Appendix E – Noise Assessment Study

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NOISE ASSESSMENT STUDY

CURTNER CORNERS SERVICE STATION

& CONVENIENCE STORE

SAN JOSE

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I. Executive Summary

This report presents the results of a noise assessment study, in compliance with the California Environmental Quality Act, for the proposed "Curtner Corners" service station and convenience store at 1103 Curtner Avenue in San Jose. This study includes an analysis of project traffic noise impacts to the existing traffic network, project-generated noise from the parking lot, vehicle fueling activity, storage tank refilling operations and mechanical equipment.

The results of the analysis reveal that there are no noise impacts to the project. The project-generated noise exposures will be in compliance with the noise policies of the City of San Jose General Plan and CEQA. Maximum noise levels generated by certain operations will exceed the limits of the City of San Jose Zoning Ordinance. However, the project maximum noise levels will be below or within the range of the existing maximum noise levels at the noise receptor locations adjacent to or near the site. Reduction of the maximum noise levels for compliance with the Zoning Ordinance standards is not feasible. Noise mitigation measures are not required for conformance to the policies of the City of San Jose General Plan and CEQA. Noise reduction measures are not recommended for compliance with the City of San Jose Zoning Ordinance as the project noise levels will be typical for the environment.

The following report includes background information on acoustics, noise standards applicable to the project and project-generated noise impacts to adjacent and nearby noise sensitive receptors.

In terms of the CEQA compliance checklist, the project indicates the following:

a) 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?	Less Than Significant
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	No Impact
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	Less Than Significant
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	Less Than Significant
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?	No impact
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

II. Background Information on Acoustics

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB) with 0 dB corresponding roughly to the threshold of hearing.

Most of the sounds which we hear in our normal environment do not consist of a single frequency, but rather a broad range of frequencies. As humans do not have perfect hearing, environmental sound measuring instruments have an electrical filter built in so that the instrument's detector replicates human hearing. This filter is called the "A-weighting" network and filters out low and very high frequencies. All environmental noise is reported in terms of A-weighted decibels, notated as “dBA”. All sound levels used in this report are A-weighted unless otherwise noted. Table I, below, shows the typical human response and noise sources for A-weighted noise levels.

TABLE I

The A-Weighted Decibel Scale, Human Response, and Common Noise Sources

Noise Level, dBA	Human Response	Noise Source
120-150+	Painfully Loud	Sonic Boom (140 dBA)
100-120	Physical Discomfort	Motorcycle at 20 ft. (110 dBA) Nightclub Music (105 dBA)
70-100	Annoying	Diesel Pump at 100 ft. (95 dBA) Freight Train at 50 ft. (90 dBA) Food Blender (90 dBA) Jet Plane at 1000 ft. (85 dBA) Freeway at 50 ft. (80 dBA) Alarm Clock (80 dBA)
50-70	Intrusive	Average Traffic at 100 ft. (70 dBA) Pass. Car, 30 mph @ 25 ft. (65 dBA) Vacuum Cleaner (60 dBA) Suburban Background (55 dBA)
0-50	Quiet	Normal Conversation (50 dBA) Light Traffic at 100 ft. (45 dBA) Refrigerator (45 dBA) Desktop Computer (40 dBA) Whispering (35 dBA) Leaves Rustling (20 dBA) Threshold of Hearing (0 dBA)

Although the A-weighted noise level may adequately indicate the level of noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that create a relatively steady background noise from which no particular source is identifiable. To describe the time-varying character of environmental noise, the statistical noise descriptors, L_1, L_{10}, L_{50} and L_{90} are commonly used. They are the A-weighted noise levels exceeded for 1%, 10%, 50% and 90% of a stated time period. The continuous equivalent-energy level (L_{eq}) is that level of a steady state noise which has the same sound energy as a time-varying noise. It is often considered the average noise level and is used to calculate the Day-Night Levels (DNL) and the Community Noise Equivalent Level (CNEL) described below.

In determining the daily level of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes very noticeable. Furthermore, most people sleep at night and are very sensitive to noise intrusion. To account for human sensitivity to nighttime noise levels, the Day-Night Level (DNL) noise descriptor was developed. The DNL is also called the L_{dn}. Either is acceptable, however, DNL is more popular worldwide. The DNL divides the 24-hour day into the daytime period of 7:00 a.m. to 10:00 p.m. and the nighttime period of 10:00 p.m. to 7:00 a.m. The nighttime noise levels are penalized by 10 dB to account for the greater sensitivity to noise at night. The Community Noise Equivalent Level (CNEL) is another 24-hour average which includes a 5 dB evening (7:00 p.m. - 10:00 p.m.) penalty and a 10 dB nighttime penalty. Both the DNL and the CNEL average the daytime, evening and nighttime noise levels over a 24-hour period to attain a single number *noise exposure*. The proper notations for the Day-Night Level and the Community Noise Equivalent Level are dB DNL and dB CNEL, respectively, as they can only be calculated using A-weighted decibels. It is, therefore, considered redundant to notate dB(A) DNL or dB(A) CNEL.

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

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning, relaxing;
- physiological effects such as startling, hearing loss.

The levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants, airports, etc., can experience noise in the last category. Unfortunately, there is, as yet, no completely satisfactory way to measure the subjective effects of noise, or of the corresponding reactions of annoyance and dissatisfaction. This is primarily due to the wide variation in individual thresholds of annoyance and differing individual past experiences with noise.

An important way to determine a person's subjective reaction to a new noise is to compare it to the existing environment to which one has adapted, i.e., the "ambient". In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by the receivers.

With regard to increases in A-weighted noise levels, the Environmental Protection Agency has determined the following relationships that will be helpful in understanding this report.

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

The adding or subtracting of sound levels is not simply arithmetic. The sound levels, in decibels, must be converted to Bels, the anti-log's of which are then calculated. The manipulation is then performed (arithmetic addition or subtraction), the logarithm of the sum or difference is calculated. The final number is then multiplied by 10 to convert Bels to decibels. The formula for adding decibels is as follows:

$$\text{Sum} = 10\log(10^{SL/10} + 10^{SL/10}) \qquad \text{where, SL is the Sound Level in decibels.}$$

For example, 60 dB + 60 dB = 63 dB, and 60 dB + 50 dB = 60 dB. Two sound sources of the same level are barely noisier than just one of the sources by itself. When one source is 10 dB higher than the other, the less noisy source does not add to the noisier source.

III. Noise Standards, Goals & Policies

A. City of San Jose General Plan

The noise assessment results presented in the findings were evaluated against the City of San Jose General Plan Goals and Policies, Ref. (a), which utilize the Day-Night Level (DNL) 24-hour noise descriptor. As the project is not a noise sensitive use, GP Policy EC-1 (noise impacts to the project) is not being applied.

Per GP Policy EC-1.3, new non-residential land use project-generated noise exposures are limited to 55 dB DNL at the property line when adjacent to noise sensitive residential or public land uses and 60 dB DNL when adjacent to commercial uses.

The General Plan Goals and Policies also quantify substantial noise increases for the determination of significant noise impacts related to CEQA. The allowable CEQA increases, as stated in GP Policy EC-1.2 are: less than 5 dB where the noise exposure remains Normally Acceptable (60 dB DNL); less than 3 dB where the noise exposure equals or exceeds the Normally Acceptable level. As the existing noise exposures at the noise sensitive uses adjacent to or near the project are in excess of 60 dB DNL, the existing + 2 dB limit is applicable.

B. City of San Jose Zoning Ordinance

The project-generated noise levels were also evaluated against the standards of the City of San Jose Zoning Ordinance, Ref. (b), which limits short-term noise levels to 55 dBA for residential land uses and 60 dBA for commercial and other non-residential land use. The Zoning Ordinance specifies a "maximum" sound level limit. However, as the maximum noise level, by definition, is a 1 second noise occurrence and can be overly restrictive, exceedances of the Zoning Ordinance limit may be allowed under certain types of Use Permits.

D. California Environmental Quality Act (CEQA)

The project-generated noise exposures were evaluated against the guidelines of the California Environmental Quality Act (CEQA). CEQA does not limit noise levels or noise exposures nor does it quantify noise exposure or noise level increases over the ambient to define noise impacts. CEQA evaluates a project as a significant noise impact if it "...caused a substantial increases in the ambient noise levels...". The quantification of the threshold of significance is left up to the local jurisdiction. The City of San Jose General Plan Goals and Policies provide thresholds of significance in the General Plan. The thresholds of significance are applied at the residence at 1116 Curtner Avenue across the street from the site, at Lincoln Glen Park adjacent to the west of the site and the commercial building adjacent to the north of the site.

The City of San Jose General Plan Policy EC-1.2 states that significant noise impacts would occur if a project would:

- Cause the DNL at noise sensitive receptors to increase by five dB DNL or more where the noise levels would remain "Normally Acceptable"; or

- Cause the DNL at noise sensitive receptors to increase by three dB DNL or more where the noise levels equal or exceed the "Normally Acceptable" level.

If the project causes either of the above criteria to occur, the project will be considered a significant noise impact to the areas where it occurs and mitigation measures will be required. Table II summarizes the quantitative noise limits applied at 1116 Curtner Avenue, at Lincoln Glen Park and at the commercial property line to the north. As shown in the table, the 55 dB DNL limit of Policy EC-1.3 is the most restrictive policy of the General Plan. The Zoning Ordinance standard is more restrictive than the General Plan Goals and Policies.

TABLE II	
Project-Generated Noise Limits	
General Plan Goals and Policies EC-1.2 and CEQA (based on ambient +2)	61 dB DNL at 1116 Curtner Avenue 60 dB DNL at Lincoln Glen Park 55 dB DNL at North Property Line
General Plan Goals and Policies EC-1.3	55 dB DNL at 1116 Curtner Avenue 55 dB DNL at Lincoln Glen Park 60 dB DNL at the north property line
Zoning Ordinance	55 dBA maximum (short-term) at 116 Curtner Ave. 60 dBA maximum at Lincoln Glen Park 60 dBA maximum at north property line

IV. Acoustical Setting

A. Site Description

The project site is located at 1103 Curtner Avenue at the intersection of Curtner Avenue and Lincoln Avenue in San Jose. The site is relatively flat and approximately at-grade with the land uses to the south and west. The commercial building adjacent to the north is approximately 0 - 2 ft. below the project site grade. A 2 ft. to 6 ft. high masonry wall is situated along the north property line. The project construction is substantially completed. Surrounding land-uses include an ACE Hardware store and single-family residential across Curtner Avenue to the south, Lincoln Glen Park adjacent to the west, a commercial building adjacent to the north and an auto repair facility across Lincoln Avenue to the east.

The primary source of noise at the site is traffic on Curtner Avenue and Lincoln Avenue. Curtner Avenue carries an existing Average Daily Traffic (ADT) volume of 18,490 vehicles. Lincoln Avenue carries an ADT of 16,800, as reported by the consulting traffic engineer, Ref. (c)

B. Project Description

The project, as shown on the Site Plan, Ref. (d), includes a one story service station convenience store, two dispenser pump islands, a trash enclosure, a small air-conditioning unit, and air/water station and 12 twelve parking spaces. Ingress and egress to the site are by way of existing driveways off of Curtner Avenue and Lincoln Avenue. The site plan is shown as Figure 1 on page 10.

Noise generating sources associated with the project include traffic entering and exiting the site for fueling, commercial fuel deliveries, vehicles parking to visit the convenience store and the air-conditioner. There are no specifications for the air/water system. Therefore, this equipment could not be analyzed. The project is proposed for 24 hour operation. The air-conditioner is estimated to operate from 7:00 AM to 10:00 PM. Information on the project operations was provided by the project sponsor, Ref. (e).

The number of vehicles accessing the site was based on the volume of 115,000 gallons of fuel expected to be sold per month assuming an average of 15 gallons sold per vehicle. This is an average of 256 vehicles using the fueling stations per day (ADT). For the purposes of this study, we are assuming that half of the vehicles will use the northerly pumps and half of the vehicles will use the southerly pumps. The TIA reports a peak hour (PM) volume of 24 vehicles (9.5% of ADT) and an AM peak hour volume of 16 vehicles (6.2% of ADT) entering the site for fuel. The hourly distribution of vehicles volumes over the 24 hour day were derived from information provided in the Highway Research Report 117, Ref. (f). Report 117 provides a graph of hourly percentages of the ADT for typical roadways. Table III on page 11 provides the hourly traffic volumes using either the Curtner Avenue driveway or the Lincoln Avenue driveway and which dispenser island each vehicle is assumed to use. We are assuming that each vehicle will exit the site using the same driveway that was used for entering.

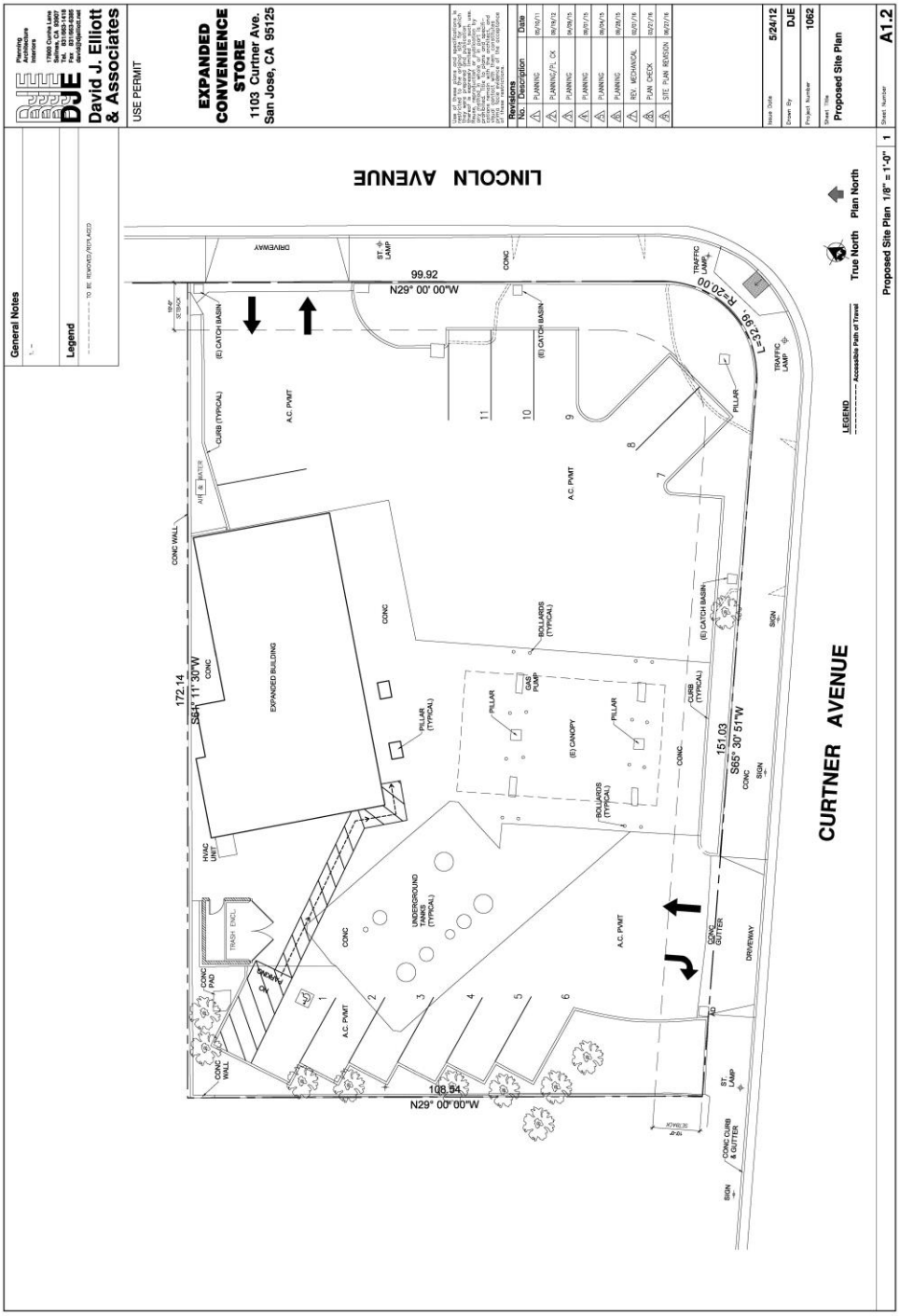

FIGURE 1 – Site Plan

TABLE III						
Hourly Traffic Per Driveway Per Dispenser Island						
	ADT =	256				
	Percentage of ADT	Hourly Vol	South Pumps	North Pumps	Curtner DW	Lincoln DW
7:00 AM	5.5	14	7	7	6	8
8:00 AM	6.2	16	8	8	8	8
9:00 AM	5.7	15	7	8	7	8
10:00 AM	5.5	14	7	7	6	8
11:00 AM	5.1	13	6	7	6	7
12:00 PM	5.0	13	6	7	6	7
1:00 PM	4.5	12	6	6	6	6
2:00 PM	5.0	13	6	7	7	6
3:00 PM	5.8	15	7	8	7	8
4:00 PM	6.8	17	8	9	9	8
5:00 PM	9.5	24	12	12	12	12
6:00 PM	7.2	18	9	9	9	9
7:00 PM	5.9	15	7	8	7	8
8:00 PM	4.5	12	6	6	6	6
9:00 PM	3.5	9	4	5	4	5
10:00 PM	3.1	8	4	4	4	4
11:00 PM	2.4	6	3	3	3	3
12:00 AM	1.5	4	2	2	2	2
1:00 AM	1.4	4	2	2	2	2
2:00 AM	0.9	2	1	1	1	1
3:00 AM	0.5	1	1	0	1	0
4:00 AM	0.6	2	1	1	1	1
5:00 AM	1.0	3	1	2	1	2
6:00 AM	2.5	6	3	3	3	3
	TOTAL	256	124	132	124	132

V. Existing Noise Environments

A. Existing Noise Levels

To determine the existing noise environment at the site, continuous recordings of the sound levels were made at three locations. Location 1 was at the front of the home at 1116 Curtner Avenue, which is directly across the street from the site and directly behind the ACE Hardware store. Location 2 was along the west property line contiguous with Lincoln Glen Park, 100 ft. from the centerline of Curtner Avenue. Location 3 was at the north property line behind the convenience store building 135 ft. from the centerline of Lincoln Avenue. This location was chosen for security of the sound measuring equipment. The measurements were made on Sunday October 8, 2017 for a continuous period of 24 hours and included measurements during the daytime and nighttime periods of the DNL index.

Please note that the existing ambient noise levels were measured on a Sunday as this period has the lowest sound levels during the week. The lower the ambient noise environment, the more restrictive are the noise limits applied to the project.

The sound levels were recorded and analyzed using Larson-Davis Model 812 Precision Integrating Sound Level Meters. The meters yield, by direct readout, a series of descriptors of the sound levels versus time, which include the L_1, L_{10}, L_{50}, and L_{90}, i.e., those levels that are exceeded 1%, 10%, 50%, and 90% of the time. The meters also yield the maximum and minimum levels, and the continuous equivalent-energy levels (L_{eq}), which are used to calculate the DNL. The measured L_{eq}'s are shown in the data tables in Appendix C.

The L_{eq}'s at measurement Location 1, at the front of the home at 1116 Curtner Avenue, ranged from 58.1 to 65.6 dBA during the daytime and from 48.5 to 56.9 dBA at night.

At measurement Location 2 along the west property line, the L_{eq}'s ranged from 56.3 to 64.6 dBA during the daytime and from 48.2 to 56.5 dBA at night.

At measurement Location 3 along the north property line, the L_{eq}'s ranged from 52.0 to 59.2 dBA during the daytime and from 43.2 to 51.1 dBA at night.

A loud noise event occurred in the 3:00 AM hour during the measurement period that lasted for several minutes. This was likely an emergency vehicle operation/activity and is not typical of the normal noise environment. The sound levels reported above and shown in the data tables during the 3:00 AM hour were adjusted by interpolation to represent the typical 3:00 AM hour.

The measurement locations are shown on Figure 2, below.

FIGURE 2- Noise Measurement Locations

B. Noise Exposures

To calculate the noise exposures for the purposes of the General Plan and CEQA noise limits and evaluations, the DNL's for the survey locations were calculated by decibel averaging of the L_{eq}'s as they apply to the various time periods of the DNL index. A 10 decibel nighttime weighting factor was applied and the DNL was calculated using the formula shown in Appendix B. The measured L_{eq}'s and DNL calculations are shown in the data tables in Appendix C.

The results of the calculations indicate that the noise exposure at measurement Location 1 at the residence at 1116 Curtner Avenue was 63 dB DNL. The noise exposure at measurement Location 2 along the west property line was 62 dB DNL. The noise exposure at measurement Location 3 along the north property line behind the convenience story building was 57 dB DNL. The noise exposure along the north property line near the windows of the adjacent commercial building was calculated to be 63 dB DNL.

The noise environment at receptor locations in the area are in excess of the "Normally Acceptable" noise exposure of 60 dB DNL. Thus, Policy EC-1.2 (CEQA) limits the combined (existing + project) noise exposure to the ambient + 2 dB. The project-generated noise exposure limit is the ambient minus 2 dB. For instance, if the ambient is 60 dB DNL, the project noise may be up to 58 dB DNL.

60 dB + 58 dB = 62 dB.

Sum (62 dB) = $10\log_{10}(10^{(60/10)}) + (10^{(58/10)})$

VI. Noise Impacts

A. Impacts to the Project

There are no exterior noise sensitive uses associated with the project. The City of San Jose General Plan Goals and Policies does not contain commercial interior noise limits. The project is not a noise sensitive use. Therefore, there are no noise impacts to the project.

B. Project-Generated Noise Impacts

The evaluation of project noise at the area surrounding the service station includes project-generated traffic, parking lot noise (parking and entering/exiting for fuel service) and mechanical equipment. The mechanical equipment associated with the project is limited to the air conditioner at the northwest corner of the building. There is no information available for the air/water service equipment. Based on our experience with mechanical equipment, the air compressor and water pump will be located inside the equipment housing and will be adequately noise shielded by the property line sound barrier (masonry wall) such that noise impacts to the adjacent commercial building will be insignificant.

Project Traffic Noise Analysis

Project traffic noise on the local street system will be less than significant as the total daily volume of school traffic will be less than 1% of the daily traffic volumes on both Curtner Avenue and Lincoln Avenue. The project traffic noise will add less than 0.03 dB to the Curtner Avenue traffic noise levels and 0.02 dB to the Lincoln Avenue traffic noise levels, as shown in Table IV.

$$\Delta dB = 10\log_{10}[(\text{Existing} + \text{Project})/\text{Existing}]$$

There is a slight discrepancy between the TIA project volume of approximately 200 vehicles per day and the 256 vehicles per day expected based on the monthly fuel sales. This difference is negligible in terms of the effect of project traffic.

TABLE IV				
Project-Generated Traffic Noise Impact Analysis				
Roadway	AM Peak	PM Peak	ADT	Δ dB
Curtner Avenue				
Existing	1,792	1,849	18,490	
Existing + Project	1,800	1,861	18,610	+0.03
Lincoln Avenue				
Existing	1,680	1,570	16,800	
Existing + Project	1,688	1,582	16,880	+0.02

Impact: Less Than Significant

Project-Generated Noise Exposures (General Plan and CEQA Evaluations)

Fuel Service and Driveway Noise

The primary source of noise associated with the project will be vehicles entering the site for fuel service and exiting the site once fuel service is complete. The noise due to this activity consists of vehicular noise in the driveway, car doors closing and engines starting. Modern fuel dispensers generate very little sound and are often barely audible if at all standing next to a fuel dispenser.

This section analyzes vehicles entering the site from either Curtner Avenue or Lincoln Avenue, parking at either the north pump island or the south pump island, getting fuel, starting their engine and exiting the site using the same driveway from which they entered. It is unknown how many of these vehicles will leave the pump islands and park in a parking space to visit the convenience store. Because of the short drive from the islands to the parking spaces and very low speeds, the noise created by this operation is negligible. Noise from patrons visiting the convenience store only is analyzed in a subsequent section.

Tables V, VI and VII provide the analyses of vehicle noise at the residence at 1116 Curtner Avenue, at the Lincoln Glen Park property line and at the north property line near Lincoln Avenue, respectively. Vehicles obtaining fuel will not affect the north property line behind the convenience store.

Vehicles will enter the site, drive at approximately 5 mph from the driveway to the pump island, the patron will exit the car, get fuel, enter the vehicle, close the door, start the engine and drive away.

The Tables provide the time it takes to drive to the pump and to drive away from the pump, which includes closing the car door and starting the engine. Cars are turned off during fuel pumping so no noise of any significance occurs. The number of vehicles entering from and exiting to Curtner Avenue are shown on the left side of the Table, with the number divided between the north pumps and the south pumps. The sound level of the vehicle driving is shown in the next columns. The total (Sub-total) sound level is shown for vehicles using both pump islands. The right side of the Table provides the same information for vehicles entering from and exiting to Lincoln Avenue. The Leq values in the gray column under "Combined" are the total sound levels of vehicles using the Curtner Avenue driveway and the Lincoln Avenue driveway for each hour of the day.

The noise exposure, dB DNL, for this project-generated operation is shown at the bottom of the table. Also shown are the existing ambient noise exposure and the combined (existing + project) noise exposure.

The results of the analysis reveal that the project-generated noise exposures will be more than 10 decibels below the existing noise exposures. Thus, the project will not add to the existing noise environment. The project will in compliance with Policy EC-1.2 of the City of San Jose General Plan Goals and Policies. The project will comply with CEQA guidelines. The project-generated noise exposures will not exceed the 55 dB DNL limit of Policy EC-1.3. Noise mitigation measures will not be required.

Impact: Less Than Significant

TABLE V

Patron Fueling Driveway Access Noise Level Analysis

1116 Curtner Ave Analysis

			SL (dBA)=	46	36					SL (dBA)=	41	44		
			t (secs) =	48	28					t (secs) =	46	52		
	Driveway Vol.	Dispenser Island		Sound Level, dBA Leq				Driveway Vol.	Dispenser Island		Sound Level, dBA Leq			
	Curtner Ave.	North	South	North Pumps	South Pumps	Sub-total		Lincoln Ave.	North	South	North Pumps	South Pumps	Sub-total	Combined
7:00 AM	6	3	3	32	20	32	7:00 AM	8	4	4	28	32	33	36
8:00 AM	8	4	4	34	21	34	8:00 AM	8	5	3	29	30	33	36
9:00 AM	7	4	3	34	20	34	9:00 AM	8	5	3	29	30	33	36
10:00 AM	6	3	3	32	20	32	10:00 AM	8	4	4	28	32	33	36
11:00 AM	6	3	3	32	20	32	11:00 AM	7	4	3	28	30	32	35
12:00 PM	6	3	3	32	20	32	12:00 PM	7	4	3	28	30	32	35
1:00 PM	6	3	3	32	20	32	1:00 PM	6	3	3	27	30	32	35
2:00 PM	7	4	3	34	20	34	2:00 PM	6	4	2	28	29	31	36
3:00 PM	7	4	3	34	20	34	3:00 PM	8	4	4	28	32	33	36
4:00 PM	9	5	4	34	21	35	4:00 PM	8	5	3	29	30	33	37
5:00 PM	12	6	6	35	23	36	5:00 PM	12	6	6	30	33	35	38
6:00 PM	9	5	4	34	21	35	6:00 PM	9	5	4	29	32	34	37
7:00 PM	7	4	3	34	20	34	7:00 PM	8	4	4	28	32	33	36
8:00 PM	6	3	3	32	20	32	8:00 PM	6	3	3	27	30	32	35
9:00 PM	4	3	1	32	15	32	9:00 PM	5	3	2	27	29	31	35
10:00 PM	4	2	2	30	18	31	10:00 PM	4	2	2	25	29	30	34
11:00 PM	3	2	1	30	15	31	11:00 PM	3	2	1	25	26	28	33
12:00 AM	2	1	1	27	15	28	12:00 AM	2	1	1	22	26	27	31
1:00 AM	2	1	1	27	15	28	1:00 AM	2	1	1	22	26	27	31
2:00 AM	1	1	0	27		27	2:00 AM	1	1	0	22		22	29
3:00 AM	1	0	0				3:00 AM	0	0	0				
4:00 AM	1	1	0	27		27	4:00 AM	1	1	0	22		22	29
5:00 AM	1	1	0	27		27	5:00 AM	2	1	1	22	26	27	30
6:00 AM	3	2	1	30	15	31	6:00 AM	3	2	1	25	26	28	33
													PROJECT-GENERATED DNL =	**38**
													EXISTING DNL =	**63**
													COMBINED DNL =	**63**

TABLE VI

Patron Fueling Driveway Access Noise Level Analysis

West Property Line/Lincoln Glen Park Analysis

			SL (dBA)=	55	54					SL (dBA)=	50	50		
			t (secs) =	34	28					t (secs) =	68	68		
	Driveway Vol.	Dispenser Island		Sound Level, dBA Leq				Driveway Vol.	Dispenser Island		Sound Level, dBA Leq			
	Curtner Ave.	North	South	North Pumps	South Pumps	Sub-total		Lincoln Ave.	North	South	North Pumps	South Pumps	Sub-total	Combined
7:00 AM	6	3	3	40	37	42	7:00 AM	8	4	4	38	38	41	45
8:00 AM	8	4	4	41	39	43	8:00 AM	8	5	3	39	37	41	45
9:00 AM	7	4	3	41	37	43	9:00 AM	8	5	3	39	37	41	45
10:00 AM	6	3	3	40	37	42	10:00 AM	8	4	4	38	38	41	45
11:00 AM	6	3	3	40	37	42	11:00 AM	7	4	3	38	37	41	44
12:00 PM	6	3	3	40	37	42	12:00 PM	7	4	3	38	37	41	44
1:00 PM	6	3	3	40	37	42	1:00 PM	6	3	3	37	37	40	44
2:00 PM	7	4	3	41	37	43	2:00 PM	6	4	2	38	35	40	45
3:00 PM	7	4	3	41	37	43	3:00 PM	8	4	4	38	38	41	45
4:00 PM	9	5	4	42	39	44	4:00 PM	8	5	3	39	37	41	46
5:00 PM	12	6	6	43	40	45	5:00 PM	12	6	6	40	40	43	47
6:00 PM	9	5	4	42	39	44	6:00 PM	9	5	4	39	38	42	46
7:00 PM	7	4	3	41	37	43	7:00 PM	8	4	4	38	38	41	45
8:00 PM	6	3	3	40	37	42	8:00 PM	6	3	3	37	37	40	44
9:00 PM	4	3	1	40	33	41	9:00 PM	5	3	2	37	35	39	43
10:00 PM	4	2	2	38	36	40	10:00 PM	4	2	2	35	35	38	42
11:00 PM	3	2	1	38	33	39	11:00 PM	3	2	1	35	32	37	41
12:00 AM	2	1	1	35	33	37	12:00 AM	2	1	1	32	32	35	39
1:00 AM	2	1	1	35	33	37	1:00 AM	2	1	1	32	32	35	39
2:00 AM	1	1	0	35		35	2:00 AM	1	1	0	32			35
3:00 AM	1	0	0				3:00 AM	0	0	0				
4:00 AM	1	1	0	35		35	4:00 AM	1	1	0	32			35
5:00 AM	1	1	0	35		35	5:00 AM	2	1	1	32	32	35	38
6:00 AM	3	2	1	38	33	39	6:00 AM	3	2	1	35	32	37	41
													PROJECT-GENERATED DNL =	**47**
													EXISTING DNL =	**62**
													COMBINED DNL =	**62**

TABLE VII

Patron Fueling Driveway Access Noise Level Analysis

North Property Line/Commercial Building Analysis

			SL (dBA)=	0	0					SL (dBA)=	59	59		
			t (secs) =	0	0					t (secs) =	42	52		
	Driveway Vol.	Dispenser Island		Sound Level, dBA Leq				Driveway Vol.	Dispenser Island		Sound Level, dBA Leq			
	Curtner Ave.	North	South	North Pumps	South Pumps	Sub-total		Lincoln Ave.	North	South	North Pumps	South Pumps	Sub-total	Combined
7:00 AM	6	3	3			0.0	7:00 AM	8	4	4	45.7	46.6	49.2	49.2
8:00 AM	8	4	4			0.0	8:00 AM	8	5	3	47	45	49	49
9:00 AM	7	4	3			0.0	9:00 AM	8	5	3	47	45	49	49
10:00 AM	6	3	3			0.0	10:00 AM	8	4	4	46	47	49	49
11:00 AM	6	3	3	The convenience store		0.0	11:00 AM	7	4	3	46	45	49	49
12:00 PM	6	3	3	building sheilds the		0.0	12:00 PM	7	4	3	46	45	49	49
1:00 PM	6	3	3	North property line		0.0	1:00 PM	6	3	3	44	45	48	48
2:00 PM	7	4	3	at the commercial building		0.0	2:00 PM	6	4	2	46	44	48	48
3:00 PM	7	4	3	from the Curtner Avenue		0.0	3:00 PM	8	4	4	46	47	49	49
4:00 PM	9	5	4	driveway access path		0.0	4:00 PM	8	5	3	47	45	49	49
5:00 PM	12	6	6			0.0	5:00 PM	12	6	6	47	48	51	51
6:00 PM	9	5	4			0.0	6:00 PM	9	5	4	47	47	50	50
7:00 PM	7	4	3			0.0	7:00 PM	8	4	4	46	47	49	49
8:00 PM	6	3	3			0.0	8:00 PM	6	3	3	44	45	48	48
9:00 PM	4	3	1			0.0	9:00 PM	5	3	2	44	44	47	47
10:00 PM	4	2	2			0.0	10:00 PM	4	2	2	43	44	46	46
11:00 PM	3	2	1			0.0	11:00 PM	3	2	1	43	41	45	45
12:00 AM	2	1	1			0.0	12:00 AM	2	1	1	40	41	43	43
1:00 AM	2	1	1			0.0	1:00 AM	2	1	1	40	41	43	43
2:00 AM	1	1	0			0.0	2:00 AM	1	1	0	40		40	40
3:00 AM	1	0	0			0.0	3:00 AM	0	0	0				
4:00 AM	1	1	0			0.0	4:00 AM	1	1	0	40		40	40
5:00 AM	1	1	0			0.0	5:00 AM	2	1	1	40	41	43	43
6:00 AM	3	2	1			0.0	6:00 AM	3	2	1	43	41	45	45
													PROJECT-GENERATED DNL =	**51**
													EXISTING DNL =	**63**
													COMBINED DNL =	**63**

Parking Lot Noise

This section analyzes patrons entering the site to vising the convenience store without getting fuel. The project sponsor indicated that the volume of cars vising the store only is approximately 1% of the number of vehicles accessing the site for fuel. This equates to 1 vehicle per hour from 7:00 AM to 3:00 PM, 2 vehicles per hour from 3:00 PM to 8:00 PM, 1 vehicle per hour from 8:00 PM to 7:00 AM with no vehicles expected in the 3:00 AM hour.

The parking space along the north property line would be used only during the 3:00 PM to 8:00 PM period when 2 vehicles are expected.

Table VIII on the following page provides the noise analysis for vehicles visiting the convenience store without purchasing fuel. During each hour of the day, with the exception of the 3:00 AM hour, one vehicle enters the site from Curtner Avenue and parks along the westerly property line contiguous with Lincoln Glen Park. The Table shows the time it takes for a vehicle to enter and park, then exit. This time includes only duration of the vehicle in motion or during start up. It does not include the time the patron is in the store as the vehicle will be turned off and silent. The time to enter and exit was calculated to be 36 seconds. A single vehicle entering and exiting the site will generate an average noise level of 40 dBA at the residence at 1116 Curtner Avenue and 61 dBA at the west property line. Over a 1 hour period, the average sound level, indicated by dBA $L_{eq(h)}$, will be 20 dBA at 1116 Curtner Avenue and 48 dBA at the west property line.

Parking lot noise data were acquired from past studies of parking lot noise, Ref's (g, h, i)

The noise exposures were calculated to be 26 dB DNL at the residence at 1116 Curtner Avenue and 54 dB DNL at the west property line.

The same analysis was used for the north property line where one vehicle is expected to enter and exit the site using the Lincoln Avenue driveway and parking at the single parking space at the north property line. Between the hours of 3:00 PM and 8:00 PM, each vehicle will generate an average sound level of 47 dBA. The hourly average sound level will be 33 dBA $L_{eq(h)}$. The noise exposure was calculated to be 26 dB DNL.

TABLE VIII
Parking for Convenience Store Noise Analysis

Curtner Ave.		Single Veh. Avg Time		Single Veh. Avg SL		Sound Level, dBA Leq(h)	
	Driveway Vol.	South PL	West PL	South PL	West PL	South PL	West PL
7:00 AM	1	36	36	40	61	20	48
8:00 AM	1	36	36	40	61	20	48
9:00 AM	1	36	36	40	61	20	48
10:00 AM	1	36	36	40	61	20	48
11:00 AM	1	36	36	40	61	20	48
12:00 PM	1	36	36	40	61	20	48
1:00 PM	1	36	36	40	61	20	48
2:00 PM	1	36	36	40	61	20	48
3:00 PM	1	36	36	40	61	20	48
4:00 PM	1	36	36	40	61	20	48
5:00 PM	1	36	36	40	61	20	48
6:00 PM	1	36	36	40	61	20	48
7:00 PM	1	36	36	40	61	20	48
8:00 PM	1	36	36	40	61	20	48
9:00 PM	1	36	36	40	61	20	48
10:00 PM	1	36	36	40	61	20	48
11:00 PM	1	36	36	40	61	20	48
12:00 AM	1	36	36	40	61	20	48
1:00 AM	1	36	36	40	61	20	48
2:00 AM	1	36	36	40	61	20	48
3:00 AM							
4:00 AM	1	36	36	40	61	20	48
5:00 AM	1	36	36	40	61	20	48
6:00 AM	1	36	36	40	61	20	48
					DNL=	26	54

Lincoln Ave.		Single Veh. Avg Time		Single Veh. Avg SL, dBA Leq		Sound Level, dBA Leq(h)	
	Driveway Vol.	North PL		North PL		North PL	
7:00 AM							
8:00 AM							
9:00 AM							
10:00 AM							
11:00 AM							
12:00 PM							
1:00 PM							
2:00 PM							
3:00 PM	1	30		39		33	
4:00 PM	1	30		39		33	
5:00 PM	1	30		39		33	
6:00 PM	1	30		39		33	
7:00 PM	1	30		39		33	
8:00 PM							
9:00 PM							
10:00 PM							
11:00 PM							
12:00 AM							
1:00 AM							
2:00 AM							
3:00 AM							
4:00 AM							
5:00 AM							
6:00 AM							
					DNL=	26	

As shown in the Table, parking lot noise from patrons using the convenience story will be within 55 dB DNL limit of the City of San Jose General Plan Goals and Policies Policy EC-1.3. Parking lot noise will not add to the noise environment at the residence at 1116 Curtner Avenue nor at the north property line. Parking lot noise will, however, add 1 dB to the noise environment at the west property line. The project-generated noise contribution to the existing noise environment will be within the ambient + 2 dB limit of the City of San Jose General Plan Goals and Policies Policy EC-1.2 and CEQA. Noise mitigation measures will not be required.

Impact: Less Than Significant

Mechanical Equipment

The air-conditioner at the site is a Carrier 24ABB360W340 and is sound rated at 76 dB PwL (A-weighted sound power on a hemispherical surface). At a distance of 8 ft. to the property line and an 8 dB reduction factor for the attenuation provided by the property line barrier, the air-conditioner noise level at the commercial property to the north will be up to 49 dBA.

At the west property line, the air-conditioner noise level will be up to 36 dBA. Thus, the equipment noise level will be within the 60 dBA limit of the City of San Jose Zoning Ordinance standard for non-residential land use.

Under an operational scenario of continuous operation from 7:00 AM to 10:00 PM, the noise exposure of 15 continuous daytime hours was calculated to be 49 dB DNL at the north property line and 36 dB DNL at the west property line. Thus, the noise exposure will be within the 60 dB DNL limit of the City of San Jose General Plan Goals and Policies. The air-conditioner noise will not add to the existing noise exposure in the parking lot of the adjacent commercial building nor at the west property line at Lincoln Glen Park. Noise mitigation measures will not be required.

Impact: Less Than Significant

Commercial Fuel Service

Commercial fuel carriers are expected to enter the site from Curtner Avenue and park near the west property line for refilling of the main tanks. A diesel tanker truck pump material into a receptacle generates a sound level of 75 dBA at a distance of 15 ft. from the front of the truck, Ref. (j). Tank refilling takes approximately 30 minutes to complete. Table IX, below, provides the analysis for the tank refilling operation at each of the three receptor locations. Tank refilling is expected to occur during daytime hours of 7:00 AM to 10:00 PM.

TABLE IX
Gas Service Tank Filling

	t min	SL, dBA	Dist	SL Leq(h)	DNL
Reference	30	75	15	72	
1116 Curtner Ave.	30	55	150	52	38
Lincoln Glen Park	30	71	25	68	54
North PL	30	57	60	54	40

As shown in the table, the sound levels of a commercial tanker refilling the tanks are 55 dBA at the 1116 Curtner Avenue residence, 71 dBA at the west property line at Lincoln Glen Park ad 57 dBA at the north property line of the commercial use in the parking lot. The noise exposures were calculated to be 38 dB DNL, 54 dB DNL and 40 dB DNL, respectively.

The noise exposures generated by tank refilling will not add to the noise environments at the Curtner Avenue residence nor at the commercial use to the north. Tank refilling will add 1 decibel to the noise environment at Lincoln Glen Park.

Combined Noise Exposures

Table X provides the combined noise exposures generated by the project, the existing ambient noise exposures and the cumulative (existing + project) noise exposures for each of the receptor locations.

TABLE X
Combined Noise Exposures, dB DNL

	Patron Fuel Operations	Convenience Store Parking	Mech. Equip	Commercial Fuel Service	Combined	Existing Ambient	Existing + Project	ΔdB
1116 Curtner Ave.	38	26		38	41	63	63	0
Lincoln Glen Park	47	54	36	54	57	62	63	1
North PL (west)	48	36	49	40	52	60	61	1
North PL (east)	51	26			51	63	63	0

The combined noise exposures at each of the receptor locations will be within the 55 dB DNL limit of Policy EC-1.3 at the residential receptor and within the 60 dB DNL limit of Policy EC-1.3 at the non-residential receptor locations.

The project will add 0 dB to the existing ambient noise environment at the residential receptor and the eastern end of the north property line (adjacent to the commercial building). The project will add 1 dB to the existing ambient noise environment at the west property line contiguous with Lincoln Glen Park 1 dB to the north property line behind the commercial building at their parking lot. The combined noise exposures will remain within the 60 dB DNL Normally Acceptable limit of the City of San Jose General Plan Goals and Policies standard of Policy EC-1.2.

As the project will be within the standards of the City of San Jose General Plan Goals and Policies EC-1.2 and EC-1.3, which includes the CEQA evaluation, noise mitigation measures will not be required.

Impact: Less Than Significant Impact.

Maximum Sound Levels (Zoning Ordinance Evaluations)

For informational purposes, the L_{max} sound levels recorded during vehicle passbys and parking operations range from 40-76 dBA at a normalized distance of 15 ft. from the side of the vehicle. Since the types of vehicles accessing the site can vary, L_{max} levels are governed by any given vehicle generating noise at any given location in relation to the receptor property boundary. Therefore, a car door closing or an engine starting near the property line can generate sound levels well above 70 dBA. Attempting to mitigate a very high, but very brief sound (the L_{max} is a one-second duration) would result in extremely high sound barriers, very large distances or no project.

Applying a "maximum" sound level limit, which has a precise technical definition, would preclude nearly all commercial activity near residential land uses. At the site currently, the maximum noise levels at measurement Location 2 along the west property line range from 68 to 96 dBA. The City of San Jose has, in the past, utilized short-term averages, hourly averages and 24-hour averages for the Zoning Ordinance limits under a conditional use permit.

Table X, below, provides the noise levels produced by the operation of the individual sources, such as a vehicle entering and exiting the site, or parking to visit the convenience store, the operations of the air-conditioner and refilling of the fuel tanks. Also shown are the maximum noise levels that will occur for each of these operations.

The total operational noise level of any given operation will be below or well within the range of the existing maximum noise levels. The actual maximum noise level of each operation will be below or within the range of the existing maximum noise levels at the receptor locations. The noise levels generated by the project will be typical for the existing noise environment.

TABLE XI
Operational and Maximum Noise Levels, dBA

	Patron Fuel Operations		Convience Store Parking		Mech. Equip		Commercial Fuel Service		Existing
	Operational Level	Lmax	Operational Level	Lmax	Operational Level	Lmax	Operational Level	Lmax	Lmax, dBA
1116 Curtner Ave.	48	46	40	46	21	21	54	63	71-96
Lincoln Glen Park	53	53	61	69	45	45	71	80	68-96
North PL (west)	44	40	47	50	49	49	57	66	62-90
North PL (east)	58	58	39	46	-	-	-	-	69-95

VII. Mitigation Measures

A. Project-Generated Short-Term Noise

The project-generated noise levels from the various sources under short-term conditions will exceed the 55 dBA and 60 dBA limits of the City of San Jose Zoning Ordinance. However, the sound levels will be below or in the range of the existing maximum sound levels and are indicative of the existing noise environment in the area. Compliance with the Zoning Ordinance standards for this type of project in the vicinity of residential or other noise sensitive land uses would require very high sound barriers or would preclude commercial uses near residential uses throughout the City of San Jose. For example, to reduce the maximum noise levels from car doors closing, engines starting or commercial delivery trucks, a noise control barrier 24 ft. high along the west property line would be required. This noise reduction measure is not feasible particularly as the existing maximum noise levels are higher than the project maximum noise levels.

We recommend that the City of San Jose allow exceedances of the Zoning Ordinance through the appropriate Use Permit.

VIII. Conclusions

In conclusion, there are no noise impacts to the project. The project-generated noise exposures will be within Policies EC-1.2 and EC-1.3 of the City of San Jose General Plan Goals and Policies and in turn, CEQA. The maximum noise levels from the project will exceed the standards of the City of San Jose Zoning Ordinance. However, the maximum noise levels at the receptor location will be lower than the existing noise levels and are typical of the area's noise environment. Noise reduction measures for the project are not recommended.

This report presents the results of a noise assessment study for the "Curtner Corners" service station and convenience store at 1103 Curtner Avenue in San Jose. The study findings for existing conditions are based on field measurements, information provided by the consulting traffic engineer and project sponsor and other data and are correct to the best of our knowledge. However, significant deviations in the predicted traffic volumes, service station or convenience store operations, changes in mechanical equipment, noise regulations or other future changes beyond our control may produce long-range noise results different from our estimates.

Report Prepared By:

EDWARD L. PACK ASSOC., INC.

Jeffrey K. Pack
President

APPENDIX A

References:

(a) The City of San Jose General Plan, (Envisions San Jose 2040), Chapter 3 Environmental Leadership, Section 3 - Environmental Considerations/Hazards, Sub-Section 1 "Noise and Vibration", November 1, 2011

(b) City of San Jose Municipal Code, Title 20, "The Zoning Ordinance", Part 7, Performance Standards, November 29, 2001

(c) 1103 Curtner Avenue Service Station Transportation Impact Analysis, by J. Daniel Takacs, December 19, 2016

(d) Proposed Site Plan, Expanded Convenience Store, 1103 Curtner Avenue, San Jose, CA 95125, by David J. Elliot & Associates, May 24, 2012

(e) Information on the Service Station Operations Provided by Mr. Mike Franges, Curtner Corners, by email to Edward L. Pack Associates, Inc., October 27, 2017

(f) Highway Research Board, "Highway Noise – A Design Guide for Highway Engineers", Report 117, 1971

(g) "Noise Assessment Study for the St. Andrew's Paris and School Remodel, Saratoga Avenue, Saratoga", by Edward L. Pack Associates, Inc., Project No. 33-009-1, June 11, 2002

(h) "Noise Assessment Study for the Planned Parking Structure, Leighton Business Center, 39350 Civic Center Drive, Fremont", by Edward L. Pack Associates, Inc., Project No. 43-029, July 21, 2011

(i) "Noise Assessment Study for the Planned Beth Haim Synagogue, Holbrook Drive, Danville", by Edward L. Pack Associates, Inc., Project No. 34-021, June 19, 2002

(j) "Noise Assessment Study for the Sugar Delivery and Silo Upgrade, Ghirardelli Chocolate Company, 1111 139th Avenue, San Leandro", by Edward L. Pack Associates, Inc., Project No. 48-061, November 25, 2016

APPENDIX B

Noise Standards, Terminology, Instrumentation,

1. Noise Standards

A. City of San Jose General Plan Goals and Policies

The City of San Jose General Plan "Envision San Jose 2040", adopted November 1, 2011, Chapter 3 "Environmental Leadership" contains noise environment goals and policies.

Goal EC-1 – Community Noise Levels and Land Use Compatibility

Minimize the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies.

Policies – 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.

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

	EXTERIOR NOISE EXPOSURE (dB DNL)					
Land Use Category	55	60	65	70	75	80
Residential, Hotels and Motels, Hospitals and Residential Care						
Outdoor Sports and Recreation, Neighborhood Parks, Playgrounds						
Schools, Libraries, Museums, Meeting Halls, Churches						
Office Buildings, Business, Commercial and Professional						
Sports Arenas, Outdoor Spectator Sports						
Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters						

	Normally Acceptable
	Conditionally Acceptable
	Unacceptable

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 Accept- able" 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-1.4 Include appropriate noise attenuation techniques in the design of all new General Plan streets projected to adversely impact noise sensitive uses.

EC-1.5 Encourage the State Department of Transportation and County transportation agencies to provide visually pleasing sound attenuation devices on all new and existing freeways and expressways.

EC-1.6 Regulate the effects of operational noise from existing and new industrial and commercial development on adjacent uses through noise standards in the City's Municipal Code.

EC-1.7 Require construction operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City's Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

For such large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

EC-1.8 Allow commercial drive-through uses only when consistency with the City's exterior noise level guidelines and compatibility with adjacent land uses can be demonstrated.

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

EC-1.10 Monitor Federal legislative and administrative activity pertaining to aircraft noise for new possibilities for noise-reducing modifications to aircraft engines beyond existing Stage 3 requirements. Encourage the use of quieter aircraft at the San José International Airport.

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

EC-1.12 Encourage the Federal Aviation Administration to enforce current cruise altitudes that minimize the impact of aircraft noise on land use.

Actions – Community Noise Levels and Land Use Compatibility

EC-1.13 Update noise limits and acoustical descriptors in the Zoning Code to clarify noise standards that apply to land uses throughout the City.

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

Goal EC-2 - Vibration

Minimize vibration impacts on people, residences, and business operations.

Policies - Vibration

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-2.2 Require new sources of ground-borne vibration, such as transit along fixed rail systems or the operation of impulsive equipment, to minimize vibration impacts on existing sensitive land uses to levels at or below the guidelines of the Federal Transit Administration.

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.

EC-2.4 Consider the effects of ground-borne vibration in the analysis for potential Land Use / Transportation Diagram changes.

2. Terminology

A. Statistical Noise Levels

Due to the fluctuating character of urban traffic noise, statistical procedures are needed to provide an adequate description of the environment. A series of statistical descriptors have been developed which represent the noise levels exceeded a given percentage of the time. These descriptors are obtained by direct readout of the Sound Level Meters and Noise Analyzers. Some of the statistical levels used to describe community noise are defined as follows:

L_1 - A noise level exceeded for 1% of the time.

L_{10} - A noise level exceeded for 10% of the time, considered to be an "intrusive" level.

L_{50} - The noise level exceeded 50% of the time representing an "average" sound level.

L_{90} - The noise level exceeded 90 % of the time, designated as a "background" noise level.

L_{eq} - The continuous equivalent-energy level is that level of a steady-state noise having the same sound energy as a given time-varying noise. The L_{eq} represents the decibel level of the time-averaged value of sound energy or sound pressure squared and is used to calculate the DNL and CNEL.

B. Day-Night Level (DNL)

Noise levels utilized in the standards are described in terms of the Day-Night Level (DNL). The DNL rating is determined by the cumulative noise exposures occurring over a 24-hour day in terms of A-Weighted sound energy. The 24-hour day is divided into two sub-periods for the DNL index, i.e., the daytime period from 7:00 a.m. to 10:00 p.m., and the nighttime period from 10:00 p.m. to 7:00 a.m. A 10 dBA weighting factor is applied (added) to the noise levels occurring during the nighttime period to account for the greater sensitivity of people to noise during these hours. The DNL is calculated from the measured L_{eq} in accordance with the following mathematical formula:

$$DNL = \left[[(10\log_{10}(10^{\Sigma Leq(7\text{-}10)})) \times 15] + [((10\log_{10}(10^{\Sigma Leq(10\text{-}7))})+10) \times 9]\right]/24$$

C. A-Weighted Sound Level

The decibel measure of the sound level utilizing the "A" weighted network of a sound level meter is referred to as "dBA". The "A" weighting is the accepted standard weighting system used when noise is measured and recorded for the purpose of determining total noise levels and conducting statistical analyses of the environment so that the output correlates well with the response of the human ear.

3. Instrumentation

The on-site field measurement data were acquired by the use of one or more of the precision acoustical instruments shown below. The acoustical instrumentation provides a direct readout of the L exceedance statistical levels including the equivalent-energy level (L_{eq}). Input to the meters was provided by a microphone extended to a height of 5 ft. above the ground. The meter conforms to ANSI S1.4 for Type 1 instruments. The "A" weighting network and the "Fast" response setting of the meter were used in conformance with the applicable ISO and IEC standards. All instrumentation was acoustically calibrated before and after field tests to assure accuracy.

Bruel & Kjaer 2231 Precision Integrating Sound Level Meter
Larson Davis LDL 812 Precision Integrating Sound Level Meter
Larson Davis 2900 Real Time Analyzer
Tascam DR-40 Linear PCM Digital Audio Recorder

APPENDIX C

Noise Level Measurement Data and Calculation Tables

DNL CALCULATIONS

CLIENT: CURTNER CORNERS, INC.
FILE: 49-058
PROJECT: CURTNER CORNERS SERVICE STATION
DATE: 10/8/2017
SOURCE: EXISTING AMBIENT/CURTNER AVE. & LINCOLN AVE.

LOCATION 1	1116 Curtner Ave			
Dist. To Source	55 ft.			
TIME	Leq	10^Leq/10		
7:00 AM	58.1	645654.2		
8:00 AM	62.4	1737800.8		
9:00 AM	64.4	2754228.7		
10:00 AM	61.9	1548816.6		
11:00 AM	61.5	1412537.5		
12:00 PM	61.6	1445439.8		
1:00 PM	65.6	3630780.5		
2:00 PM	61.4	1380384.3		
3:00 PM	65.6	3630780.5		
4:00 PM	62.8	1905460.7		
5:00 PM	62.1	1621810.1		
6:00 PM	62.7	1862087.1		
7:00 PM	60.9	1230268.8		
8:00 PM	60.6	1148153.6		
9:00 PM	59.7	933254.3	SUM=	26887458
10:00 PM	56.9	489778.8	Ld=	62.5
11:00 PM	56.4	436515.8		
12:00 AM	55.3	338844.2		
1:00 AM	53.6	229086.8		
2:00 AM	50.7	117489.8		
3:00 AM	48.7	74131.0		
4:00 AM	48.5	70794.6		
5:00 AM	50.8	120226.4		
6:00 AM	54.9	309029.5	SUM=	2185897
		1.0	Ln=	53.9
		74.3		
	Nighttime Level=	73.4		
	DNL=	**63**		
	24-Hour Leq=	60.8		

LOCATION 2	West Property Line			
Dist. To Source	97 ft.			
TIME		10^Leq/10		
7:00 AM	56.3	426579.5		
8:00 AM	60.4	1096478.2		
9:00 AM	63.6	2290867.7		
10:00 AM	60.7	1174897.6		
11:00 AM	60.2	1047128.5		
12:00 PM	60.3	1071519.3		
1:00 PM	64.6	2884031.5		
2:00 PM	60.2	1047128.5		
3:00 PM	63.5	2238721.1		
4:00 PM	63.5	2238721.1		
5:00 PM	61.0	1258925.4		
6:00 PM	61.9	1548816.6		
7:00 PM	60.7	1174897.6		
8:00 PM	59.9	977237.2		
9:00 PM	59.4	870963.6	SUM=	21346914
10:00 PM	56.5	446683.6	Ld=	61.5
11:00 PM	55.4	346736.9		
12:00 AM	53.8	239883.3		
1:00 AM	53.3	213796.2		
2:00 AM	50.2	104712.9		
3:00 AM	48.2	66069.3		
4:00 AM	49.0	79432.8		
5:00 AM	49.6	91201.1		
6:00 AM	54.5	281838.3	SUM=	1870354
			Ln=	53.2
	Daytime Level=	73.3		
	Nighttime Level=	72.7		
	DNL=	**62**		
	24-Hour Leq=	59.9		

DNL CALCULATIONS

CLIENT: CURTNER CORNERS, INC.
FILE: 49-058
PROJECT: CURTNER CORNERS SERVICE STATION
DATE: 10/8/2017
SOURCE: EXISTING AMBIENT/CURTNER AVE. & LINCOLN AVE.

LOCATION 3	North Property Line			
Dist. To Source	138 ft.			
TIME	Leq	10^Leq/10		
7:00 AM	52.0	158489.3		
8:00 AM	54.8	301995.2		
9:00 AM	58.2	660693.4		
10:00 AM	55.3	338844.2		
11:00 AM	54.8	301995.2		
12:00 PM	54.9	309029.5		
1:00 PM	59.2	831763.8		
2:00 PM	54.8	301995.2		
3:00 PM	58.1	645654.2		
4:00 PM	58.1	645654.2		
5:00 PM	55.6	363078.1		
6:00 PM	56.5	446683.6		
7:00 PM	55.3	338844.2		
8:00 PM	54.5	281838.3		
9:00 PM	54.0	251188.6	SUM=	6177747
10:00 PM	51.1	128825.0	Ld=	56.1
11:00 PM	50.0	100000.0		
12:00 AM	48.5	70794.6		
1:00 AM	47.7	58884.4		
2:00 AM	46.6	45708.8		
3:00 AM	43.2	20893.0		
4:00 AM	43.6	22908.7		
5:00 AM	45.1	32359.4		
6:00 AM	49.3	85113.8	SUM=	565488
			Ln=	48.0
	Daytime Level=	67.9		
	Nighttime Level=	67.5		
	DNL=	**57**		
	24-Hour Leq=	54.5		