Appendix I

Environmental Noise Assessment

Environmental Noise Assessment

E. & J. Gallo Winery Expansion

Merced County, California

Job # 2011-162

Prepared For:

IFC International

620 Folsom Street, Suite 200
San Francisco, CA 94107

Attn: Seema Sairam

Prepared By:

j.c. brennan & associates, Inc.

Jim Brennan
President
Member, Institute of Noise Control Engineering

October 18, 2011

j.c. brennan & associates
consultants in acoustics

P.O. Box 6748 - 263 Nevada Street - Auburn, California 95603 -p: (530) 823-0960 -f: (530) 823-0961

INTRODUCTION

This section describes the existing noise environment in the area of the proposed E. & J. Gallo Winery, the potential of the proposed winery expansion project to significantly increase noise levels due to project construction and increased truck traffic on the local roadway network, and the potential of the proposed project expansion to expose existing noise sensitive uses to excessive noise levels. The relevant noise standards are contained within the existing Merced County General Plan Noise Element, and the Merced County Zoning Code.

PROJECT DESCRIPTION

The project includes the expansion of the wine production capacity to 628,000 tons per year from the existing 538,000 tons per year. The project will be constructed in three phases which will ultimately result in the installation of 70 new fermentation tanks, 123 new wine storage tanks, a 10,000 square foot filtration building, a 45,000 square foot bottling plant, and a 15,000 square foot administration building. Additional cooling will require seven (7) new evaporative condensers and associated compressors. The project expansion area is located on the east side of the existing facility. Figure 1 shows the proposed expansion area.

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[1]. 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.

[1] For an explanation of these terms, see Appendix A: "Acoustical Terminology"

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.

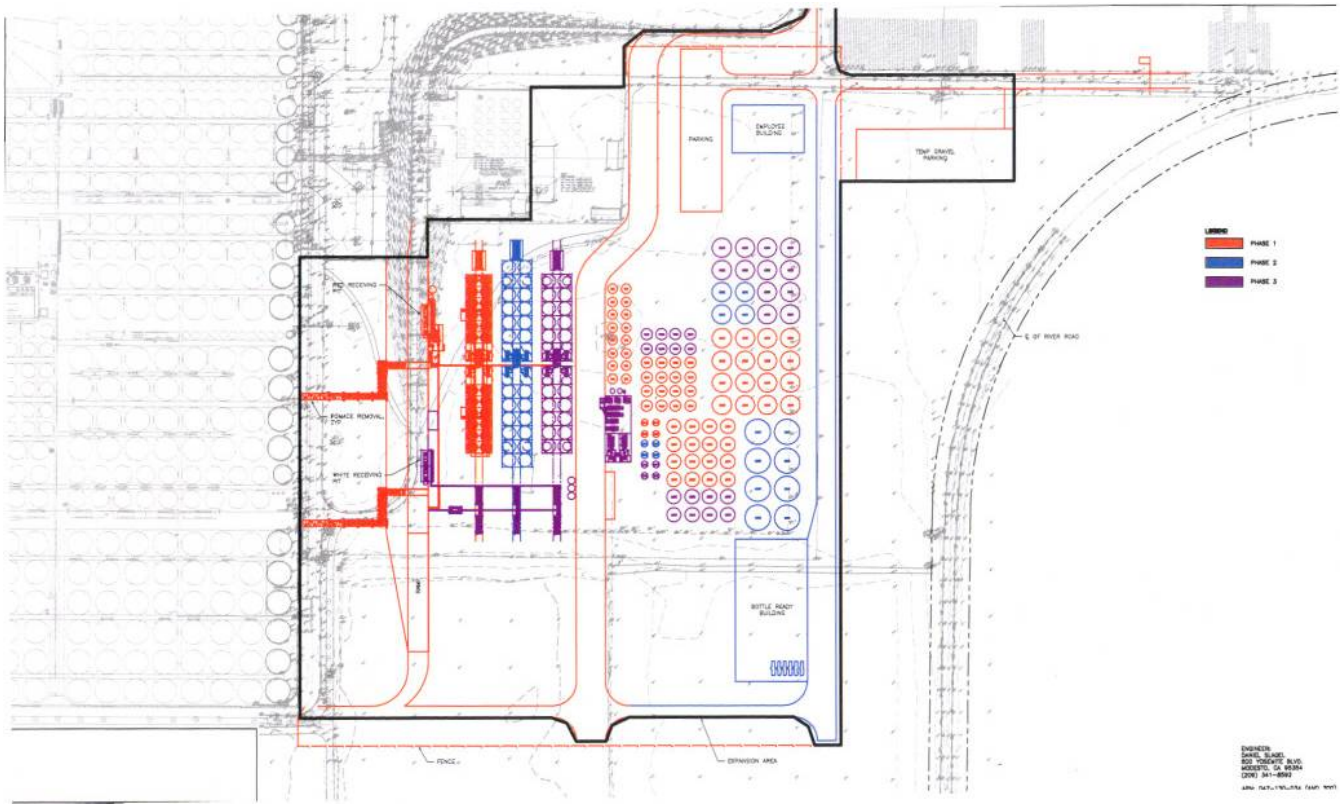
Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a 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, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (L_{dn}) 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 L_{dn} 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.

Figure 1

E. & J. Gallo Expansion Area



Source: E. & J. Gallo Winery

j.c. brennan & associates
consultants in acoustics

TABLE 1
TYPICAL NOSE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft)	--100--	
Gas Lawn Mower at 1 m (3 ft)	--90--	
Diesel Truck at 15 m (50 ft), at 80 km/hr (50 mph)	--80--	Food Blender at 1 m (3 ft) Garbage Disposal at 1 m (3 ft)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft)	--70--	Vacuum Cleaner at 3 m (10 ft)
Commercial Area Heavy Traffic at 90 m (300 ft)	--60--	Normal Speech at 1 m (3 ft)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

Source: Caltrans, Technical Noise Supplement, Traffic Noise Analysis Protocol. November 2009.

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.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6 dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

EXISTING CONDITIONS

Sources of ambient noise in the project vicinity are primarily associated with operations at the E. & J. Gallo Winery, associated truck traffic along the local roadway network, and agricultural operations.

EXISTING NOISE RECEPTORS

Some land uses are considered more sensitive to ambient noise levels than others. Land uses often associated with sensitive receptors generally include residences, schools, libraries and hospitals. Sensitive noise receptors may also include threatened or endangered noise sensitive biological species, although many jurisdictions have not adopted noise standards for wildlife areas. Noise sensitive land uses are typically given special attention in order to achieve protection from excessive noise.

Sensitivity is a function of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities involved. In the vicinity of the E. & J. Gallo Winery, the land uses are primarily agricultural with some single family residences. The nearest residences are located approximately 2,000 feet from the Project Expansion Area.

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 2.

Larson Davis Laboratories (LDL) Model 820 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 maximum, average and mean noise level at each site during the survey. The maximum value, denoted Lmax, represents the highest noise level measured during the measurement period. The average value, denoted Leq, represents the energy average of all of the noise received by the sound level meter microphone during the monitoring period, and the mean value denoted L50 represents the sound level exceeded 50% of the time during the measurement period. Table 2 shows the summary of the noise measurement data. Figures 3 and 4 graphically show the results of the continuous measurement results.

TABLE 2
SUMMARY OF EXISTING BACKGROUND NOISE MEASUREMENT DATA
E. & J. GALLO WINERY VICINITY - MERCED COUNTY, CALIFORNIA

Site	Date	Type and Time of Day/Night	Measured Noise Levels, dBA						
				Daytime (7am-10pm)			Nighttime (10pm-7am)		
			L_{dn}	L_{eq}	L_{max}	L_{50}	L_{eq}	L_{max}	L_{50}
1	10/10-11/11	Continuous 24-hours	53.8	51.3	68.4	45	46.1	60.9	44
2	10/10-11/11	Continuous 24-hours	53.4	52.3	62.1	40	44.7	57.2	40
A	10/10/11	Short-term @ 10:50 a.m.	N/A	54.5	56.0	53			
B	10/10/11	Short-term @ 11:15 a.m.	N/A	46.2	47.9	46			
		Short-term @ 9:30 p.m.	N/A	44.5	48.2	43			
C	10/10/11	Short-term @ 11:35 a.m.	N/A	54.3	76.2	50			
		Short-term @ 9:50 p.m.	N/A	45.2	68.2	40			
D	10/10/11	Short-term @ 12: 40 p.m.	N/A	44.1	66.2	40			
		Short-term @ 10:20 p.m.	N/A				44.0	54.4	43

Source: j.c. brennan & associates, Inc., 2011

NOISE MEASUREMENT LOCATIONS

Site 1 – This was a 24-hour noise monitoring site, located at the existing Gallo Administration Building and Employee Housing, located at ~ 2,000 feet south of the Winery ;

Site 2 – This was a 24-hour noise monitoring site, located at additional Employee Housing, at ~ 4,500 feet southeast of the Winery ;

Site A – This was a short-term noise monitoring site, located east of the existing winery production area, and on the Expansion Area ;

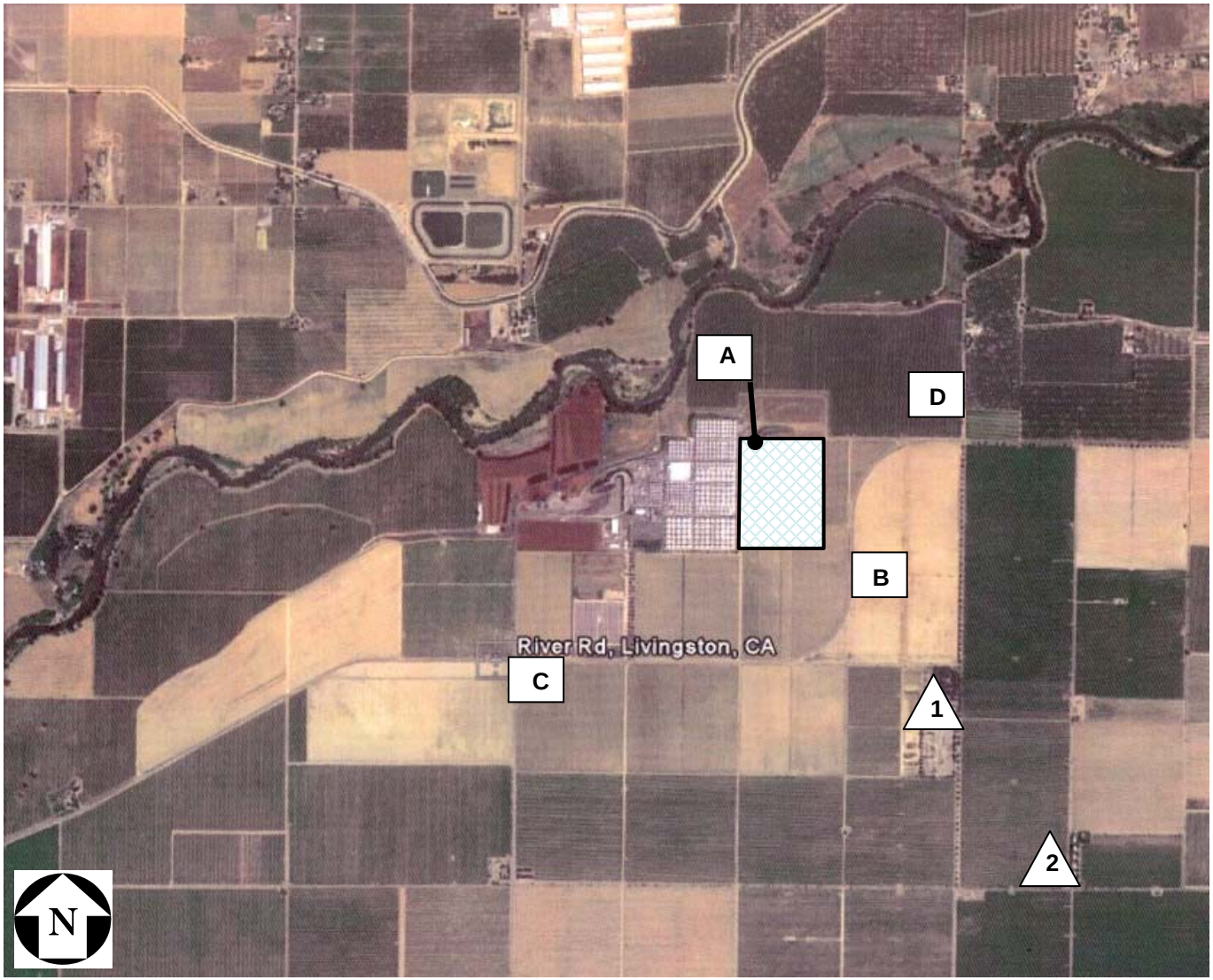
Site B – This was a short-term noise monitoring site, located 300 feet east of the Expansion Area ;

Site C – This was short-term noise monitoring site, located near the corner of Griffith Road and River Road ;

Site D – This site was located approximately 300 feet north of River Road, and 1,600 feet northeast of the expansion area.

Figure 2

Noise Monitoring Locations



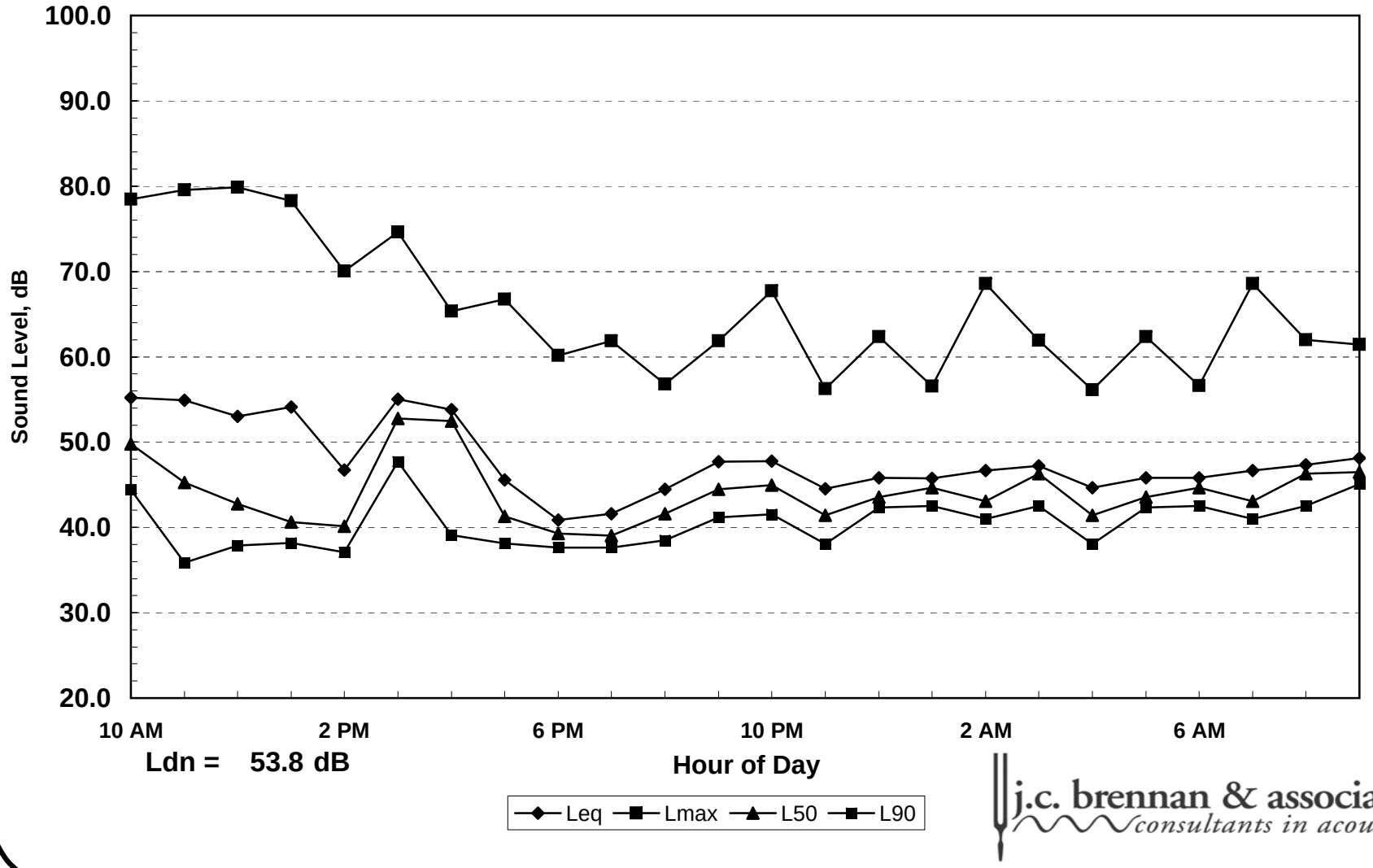
Continuous 24-hour Noise Monitoring Sites

Short-term Noise Monitoring Sites

Expansion Area

j.c. brennan & associates
consultants in acoustics

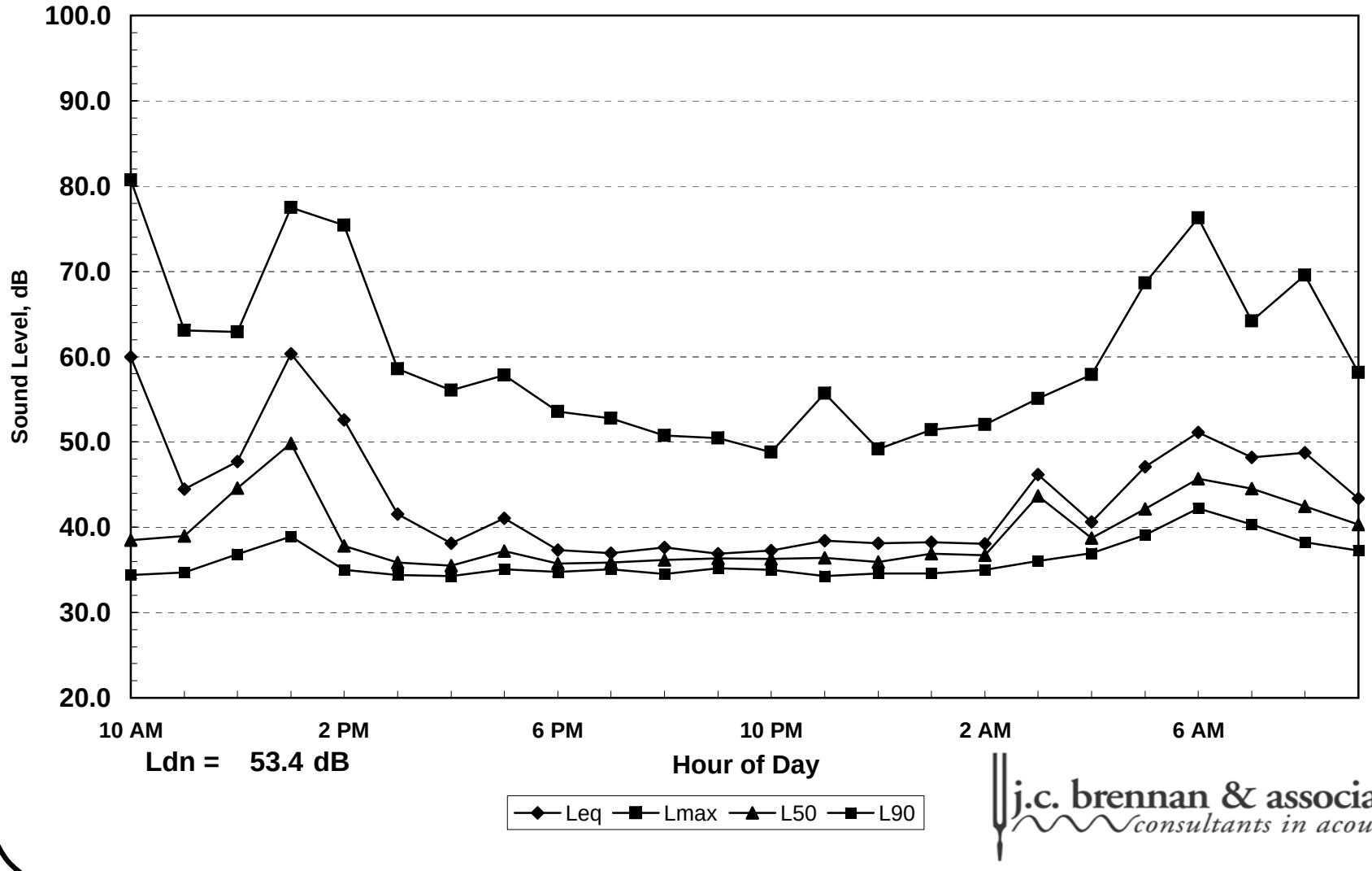
Figure 3
Gallo Livingston Expansion
24hr Continuous Noise Monitoring - Site 1 - Ranch House
October 10-11, 2011



Ldn = 53.8 dB

j.c. brennan & associates
consultants in acoustics

Figure 4
Gallo Livingston Expansion
24hr Continuous Noise Monitoring - Site 2 - Employee Housing
October 10-11, 2011 (Monday-Tuesday)



Ldn = 53.4 dB

j.c. brennan & associates
consultants in acoustics

ON-SITE NOISE SOURCES

Existing noise sources from on-site operations at the E. &. J. Gallo Winery includes boilers, cooling towers grape presses, rotary screens, electric motors for conveyor systems, and on-site truck traffic. The boilers and towers are located on the west side of the facility. Currently, presses and rotary screens are located on both the west and east sides of the facility, and truck traffic occurs along the northern perimeter of the facility.

The noise level data was collected for varying operations of the facility, including deliveries of grapes to the facility, presses, and rotary screens. The primary noise from boilers and cooling towers are confined to the west and southwest sides of the facility, and the majority of existing noise from the facility is shielded on the east side by the existing fermentation tanks.

It should be noted that the noise level data shown in Table 2 is nearly identical to the measured noise levels collected at the E. & J. Gallo facility, and contained in the existing General Plan Noise Element Background Report.

EXISTING ROADWAY TRUCK NOISE LEVELS

To predict existing noise levels due to truck traffic on the local roadways, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. 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. The FHWA model was developed to predict hourly Leq values for free-flowing traffic conditions.

Truck traffic volumes for the existing conditions were obtained from the project applicant. Assignment of truck traffic to the varying roadway segments was based upon field observations. All truck traffic noise calculations assume peak periods during the "crush" season. Vehicle speeds were based upon field observations. Table 3 shows the existing truck traffic noise levels in terms of Ldn at a reference distance of 75 feet from the centerlines of the roadways. This table also shows the distances to existing traffic noise contours. A complete listing of the FHWA Model input data is contained in Appendix B.

TABLE 3
EXISTING TRAFFIC NOISE LEVELS AND DISTANCES TO CONTOURS

Roadway	Segment	L_{dn} @ 75 Feet (dB)	Distance to Contours (feet)		
			70 dB	65 dB	60 dB
River Road	East of the Gallo Main En trance	55 dBA Ldn	7	16	34
River Road	West of the Gallo Main Entrance	62 dBA Ldn	22	48	102
Griffith Avenue	South of River Road	50 dBA Ldn	3	8	16

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

Source: FHWA-RD-77-108 with inputs from Gallo, and j.c. brennan & associates, Inc. 2011.

REGULATORY CONTEXT

Existing Merced County General Plan Noise Element

The Merced County General Plan Noise Element establishes goals, policies and criteria for determining land use compatibility with major noise sources within the community. The following provides the applicable goals, policies and criteria for evaluating the feasibility and potential noise impacts associated with Project Expansion

GOAL 1:
All citizens of the County free from the harmful effects of excessive noise.

Policy 3:
Any existing residentially designated areas that are identified to be exposed to exterior noise levels greater than 65 dBA Ldn shall be considered "noise impacted" and should be reviewed by the County to identify possible means to correct the identified noise/land use incompatibilities.

Goal 2:
Noise generating land uses and facilities important to the economic health of the County are not adversely affected by incompatible land uses.

Objective 2.A.:
The current operation and expansion of existing Commercial and Industrial designated areas are not significantly impaired by the encroachment of new incompatible noise sensitive land uses.

Objective 2.D.:
Authorized noise generating facilities in Agricultural and Foothill Pasture designated areas are not significantly impacted by encroachment of new incompatible noise sensitive land uses.

TABLE 4
LAND USE COMPATIBILITY STANDARDS FOR NON-TRANSPORTATION NOISE SOURCES

Noise Level Descriptor	Maximum Acceptable Noise Level	
	Daytime (7 am - 10 pm)	Nighttime (10 pm - 7 am)
Hourly Leq, dBA	55	45
Maximum Level (Lmax), dBA	75	65

SOURCE: MERCED COUNTY GENERAL PLAN NOISE ELEMENT

For transportation noise sources, such as roadway traffic or railroad line operations, the Merced County General Plan establishes an exterior noise level standard for residential uses of 65 dBA Ldn, which is applied at the outdoor activity areas. The Noise Element also

establishes an interior noise level criterion of 45 dB Ldn. This standard has been developed to provide an interior noise environment which allows for sleep and relaxation.

MERCED COUNTY ZONING CODE

Chapter 18.41.070 of the Merced County Zoning Code provides the following criteria for evaluating industrial noise sources and construction-related noise levels:

Noise generated by mechanical equipment, buzzers, bells, loud speakers or other noise generating devices shall comply with the noise standards below at any boundary line of the parcel, except fire protection devices, burglar alarms and church bells. The following general plan standards for unacceptable noise levels shall apply:

A. If the proposed use is adjacent to property that is zoned for residential use, the maximum noise level shall not exceed 65dBA[1] Ldn[2] or 75dBA Lmax[3] at the property line.

B. If the proposed use is adjacent to a parcel that is not zoned for residential land use, the maximum noise level at the property line shall not exceed 70dBA Ldn or 8OdBA Lmax at the property line.

C. The maximum noise level for uses receiving noise shall be 65dBA Ldn for uses in Residential Zones and 70dBA Ldn for Institutional, Commercial, Industrial and Agricultural Zones[4].

1. Elevated Noise Level During Construction. During construction, the noise level may be temporarily elevated. To minimize the impact, all construction in or adjacent to urban areas shall follow the following procedures for noise control: Construction hours shall be limited to the daytime hours between seven a.m. and six p.m., and all construction equipment shall be properly muffled and maintained.

1. dBA = Decibel with “A” level weighting scale similar to the human ear.

2. Ldn = Day/night average sound level during a 24-hour day.

3. Lmax = The maximum noise level recorded during a single event.

4. Refer to Chapter 18.38 of this code for design requirements if a noise barrier structure is required to meet the noise standards.

(Ord. 1586 (part), 1977).

PROPOSED MERCED COUNTY GENERAL PLAN UPDATE NOISE ELEMENT

Merced County is in the process of updating the General Plan. The Noise Element of the General Plan Update contains policies and criteria for evaluating land use compatibility, based upon acceptable noise exposure. For transportation noise sources such as roadway traffic, the noise level criteria contained in the existing General Plan and the General Plan Update are essentially the same, and utilize an exterior noise level of 65 dBA Ldn as an acceptable noise level. An interior noise level standard of 45 dBA Ldn is also applied.

For non-transportation noise sources, such as industrial noise sources, or mobile on-site noise sources, the General Plan Update Noise Element establishes hourly noise level criteria for daytime and nighttime hours. Table HS-2 of the General Plan Update, and Table 5 of this report provides those proposed noise level performance standards.

Table 5

(Table HS-2 of the Proposed General Plan Update)
Non-Transportation Noise Standards Median (L50) / Maximum (Lmax) [1]

Receiving Land Use	Outdoor Activity Areas[2]		Interior[3]	Notes
	Daytime	Nighttime	Day or Night	
Residential	55 / 75	50 / 70	35 / 55	
Transient Lodging	55 / 75	--	35 / 55	4
Hospitals, Nursing Homes	55 / 75	--	35 / 55	5,6
Theaters, Auditoriums,	--	--	30 / 50	6
Churches, Meeting Halls, Schools	55 / 75	--	35 / 60	6
Office Buildings	60 / 75	--	45 / 65	6
Commercial Buildings	55 / 75	--	45 / 65	6
Playgrounds, Parks	65/ 75	--	--	6
Industry	60 / 80	--	50 / 70	6

1 These standards shall be reduced by 5 dB for sounds consisting primarily of speech or music, or for recurring impulsive noises. If the existing ambient noise level exceeds the standards in this table, then the noise level standards shall be increased at 5 dB increments to encompass the ambient.

2 Sensitive Outdoor Areas include primary outdoor activity areas associated with any given land use at which noise-sensitivity exists and the location at which the County's exterior noise level standards are applied.

3 Sensitive Interior Areas includes any interior area associated with any given land use at which noise-sensitivity exists and the location at which the County's interior noise level standards are applied. Interior noise level standards are applied within noise-sensitive areas of the various land uses with windows and doors in the closed positions.

4 Outdoor activity areas of transient lodging facilities are not commonly used during nighttime hours.

5 Since hospitals are often noise-generating uses, the exterior noise level standards are applicable only to clearly identified areas designated for outdoor relaxation by either hospital staff or patients.

6 The outdoor activity areas of these uses (if any) are not typically used during nighttime hours.

7 Where median (L50) noise level data is not available for a particular noise source, average (Leq) values may be substituted for the standards of this table provided the noise source operates for at least 30 minutes. If the source operates less than 30 minutes the maximum noise level standards shown shall apply.

Vibration Standards

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

Merced County does not contain specific policies pertaining to vibration levels. However, vibration levels associated with construction activities are discussed in this report.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 6, which was developed by Caltrans, shows the vibration levels which would normally be required to result in damage to structures. The vibration levels are presented in terms of peak particle velocity in inches per second.

Table 6 indicates that the threshold for damage to structures ranges from 2 to 6 in/sec. One-half this minimum threshold or 1 in/sec p.p.v. is considered a safe criterion that would protect against architectural or structural damage. The general threshold at which human annoyance could occur is notes as 0.1 in/sec p.p.v.

Table 6
Effects of Vibration on People and Buildings

Peak Particle Velocity inches/second	Peak Particle Velocity mm/second	Human Reaction	Effect on Buildings
0-.006	0.15	Imperceptible by people	Vibrations unlikely to cause damage of any type
.006-.02	0.5	Range of Threshold of perception	Vibrations unlikely to cause damage of any type
.08	2.0	Vibrations clearly perceptible	Recommended upper level of which ruins and ancient monuments should be subjected
0.1	2.54	Level at which continuous vibrations begin to annoy people	Virtually no risk of architectural damage to normal buildings
0.2	5.0	Vibrations annoying to people in buildings	Threshold at which there is a risk of architectural damage to normal dwellings
1.0	25.4		Architectural Damage
2.0	50.4		Structural Damage to Residential Buildings
6.0	151.0		Structural Damage to Commercial Buildings

Source: Survey of Earth-borne Vibrations due to Highway Construction and Highway Traffic, Caltrans February 2002.

Subjective Reaction to Changes in Noise Levels

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.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6 dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

CEQA guidelines state that implementation of the project would result in significant noise impacts if the project would result in either of the following:

a. Exposure of persons to or generation of noise levels in excess of standards established in the San Benito County General Plan Noise Element or the San Benito County Zoning Ordinance.

b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. Based upon the previous discussion, a 5 dB change (Level required before any noticeable change in human response would be expected) in noise levels will be considered to be a significant increase in noise levels.

d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. Based upon the previous discussion, a 5 dB change (Level required before any noticeable change in human response would be expected) in noise levels will be considered to be a significant increase in noise levels.

e. For a project located within an airport land use plan or, where such a plan has not be adopted, within two miles of a public airport or public use airport, where the project would expose people residing or working in the area to excessive noise levels.

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

The project site is not located within the vicinity of a public or private airport, therefore, items "e" and "f" would not apply.

METHOD OF ANALYSIS

Traffic Noise Impact Assessment Methodology

To assess noise impacts due to project-related truck traffic increases on the local roadway network, traffic noise levels are predicted at a representative distance for both Existing and Existing + Project conditions for the Proposed Project. Noise impacts are identified at existing noise-sensitive areas if the noise level increases which result from the project or alternative exceed the County's significance threshold or if there is a significant increase in roadway truck traffic noise levels.

Once again, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The model is based upon the Calveno reference emissions 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. The FHWA model was developed to predict hourly Leq values for

free-flowing traffic conditions. To predict traffic noise levels in terms of Ldn, it is necessary to adjust the input volume to account for the day/night distribution of traffic.

Truck traffic volumes for the existing conditions, and the increase in truck traffic volumes associated with the expansion were obtained from the project applicant. Assignment of truck traffic to the varying roadway segments was based upon information provided by the applicant. All truck traffic noise calculations assume peak periods during the "crush" season. Vehicle speeds were based upon field observations. Table 7 shows the existing truck traffic noise levels and the Existing + Project truck traffic noise levels in terms of Ldn at a reference distance of 75 feet from the centerlines of the roadways. This table also shows the distances to existing traffic noise contours. A complete listing of the FHWA Model input data is contained in Appendix B.

TABLE 7
PREDICTED EXISTING AND EXISTING PLUS PROJECT TRUCKE TRAFFIC NOISE LEVELS
E. & J. GALLO EXPANSION

Roadway	Segment	Traffic Noise Levels (Ldn) @ 75' of Roadway C.L.			Distance to Contours (feet) Existing			Distance to Contours (feet) Existing Plus Project		
		Existing	Existing Plus Project	Change	70 Ldn	65 Ldn	60 Ldn	70 Ldn	65 Ldn	60 Ldn
River Road	East of Gallo Entrance	55 dBA	55 dBA	0 dBA	7	16	34	8	17	37
River Road	West of Gallo Entrance	62 dBA	63 dBA	+1 dBA	22	48	102	24	53	113
Griffith Road	South of River Road	50 dBA	51 dBA	+1 dBA	3	8	16	4	8	18

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

Source: FHWA-RD-77-108 with inputs from E. & J. Gallo, and j.c. brennan & associates, Inc. 2011.

Gallo Plant Expansion Noise Impacts Methodology

The primary noise sources associated with the Gallo Plant Expansion, based upon the Phase 3 Buildout, will include an additional129 trucks, the process of dumping grapes into the rotary screens, and additional presses and conveyors. Other improvements which are not considered to be noise sources include 70 fermentation tanks, 123 wine storage tanks, equipment inside of the fermentation building, equipment inside of the bottling plant, administration building and employee parking areas.

On-Site Truck Traffic Noise Levels

On-site truck circulation is a potential noise source. Truck circulation routes are shown in Figure 5. As a means of determining the noise levels associated with truck circulation, j.c. brennan & associates, Inc. conducted noise level measurements of truck passbys on the existing circulation route on October 10, 2011. The noise measurements were conducted at a distance of 50 feet from the circulation drive. Typical measured sound exposure levels (SEL) of truck passbys were 74.2 dBA for arrivals and 75.8 dBA for departures. To evaluate the potential noise impact associated with the additional 129 trucks on the truck circulation route, the following formula can be used:

76 + 10 * Logarithm (129) – 49.4, where:

76 is equal to the mean SEL associated with a truck passby, 129 is the number of additional project-related truck operations per day, and 49.4 is 10 times the logarithm of the number of seconds in a day.

The equation above results in an Ldn associated with the additional trucks on the circulation route of 48 dBA Ldn, at a distance of 50 feet from the circulation route. The total Ldn from the total daily number of trucks (1,068) is 57 dBA Ldn, at a distance of 50 feet from the circulation route. The increase in the overall Ldn due to the increased number of trucks is 1 dBA. The noise levels associated with truck operations at the nearest property line is approximately 30 dBA Ldn.

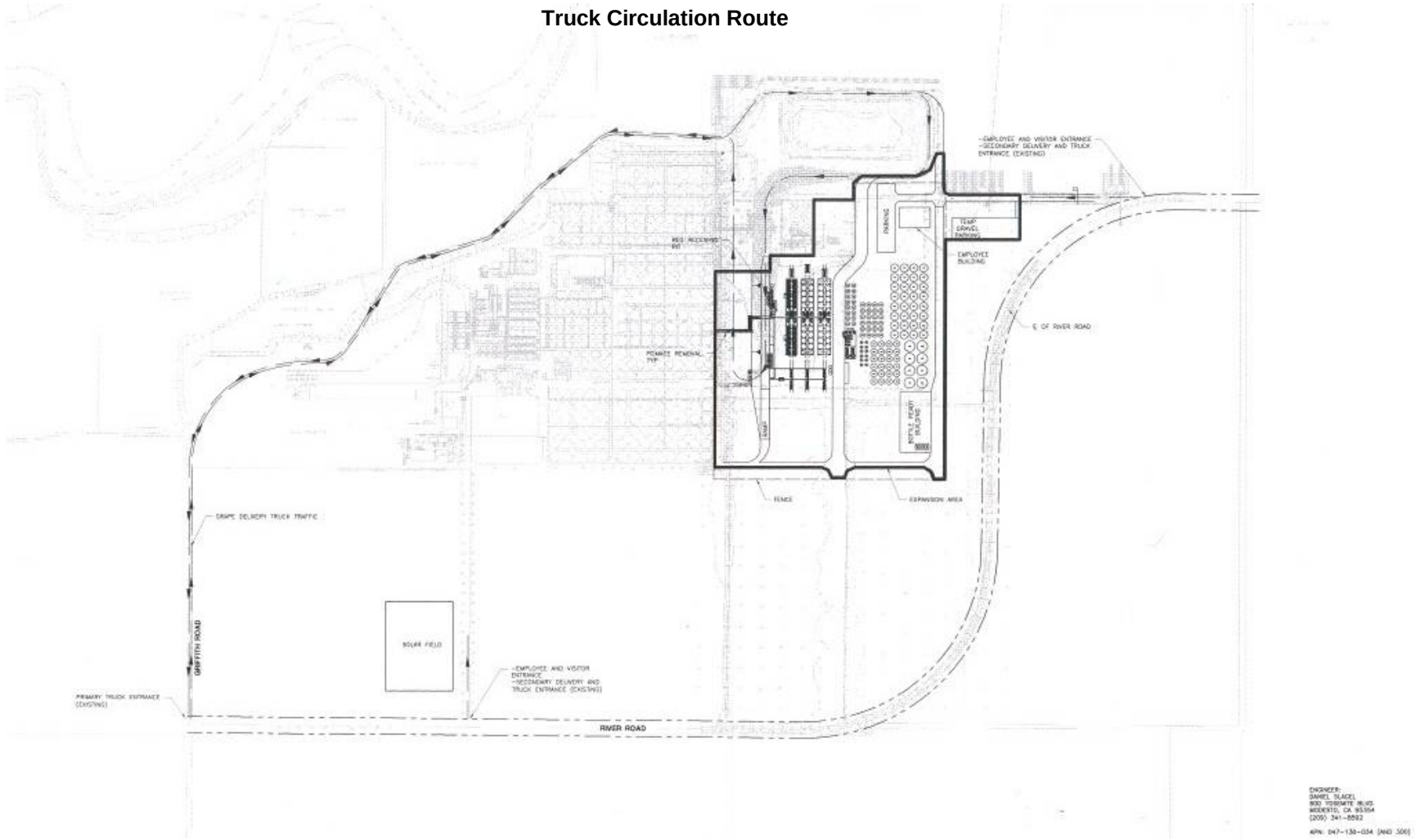
Assuming that 15 percent of the truck traffic occurs in any given hour, the hourly Leq at a distance of 50 feet, assuming that 160 trucks travel on the truck route, is 62 dBA Leq. The hourly noise levels associated with all truck operations at the nearest property line is approximately 35 dBA Leq.

Grape Delivery Noise Levels

Grape deliveries include the arrival of a truck, dumping of the grapes in a steel bin with a rotary screw which crushes and strains the grapes. Noise level measurements of this process was conducted by j.c. brennan & associates, Inc. on October 10, 2011. A typical delivery resulted in a measured SEL of 100 dBA, at a distance of 10 feet from the bin and truck. The Ldn associated with 129 trucks, at a distance of 10 feet is approximately 72 dBA. Based upon the location of the receiving ramp to the nearest property line, the predicted Ldn associated with the 129 trucks is less than 32 dBA Ldn. Using the same peak hour assumptions described above, the hourly Leq is approximately 37 dBA Leq. This does not include shielding which is expected from the proposed on-site fermentation and storage tanks.

Figure 5

Truck Circulation Route



1

Source: E. & J. Gallo

j.c. brennan & associates
consultants in acoustics

New Presses and Conveyors Noise Levels

Grape presses and conveyor systems along with electric motors are a source of noise at the existing plant and the proposed plant expansion. Noise level measurements conducted for a large bank of presses, conveyors and electric motors on the west side of the plant, resulted in a steady-state sound level of 75 dBA. Due to the large number of presses, conveyors and associated electric motors, the noise measurement was conducted in the middle of the equipment, and was considered to encompass all of the equipment noise. Based upon the proposed expansion layout, it is assumed that the center of the new equipment will be located a minimum of 1,500 feet from the nearest residence. The predicted hourly Leq due to the additional equipment is less than 35 dBA Leq, and the Ldn would be less than 41 dBA Ldn.

Additional Cooling & Refrigeration Noise Levels

Additional cooling and refrigeration noise levels will be associated with seven (7) new Baltimore Air Coil Model VCA-S1124A evaporative condenser units and associated compressors. Noise level data provided by the Baltimore Air Coil representatives indicated that each evaporative condenser and associated compressors would generate noise levels of 68 dBA on the opposite side from the air inlet, and 85 dBA on the side of the air inlet (w/fans). Each of the noise levels are based upon a distance of 50 feet from the unit. Based upon the locations of the cooling systems, the nearest residence is located approximately 2,000 feet from the new evaporative condensers. Assuming that all condensers are operating simultaneously, the overall noise levels associated with all seven condensers is 56 dBA Leq on the inlet side, and 39 dBA Leq on the opposite side from the inlet, at a distance of 2,000 feet. Based upon the project design, a minimum of 5 dBA shielding would be expected from the proposed fermentation and storage tanks, resulting in overall noise levels of 51 dBA Leq on the inlet side, and 34 dBA Leq on the opposite side from the inlet, at a distance of 2,000 feet. Assuming the equipment operated 24-hours, the Ldn values would range between 40 dBA Ldn and 58 dBA Ldn, depending on the orientation of the condenser units.

Cumulative On-Site Noise Levels

The cumulative on-site noise levels due to all equipment and on-site truck circulation, after the Phase 3 construction, is predicted to be less than 43 dBA Leq and less than 43 dBA Ldn. This assumes that the evaporative condensers are configured with the inlet side of the condensers facing to the west where the nearest noise-sensitive receptor is located. The nearest noise-sensitive receptor to the west is more than 1 mile from the proposed expansion area, and the overall noise levels associated with the expansion would not contribute to the overall noise environment.

Construction Noise Impact Methodology

Construction-related activities would result in project-generated noise levels from on-site truck travel on proposed haul routes for material transport; and heavy-duty construction equipment at the Gallo site. Based upon information provided by Gallo, construction equipment would likely include bulldozers, backhoes, loaders, trenchers, concrete trucks, dump trucks, vibratory compactors, water trucks, forklifts and some heavy delivery trucks.

To assess noise impacts associated with construction activities, the Federal Highway Administration Construction Noise Model was employed. The model has default average

(Leq) and maximum (Lmax) noise levels for individual pieces of equipment. The model has the ability to calculate cumulative noise impacts based upon multiple pieces of equipment operating during a given hour. Direct inputs to the model included lists of equipment to be used at each of the construction areas. For this analysis, it was assumed that all equipment which potentially could be operating, would operate simultaneously during any given hour. Table 8 provides a list of equipment and maximum noise levels associated with each piece of equipment, as contained in the Federal Highway Administration Construction Noise Model.

Based upon the Construction Noise Model calculations, the predicted noise levels at the nearest residential property line to the east is approximately 54 dBA Leq, and the maximum noise levels could be as high as 59 dBA Lmax.

TABLE 8
TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVELS

Equipment Description	Noise Level, L_{max} at 50 ft (dBA, slow)
Auger Drill Rig	84
Backhoe	78
Blasting	94
Boring Jack Power Unit	83
Chain Saw	84
Clam Shovel (dropping)	87
Compactor (ground)	83
Compressor (air)	78
Concrete Batch Plant	83
Concrete Mixer Truck	79
Concrete Pump Truck	81
Concrete Saw	90
Crane	81
Dozer	82
Drill Rig Truck	79
Drum Mixer	80
Dump Truck	76
Excavator	81
Flat Bed Truck	74
Front End Loader	79
Generator	81
Gradall	83
Grader	85
Grapple (on backhoe)	87
Horizontal Boring Hydr. Jack	82
Hydra Break Ram	90
Impact Pile Driver	101
Jackhammer	89
Man Lift	75
Mounted Impact Hammer (hoe ram)	90
Pavement Scarafier	90
Paver	77
Pickup Truck	75
Pneumatic Tools	85
Pumps	81
Refrigerator Unit	73
Rivit Buster/chipping gun	79
Rock Drill	81
Roller	80
Sand Blasting (Single Nozzle)	96
Scraper	84
Shears (on backhoe)	96
Slurry Plant	78
Slurry Trenching Machine	80
Soil Mix Drill Rig	80
Tractor	84
Vacuum Excavator (Vac-truck)	85
Vacuum Street Sweeper	82
Ventilation Fan	79
Vibrating Hopper	87
Vibratory Concrete Mixer	80
Vibratory Pile Driver	101
Warning Horn	83
Welder / Torch	74

Construction Vibration Impact Methodology

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 9 shows the typical vibration levels produced by construction equipment.

TABLE 9
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)
Vibratory Compactor/roller	0.210 (inches/second)	94 (VdB)

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

PROJECT-SPECIFIC IMPACTS AND MITIGATION MEASURES

Impact 1 Construction noise at sensitive receptors

Construction of the Proposed Project would temporarily increase noise levels during construction. However, the predicted construction noise levels are predicted to comply with Chapter 18.41.070 of the Merced County Zoning Code, which provides criteria for construction related noise levels. This is a ***less than significant*** impact.

Impact 2 Construction vibration at sensitive receptors

Construction of the Proposed Project could result in temporarily vibration levels during construction.

When comparing Table 6 which contains the criteria for acceptable vibration levels to Table 8, which shows potential vibration impacts, and the distance between the construction area and the nearest sensitive receptor, it is not expected that vibration impacts would occur which would cause any structural damage or human annoyance. This **is a less than significant** impact.

Impact 3 The Proposed Project could expose existing receptors to significant increases in truck traffic noise levels

The proposed project will result in additional truck traffic along the primary roadways. The project-related heavy truck traffic would result in increases in

truck traffic noise of no more than 1 dBA Ldn. In addition, the overall truck traffic noise levels will comply with the existing General Plan and the proposed General Plan Update noise level criteria for roadway traffic. This is a **less than *significant*** impact.

Impact 4 ***The Proposed Project could expose existing residences to noise levels associated with the on-site operations in excess of the County Zoning Ordinance or General Plan Criteria.***

The Proposed Project includes on-site activities which will produce additional on-site noise levels associated with truck circulation, grape deliveries, cooling equipment and equipment operations. Based upon the analysis and noise measurement data collected at the Gallo plant, the predicted overall noise levels associated with the additional activities would result in noise levels of approximately 40 dBA Ldn and 43 dBA Leq. However, if cooling equipment is positioned so that the air inlet sides of the evaporative condensers are facing to the east, the predicted noise levels could exceed the County General Plan Noise Element nighttime noise level criterion of 45 dBA Leq, and the proposed General Plan Update Noise Element nighttime noise level criterion of 50 dBA L50/Leq. The predicted overall noise levels would be less than the criteria contained in the Zoning Code. This is a potentially **significant** impact.

Mitigation Measure for Impact 4

All proposed evaporative condenser units should be positioned so that the air inlet side of the condenser faces to the west. The resulting overall noise levels would not result in a significant increase in overall noise levels, and would comply with the applicable Merced County noise level criteria. The resulting noise levels would be **less than significant.**

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.
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	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 L50 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.
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 "Maximum" 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.
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

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

Data Input Sheet

Project #: 2011-162
Description: Existing Truck Traffic Noise Levels
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	River Road	East	155	99		1	1	89	50	75	
2	River Road	West	826	99		1	1	89	50	75	
3	Griffith Avenue	South of River Road	52	99		1	1	89	50	75	
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

Appendix B

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

Project #: 2011-162
Description: Existing Truck Traffic Noise Levels
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	River Road	East	33.4	31.0	54.7	55
2	River Road	West	40.6	38.3	62.0	62
3	Griffith Avenue	South of River Road	28.6	26.3	50.0	50

Appendix B

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

Project #: 2011-162
Description: Existing Truck Traffic Noise Levels
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	River Road	East	3	7	16	34	72
2	River Road	West	10	22	48	102	221
3	Griffith Avenue	South of River Road	2	3	8	16	35

Appendix B

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

Data Input Sheet

Project #: 2011-162
Description: Existing Plus Project Truck Traffic Noise Levels
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	River Road	East	176	99		1	1	91	50	75	
2	River Road	West	940	99		1	1	91	50	75	
3	Griffith Avenue	South of River Road	59	99		1	1	91	50	75	
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

Appendix B

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

Project #: 2011-162
Description: Existing Plus Project Truck Traffic Noise Levels
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	River Road	East	33.0	31.6	55.4	55
2	River Road	West	40.2	38.8	62.6	63
3	Griffith Avenue	South of River Road	28.2	26.8	50.6	51

Appendix B

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

Project #: 2011-162
Description: Existing Plus Project Truck Traffic Noise Levels
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	River Road	East	4	8	17	37	80
2	River Road	West	11	24	53	113	244
3	Griffith Avenue	South of River Road	2	4	8	18	39

Appendix C Roadway Construction Noise Model (RCNM),Version 1.0

Report date: 10/18/2011
Case Description: Gallo Construction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Residence	Residential	45	45	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	1500	0
Compactor (ground)	No	20		83.2	1500	0
Compressor (air)	No	40		77.7	1500	0
Concrete Mixer Truck	No	40		78.8	1500	0
Concrete Pump Truck	No	20		81.4	1500	0
Dozer	No	40		81.7	1500	0
Dump Truck	No	40		76.5	1500	0

Results

Equipment	Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq
Backhoe	48	44	75	55	75	55
Compactor (ground)	53.7	46.7	75	55	75	55
Compressor (air)	48.1	44.1	75	55	75	55
Concrete Mixer Truck	49.3	45.3	75	55	75	55
Concrete Pump Truck	51.9	44.9	75	55	75	55
Dozer	52.1	48.1	75	55	75	55
Dump Truck	46.9	42.9	75	55	75	55
Total	53.7	53.9	75	55	75	55

*Calculated Lmax is the Loudest value.