

7 December 2016

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Subject: **Proposed Diablo MX Ranch Motocross Facility**  
**Follow-up Noise Comments**  
CSA Project: 15-0428

Dear Mr. Trotter:

As you know, we have reviewed ambient and projected future noise for the proposed Diablo MX Ranch motocross facility and provided the following letters:

- 20 October 2015 summary of our own ambient noise measurements and understanding of project noise standards.
- 25 July 2016 review of the Wilson Ihrig noise report dated 8 March 2016 (WI report).

We also attended the Contra Costa County Board of Supervisors hearing on 15 November 2016 and reviewed the associated staff report for the project. This letter summarizes our follow-up comments.

### SUMMARY

The proposed Diablo MX project and proposed conditions of approval do not include sufficient mitigation to reduce the potential severe noise impacts on the neighboring residences. Allowing noise to reach the County Agricultural/Industrial Land-Use noise standard of DNL 75 would severely impact the neighbors. We suggest that the County incorporate noise restrictions that are at least in-line with the Diablo MX projected noise levels to reduce the noise impact on neighboring residences, as follows:

- Limit race days to typical noise levels of DNL of 65 dB and hourly average levels of 70 dB.
- Limit practice and recreational riding days to typical DNL of 60 dB and hourly average levels of 65 dB.
- Limit quantity of simultaneous riders as appropriate to meet these limits.
- Incorporate additional mitigation as needed, to meet these limits.
- Consider a future phase-out of gas-powered bikes for practice activities (gas-powered vehicles would be allowed for racing events).

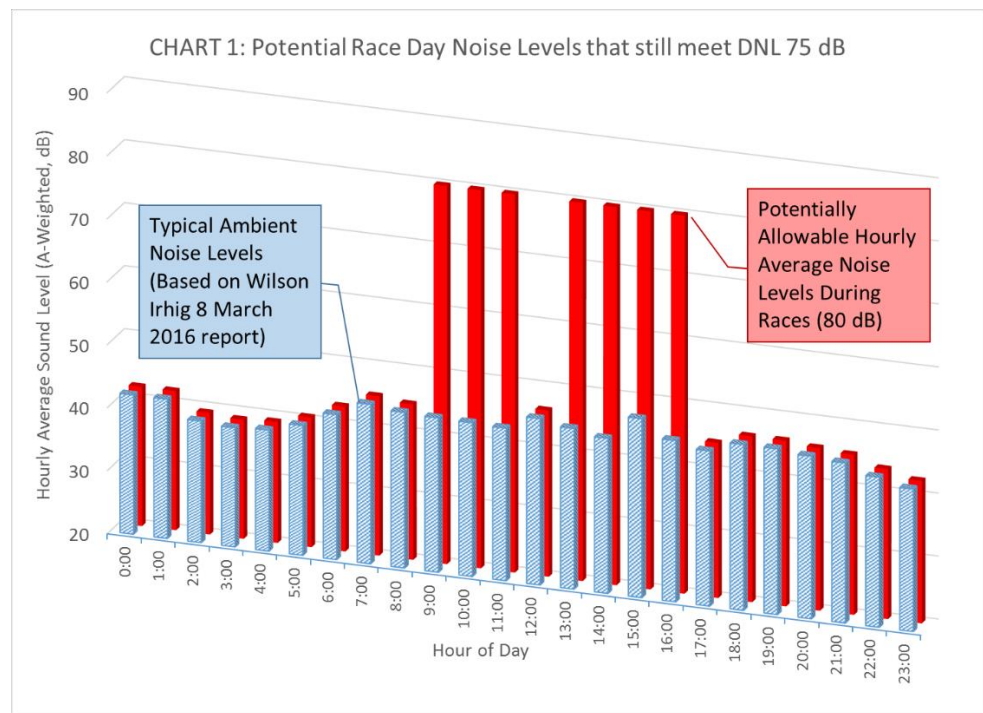
These limits could be considered a compromise between the reasonable operation of the Diablo MX facility and its noise impact on the quiet existing ambient noise environment of DNL 50 dB and hourly average noise levels of approximately 45 dB. These limits could be applied during future compliance monitoring by averaging the results around the perimeter of the site. Monitoring locations should be similar to those selected for the Wilson Ihrig study. The overall purpose is to avoid excessive noise that consistently exceeds these limits around the entire site. More details are provided below.

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**DISCUSSION**

Since the Diablo MX project and surrounding residences are located in an “agricultural” zone, the previous County staff report proposed that the motocross facility be allowed to generate noise up to DNL 75 dB. As we have stated before, this noise level is incompatible with residential land-use and would constitute a significant adverse noise impact on the neighbors. This is supported by the County’s own Land-Use Compatibility standards.

The adverse impacts associated with this issue are compounded by the fact that the DNL metric is based on a 24-hour day-night average of noise levels. Thus, quiet ambient noise levels would be averaged with much louder noise levels during the events to compute the DNL. To demonstrate this, we calculated the actual hourly average noise levels ( $L_{eq}$ ) that the Diablo MX project could generate during a race day and still meet the DNL 75 dB noise limit. The typical ambient levels at the site are approximately DNL 50 dB and hourly average levels are commonly 45 dB (approximately). In the WI report, they assumed “seven hours of races with one-hour break for lunch.”<sup>1</sup> We calculate that Diablo MX could generate hourly average noise levels of 80 dB at the property line for 7 hours and still meet the DNL 75 dB noise metric. This is a severe increase over the ambient noise levels of approximately 45 dB, as illustrated in Chart 1 below. The same concept applies to practice days, though the hours and allowable levels would vary slightly.



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For reference, pneumatic construction tools and train passbys also generate noise levels of 80 dB (at 50 feet away, see Figure 1 enclosed). Such levels would significantly interfere with speech communication, which is commonly 60 dB in face-to-face conversation and 65 dB to 70 dB for raised voices. Communication would likely require shouting (> 75 dB) in such an environment.

<sup>1</sup> See WI report Section 4.1, Page 8.

Allowing noise levels of 80 dB (hourly average) and DNL 75 dB are excessive. It is also important to recognize that noise levels would vary within each hour, likely above and below 80 dB. Therefore, at moments of loud activities, noise levels could certainly exceed 80 dB, perhaps to 85 dB to 95 dB during motorcross bike passbys (see Table 5 at the end of this report).

Moreover, these potential average and DNL noise levels substantially exceed the projected noise levels determined by Wilson Ihrig and Diablo MX. The WI report measured the short-term average noise level of simulated motocross race and practice activity to be between 52 dB and 78 dB<sup>2</sup> at various locations around the property line. Averaged across all simulations and measurement locations, the typical racing noise level at the property line was 68 dB. The typical average practice noise level was 65 dB. For more information on these levels, see Table 1 below.

*Table 1: Measured Leq during simulated DMXR Activity  
(based on Table 3 of WI report)*

<b>Event Type</b>	<b>Source Track</b>	<b>Loc 1</b>	<b>Loc 2</b>	<b>Loc 3</b>	<b>Loc 4</b>	<b>Loc 5</b>	<b>AVERAGE Leq (over activities/locations)</b>
Race	MX	66	74	69	78	65	<b>68</b>
	Oval	70	58	66	62	70	
Practice	MX + Oval	65	72	68	75	65	<b>65</b>
	MX	64	71	68	74	64	
	Oval	64	52	60	56	64	

Allowing Diablo MX to generate hourly average noise levels of 80 dB at all neighboring property lines is excessive and does not even line up with the proposed future motocross conditions (as outlined in the Wilson Ihrig report). Therefore, we recommend that the project conditions of approval be made more strict to be in-line with Diablo MX projections and to reduce the potential noise impact on neighbors. Typical hourly average noise levels could be limited to 70 dB on race days and 65 dB on practice and recreational riding days.

The same concept is evident in the evaluation of the projected future DNLs calculated in the WI report. Table 2 below summarizes the Wilson Ihrig calculated DNLs and overall site-average levels.

*Table 2: Modeled Property Line DNL during DMXR typical Operating Scenarios at various Locations  
(based on Table 4 of WI report)*

<b>Scenario</b>	<b>Loc. 1</b>	<b>Loc. 2</b>	<b>Loc. 3</b>	<b>Loc. 4</b>	<b>Loc. 5</b>	<b>AVERAGE DNL (over activities/locations)</b>
Weekend race	61	69	64	73	60	<b>65</b>
Weekend practice	58	64	60	68	58	<b>60</b>
Weekday practice	56	61	58	64	56	
Night under Lights	60	52	57	56	60	<b>57</b>

<sup>2</sup> See WI report Table 3, Page 7.

Again, Wilson Ihrig projected that typical future Diablo MX noise levels would be lower than the County standard of DNL 75 dB. A weekend Race day was projected to be DNL 65 dB, on average around the site. And practice days were projected to be approximately DNL 60 dB, on average. Therefore, it seems reasonable to limit average noise levels around the perimeter of the Diablo MX property to be in-line with these projected future levels (as listed in the Summary section above). In addition to "practice" activities, this noise limit should be applied to all non-race activities, such as recreational riding.

To reasonably measure average noise levels around the Diablo MX site, it would be appropriate to perform future compliance noise monitoring at various locations around the site. Locations similar to these selected for the Wilson Ihrig study might be considered. One purpose of utilizing several measurement locations is to avoid monitoring in a location where motocross noise levels are uniquely high or low that do not properly assess the noise impact on neighbors. Another goal is to avoid excessive noise that consistently exceeds these limits around the entire site. For example, a minor short-term exceedance at one particular location might not be objectionable.

By utilizing more reasonable noise limits in-line with Diablo MX projections, the many noise goals and policies of the County General Plan might be satisfied. These are listed below.

*Goal 11-A: To improve the overall environment in the County by reducing annoying and physically harmful levels of noise for existing and future residents and for all land uses.*

*Goal 11-B: To maintain appropriate noise conditions in all areas of the County.*

*Goal 11-C: To ensure that new developments will be constructed so as to limit the effects of exterior noise on the residents.*

*Goal 11-D: To recognize the economic impacts of noise control and encourage an equitable distribution of these costs.*

*Goal 11-E: To recognize citizen concerns regarding excessive noise levels, and to utilize measures through which the concerns can be identified and mitigated.*

*Policy 11-2: The standard for outdoor noise levels in residential areas is a DNL of 60 dB. However, a DNL of 60 dB or less may not be achievable in all residential areas due to economic or aesthetic constraints...*

*Policy 11-6: If an area is currently below the maximum "normally acceptable" noise level, an increase in noise up to the maximum should not be allowed necessarily.*

*Implementation Measure 11-a: Continue to require a review and analysis of noise-related impacts as part of the existing project development review procedures of the County.*

*Implementation Measure 11-b: Evaluate the noise impacts of a proposed project upon existing land uses in terms of the applicable Federal, State, and local codes, and the potential for adverse community response, based on a significant increase in existing noise levels.*

*Implementation Measure 11-d: Noise mitigation shall be incorporated into the design and construction of new projects or be required as conditions of project approval.*

## SUMMARY OF NOISE IMPACT ANALYSIS

For reference, the following Tables 3 through 5 summarize the projected noise impact of Diablo MX activity. The levels listed in Tables 3 and 4 are summarized from the Wilson Ihrig 8 March 2016 noise study report. These tables demonstrate that even with the more strict noise limits proposed above, the noise impact will not be eliminated to a less-than-significant level. Any increase by more than five decibels is commonly considered significant. However, the suggested limits above seem to be a reasonable compromise between noise impact and reasonable operation of the Diablo MX facility, particularly since the suggested limits are in-line with projected future Diablo MX noise levels.

*Table 3: Summary Comparison of Ambient and Projected Day-Night Average Noise Levels*

Scenario	Existing Ambient	Predicted with DMXR	Difference
Practice Day (average all locations)	DNL 50 dB	DNL 60 dB	+10 dB
Race Day (average all locations)		DNL 65 dB	+15 dB
Race Day (worst location)		DNL 73 dB	+23 dB

*Table 4: Summary Comparison of Ambient and Projected Hourly Average Noise Levels*

Scenario	Existing Ambient	Predicted with DMXR	Difference
Practice Day (average all locations)	Leq 45 dB	Leq 65 dB	+20 dB
Race Day (average all locations)		Leq 68 dB	+23 dB
Race Day (worst location)		Leq 75 dB	+30 dB

*Table 5: Summary Comparison of Ambient Levels and potential Maximum Noise Levels*

Motorcycle Measurement Location	Existing Ambient	Motorcycle Noise	Difference
At residence property lines	Leq 45 dB	L <sub>max</sub> 80 to 95 dB	+35 to 50 dB

The maximum "momentary" noise levels (i.e., L<sub>max</sub>) listed in Table 5 below are based on our measurements of motocross bikes at the site (see our 20 October 2015 letter) and at another facility in northern California (Honey Lake Motocross).

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We understand that our 20 October 2015 letter was peer reviewed by an independent consultant for the County. The County might also consider having our 25 July 2016 letter and this letter peer reviewed.

This concludes our follow-up comments on the proposed Diablo MX project. Should you have any questions, please call.

Sincerely,

**CHARLES M. SALTER ASSOCIATES**



Jeremy L. Decker, PE  
Principal Consultant

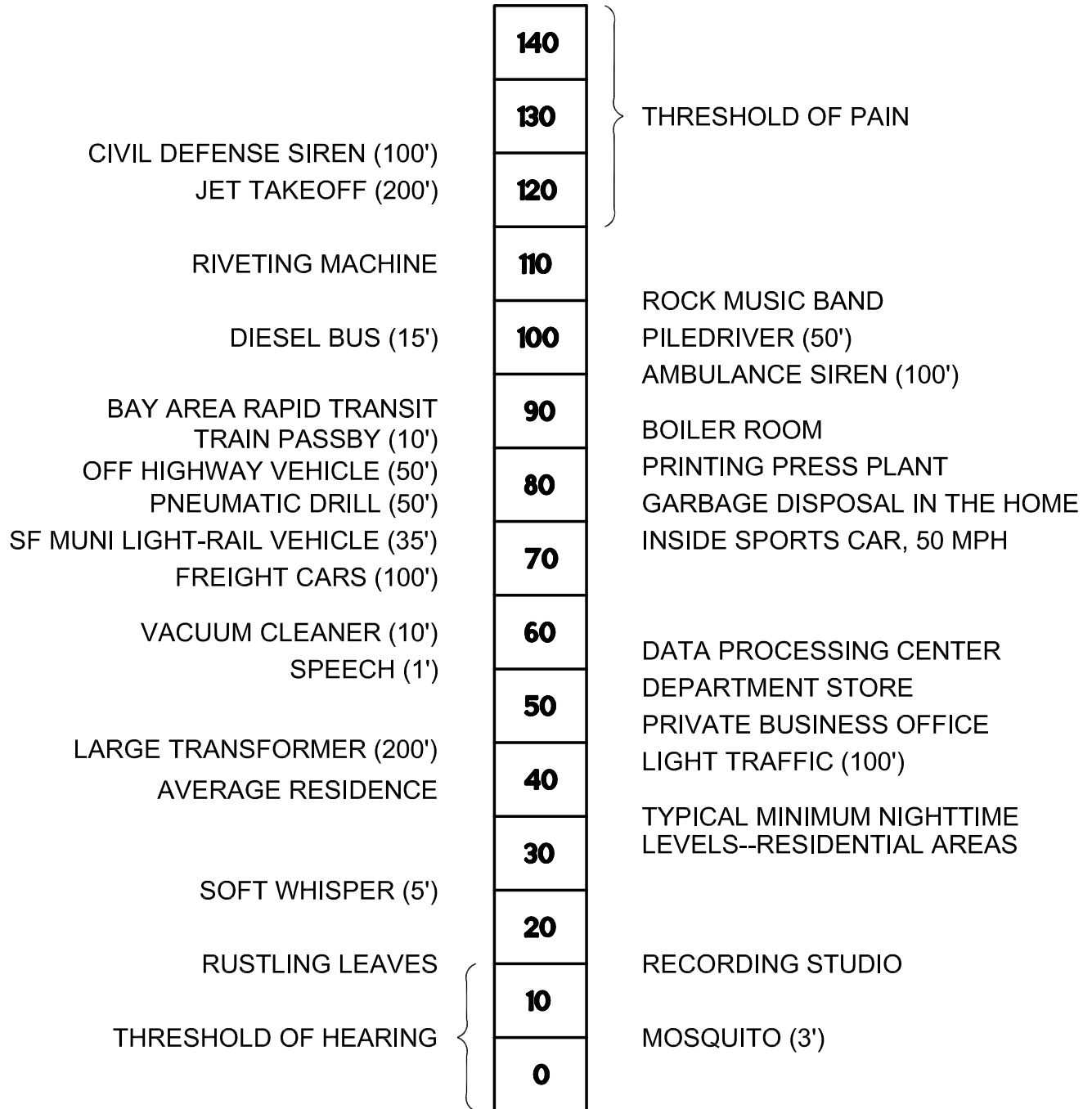
Glossary:

- A-Weighting – A standard frequency weighting that accounts for the sensitivity of human hearing to the range of audible frequencies. ANSI S1.4 defines A-weighting. People perceive a 10 dB increase in sound level to be twice as loud. All noise data in this report are A-weighted.
- DNL (Day-Night Average Sound Level) – A descriptor for a 24-hour A-weighted average noise level. DNL accounts for the increased acoustical sensitivity of people to noise during the nighttime hours. DNL penalizes sound levels by 10 dB during the hours from 10 PM to 7 AM. For practical purposes, the DNL and CNEL are usually interchangeable. DNL is sometimes written as  $L_{dn}$ .
- $L_{eq}$  – The equivalent steady-state A-weighted sound level that, in a stated period of time, would contain the same acoustic energy as the time-varying sound level during the same period.
- $L_{max}$  (Maximum Sound Level) – The maximum sound level for a specified measurement period of time as defined in ASTM E1686.

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# TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT AND INDUSTRY

## FIGURE 1

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