

TABLE 3
TRAFFIC NOISE LEVELS AND DISTANCES TO CONTOURS

Roadway	Segment	DNL @ 50-feet	Distance to Contours		
			70 dBA	65 dBA	60 dBA
Oakland Road	Adjacent to Project Site	73 dBA	75-feet	161-feet	347-feet
Commercial Street	Adjacent to Project Site	67 dBA	33-feet	70-feet	151-feet

Notes: Distances to traffic noise contours are measured in feet from the centerlines of the roadways.

Source: FHWA-RD-77-108 with inputs from City of San Jose and j.c. brennan & associates, Inc. 2017.

ANALYSIS

Roadway Noise Levels

A traffic report was not available at the time that the noise analysis was prepared, therefore, project-related increases in traffic noise could not be conducted in detail. However, existing traffic volumes on Oakland Road are 39,381 vehicles per day. Existing traffic volumes along Commercial Street are 23,000 vehicles per day. Assuming that the project increased traffic along the roadways by 10% (3,939 ADT on Oakland Road, and 2,300 ADT on Commercial Street), the overall increase in traffic noise would be less than 0.5 dB DNL. This would not be a significant increase in noise levels.

On-site Fueling and Parking Lot Noise Levels

The ITE trip generation rate for a service station with a convenience store is 164 daily trips / fueling pump. Using this trip generation rate, there would be 5,904 daily trips, based upon the 36 pumps associated with the proposed Rotten Robbie project. Assuming a conservative 10% peak hour factor, there would be 590 peak hour trips.

As a means of determining the noise levels due to people arriving and departing from the gas station and mini market, j.c. brennan & associates, Inc., utilized noise level data collected for previous parking lot studies. A typical SEL due to automobile arrivals/departures, including car doors slamming and people conversing is approximately 71 dB, at a distance of 50 feet. Based upon the trip generation data described above, the gas station and mini market noise levels were determined using the following formulas.

$$DNL = 71 + 10\log(Neq) - 49.4, \text{ and}$$

$$\text{Peak Hour } L_{eq} = 71 + 10\log(Neq) - 35.6, \text{ where:}$$

71 is the mean Sound Exposure Level (SEL) for an automobile operation, Neq is the equivalent number of parking lot operations in a given 24-hours, N is the number of parking lot operations in a peak hour, 49.4 is 10 times the logarithm of the number seconds in a 24-hour period, and 35.6 is 10 times the logarithm of the number of seconds in an hour.

It is important to note that the Neq applies a penalty of ten times the number of operations which occur during the nighttime period (10 p.m. - 7 a.m.).

Using the equations and operations data described above, the predicted noise levels associated with the gas station use is 63 dB DNL, and 63 dB Leq, at a reference distance of 50 feet. Based upon the distance to the nearest residential use (Trailer Tel RV Park) from the center of the gas pump area (97 feet), the predicted noise levels associated the gas station operations and parking lot is 57 dB DNL / Leq. Therefore, the project would exceed the 55 dB DNL standard at the property line to the north.

A barrier analysis was conducted to determine if the proposed 7-foot tall masonry wall would reduce noise levels to within the 55 dB DNL standard. The results indicate that the barrier would reduce overall noise levels to 51 dBA DNL, and would comply with the City of San Jose noise level standard.

San Jose Airport Noise Levels

Based upon extensive noise monitoring and noise contour analyses which has been conducted for the San Jose International Airport Master Plan, the project site is located outside of the 65 dBA DNL contour. Figure 3 shows the 2027 San Jose International Airport noise contours, and the location of the project site.

Overall Rotten Robbie Exterior Noise Levels

As a means of determining the typical overall noise levels associated with the Rotten Robbie project site, j.c. brennan & associates, Inc. conducted noise level measurements of a similar facility in Penryn, California. The site is located at the west-bound Interstate 80 / Penryn Road exit. That facility is a Union 76 gas station which includes a 4,000 square foot convenience store, 5-island (20 fueling pumps), truck/RV canopy with 6 fueling pumps and a car wash.

Noise measurements were conducted for a period of 4 hours on February 26th and 27th, 2017. Noise measurements were conducted at two locations, which included the center of the facility, and near one of the entrance/exits of the facility. Figure 4 shows an aerial of the Union 76 facility and the noise measurement locations. Table 4 shows the results of the noise measurements.

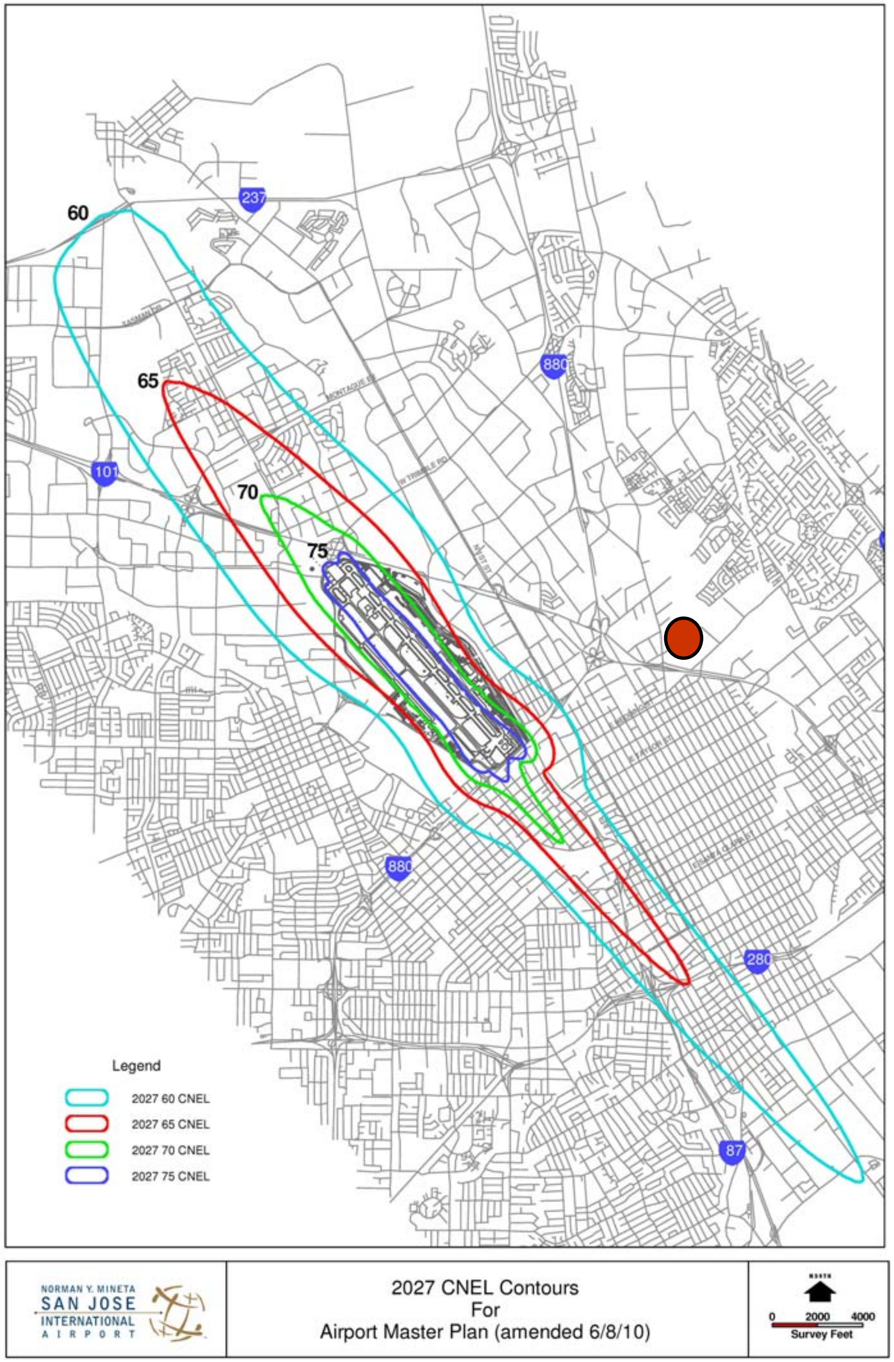
TABLE 4
MEASURED PENRYN ROAD UNION 76
GAS STATION / CONVENIENCE STORE / CAR WASH NOISE LEVELS

Measurement Site	Noise Sources	Measured Noise Levels		
		Hourly Leq	Hourly L50	Hourly Lmax
Site 1	Automobiles arriving and departing Trucks arriving and gas delivery Car wash operations Some I-80 traffic influenced the noise measurements	58 dB	56 dB	78 dB
Site 2	Automobiles arriving and departing Trucks arriving and gas delivery Car wash operations Some I-80 traffic influenced the noise measurements	54 dB	51 dB	76 dB

Assuming the measured noise levels at the Union 76 facility are similar to those associated with the proposed Rotten Robbie project, the overall measured noise levels will not exceed the background roadway traffic noise levels, and will be approximately 55 dB to 60 dB DNL at the property line. Therefore, the project may exceed the 55 DNL at the property lines. The project will not exceed the 55 DNL standard at the White Way Motel or the single family residence to the single family residence to the northwest.

It is noted that the measured noise levels from the Penryn Union 76 gas station / convenience store are very similar to those which were calculated based upon the trip generation noise analysis previously described.

Based upon the previously discussed barrier analysis, the proposed 7-foot tall masonry barrier would reduce overall noise levels by 6 dB DNL, and would comply with the 55 dB DNL standard.



Project Site

Figure 3

San Jose Airport Noise Contours Project Site

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Noise Measurement Sites

Figure 4

Penryn Road Union 76

Noise Measurement Locations

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Construction Noise Levels

Construction noise was analyzed using data compiled by the US Environmental Protection Agency that lists typical noise levels at 50 feet for construction equipment and various construction activities.

Noise from construction activities would add to the noise environment in the immediate project vicinity. Activities involved in typical construction would generate maximum noise levels, as indicated in Table 5, ranging from 80 to 89 dB at a distance of 50 feet.

Noise would also be generated during the construction phase by increased truck traffic on area roadways. A significant project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from construction sites. This noise increase would be of short duration, and would likely occur primarily during daytime hours.

TABLE 5
NOISE LEVELS OF TYPICAL CONSTRUCTION EQUIPMENT

Equipment Type	Typical Equipment Level (dBA)- 50 ft from Source
Air Compressor	81
Backhoe	85
Concrete Pump	82
Concrete Breaker	82
Truck Crane	88
Dozer	87
Generator	78
Loader	84
Paver	88
Pneumatic Tools	85
Water Pump	76
Power Hand Saw	78
Shovel	82
Trucks	88

Source: Bolt, Beranek and Newman, Noise from Construction Equipment and Operations, Building Equipment and Home Appliances, U.S. EPA, 1971.

Noise impacts primarily occur when construction activities occur during noise-sensitive times of the day (early morning, evening, or nighttime hours). These impacts also occur in areas immediately adjoining noise sensitive land uses, or when construction noise lasts over an extended period of time. Therefore, the project should comply with Policy EC-1.7 of the General Plan as shown below.

Policy 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.

Construction Vibration

The types of construction vibration impact include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural. Table 6 shows the typical vibration levels produced by construction equipment.

TABLE 6
VIBRATION LEVELS FOR VARYING CONSTRUCTION EQUIPMENT

Type of Equipment	Peak Particle Velocity @ 25 feet	Approximate Velocity Level @ 25 feet
Large Bulldozer	0.089 (inches/second)	87 (VdB)
Loaded Trucks	0.076 (inches/second)	86 (VdB)
Small Bulldozer	0.003 (inches/second)	58 (VdB)
Auger/drill Rigs	0.089 (inches/second)	87 (VdB)
Jackhammer	0.035 (inches/second)	79 (VdB)
Vibratory Hammer	0.070 (inches/second)	85 (VdB)

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Guidelines, May 2006

The primary construction activities associated with the project would occur when the infrastructure such as buildings and utilities are constructed. Based upon Table 6, which shows potential vibration impacts, it is not expected that vibration impacts would occur which would cause any structural damage at any historic structures and is not expected to exceed the 0.20 in/second ppv criterion contained in the General Plan at any adjacent structures.

CONCLUSIONS

Based upon the analysis, the project will comply with the City of San Jose noise level criteria, based upon the project design.

Appendix A
Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).
L_{dn}	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
L_{eq}	Equivalent or energy-averaged sound level.
L_{max}	The highest root-mean-square (RMS) sound level measured over a given period of time.
$L_{(n)}$	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L_{50} is the sound level exceeded 50% of the time during the one hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
NRC	Noise Reduction Coefficient. NRC is a single-number rating of the sound-absorption of a material equal to the arithmetic mean of the sound-absorption coefficients in the 250, 500, 1000, and 2,000 Hz octave frequency bands rounded to the nearest multiple of 0.05. It is a representation of the amount of sound energy absorbed upon striking a particular surface. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption.
Peak Noise	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the AMaximum@ level, which is the highest RMS level.
RT_{60}	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 Sabin.
SEL	Sound Exposure Level. SEL is s rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy into a one-second event.
STC	Sound Transmission Class. STC is an integer rating of how well a building partition attenuates airborne sound. It is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches.

Appendix B
Rotton Robie San Jose
24hr Continuous Noise Monitoring - Site A
February 14th-15th, 2017

Hour	Leq	Lmax	L50	L90
10:00:00	54.2	78.7	49.2	46.4
11:00:00	51.9	69.9	49.2	46.8
12:00:00	52.5	74.2	49.0	46.4
13:00:00	57.4	72.7	52.0	47.3
14:00:00	54.8	71.3	49.5	45.8
15:00:00	53.7	72.9	50.8	48.4
16:00:00	53.6	70.9	52.0	49.7
17:00:00	54.7	73.6	51.4	49.3
18:00:00	53.0	76.4	50.8	48.6
19:00:00	54.1	76.4	52.9	50.9
20:00:00	54.7	74.9	53.2	51.0
21:00:00	52.4	62.5	51.3	48.7
22:00:00	52.4	65.3	51.7	49.3
23:00:00	49.7	60.3	49.0	47.3
0:00:00	49.7	62.6	49.3	46.1
1:00:00	48.9	59.6	48.3	44.8
2:00:00	52.1	64.4	51.5	49.2
3:00:00	53.3	66.3	52.3	49.8
4:00:00	56.4	67.4	56.1	54.2
5:00:00	57.9	70.4	57.4	55.7
6:00:00	58.1	69.6	57.6	56.2
7:00:00	58.5	77.7	56.4	54.8
8:00:00	57.4	71.5	56.2	54.2
9:00:00	55.4	69.4	54.6	52.6

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	58	52	55	58	49	54
Lmax (Maximum)	79	62	73	70	60	65
L50 (Median)	56	49	52	58	48	53
L90 (Background)	55	46	49	56	45	50

Computed Ldn, dB	61
% Daytime Energy	65%
% Nighttime Energy	35%

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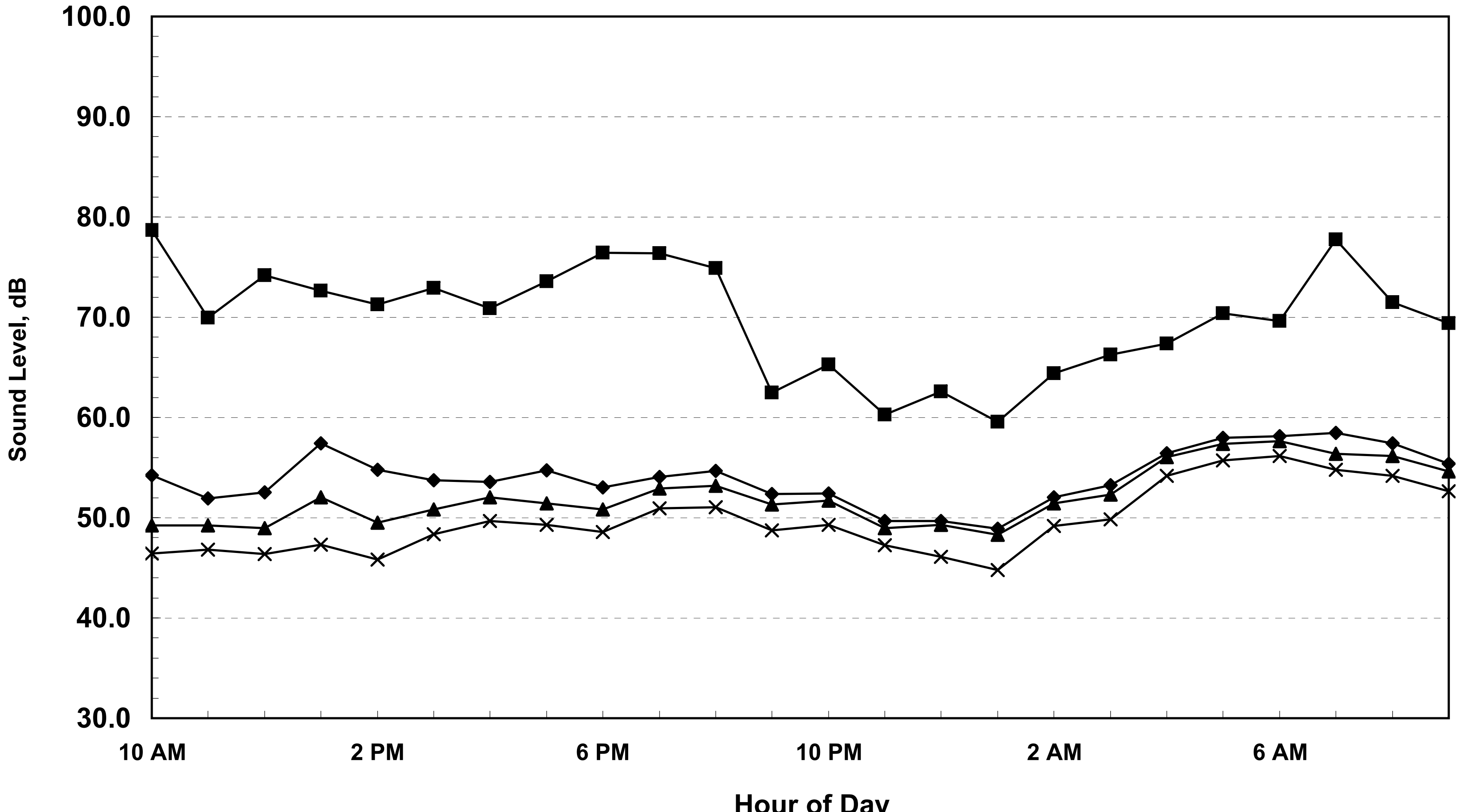
Appendix B
Rotton Robie San Jose
24hr Continuous Noise Monitoring - Site A
February 14th-15th, 2017



Ldn = 61 dB

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Appendix B-10
Short-Term Noise Monitoring Summary

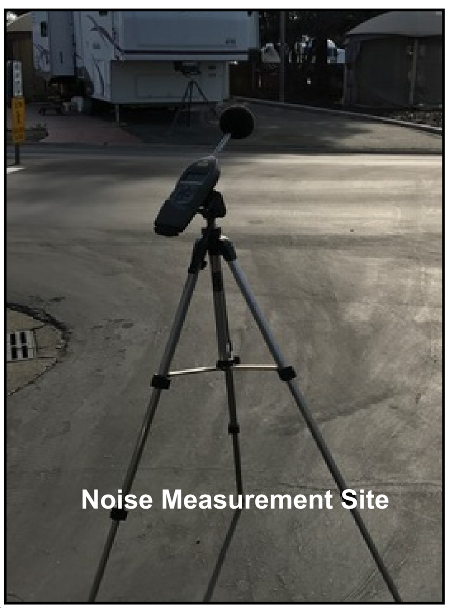
Project: Rotten Robbie San Jose
Location: Site 1
Date: 2/14/2017
Time: 10:00 AM
SLM: Larson Davis Model 824-1

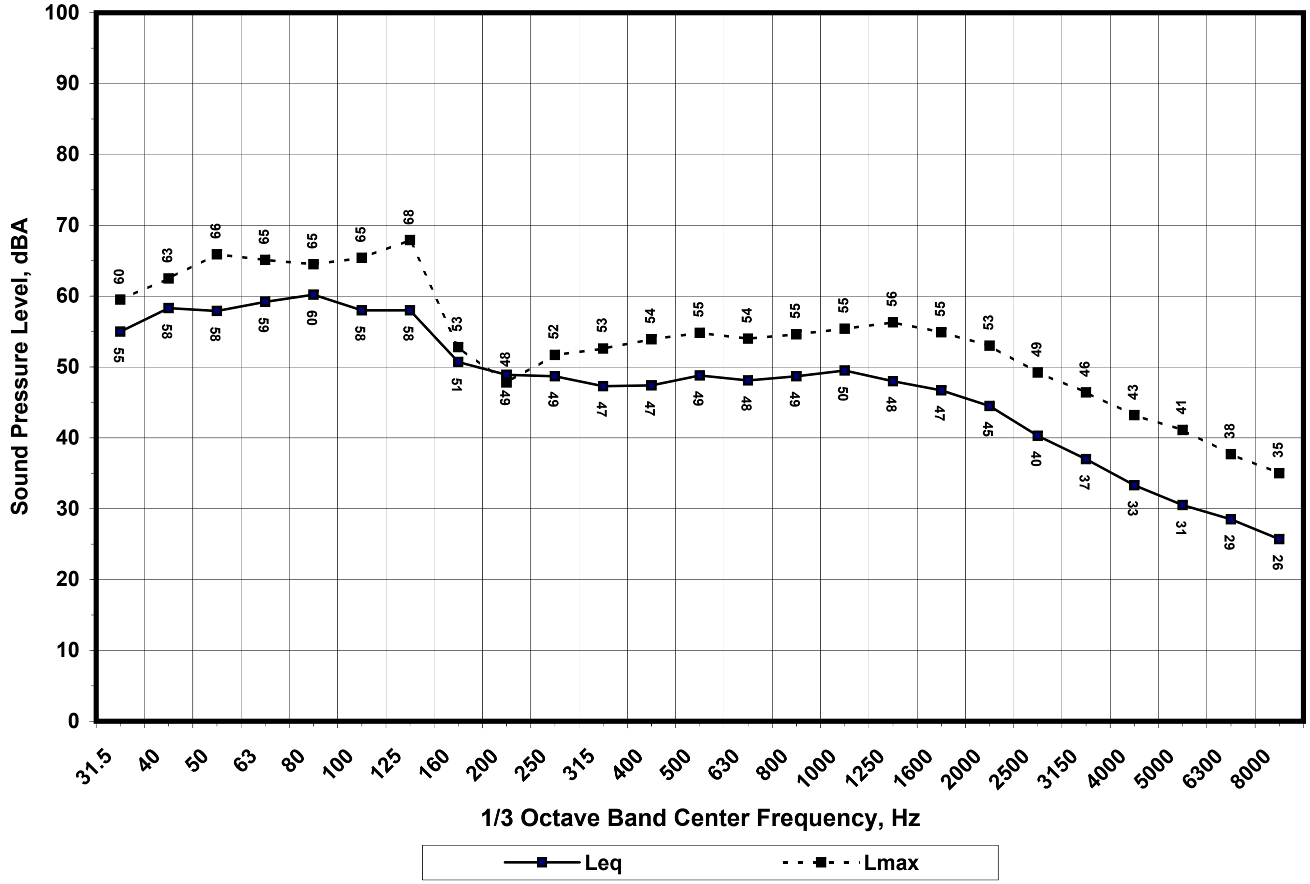
Calibrator: LDL CAL 200
Wind Speed: Calm
Weather: Clear, dry, ~ 70 F
Field Tech: JCB

Measurement Results, dBA

Duration:	0:00
L_{eq}:	57.0 dBA
L_{max}:	62.7 dBA
L_{min}:	49.3 dBA
L_{50}:	0
L_{90}:	0

Notes





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Appendix B-10

Short-Term Noise Monitoring Summary

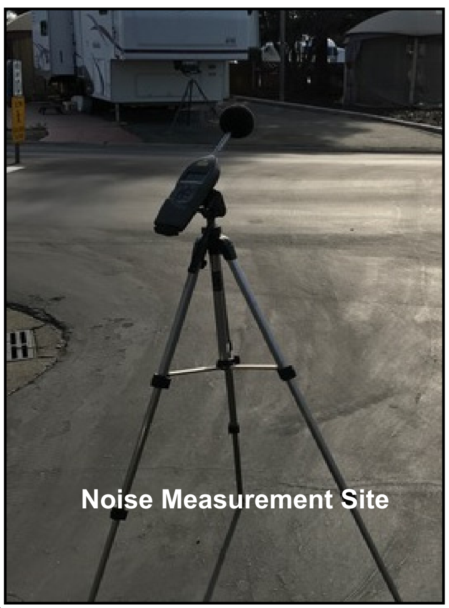
Project: Rotten Robbie San Jose
Location: Site 1
Date: 2/15/2017
Time: 9:25 AM
SLM: Larson Davis Model 824-1

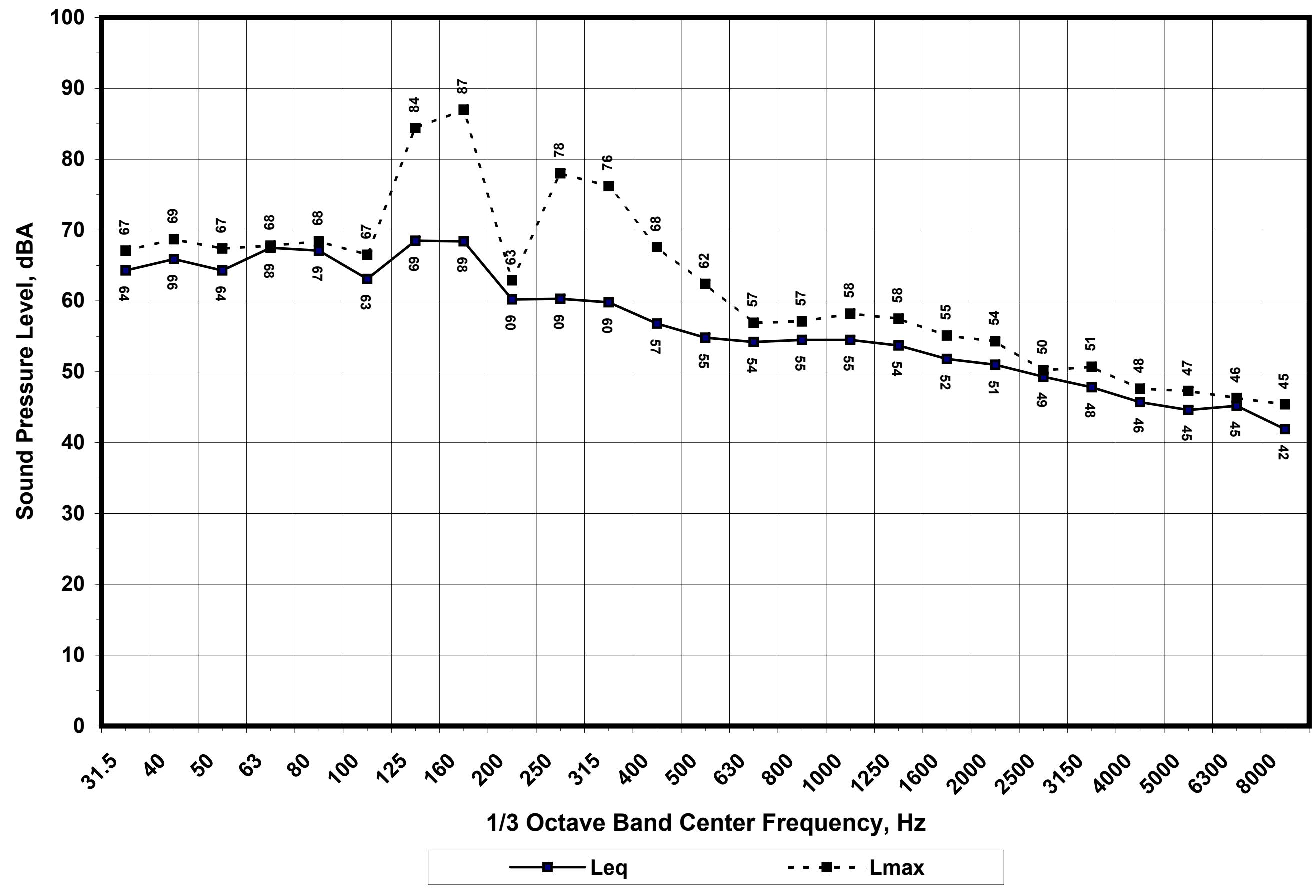
Calibrator: LDL CAL 200
Wind Speed: Calm
Weather: Clear, dry, ~ 70 F
Field Tech: JCB

Measurement Results, dBA

Duration:	0:04
L_{eq}:	64.6 dBA
L_{max}:	75.6 dBA
L_{min}:	55.7 dBA
L_{50}:	0
L_{90}:	0

Notes


Noise Measurement Site



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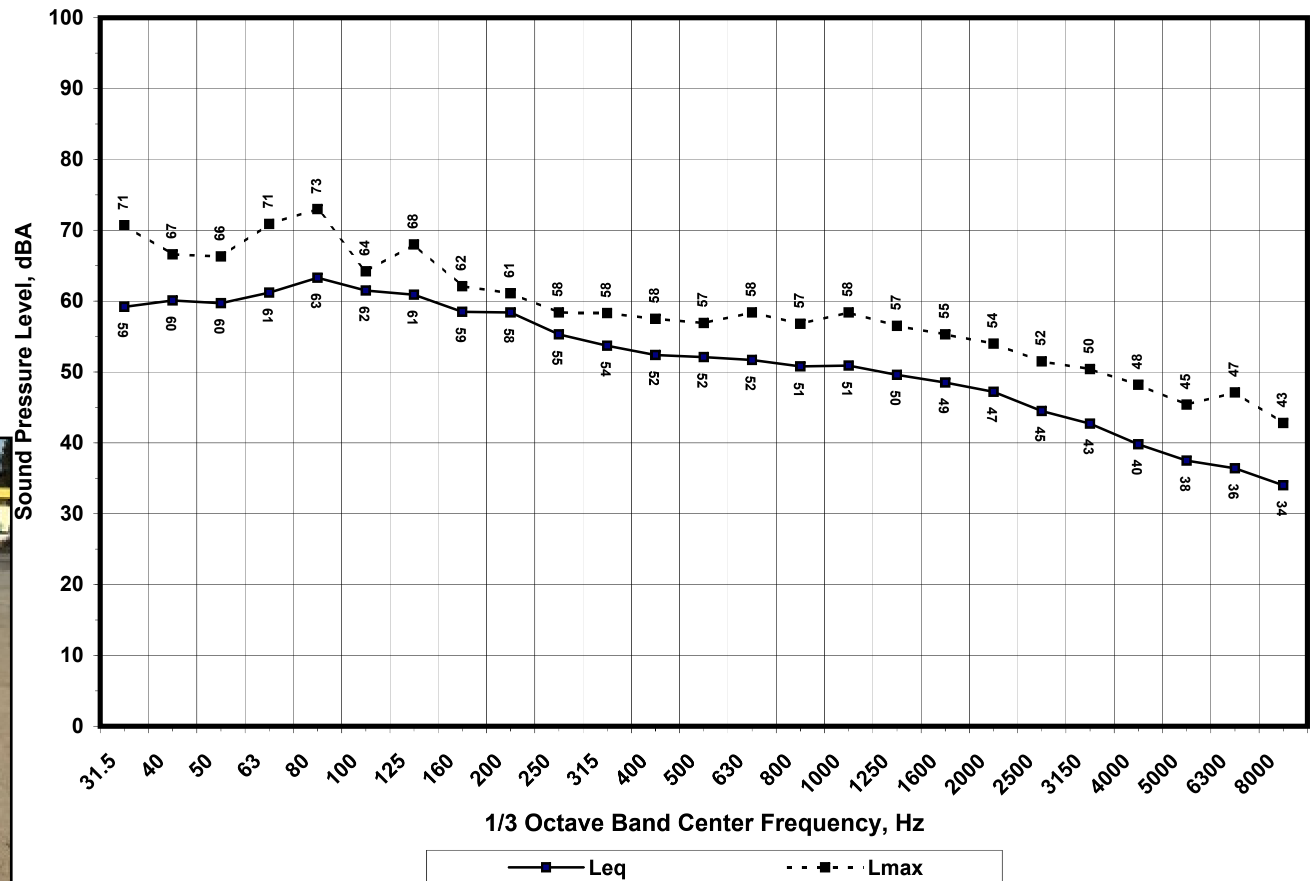
Appendix B-10
Short-Term Noise Monitoring Summary

Project: Rotten Robbie San Jose
Location: Site 2
Date: 2/14/2017
Time: 10:08 AM
SLM: Larson Davis Model 824-1

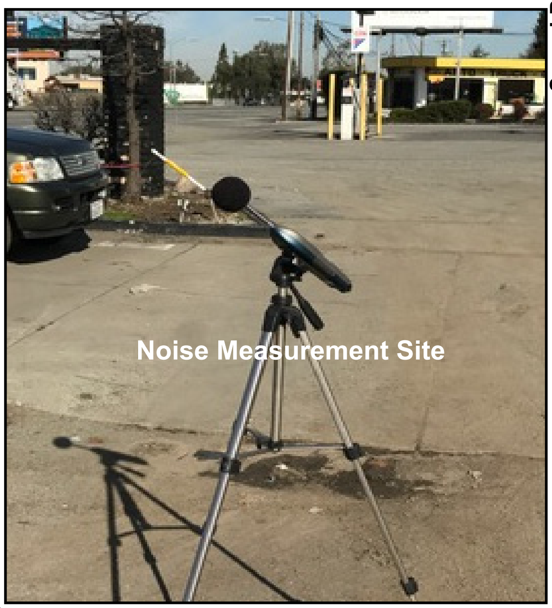
Calibrator: LDL CAL 200
Wind Speed: Calm
Weather: Clear, dry, ~ 70 F
Field Tech: JCB



__Measurement Results, dBA__

Duration:	0:00
L_{eq}:	60.2 dBA
L_{max}:	66.0 dBA
L_{min}:	54.0 dBA
L_{50}:	0
L_{90}:	0

__Notes__



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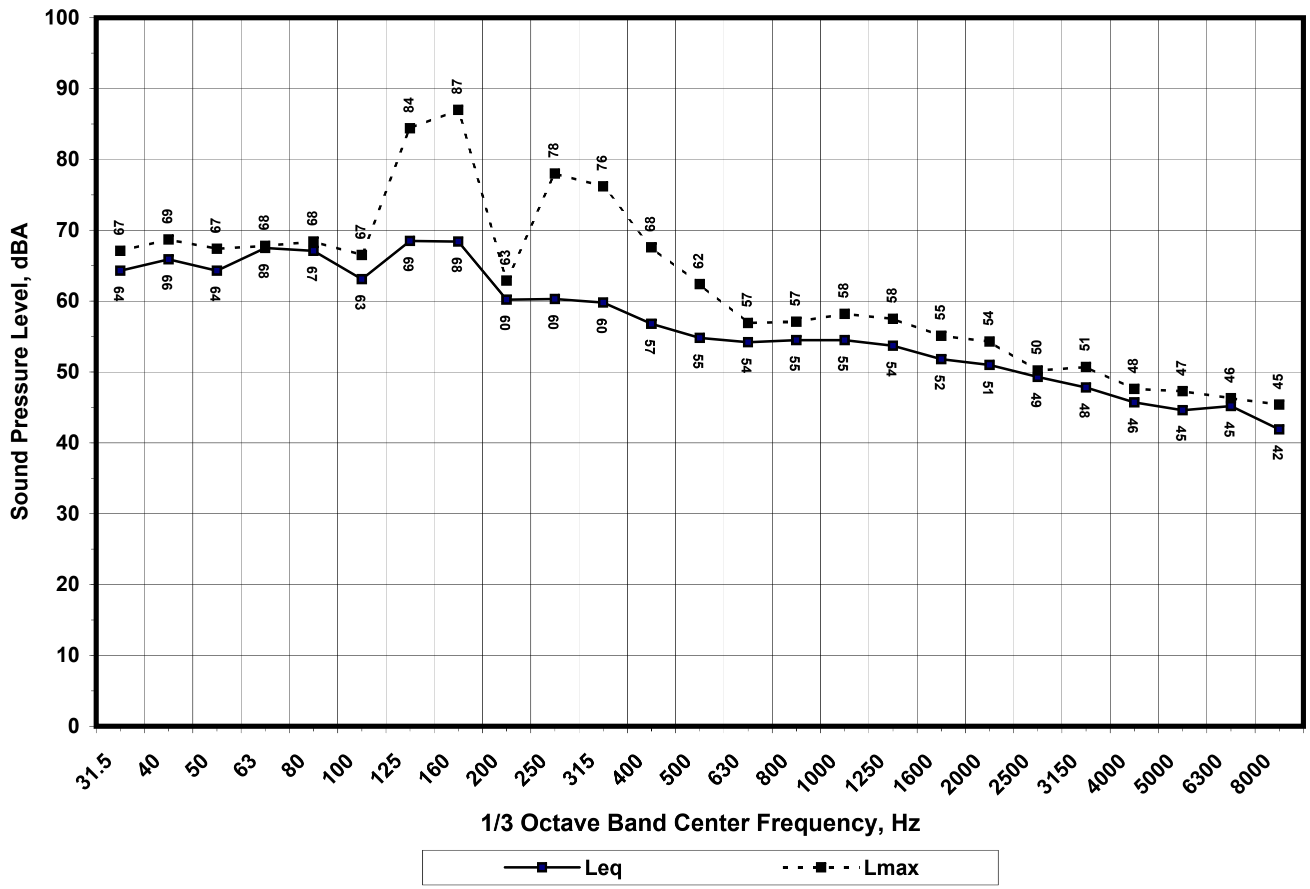
Appendix B-10
Short-Term Noise Monitoring Summary

Project:	Rotten Robbie San Jose		
Location:	Site 2	**Calibrator:**	LDL CAL 200
Date:	2/15/2017	**Wind Speed:**	Calm
Time:	9:25 AM	**Weather:**	Clear, dry, ~ 70 F
SLM:	Larson Davis Model 824-1	**Field Tech:**	JCB

Measurement Results, dBA

Duration:	0:04
L_{eq}:	64.6 dBA
L_{max}:	75.6 dBA
L_{min}:	55.7 dBA
L_{50}:	0
L_{90}:	0

Notes



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Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Data Input Sheet

Project #: 2017-116
Description: Rotten Robbie
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Oakland Road	Project Site	39,381	85		15	2	2	40	50	
2	Commercial Street	Project Site	23,000	85		15	2	1	30	50	
3											
4											
5											
6											
7											
8											
9											
10											
11											
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22											
23											
24											
25											

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Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2017-116
Description: Rotten Robbie
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Oakland Road	Project Site	70.4	62.5	67.4	73
2	Commercial Street	Project Site	64.5	58.3	62.4	67

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2017-116
Description: Rotten Robbie
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	Oakland Road	Project Site	35	75	161	347	748
2	Commercial Street	Project Site	15	33	70	151	325

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Appendix D

Barrier Insertion Loss Calculation

Project Information:

Job Number: 2017-173
Project Name: Barrier Insertion Loss
Location(s): RV Park

Noise Level Data:

Source Description: Rotten Robbie
Source Noise Level, dBA: 57
Source Frequency (Hz): 500
Source Height (ft): 5

Site Geometry:

Receiver Description: Nearest Backyard
Source to Barrier Distance (C_1): 97
Barrier to Receiver Distance (C_2): 20

Pad/Ground Elevation at Receiver: 0
Receiver Elevation[1]: 5
Base of Barrier Elevation: 0
Starting Barrier Height 6

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height (ft)	Insertion Loss, dB	Noise Level, dB	Barrier Breaks Line of Site to Source?
6	6	-5.2	51.8	Yes
7	7	-6.0	51.0	Yes
8	8	-7.1	49.9	Yes
9	9	-8.1	48.9	Yes
10	10	-9.1	47.9	Yes
11	11	-10.1	46.9	Yes
12	12	-10.7	46.3	Yes
13	13	-11.5	45.5	Yes
14	14	-12.3	44.7	Yes
15	15	-13.0	44.0	Yes
16	16	-13.6	43.4	Yes

Notes: 1.Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s)

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