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DEVELOPMENT & PLANNING DEPT.

October 7, 2010

Chuck Meibeyer  
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1236 Spring Street  
St. Helena, CA 94574

Dear Chuck:

As you've requested, ICF International (ICF) has conducted a study to evaluate noise associated with expanded marketing events at the Darioush Winery located on State Route (SR) 29 in Napa, California.

## Background

Darioush Winery has applied to Napa County to expand marketing events at the facility located at 4210 Howard Lane in Napa, California.

The winery proposes to increase the number of visitors from a maximum of 25 on the busiest day to 400 for private tours and tastings. The maximum number of daily visitors will at all times also include the number of visitors who may attend a marketing events at the winery so there will never be more than 400 visitors to the winery on any day. Winery proposes to increase the hours of operation of the private tasting room to close at 10 pm instead of 6 pm.

The winery is currently authorized to conduct the following marketing events.

- Six annual events with a maximum attendance of 35 persons.
- Two annual Wine Auction-related events with a maximum attendance of 50 persons.
- One meeting per month for various wine-related organizations with a maximum attendance of 35 persons.
- Two events per year with a maximum attendance of 35 persons for each of the four entities associated with custom wine production activities onsite.

In addition, the current marketing events cannot exceed six events in the month of June and two events per month for the remainder of the year. All marketing events, including cleanup, must end no later than 11:00 p.m.

The winery proposes to eliminate the current plan in its entirety and replace it with the new marketing plan summarized below.

- Fifteen dinners or food and wine pairings per month after 6:00 p.m. with a maximum of 12 people in attendance. The meals and/or food and wine pairings shall be prepared in the winery's onsite kitchen.

- Twenty lunches or food and wine pairings per month between 10:00 a.m. and 6:00 p.m., with a maximum of eight people in attendance. Lunches and/or the daytime food and wine pairings also will be prepared onsite.
- Eight large events per year (educational events and releases) with a maximum of 150 people in attendance and an average of 120 people per event. These larger events will be catered.

Portable toilets will be used for the eight large events. The number of visitors to these marketing events will be included in the total daily count of visitors such that the winery will not exceed the 400-person maximum (i.e., daily tours and tastings collectively). Evening events hosted at the winery will be scheduled to conclude by 10:00 p.m., with cleanup to be completed by 11:00 p.m.

The winery proposes to increase the number of full-time employees from 5 to 15 and the number of part-time employees from 2 to 15. The hours of operation for all employees in the office shall remain 8:00 a.m. to 6:00 p.m., with certain employees to be onsite for tasting and marketing activities from 6:00 p.m. to 11:00 p.m., and crush operations to occur as necessary.

The applicant has stated that outdoor activities will be limited to tastings and serving of light h'orderves with no more than 12 people outside at one time. Large events with as many as 150 people will be held indoors. As many 12 people could use the outdoor sitting area during these large event. There will be no amplified music or use of a public address system outside.

The purpose of this study is to evaluate how the increased number and size of events may change noise at residences located south and east of the project site relative to applicable noise standards. The winery is located in unincorporated Napa County, while the residences are located within the City of Napa. Figure 1 (attached) shows the location of the residences relative to the winery.

## Noise Fundamentals

Noise is commonly defined as unwanted sound that annoys or disturbs people and potentially causes an adverse psychological or physiological effect on human health. Because noise is an environmental pollutant that can interfere with human activities, evaluation of noise is necessary when considering the environmental impacts of a proposed project.

Sound is mechanical energy (vibration) transmitted by pressure waves over a medium such as air or water. It is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient (existing) sound level. Although the decibel (dB) scale, a logarithmic scale, is used to quantify sound intensity, it does not accurately describe how sound intensity is perceived by human hearing. The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called "A-weighting," written as "dBA" and referred to as "A-weighted decibels."

Table 1 summarizes typical A-weighted sound levels for different noise sources.

Table 1. Typical A-weighted Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
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Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Jet flyover at 1,000 feet	110	Rock band
Gas lawnmower at 3 feet	100	
Diesel truck at 50 feet at 50 mph	90	Food blender at 3 feet
Noisy urban area, daytime	80	Garbage disposal at 3 feet
Gas lawnmower, 100 feet	70	Vacuum cleaner at 10 feet
Commercial area	60	Normal speech at 3 feet
Heavy traffic at 300 feet	50	Large business office
Quiet urban daytime	40	Dishwasher in next room
Quiet urban nighttime	30	Theater, large conference room (background)
Quiet suburban nighttime	20	Library
Quiet rural nighttime	10	Bedroom at night, concert hall (background)
	0	Broadcast/recording studio

Source: California Department of Transportation 2009.

In general, human sound perception is such that a change in sound level of 1 dB cannot typically be perceived by the human ear, a change of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level.

Different types of measurements are used to characterize the time-varying nature of sound. These measurements include the equivalent sound level ( $L_{eq}$ ), the minimum and maximum sound levels ( $L_{min}$  and  $L_{max}$ ), percentile-exceeded sound levels (such as  $L_{10}$ ,  $L_{20}$ ), the day-night sound level ( $L_{dn}$ ), and the community noise equivalent level (CNEL).  $L_{dn}$  and CNEL values differ by less than 1 dB. As a matter of practice,  $L_{dn}$  and CNEL values are considered to be equivalent and are treated as such in this assessment. Table 2 provides definitions of sound measurements and other terminology used in this report.

**Table 2. Definition of Sound Measurements**

Sound Measurements	Definition
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Sound Measurements	Definition
Decibel (dB)	A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
Maximum Sound Level ( $L_{max}$ )	The maximum sound level measured during the measurement period.
Minimum Sound Level ( $L_{min}$ )	The minimum sound level measured during the measurement period.
Equivalent Sound Level ( $L_{eq}$ )	The equivalent steady-state sound level that in a stated period of time would contain the same acoustical energy.
Percentile-Exceeded Sound Level ( $L_{xx}$ )	The sound level exceeded "x" percent of a specific time period. $L_{10}$ is the sound level exceeded 10 percent of the time. $L_{90}$ is the sound level exceeded 90 percent of the time. $L_{90}$ is often considered to be representative of the background noise level in a given area.
Day-Night Level ( $L_{dn}$ )	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
Community Noise Equivalent Level (CNEL)	The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
Frequency: Hertz (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure.

For a point source such as a stationary compressor or construction equipment, sound attenuates based on geometry at a rate of 6 dB per doubling of distance. For a linear source such as free-flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance. Atmospheric conditions, such as wind, temperature gradients, and humidity, can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface such as grass attenuates at a greater rate than sound that travels over a hard surface such as pavement. The increased attenuation is typically 1.5 per doubling of distance (California Department of Transportation 2009). Barriers such as buildings and topography that block the line of sight between a source and receiver also increase the attenuation of sound over distance.

## Noise Standards

### Napa County Code

Section 8.16.070 of the Napa County Code specifies maximum exterior noise standards for rural, suburban, and urban areas. The base noise standard for rural residential areas is 45 dBA for hours between 10:00 p.m. and 7:00 a.m. and 50 dBA for hours between 7:00 a.m. and 10:00 p.m. These standards are increased depending on the duration of the noise event of interest. The ordinance, in essence, states that no person shall cause noise that exceeds any of the limits listed below.

- The noise standard for a cumulative period of more than 30 minutes in any hour.
- The noise standard plus 5 dB for a cumulative period of more than 15 minutes in any hour.
- The noise standard plus 10 dB for a cumulative period of more than 5 minutes in any hour.
- The noise standard plus 15 dB for a cumulative period of more than 1 minute in any hour.
- The noise standard plus 20 dB, or the maximum measured ambient level, for any period of time.

The code further states the following:

If the measured ambient noise level differs from that permissible within any of the first four noise limit categories above, the allowable noise exposure standard shall be the ambient noise level. 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 shall be reduced by five dB, but not lower than forty-five.

### Napa County General Plan

The Community Character Element of the Napa County General Plan contains the County's goals and policies related to noise. The noise standards in the County Code stated above are repeated in Policy CC-38. The Community Character Element also describes land use compatibility in term of the 24-hour noise metric  $L_{dn}$  as follows for residential uses:

- Completely Compatible: 55 dBA- $L_{dn}$
- Tentatively Compatible: 55 to 60 dBA- $L_{dn}$
- Normally Incompatible: 65 to 70 dBA- $L_{dn}$
- Completely Incompatible: greater than 75 dBA- $L_{dn}$

Each of these terms is defined as follows.

*Completely Compatible* means the specified land use is satisfactory and both the indoor and outdoor environments are pleasant.

*Tentatively Compatible* means that noise exposure may be of concern, but common building construction practices will make the indoor living environment acceptable, even for sleeping quarters, and the outdoor environment will be reasonably pleasant.

*Normally Incompatible* means that noise exposure warrants special attention, and new construction or development should generally be undertaken only after a detailed analysis of noise reduction

requirements is made and needed noise insulation features are included in the design. Careful site planning or exterior barriers may be needed to make the outdoor environment tolerable.

*Completely Incompatible* means that the noise exposure is so severe that new construction or development should generally not be undertaken.

## City of Napa Municipal Code

Chapter 8.08 of the City of Napa Municipal Code contains the City's noise regulations. Section 8.08.020 of the code relates to commercial activity. The code states:

Between the hours of 9:00 p.m. and 7:00 a.m., no commercial activity shall be conducted upon any privately owned real property within the city, which activity creates noise which can be heard at the property line of any parcel of real property within the city which bears an RP, residential/professional office district, or more restrictive zoning designation unless a permit shall first have been secured from the City Manager. The City Manager shall grant such permit if it reasonably appears that: (1) the activity is otherwise permitted under this code; and (2) the benefit to be derived by the applicant from conducting such activity at the time and place specified in the application outweighs the detriment to be suffered by the neighborhood, by neighboring residents, and by the city generally.

## City of Napa General Plan

The City of Napa Health and Safety Element of the City's General Plan identifies land use compatibility standards for noise. The element identifies 60 CNEL as being "normally acceptable" for residential uses. *Normally acceptable* is defined as follows.

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

## Noise Analysis

As discussed above, the winery is located in unincorporated Napa County while the residences located to the south and east are within the Napa city limits. The Napa County land use compatibility standards are generally more stringent than the City's standards, with 55 dBA- $L_{dn}$  being identified as "completely compatible" for residences by the County and 60 dBA-CNEL being identified as "normally acceptable" for residential uses. The County also has specific noise level limits specified in the County Code. Accordingly, Napa County noise standards are used to evaluate potential noise impacts associated with the expanded marketing events.

## Ambient Noise Level Measurements

As discussed above, the ambient noise level is a consideration in the Napa County code. Accordingly, ambient noise level measurements were taken near the residences east and south of the winery. Figure 1 shows the location of each measurement position. Continuous, long-term measurements were initiated on Wednesday, September 15, 2010, and were concluded on Wednesday, September 22, 2010 at Position 2. At Position 1 measures were initiated on Wednesday, September 22, 2010 and concluded on Sunday, September 26, 2010. Measurements were conducted with Larson-Davis Model 812 sound-level meters with the microphone placed 5 feet above the ground. The meters were set to collect data in 1-hour intervals.

Tables 3 and 4 summarize key sound-level data at each position.  $L_{eq}$  is the energy average sound level and  $L_{50}$  is the sound level exceeded 50% of the time. This corresponds to the County noise standard for the cumulative period of more than 30 minutes in any hour.

**Table 3. Summary of Measurements at Position 1**

Date	8:00 a.m. to 10:00 p.m.				10:00 p.m. to 11:00 p.m.	
	Range of $L_{eq}$		Range of $L_{50}$		$L_{eq}$	$L_{50}$
Wed. Sept. 22	*	*	*	*	35.1	34.4
Thurs. Sept. 23	38.8	46.6	37.1	43.3	38.6	37.8
Fri. Sept. 24	38.0	58.7	35.9	50.3	44.9	44.4
Sat. Sept. 25	39.6	51.7	35.9	47.8	43.2	45.2
Sun. Sept. 26	36.8	47.7	35.0	45.3	42.5	41.9

**Table 4. Summary of Measurements at Position 2**

Date	8:00 a.m. to 10:00 p.m.				10:00 p.m. to 11:00 p.m.	
	Range of $L_{eq}$		Range of $L_{50}$		$L_{eq}$	$L_{50}$
Wed. Sept. 15	*	*	*	*	52.1	46.5
Thurs. Sept. 16	52.1	57.7	47.3	55.3	50.4	45.8
Fri. Sept. 17	51.8	57.8	47.1	55.5	50.8	46.5
Sat. Sept. 18	52.1	60.2	48.3	56.0	55.0	48.4
Sun. Sept. 19	51.9	58.2	48.0	54.3	50.4	45.8
Mon. Sept. 20	51.2	58.1	45.1	55.0	50.3	44.9
Tues. Sept. 21	51.2	58.1	46.2	55.8	49.8	44.7

\*-not measured

## Impact Assessment

The number and type of events that the winery is currently authorized to conduct and the type and number proposed are described above. In summary, the winery is currently authorized to conduct 26 meetings or events with a maximum attendance of 35 people and 2 events with a maximum attendance of 50 people. The current marketing events cannot exceed six events in the month of June and two events per month for the remainder of the year. All marketing events, including clean-up, must end no later than 11:00 p.m. There are currently 5 full-time employees and 2 part-time employees.

Under the proposed plan events would change as summarized below.

- Fifteen dinners after 6:00 p.m. with a maximum of 12 people in attendance.
- Twenty lunches between the 10:00 a.m. and 6:00 p.m. with a maximum of 8 people in attendance.
- Eight large events with a maximum of 150 people in attendance and an average of 120 people per event.

Evening events would be scheduled to conclude by 10:00 p.m., with cleanup to be completed by 11:00 p.m. The number of full-time employees would increase to 15 and the number of part-time employees would increase to 15. The hours of operation for all employees in the office would remain 8:00 a.m. to 6:00 p.m., with certain employees to be onsite for tasting and marketing activities from 6:00 p.m. to 11:00 p.m.

No amplified music or speech would be allowed outside. Consequently, the predominant source of noise during events would be people conversing in the outdoor sitting area. As discussed above there would be no more than 12 people in the outside sitting area at one time. The sound of vehicles accessing the parking lot would also be a source of noise before and after events. These sound sources are evaluated below.

Table 5 summarizes the average A-weighted sound level produced by speech under various levels of vocal effort.

**Table 5. Speech Sound Levels**

Vocal Effort	A-Weighted Sound Level (dBA) at 1 meter	A-Weighted Sound Level (dBA) at 50 feet <sup>1</sup>
Maximum	88	64
Shout	82	58
Very loud	74	50
Raised	65	41
Normal	57	33
Relaxed	50	23
Whisper	40	16

Source: Harris 1979.

<sup>1</sup> Calculated from 1 meter reference value based on 6 dB per doubling of distance.

To provide a reasonably conservative estimate of sound produced by people speaking, it is assumed that 12 people using the outdoor sitting area could speak in a "raised" voice. This corresponds to 65 dBA at 1 meter and 41 dBA at 50 feet. To adjust the sound level from one person to 12 people a value of 11 dB is added to the single person sound level. 11 dB is determined by adding 10 times the base 10 logarithm of 12 to the single person value. Twelve people speaking at a sound level of 41 dBA at 50 feet therefore corresponds to 52 dBA at 50 feet.

The Federal Transit Administration (FTA) has developed a method for evaluating noise from parking facilities (Federal Transit Administration 2006). The amount of noise generated is based on the number of vehicles that access the facility within a 1-hour period. With the largest event it is possible, but unlikely, that up to 150 visitor vehicles could access the parking lot in 1 hour. A reasonable worst case assumption is that 75% of the vehicles are single occupancy and 25% are double occupancy for a total of 132 vehicles. With 15 winery staff and 3 catering staff there could be an additional 18 vehicles bringing the total to 150. It is therefore assumed that up to 150 vehicles could access the parking lot the hour before an event and the hour after the event. The sound level of 150 vehicles accessing a parking lot is estimated to be 48 dBA-Leq at 50 feet using the FTA method.



Residences to the south are about 650 feet from the facility; residences to the east are about 730 feet from the facility. As discussed above, sound from a point source attenuates at a rate of 6 dB per doubling of distance. Because sound will travel through the vineyards over disturbed soil, it is assumed that ground absorption and vines will provide additional attenuation of 1.5 dB per doubling of distance for a total attenuation of 7.5 dB per doubling of distance.

Table 6 summarizes predicted sound levels at the adjacent residential locations based on the sources, levels, and attenuation rate discussed above. Because parking activity and outdoor activity in the sitting area would typically not occur at the same time, sound from parking and the event are considered separately.

**Table 6. Summary of Ambient and Predicted Noise Levels**

Activity	Sound Level at 50 feet	Sound Level at South Residences	Ambient Sound Level at South Residences		Sound Levels at East Residences	Ambient Sound Level at East Residences	
			Daytime <sup>a</sup>	Nighttime <sup>a</sup>		Daytime <sup>a</sup>	Nighttime <sup>b</sup>
Parking	48 dBA	20 dBA	45.1	44.7	19 dBA	35.0	34.4
Event	52 dBA	24 dBA	45.1	44.7	23 dBA	35.0	34.4

<sup>a</sup> Minimum L<sub>50</sub> value measured between 8:00 a.m. and 10:00 p.m.

<sup>b</sup> Minimum L<sub>50</sub> value measured between 10:00 p.m. and 11:00 p.m.

The results in Table 6 indicate that neither the parking lot sound nor the event sound would exceed the 50 dBA daytime standard or the 45 dBA nighttime standard at the residences. Moreover, sound levels from event activities would clearly be less than the County's 55 dBA-L<sub>dn</sub> land use compatibility standard for residential uses. With predicted event levels being at least 10 dB less than existing minimum background sound levels, sound from event activity is not expected to result in any increase in ambient sound levels at neighbors located to the south and east of the facility.

I hope that you will find this information to be useful. Please let me know if you have any questions.

Sincerely,



David M. Buehler, P.E., INCE Bd. Cert.  
Principal

## References

California Department of Transportation 2009. *Technical Noise Supplement to the Caltrans Traffic Noise Analysis Protocol*. Sacramento, CA.

Federal Transit Administration. 2006. *Transit Noise and Vibration Impact Assessment*. Washington, DC.

Harris, Cyril M. 1979. *Handbook of Noise Control*. Second edition. New York, NY.



Source: Google, Inc. © 2010 Google Earth Pro, Version 5.2, Mountain View, CA. Accessed September 21, 2010.

Figure 1  
Noise Monitoring Locations