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Noise Study

Paul Hobbs – Nathan Coombs Winery P15-00128
Planning Commission Hearing October 4, 2017

PAUL HOBBS-NATHAN COOMBS WINERY ENVIRONMENTAL NOISE ASSESSMENT

Napa County, California

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INTRODUCTION

This report provides an assessment of noise resulting from the operation and use of the proposed Paul Hobbs - Nathan Coombs winery located on vineyard parcels at 2184 Imola Avenue in Napa, California with regard to the regulatory criteria established by the Noise Policy of the Napa County General Plan. This report includes a summary of applicable noise regulations, the results of a noise monitoring survey conducted for the project, and an assessment of noise impacts and mitigation measures necessary to meet the applicable County standards at adjacent noise sensitive land uses. Persons not familiar with environmental noise analysis are referred to Appendix A for additional discussion.

PROJECT DESCRIPTION

The Paul Hobbs-Nathan Coombs Winery will be situated at the location of the existing vineyard equipment barn and within existing 77.96 and 12.07 acre vineyard parcels northwest of the Imola Avenue 4th Avenue intersection southeast of the City of Napa in un-incorporated Napa County. The winery is bordered on the east and west by residential uses, to the north by vineyards, and to the south by Skyline Wilderness Park. Figure 1 shows the site boundaries and vicinity.

Figure 1: Project Site and Vicinity

The project will be built in two phases. Based on the project description the Phases will include the following site improvements and activities;

PHASE I:

1. A new winery facility located within the existing vineyard with a Phase I production of 5,000 cases (12,000 gallons)
2. Tasting and retail sales by appointment only between the hours of 10:30 am to 5 pm Monday through Sunday.
3. 4 agricultural promotional events per year. With 2 events having 20 to 50 attendees and 2 events with a maximum of 100 attendees. Events will be limited to 11 am to 9 pm Monday through Sunday.
4. Construction of a single level 10,820 sq.ft. winery building with, 7,220 sq.ft. of building area, 1,390 sq.ft. of covered porch area, and 2,210 sq.ft. of covered canopy crush area.

5. Infrastructure improvements including;
   a) New entrance on 4th Avenue with a pervious chip seal paved driveway to winery site,
   b) New sanitary wastewater leach field system, and
   c) New process wastewater treatment system, storm water management improvements, fire protection water storage, utilities and associated grading and landscape improvements.
6. 5 full-time employees during non-harvest & 7 full-time employees during the harvest season and bottling.
7. Winery operating hours established at 7 am to 6 pm Monday through Friday off-harvest and 6 am to 10 pm Monday through Sunday during harvest season.

PHASE II:

1. Increased production capacity of 25,000 cases (60,000 gallons)
2. Construction of a single level 14,835 sq.ft. winery building located adjacent to the Phase I building which will include additional production space, a wine laboratory, case goods storage, and offices with 12,570 sq.ft. of building area, and 2,265 sq.ft. of covered canopy crush area.
3. Additional parking to support the Phase II administration/production building.
4. An increase in employees to 7 full-time employees during non-harvest & a maximum of 9 full-time employees during the harvest season and bottling.
5. Relocation of the process wastewater system to accommodate the increase in production. The Phase II process wastewater will be treated in the existing reservoir and reused for drip irrigation of the vineyard.

NAPA COUNTY NOISE REGULATIONS

The Anthem Winery lies east of the Napa City Limits and is contained entirely within Napa County and as a result, the County regulations apply. Section 8.16.070 of the Napa County Noise Ordinance regulates exterior noise levels within the unincorporated area of the county due to operational related noise as follows;

No person shall operate, or cause to be operated, any source of sound at any location within the unincorporated area of the county, or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level, when measured on any other property, either incorporated or unincorporated, to exceed:

a. The noise standard for that land use as specified in Table 8.16.070 for a cumulative period of more than thirty minutes in any hour [equivalent to the L_{50} noise metric]; or

b. The noise standard plus five dB for a cumulative period of more than fifteen minutes in any hour [equivalent to the L_{25} noise metric]; or

c. The noise standard plus ten dB for a cumulative period of more than five minutes in any hour [equivalent to the L_{08} noise metric]; or

d. The noise standard plus fifteen dB for a cumulative period of more than one minute in any hour [equivalent to the L_{02} noise metric];

e. The noise standard plus twenty dB or the maximum measured ambient level, for any period of time [equivalent to the L_{max} noise metric].

Table 8.16.070: **EXTERIOR NOISE LIMITS**
(Levels not to be exceeded more than 30 minutes in any hour)

Receiving Land Use Category	Time Period	Noise Level (dBA) Noise Zone Classification		
		Rural	Suburban	Urban
Residential: Single and double	10 p.m. to 7 a.m.	45	45	50
	7 a.m. to 10 p.m.	50	55	60
Residential: multiple and country	10 p.m. to 7 a.m.	45	50	55
	7 a.m. to 10 p.m.	50	55	60
Commercial	10 p.m. to 7 a.m.	60		
	7 a.m. to 10 p.m.	65		
Industrial, including wineries	10 p.m. to 7 a.m.	75		
	7 a.m. to 10 p.m.	45		

Based on the exterior noise limits shown in Table 8.16.070 and the cumulative hourly noise levels described above for rural residential and commercial uses are as shown in Table 1, below:

Table 1: County Noise Ordinance Standards

	Rural Residential		Commercial	
Hourly Noise Metric	**Daytime Level**	**Nighttime Level**	**Daytime Level**	**Nighttime Level**
$\mathbf{L_{50}}$ (30 Min.)	50 dBA	45 dBA	65 dBA	60 dBA
$\mathbf{L_{25}}$ (15 Min.)	55 dBA	50 dBA	70 dBA	65 dBA
$\mathbf{L_{08}}$ (5 Min.)	60 dBA	55 dBA	75 dBA	70 dBA
$\mathbf{L_{02}}$ (1 Min.)	65 dBA	60 dBA	80 dBA	75 dBA
$\mathbf{L_{max}}$	70 dBA	65 dBA	85 dBA	80 dBA

If the measured ambient noise level differs from that permissible within any of the first four noise categories (L_{50}, L_{25}, L_{08}, L_{02}), the allowable noise exposure standard shall be the ambient noise level.

Another provision is included to correct the allowable noise standard for the character of the sound as follows,

> "*In the event the alleged offensive noise, as judged by the noise control officer, contains a steady, audible tone such as a whine, screech or hum, or is a repetitive noise such as hammering or riveting, or contains music or speech, the standard limits set forth in Tables 8.16.060 and 8.16.070 shall be reduced by five dB, but not lower than forty-five.*"

EXISTING NOISE ENVIRONMENT

To quantify the existing noise levels on the site and at the closest noise sensitive (residential) uses, an ambient noise monitoring survey was conducted between noon on Friday, June 6th and noon on Tuesday, June 14th, 2016. For this survey long-term monitoring was conducted at two locations, identified in Figure 2 as LT-1 and LT-2.

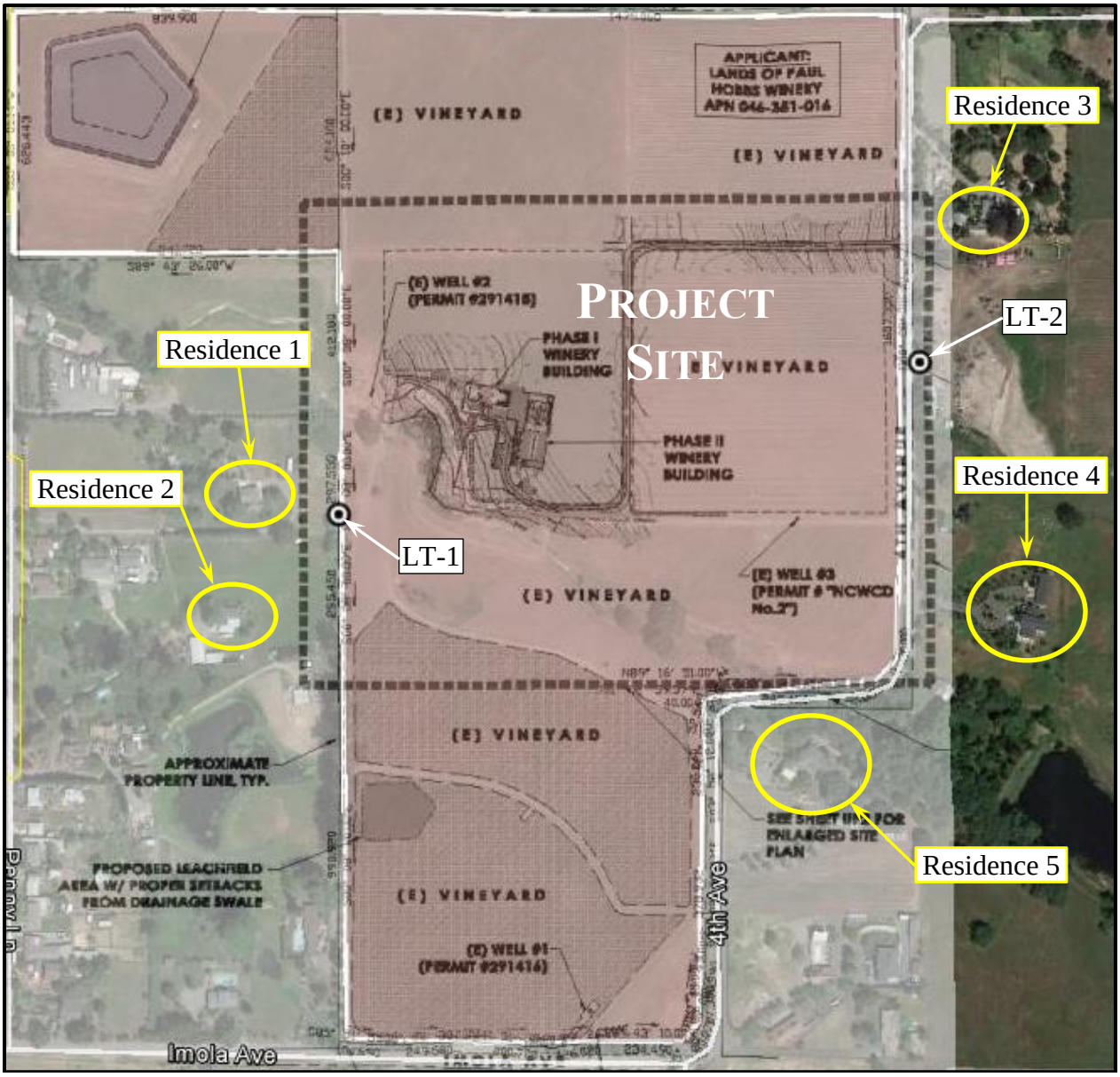
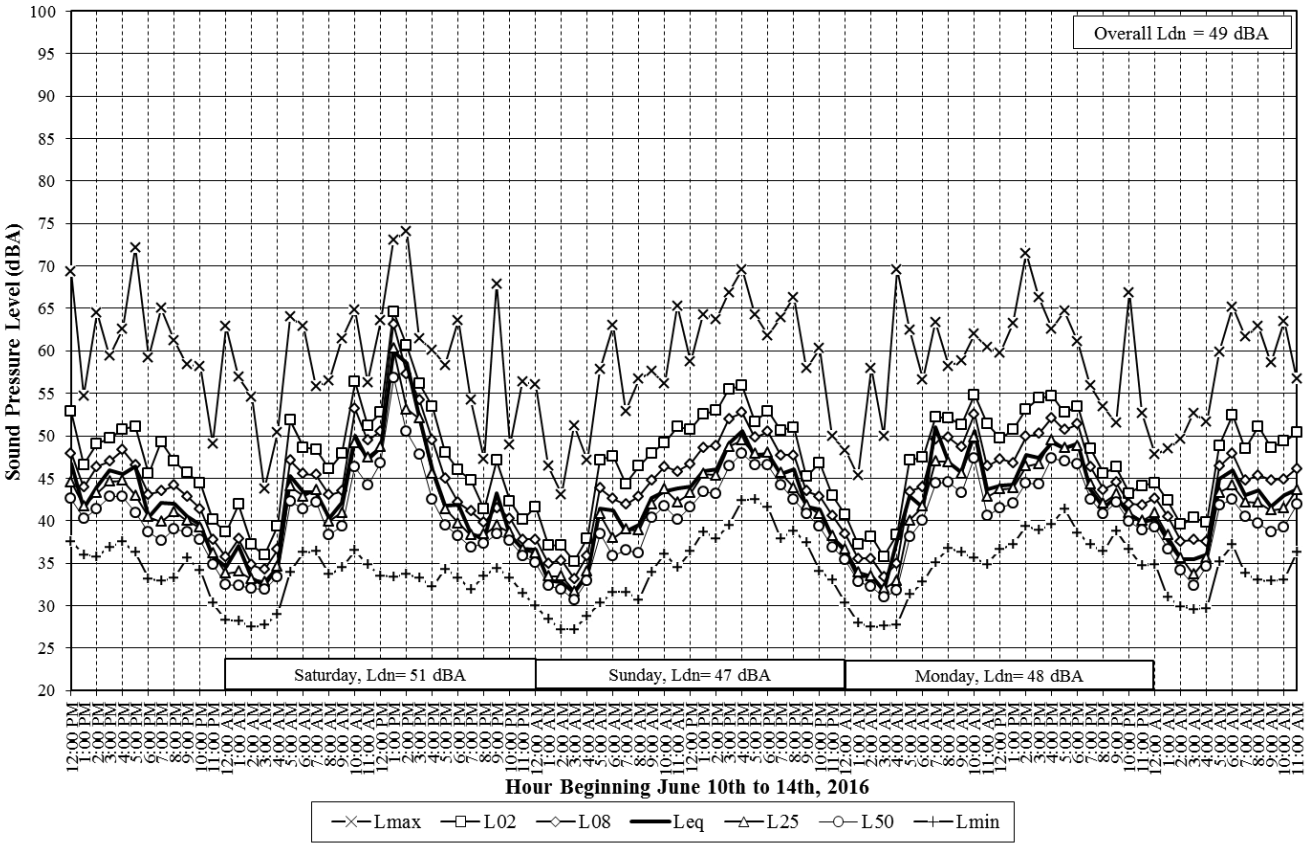


Figure 2: Site Plan, Measurement Locations, and Adjacent Residences

The measurements were made using Larson-Davis Laboratories (LDL) precision Type 1 model meters fitted with a ½-inch pre-polarized condenser microphones and windscreens. The time signatures of all meters were synchronized to allow simultaneous measure periods between the various locations and all meters were calibrated before and after installation with an LDL acoustical calibrator. During the measurement period the weather was clear with no precipitation.

The first long-term sound level measurement (LT-1) was made on the property line shared with the residence closest to the proposed winery development (Residence 1) as shown in Figure 2. The monitoring equipment was installed in tree on the property line and about 400 feet from the closest area of project development, which is the outdoor porch (which will be used during marketing events) of Phase I winery building. Noise levels measured at this site were primarily produced by distant traffic, aircraft overflights, wind in trees, sounds from the adjacent residence, and bird chirps, insects, and other noise associated with wooded agricultural areas. The hourly trend in noise levels at this location, including the energy equivalent noise level (L_{eq}), maximum (L_{max}), minimum (L_{min}), and the noise levels exceeded 2, 8, 25, and 50 percent of the time (indicated as L_2, L_8, L_{25}, and L_{50}) are shown on Chart 1.

Chart 1: Measured Noise Levels at LT-1



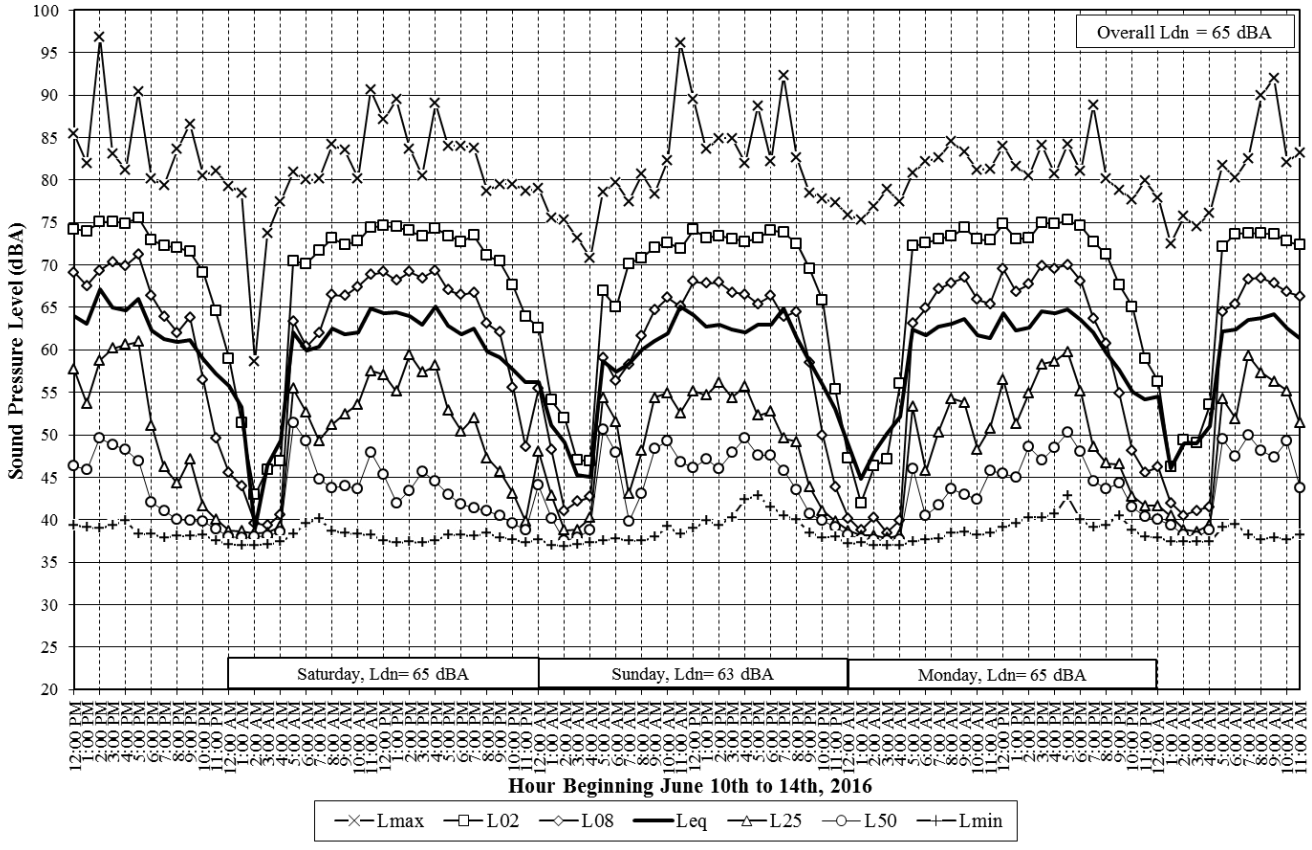
The average weekday noise levels ranged from 40 to 51 dBA L_{eq} during the day, and 31 to 46 dBA L_{eq} at night, and average weekend noise levels ranged from 38 to 60 dBA L_{eq} during the day and 32 to 44 dBA L_{eq} at night. The calculated average day/night noise level (L_{dn}) at this location was 48 dBA on weekdays and 49 dBA on the weekend. The overall L_{dn} at this location was found to be 48 dBA. The average, maximum, minimum levels measured for the daytime and nighttime periods for the entire LT-1 measurement along with the corresponding Napa County Noise Standard Limits are shown in Table 2.

Table 2: Comparison of LT-1 Noise Measurements Results and Napa County Standards

Type of Level		Noise Level, dBA				
		L_{50}	L_{25}	L_8	L_2	L_{max}
Daytime Levels	County Noise Standard	50	55	60	65	70
	Average Level **Measured**	**42**	**44**	**47**	**50**	**61**
	Range (Max/Min)	*36/57*	*38/60*	*40/63*	*41/65*	*47/74*
Nighttime Levels	County Noise Standard	45	50	55	60	65
	Average Level **Measured**	**36**	**37**	**39**	**42**	**55**
	Range (Max/Min)	*31/42*	*32/44*	*33/48*	*35/52*	*43/70*

The second long-term sound level measurement (LT-2) was made at the setback of the residential property lines west of 4th Avenue on the property line of the residence closest to the new entry road from Dry Creek Road (Residence 2) as shown in Figure 2. The monitoring equipment was installed in tree at a distance of 50 feet from the roadway centerline. Noise levels measured at this site were primarily produced passing traffic of 4th Avenue, with sounds produced by insects and other noise associated woodland areas, aircraft overflights, and bird chirps, contributing to background, ambient, sound levels. The hourly trend in noise levels at this location, including the energy equivalent noise level (L_{eq}), maximum (L_{max}), minimum (L_{min}), and the noise levels exceeded 2, 8, 25, and 50 percent of the time (indicated as L_2, L_8, L_{25}, and L_{50}) are shown on Chart 2.

Chart 2: Measured Noise Levels at LT-2



The average weekday noise levels ranged from 58 to 67 dBA L_{eq} during the day, and 45 to 62 dBA L_{eq} at night, and average weekend noise levels ranged from 58 to 65 dBA L_{eq} during the day and 39 to 62 dBA L_{eq} at night. The calculated average day/night noise level (L_{dn}) at this location was 65 dBA on weekdays and 64dBA on the weekend. The overall L_{dn} at this location was found to be 65 dBA. The average, maximum, minimum levels for the daytime and nighttime levels for the entire LT-2 measurement period are shown in Table 3, along with the Napa County Noise Standards.

Table 3: Comparison of LT-2 noise measurements results and Napa County Standards

Type of Level		Noise Level, dBA				
		L_{50}	**L_{25}**	**L_8**	**L_2**	**L_{max}**
Daytime Levels	County Noise Standard	50	55	60	65	70
	Average Level **Measured**	**45**	**53**	**66**	**73**	**84**
	Range (Max/Min)	*40/50*	*43/61*	*55/71*	*68/76*	*78/97*
Nighttime Levels	County Noise Standard	45	50	55	60	65
	Average Level **Measured**	**41**	**43**	**48**	**58**	**77**
	Range (Max/Min)	*38/51*	*38/55*	*38/65*	*42/74*	*59/82*

PROJECT SPECIFIC NOISE LEVEL CRITERIA

Based on the results of the noise measurement data the existing levels at the western property line, shared with identified Residences 1 and 2 (measured at site LT-1), do not exceed the Napa County Noise Limits for L_2, L_8, L_{25}, and L_{50} for either the daytime or nighttime. The average measured levels at this location ranged from 8 dB to 18 dB below the County noise limits. The existing daytime L_{25} and L_{50} and, with the exception of L_{max} levels, all nighttime levels at the near property lines identified Residences 3,4, and 5 (measured at site LT-2) also do not exceed the Napa County Noise Limits. However, the measured noise levels at LT-2 were found to exceed the daytime L_{max}, L_2 and L_8 and the nighttime L_{max} Napa County Noise Limits by 6 to 14 dBA.

For assessment purposes, the Noise Ordinance allows the individual L_N limit to be raised to the ambient level, however, from these data, this is only appropriate for daytime L_8, L_2 and L_{max} levels at the property lines of Residences 3,4, and 5. Further, for music or speech, the limits are to be lowered by 5 dB. Thus for assessing the non-vehicular event noise the noise limits should be lower by the 5 dB. The project specific noise criteria are given in Table 4 for adjacent residences for event noise and vehicular related noise.

Table 4: Project Specific Noise Criteria for Specific Types of Noise

Residences 1 and 2 (at western property line)				
Hourly Noise Metric	**Maximum Exterior Noise Level Standards, dBA**			
	Event Noise (music or speech)		**Operations, Equipment & Vehicular Noise**	
	Daytime	**Nighttime**	**Daytime**	**Nighttime**
L_{50} (30 Min.)	45	40	50	45
L_{25} (15 Min.)	50	45	55	50
L_{08} (5 Min.)	55	50	60	55
L_{02} (1 Min.)	60	55	65	60
L_{max}	65	60	70	65
Residences 3, 4 and 5 (east of 4th Avenue)				
Hourly Noise Metric	**Maximum Exterior Noise Level Standards, dBA**			
	Event Noise (music or speech)		**Operations, Equipment & Vehicular Noise**	
	Daytime	**Nighttime**	**Daytime**	**Nighttime**
L_{50} (30 Min.)	45	40	50	45
L_{25} (15 Min.)	50	45	55	50
L_{08} (5 Min.)	**61**	50	**66**	55
L_{02} (1 Min.)	**68**	55	**73**	60
L_{max}	**79**	**72**	**84**	**77**

Notes: **Bolded** entries indicate criteria which has been raised to measured ambient levels

NOISE ASSESSMENT

Estimating the expected noise produced by, and impacts from, the proposed project at adjacent noise sensitive uses requires three elements; the first is an assessment of what noise producing operations are likely to occur, the second is typical noise source levels for those operations, and the third is to determine the temporal nature of the operations.

I. Identification of Noise Producing operations/uses

There are a number of operations associated with wine production and events at the proposed facility that will produce noise. These include:

1. Winery operations and seasonal production activities,
2. Maintenance and forklift operations,
3. Promotional event noise and,
4. Project traffic.

II. Typical Noise Source Levels

To estimate the noise levels associated with project operations, some attention must be given to the temporal nature of the noise produced. Below each of the major winery related noise producing operations outlined above are discussed:

Winery and seasonal production operations would produce the following type and range of noise levels:

- Refrigeration equipment, as a maximum condition, is assumed operate under constant conditions day and night. Though the model, type and capacities of the cooling compressors for the facility are not specified, field measurements of such equipment shows that sound levels from such equipment can produce levels of between 50 dBA to 65 dBA at 50 feet, with average (L_{eq}) noise levels of 60 dBA at 50 feet.

- Air compressors, used for various processes in the facility, typically cycle on and off based on the need for compressed air. Though the model, type and capacities of the cooling compressors for the facility are not specified, from field measurements of cooling compressors at other wineries, we expect this equipment to produce average (L_{eq}) sound levels of 62 dBA at 50 feet.
- Bottling would be constant on an hourly basis although it is likely to occur for only a few weeks each year. Based on sound level measurements of mobile (truck based) and fixed bottling lines at other wineries, we would expect bottling operations to produce average (L_{eq}) sound levels of between 65 and 70 dBA at 50 feet.
- Crush activities typically occur for about two weeks each year. The majority of the noise sources associated with the crush include the operation of hoppers, presses, destemmers, separators, crushers, air compressors, forklifts, conveyors, etc. Average noise levels resulting from the crush are typically constant on an hourly basis. Individual pieces of crush-specific equipment such as the separators and destemmers are relatively quiet with sound levels of around 50 dBA L_{eq} at about 50 feet, however the composite crush activities at a small sized winery, such as the proposed 25,000 case capacity facility (at full build out), typically generate noise levels of about 63 dBA L_{eq}, at a distance of 50 feet from the center of operations. During the crush, discrete maximum noise events, such as the setting of empty bins, may reach 70 to 80 dBA L_{max} at 50 feet from the center of operations.

Maintenance and forklift operations would produce intermittent noise depending on the exact nature of the operation. These would likely occur at a much less than a daily rate although operations may span several hours once initiated. Backup alarms (or beepers), which are repetitive and irritating by design, will also produce noise during these activities, and as with forklift operations themselves are expected to be intermittent by nature. Based on experience with other winery operations, we estimate that non-attenuated L_{25} noise levels from these operations may reach levels of 66 to 67 dBA at 50 feet.

Promotional Event Noise

The use permit for the winery requests up to a total of 4 agricultural promotional events per year. These events would consist of two (2) Business/Trade promotional gatherings per year with a maximum of 20 to 50 attendees and two (2) Wine Club Member's Events per year with a maximum of 100 people. Amplified sound is not proposed or planned to occur with these promotional events. Furthermore, the participation in industry wide events or weddings and rehearsals are not planned or requested by the project use permit. Based on these proposed events, Table 5 lists typical average noise levels at distances of 50 feet from the source generated by the types of events which may occur at the project.

Table 5: Typical Noise Source Levels for Events (A-Weighted L_{eq} Levels)

Event or Activity	Typical Noise Level @ 50 ft.
Non-amplified (acoustic) Music Band Performance	67 dBA
50 Guests in Raised Conversation with Background Music	56 dBA
100 Guests in Raised Conversation with Background Music	60 dBA

Based upon a review of the project plans and experience with other wineries, events are expected to occur both inside and outside the winery building. Promotional events are proposed to between 11 am to 9 pm Monday through Sunday, and are expected to be by invitation only.

Project Traffic would produce the following type and range of traffic noise levels:

- Automobile and light vehicle traffic accessing the tasting room would occur during the daytime hours and noise produced is expected to include the sounds of vehicles traveling on the access road maneuvering in parking areas, engine starts, door slams. Automobile and other light vehicle traveling at 25 to 35 mph typically produce sound levels of between 59 to 65 dBA at 50 feet. Parking lot activities such as engine starts, door slams and low speed vehicle movements typically produce maximum sounds levels ranging from 53 dBA to 63 dBA at 50 feet.
- Truck traffic on the project site will access the winery via the reoriented 4th Avenue entrance. Noise levels generated by truck traffic are dependent on the size and speed of trucks, typical noise levels generated by heavy duty (semi-tractor trailer type) trucks would be expected to range from 70 to 75 dBA when traveling at constant speeds to 75 to 80 dBA when stopping/starting and maneuvering at a distance of 50 feet. Typical maximum noise levels generated by medium (box type and delivery) trucks would be expected to range from 60 to 65 dBA when traveling at constant speeds to 65 to 70 dBA when stopping/starting and maneuvering at a distance of 50 feet.

III. Propagation of sound

The final step in estimating the project noise levels is assessing the propagation of sound to the sensitive receptors. To do this, it is necessary to assume some rate of sound attenuation between the operations and receiver locations. Typically, the most dominant physical effect is due to the spreading out of sound waves with distance. Sound from localized sources, such as the winery production and tasting room areas at the project, spreads out (diverges) as it travels away from the source with the sound level (acoustic energy) dropping off with distance according fundamental geometric relationships. This type of sound loss occurs independent of the barrier or terrain losses. Other effects can modify these fall-off rates such as partial shielding from buildings or topography, atmospheric attenuation of sound, ground absorption, and meteorological effects. If present, these effects reduce the noise in addition to that due to sound divergence.

Sound sources may be treated as a "point source" when the distance from the source to the receiver is large compared to the dimension of the source. For the size to distance relationships present for this project, it can be assumed that sound at the adjacent residences from sources at the production and hospitality facilities would be considered as a point source. With point sources sound levels are reduced with distance in accordance with the "inverse square law", which yields a six (6) dB sound level reduction for each doubling of the distance[1] from the source. For moving sources of noise, such as auto traffic or truck movements, which are considered linear sources of noise, the divergence of the sound wave is cylindrical in nature producing a reduction of 3 to 4 ½ dB with each doubling of distance.

The closest noise sensitive uses to the proposed Winery are homes to the east and west of the site identified as Residences 1, 2, 3, 4, and 5 in Figure 2. There are other homes in the site vicinity, but these homes are situated further from the project, and thus would be exposed to lower winery generated noise levels.

[1] Mathematically expressed as $L_{rec} = L_{source} - 20xLog(D_{rec}/D_{source})$

IMPACT ASSESSMENT

Impact 1: Vehicular Noise on Access Road and On-site.

Automobile traffic on Access Road

Visitor and employee traffic to and from the winery would use the new entrance road off of 4th Avenue. The closest noise sensitive uses will be Residences 1, 2, 3, 4 and 5 as shown in Figure 2. Based on distance information obtained via Goggle Earth[2], the closest outdoor use areas of these residences will, respectively, be approximately 550, 740, 150, 1000, and 650 feet from the new access roadway. Considering these distances and that automobile speeds are expected to be between 20 to 30 mph on the access roadway, the highest average noise generated by automobile and light vehicles passing closest to these homes at 30 mph would be[3];

42 dBA at the closest outdoor use area of Residence 1,
39 dBA at the closest outdoor use area of Residence 2,
53 dBA at the closest outdoor use area of Residence 3,
36 dBA at the closest outdoor use area of Residence 4, &
40 dBA at the closest outdoor use area of Residence 5

All of these noise levels would be below the hourly project specific noise criteria for daytime vehicular noise occurring for 15 minutes or more per hour as shown in Table 5. Automobile passby noise at Residence 3 could however exceed the L_{50} threshold, if such noise were to occur for 30 minutes per hour or more. Though a traffic study for the project was not reviewed for this analysis, assuming an average vehicular speed of 25 mph (approximately 37 feet/second), noise from each automobile passing by the closest residence (Residence 3) would produce noise levels exceeding 50 dBA for approximately 2 seconds. Therefore the winery would need to have hundreds of visitors per hour for automobile traffic to exceed the L_{50}, 30 minute per hour, standard. Under a worst case situation, with a 100 person event where all attendees arrived in separated vehicles in the same hour the total duration of time in that hour in which noise levels would exceed 50 dBA would be about 200 seconds, or 3 minutes and 20 seconds. Therefore, even under extreme peak hour conditions, automobile traffic on the new access roadway could affect the adjacent residences for more than one minute, but less than 5 minutes in any hour. Therefore, the L_{02} would be the regulatory threshold applicable to the assessment of automobile traffic on the new access roadway. Noise resulting from automobile traffic on the new access roadway therefore would not exceed the Table NE-2 noise limits contained in the Project Specific Noise Criteria. Table 6, following, summarizes the assessment of automobile noise on the new access roadway.

Table 6: Access Road Automobile Noise Levels

	L_{02} (Noise Level Exceeded 1 Minute in any Hour), dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 5**
Daytime L_{02} Noise Limit	65	65	73	73	73
L_{02} Noise levels due to Automobiles on the Access Road at Residence	42	39	53	36	40
Access Road Noise Exceeds L_{02} Limit?	*No*	*No*	*No*	*No*	*No*

[2] The distances determined from Google Earth are the line of sight distances, not the distances over intervening terrain, which are typically greater.

[3] Reported sound levels are calculated using California Vehicle Noise Reference Energy Mean Emissions Levels (REMELS), Cal Trans Technical Advisory, Noise TAN 95-03, Page 2.

Considering these findings, noise levels associated with automobiles and light vehicles using the project access road would not exceed the project specific noise standards at the closest noise sensitive uses.

Truck Traffic on Access Road

Trucks visiting the winery site will also use the new access road. This will take trucks within the same distance of the closest outdoor use areas of these residences as automobiles on the access road, or approximately 550 feet from the closest outdoor use area of Residence 1, 740 feet from the closest outdoor use area of Residence 2, 150 feet from the closest outdoor use area of Residence 3, 1000 feet from the closest outdoor use area of Residence 4, and 650 feet from the closest outdoor use area of Residence 5. Considering these distances and that truck speeds on the access roadway are expected to be limited to 20 mph, the highest average noise generated by heavy trucks passing closest to these homes would be;

56 dBA at the closest outdoor use area of Residence 1,
53 dBA at the closest outdoor use area of Residence 2,
67 dBA at the closest outdoor use area of Residence 3,
51 dBA at the closest outdoor use area of Residence 4, and
55 dBA at the closest outdoor use area of Residence 5

Based on, the size of the facility we expect that the winery may have an average of one truck trip per day during non-harvest season, with an expected increase in truck trips during harvest season. However, given the relatively small size of the facility we expect that fewer than ten truck trips would be necessary to deliver grapes for processing during harvest, with deliveries likely to occur at a rate of two or three per week. Therefore, we do not expect more than one truck trip per hour to the winery. Though all truck trips are expected to take place during daytime hours, during harvest nighttime truck trips may occur. With a maximum truck speed of 20 mph (approximately 29 feet/second), noise from each truck passing by the closest residence (Residence 3) would produce noise levels exceeding 57 dBA (10 dBA below the peak level) [4] for approximately 7 seconds. Thus, truck operations, would fall in the Project Specific Noise Criteria L_{max} (less than 1 minute per hour) criterion at the adjacent residential uses. Table 7, summarizes the assessment of truck traffic noise on the access roadway for worst case nighttime truck usage.

Table 7: Access Road Truck Noise Levels

	L_{max} (Noise Level Exceeded less than 1 Minute per Hour), dBA				
	Res.1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 5**
Nighttime L_{max} Noise Limit	65	65	77	77	77
Noise levels due to Trucks on the Access Road at Residence	**56**	**53**	**67**	**51**	**53**
Trucks Noise Exceeds Nighttime L_{max} Limit?	*No*	*No*	*No*	*No*	*No*

Considering this finding, noise associated with truck traffic at the winery would comply with the project specific standards at all adjacent residences.

[4] A 10 dBA sound level reduction represents an approximate halving of a given sound level and is commonly considered the point where the noise has diminished to a point of irrelevance.

Auto and Trucks in On-Site Parking/Delivery Areas

A review of the project site development plan (see Figure 3) and distance information obtained via Goggle Earth, indicates that the new visitor parking area will, respectively, be situated approximately 500, 675, 1250,1200, and 820 feet from the closest outdoor use areas of Residences 1, 2, 3, 4 and 5, as shown in Figure 2. Additionally the shipping & receiving area (expected to be near the Phase 1 covered crush area) will, respectively, be situated approximately 630, 830, 1150, 1320, and 980 feet from the closest outdoor use areas of Residences 1, 2, 3, 4 and 5. Considering these distances in combination with typical visitor parking lot noise levels of 53 to 63 dBA at 50 feet along with noise from stopping/starting and maneuvering trucks of between 70 to 75 dBA at 50 feet, the noise generated by automobile and light vehicles in the parking area and trucks in the shipping & receiving area would be;

Residence 1: 33 to 43 dBA from parking lot activity,
43 to 53 dBA from shipping & receiving activity

Residence 2, 30 to 40 dBA from parking lot activity,
41 to 51 dBA from shipping & receiving activity

Residence 3, 25 to 35 dBA from parking lot activity,
38 to 48 dBA from shipping & receiving activity,

Residence 4 25 to 35 dBA from parking lot activity,
37 to 47 dBA from shipping & receiving activity, and

Residence 4 29 to 39 dBA from parking lot activity,
39 to 49 dBA from shipping & receiving activity.

Given the expected visitor and employee use, parking lot activities are expected to occur for less than 5 minutes out of an hour on a typical day and fall in the 5 minutes per hour or L_{08} daytime project specific criterion (see Table 5). However, during events or on busy weekends, such activities may occur more frequently and fall in the 15 minutes per hour or L_{25} NE-2 daytime category of 55 dBA. Table 8 summarizes the assessment of Visitor and Employee Parking Lot Activity noise at the outdoor use areas of the closest noise sensitive uses.

Table 8: Visitor and Employee Parking Lot Activity Noise Levels

	Noise Levels, dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 5**
Daytime L_{08} Noise Limit	60	60	66	66	66
Daytime L_{25} Noise Limit	55	55	55	55	55
Parking Lot Activity Noise Levels at Residence	**33 to 43**	**30 to 40**	**25 to 35**	**25 to 35**	**29 to 39**
Activity Noise Level Exceeds L_{08} Limit?	*No*	*No*	*No*	*No*	*No*
Activity Noise Level Exceeds L_{25} Limit?	*No*	*No*	*No*	*No*	*No*

Given the size of the proposed winery, shipping & receiving truck activities are expected occur on a maximum basis for 5 minute per hour or less, since it is unlikely that more than one truck would be loaded or unloaded in any given hour. Thus, as a worst case condition truck shipping & receiving activities operations are judged to fall in the L_{08} daytime project specific criterion. Table 9, following, summarizes the assessment of on-site Truck Activity noise at the outdoor use areas of the closest noise sensitive uses.

Table 9: On-site Truck Shipping & Receiving Noise Levels

	Noise Levels, dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 5**
Daytime L_{08} Noise Limit	60	60	66	66	66
On-site Truck Activity Noise Levels at Residence	**43 to 53**	**41 to 51**	**38 to 48**	**37 to 47**	**39 to 49**
Activity Exceeds L_{08} Limit?	*No*	*No*	*No*	*No*	*No*

Considering the findings shown in Tables 6,7, 8 and 9, noise levels associated with automobile and visitor parking lot noise and with trucks using the on-site parking and delivery areas would not exceed the project specific noise standards at the closest noise sensitive uses.

Mitigation 1: No mitigation required

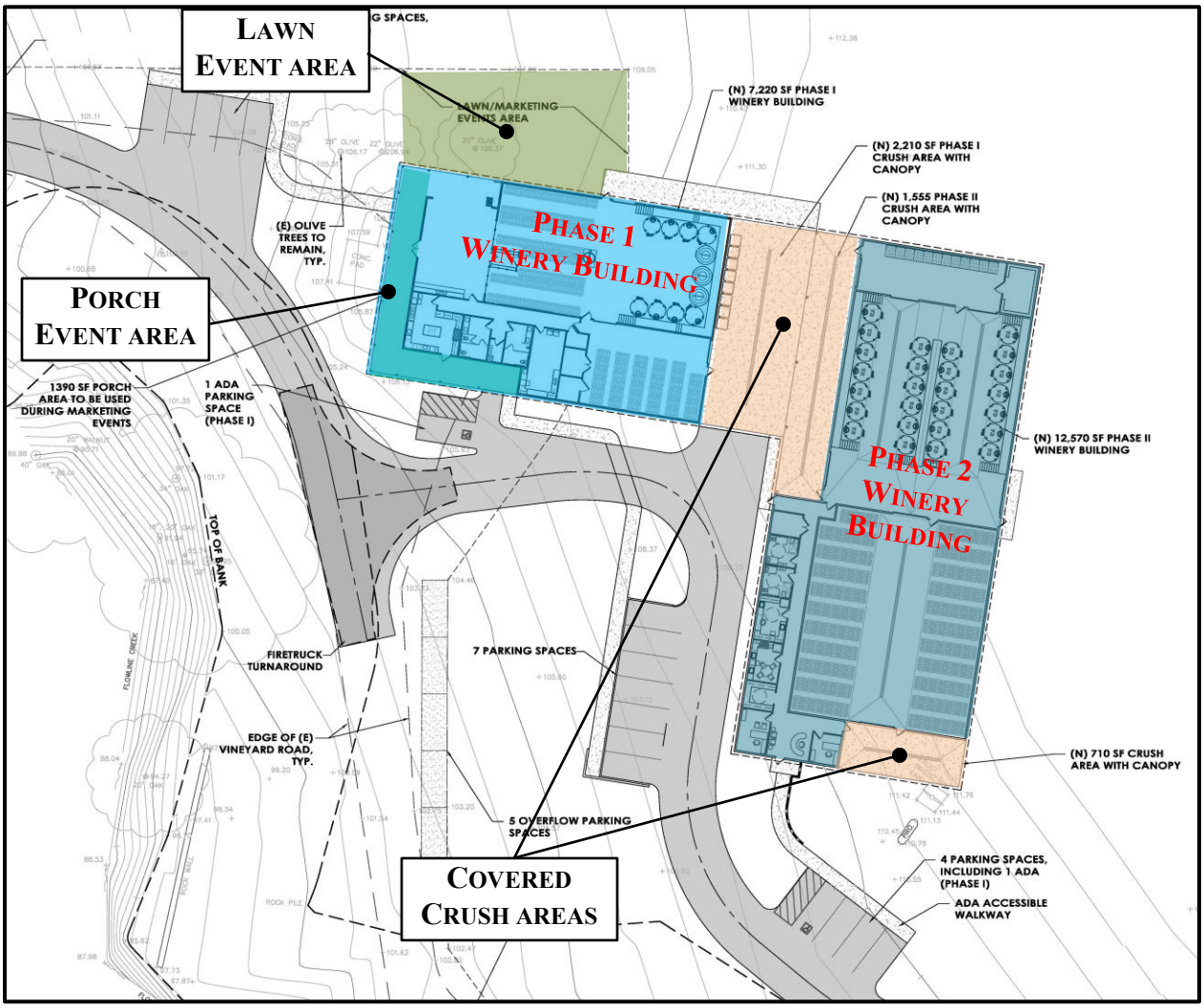


Figure 3: Site Development Plan

Impact 2: Mechanical Equipment Noise

The project would likely include noise-generating mechanical equipment such as air-cooled condensing units, pumps, and compressors as well as less significant sources of noise, such as air-conditioning systems and exhaust fans at the Winery Buildings. The project drawings do not indicate the location of this mechanical equipment. Some of the equipment will likely be place in mechanical rooms within the Phase 1 and Phase 2 Winery Buildings, however some equipment, such as cooling compressors, will likely need to be located outside of a structures due to air flow considerations. Equipment may also be placed on the building rooftop. Considering these possibilities, and distance information obtained via Goggle Earth, the equipment outside of the Phase 1 winery building may be as close as 540 feet from the closest outdoor use area of Residence 1. Distances to all other residences from either the Phase 1 or Phase 2 winery buildings would be farther (approximately 760 feet from Residence 2, 1100 feet from Residence 3, 1220 feet from Residence 4, and 850 feet from Residence 5). Thus, under the worst case condition with the equipment located outside and unshielded by the building structures, constant L_{50} noise levels from mechanical equipment outside the Phase I winery buildings could produce an L_{50} level of 41 dBA at Residence1. The levels at other residences would be lower. Table 10, below, presents and summarizes the assessment of this worst case mechanical equipment noise versus the L_{50} daytime project specific criterion of 50 dBA at the outdoor use areas of the closest noise sensitive uses.

Table 10: Mechanical Equipment Noise Levels

	L_{50} (Noise Level Exceeded 30 Minutes in any Hour), dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 5**
Daytime L_{50} Noise Limit	50	50	50	50	50
Mechanical Equipment Noise Levels at Residence	**41**	**38**	**35**	**34**	**37**
Mechanical Noise Exceeds L_{50} Limit?	*No*	*No*	*No*	*No*	*No*

Considering the findings shown in Table 10, noise levels associated with winery mechanical equipment would not exceed the project specific noise standards at the closest noise sensitive uses.

Mitigation 2: No mitigation required

Impact 3: Crush Related Noise

Annual crush related activities would take place in the Phase 1 or Phase 2 covered crush areas. Crush activities occurring in these areas may revive some noise shielding from building structures, however to conduct a conservative impact assessment no attenuation between crush activities and adjacent residences was considered. Based on a review of project plans and distance information obtained via Goggle Earth, crush activities may be as close as 630 feet from Residence 1, 810 feet from Residence 2, 1120 feet from Residence 3, 1120 feet from Residence 4, and 870 feet from Residence 5. As discussed previously noise from crush activities are largely made up of relatively constant noise, with occasional discrete maximum noise events, such as the setting of empty bins. Noise from crush activities would therefore fall in the Project Specific Noise Criteria L_{50} of 50 dBA and L_{max} of 70 dBA at the adjacent residential uses.

Table 11, below, presents and summarizes the assessment of indoor crush noise against these L_{50} and L_{max} noise criteria noise standard and outdoor maximum noise events, such as the setting of empty bins, without the benefit of sound losses from intervening terrain.

Table 11: Crush Noise Levels

	Noise Levels, dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 5**
Daytime L_{50} Noise Limit	50	50	50	50	50
L_{50} Crush Noise Levels at Residence	**29**	**27**	**24**	**23**	**25**
Crush Noise Exceeds L_{50} Limit?	*No*	*No*	*No*	*No*	*No*
Daytime L_{max} Noise Limit	70	70	70	70	70
L_{max} Crush Noise Levels at Residence	**58**	**56**	**53**	**52**	**54**
Crush Noise Exceeds L_{max} Limit?	*No*	*No*	*No*	*No*	*No*

Considering the findings shown in Table 11, noise levels associated with annual crush activities would not exceed the project specific noise standards at the closest noise sensitive uses.

Mitigation 3: No mitigation required

Impact 4: Bottling Noise

The project description or drawings do not indicate whether bottling will occur within buildings or in the covered receiving area. However, in keeping with the practice of many similar sized wineries this report assumes that bottling will be done with a mobile bottling truck in the centrally located Phase 1 covered crush area. Based on distance information obtained via Goggle Earth, bottling will, respectively, occur approximately 630, 830, 1150, 1320, and 980 feet from the closest outdoor use areas of Residences 1, 2, 3, 4 and 5. As discussed previously noise from bottling is relatively constant noise and would therefore fall in the Project Specific Noise Criteria L_{50} of 50 dBA at the adjacent residential uses.

Table 12, below, presents and summarizes the assessment of indoor bottling noise against the L_{50} project specific noise criterion, without the benefit of sound losses from intervening buildings or terrain.

Table 12: Bottling Noise Levels

	L_{50} (Noise Level Exceeded 30 Minutes in any Hour), dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 5**
Daytime L_{50} Noise Limit	50	50	50	50	50
Bottling Noise Levels at Residence	**36**	**34**	**31**	**30**	**32**
Bottling Noise Exceeds L_{50} Limit?	*No*	*No*	*No*	*No*	*No*

Considering the findings shown in Table 12, noise levels associated with bottling activities would not exceed the project specific noise standards at the closest noise sensitive uses.

Mitigation 4: No mitigation required

Impact 5: Maintenance and Forklift Operations

Forklift and maintenance operations would likely take place in the covered crush/receiving areas, and within the winery buildings. Such activities within the Winery building would receive significant noise shielding from the building and are not analyzed here. Outdoor forklift and maintenance operations are considered a worst-case condition and are analyzed. Such outdoor operations could be as close as 630 feet from Residence 1, 810 feet from Residence 2, 1120 feet from Residence 3, 1120 feet from Residence 4, and 870 feet from Residence 5. Based on experience with other winery operations, and considering that forklift backup alarms are repetitive and irritating by design, this activity noise has been judged against the more stringent L_{25} project specific noise criterion (reduced by 5 dBA, which is more typically used for event noise) of 50 dBA at the adjacent residential uses.

Table 13, below, presents and summarizes the assessment of forklift and maintenance activity against the L_{50} project specific noise criterion, without the benefit of sound losses from intervening buildings or terrain.

Table 13: Forklift and Maintenance Activity Noise Levels

	Noise Levels, dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 5**
Daytime L_{25} Noise Limit (5 dB reduction applied for repetitive sound)	50	50	50	50	50
L_{50} Forklift and Maintenance Activity Noise Levels at Residence	**45**	**43**	**40**	**39**	**41**
Noise Exceeds L_{50} Limit?	*No*	*No*	*No*	*No*	*No*

Considering the findings shown in Table 13, noise levels associated with Forklift and Maintenance Activity activities would not exceed the project specific noise standards at the closest noise sensitive uses.

Mitigation 5: No mitigation required

Impact 6: Promotional Event Noise at adjacent residential uses

The winery requests up to a total of 4 agricultural promotional events per year. These events would consist of two (2) Business/Trade promotional gatherings per year with a maximum of 20 to 50 attendees and two (2) Wine Club Member's Events per year with a maximum of 100 people. Amplified sound is not proposed or planned to occur with these promotional events. Furthermore, the participation in industry wide events or weddings and rehearsals are not planned or requested by the project use permit. The events are expected to occur both inside and outside the winery buildings. Outside event areas identified in the project plans are include a Lawn/Marketing Events area north of the Phase 1 winery building and the 1390 square foot porch at the Phase 1 winery building. Because of the relative size and configuration of the outdoor event areas any events with performances by non-amplified (acoustic) bands are only expected to occur within the winery buildings or at the lawn event area. Evening marketing events are proposed to cease by 9:00 p.m., thus all events would occur during the daytime period.

Events occurring within winery buildings would receive noise shielding from building structure estimated at 12 dBA (assuming open windows and/or doors). Outdoor events may also receive varying degrees of acoustical shielding from intervening terrain features and building structures.

However to conduct a conservative analysis of event noise impacts, no such attenuation is considered in this analysis.

Based on a review of the project site plan and distance information obtained via Goggle Earth;

- Events held in the Lawn/Marketing area, could be close as 600 feet from the closest outdoor use area of Residence 1, 830 feet from the closest outdoor use area of Residence 2, 1230 feet from the closest outdoor use area of Residence 3, 1450 feet from the closest outdoor use area of Residence 4, and 1140 feet from the closest outdoor use area of Residence 5, and
- Events held on the Porch could be close as 530 feet from the closest outdoor use area of Residence 1, 750 feet from the closest outdoor use area of Residence 2, 1250 feet from the closest outdoor use area of Residence 3, 1200 feet from the closest outdoor use area of Residence 4, and 1100 feet from the closest outdoor use area of Residence 5.

When underway, events typically produce noise from periods of 30 minutes or more per hour, and thus event noise is judged against the L_{50} standard. Additionally, a 5 dBA penalty is applied to event noise, because event noise includes typically contains music or speech. Noise from events concluding at prior to 10 pm is therefore judged against a Project Specific Noise Criteria L_{50} of 45 dBA.

The tables below present and summarize the assessment of promotional event noise versus project specific criterion at the closest outdoor use areas of noise sensitive uses for events occurring; within buildings (Table 14a), at the outdoor Lawn and Porch event areas (Table 14b).

Table 14a: Indoor Marketing Event Activity Noise Levels

	L_{50} (Noise Level Exceeded 30 Minutes in any Hour), dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 5**
Daytime L_{50} Noise Limit	45	45	45	45	45
Non-amplified Music Performance	**34**	**31**	**28**	**27**	**30**
100 Guests with Background Music	**27**	**24**	**21**	**20**	**23**
50 Guests with Background Music	**23**	**20**	**17**	**16**	**19**
Noise level Exceeds L_{50} Limit?	*No (all)*	*No (all)*	*No (all)*	*No (all)*	*No (all)*

Table 14b: Outdoor Marketing Event Activity Noise Levels

	L_{50} (Noise Level Exceeded 30 Minutes in any Hour), dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 5**
Daytime L_{50} Noise Limit	45	45	45	45	45
Events at Outdoor Lawn Area					
Non-amplified Music Performance	**45**	**43**	**39**	**38**	**40**
100 Guests with Background Music	**38**	**36**	**32**	**31**	**33**
50 Guests with Background Music	**34**	**32**	**28**	**27**	**29**
Events at Outdoor Porch					
100 Guests with Background Music	**39**	**36**	**32**	**31**	**33**
50 Guests with Background Music	**35**	**32**	**28**	**27**	**29**
Noise level Exceeds L_{50} Limit?	*No (all)*	*No (all)*	*No (all)*	*No (all)*	*No (all)*

Considering the findings shown in Table 14a and 14b, all agricultural promotional events will meet the Project Specific Noise Criteria at the closest noise sensitive uses.

Mitigation 6: No mitigation required

APPENDIX A:
FUNDAMENTAL CONCEPTS OF ENVIRONMENTAL ACOUSTICS

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound may be caused by either its *pitch* or its loudness. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales that are used to describe noise in a particular location. A decibel (dB) is a unit of measurement that indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10-decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. For lesser increases of sound from the same or similar sources, a 6 dB change is perceived to be a "noticeable" change and a 3 dB change to be just perceptible. Technical terms are defined in Table 1. There are several methods of characterizing sound. The most common in California is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2.

Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The Day/Night Average Sound Level, Ldn, is a measure of the cumulative noise exposure in a community, with a 10 dB penalty added to nighttime (10:00 pm - 7:00 am) noise levels. The Community Noise Equivalent Level, CNEL, is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels.

Effects of Noise

Sleep and Speech Interference: The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity; above 35 dBA, and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime

is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses.

TERM	DEFINITIONS
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
Day/Night Noise Level, L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels in the night between 10:00 pm and 7:00 am.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Definitions Of Acoustical Terms **Table 1**

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Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA L_{dn} with open

windows and 65-70 dBA L_{dn} if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed, those facing major roadways and freeways typically need windows with special glass.

At a Given Distance From Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
	140		
Civil Defense Siren (100')	130		
Jet Takeoff (200')	120		Pain Threshold
	110	Rock Music Concert	
Diesel Pile Driver (100')	100		Very Loud
	90	Boiler Room	
Freight Cars (50')		Printing Press Plant	
Pneumatic Drill (50')	80		
Freeway (100')		In Kitchen With Garbage	
Vacuum Cleaner (10')	70	Disposal Running	Moderately Loud
	60	Data Processing Center	
Light Traffic (100')	50	Department Store	
Large Transformer (200')			
	40	Private Business Office	Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
	0		

Typical Sound Levels in the Environment & Industry | **Table 2**

ILLINGWORTH & RODKIN, INC./*Acoustical Engineers*

Annoyance: Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The Ldn as a measure of noise has been found to provide a

valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 55 dBA Ldn. At an Ldn of about 60 dBA, approximately 2 percent of the population is highly annoyed. When the Ldn increases to 70 dBA, the percentage of the population highly annoyed increases to about 12 percent of the population. There is, therefore, an increase of about 1 percent per dBA between an Ldn of 60-70 dBA. Between an Ldn of 70-80 dBA, each decibel increase increases by about 2 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the Ldn is 60 dBA, approximately 10 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 2 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 3 percent increase in the percentage of the population highly annoyed.