



## Memorandum

Date: December 6, 2015

To: Ms. Mikaela Klein, Mt. San Antonio College

From: Fred Greve, P.E., Greve & Associates, LLC

Subject: CEQA Thresholds and Procedures for Noise (Report #15-116)

Below are the recommended CEQA thresholds for noise. First, I present the activity that the threshold addresses. Next I present the recommended threshold. Then the level of activity that would likely exceed the threshold is presented. If a project has less than this activity level, then it clearly would not exceed the threshold and would not require further analysis. Finally I provide a discussion of the threshold and exempted activity level. In some cases, spreadsheets have been provided in the Appendix providing further justification for these recommendations.

### 1. CONSTRUCTION PROJECT LASTING 1 YEAR OR LESS

**Issue:** A construction project with site preparation, demolition, grading, and building shell construction lasting a total of 1 year or less, and within 1,500 feet of a sensitive land use (i.e., residential, hospital, motel/hotel). Per existing Mitigation Measure 5d, exceptions would continue for "Concrete pouring for the proposed parking structure south of Edinger Way [which] shall be located as far away from residences as possible. Concrete trucks shall use Bonita Drive and Walnut Drive for access. Construction of the parking structure is limited to the hours of 7 am to 7 pm Monday-Saturday."

**Threshold:** Construction should be limited to 7 a.m. to 7 p.m. Monday through Saturday. No construction on Sunday and federal holidays except for emergencies.

**Activity Likely to Exceed Threshold:** Any construction that would occur outside of the hours stated in the threshold.

**Discussion:** Construction with the noisiest phases lasting less than 1 year is often considered to be temporary impacts. Limiting the times of construction to daytime hours and days when residents will be less likely affected is a common approach many noise ordinances (e.g., City of Walnut and the State of California "Model Noise Ordinance"). Construction limited to daytime hours on Monday through Saturday will generally not affect resident's enjoyment of their yard and home during the evening hours when they are most likely to be home. Additionally, it will prevent sleep disruption during nighttime hours. Previous studies for campus construction projects (e.g., "Business Computer Technology and Language Center Lobby Addition - Construction Noise Analysis," dated October 16, 2015) show that construction impacts do not extend past 1,200 feet, and a 1,500 foot buffer is used here to accommodate even bigger construction projects. Finally this threshold applies to projects with noisy construction phases (i.e.; demolition, grading, and shell construction) lasting a year or less. (Painting and landscaping are examples of construction phases that do not generate significant levels of noise.) Projects in this time range can be considered temporary.

## **2. CONSTRUCTION PROJECT LASTING MORE THAN 1 YEAR**

**Issue:** A construction project with site preparation, demolition, grading, and building shell construction lasting more than 1 year, and within 1,500 of a sensitive land use (i.e., residential, hospital, motel/hotel).

**Threshold:** Construction limited to 7 a.m. to 7 p.m. Monday through Saturday. No construction on Sunday and federal holidays except for emergencies. Additionally, L<sub>max</sub> levels during daytime (7 a.m. to 7 p.m.) should be less than 90 dBA, and Leq levels should be less than 65 dBA at the property line of sensitive receptors. During the nighttime hours (7 p.m. to 7 a.m.) L<sub>max</sub> levels should be less than 80 dBA and Leq levels less than 55 dBA at the property lines of sensitive receptors.

**Activity Likely to Exceed Threshold:** Any construction that must extend hours of activity past the times allowed would exceed the threshold. Additionally, construction activities with noisy phases lasting more than 1 year and within 1,500 feet of the property line of sensitive receptors have the potential to exceed the noise limits identified in the threshold.

**Discussion:** Construction with the noisiest phases lasting more than 1 year is often considered to be long-term impacts. Construction limited to daytime hours on Monday through Saturday will have a minimal impact on surrounding land uses because construction will be occurring during hours when people are less sensitive to noise. However, since impacts are long term other requirements may need to be imposed. For example, sound attenuation measures (e.g., sound curtains) and other devices may need to be installed to reduce noise impacts.

The noise limits proposed are intended to eliminate excessive and disruptive noise. An L<sub>max</sub> limit of 90 dBA is similar to a loud truck passing by on an adjacent roadway. While this is not a desirable noise event, it does keep the noise limited to a level that could be experienced without the construction. An average noise level (Leq) limit of 65 dBA would prevent significant speech interference, and therefore, would make yard areas unusable during the day. The 55 dBA limit (Leq) is intended to eliminate speech interference during the evening and nighttime period, and to minimize the potential for sleep disturbance.

### 3. VIBRATION

**Issue:** Vibration due to construction activities can annoy nearby sensitive receptors and can cause damage to buildings.

**Threshold:** A PPV (peak particle velocity) of 0.5 inches per second or above could result in building damage. A PPV of 0.04 in/sec is considered to be "distinctly perceptible," and would also be considered a short-term impact for sensitive receptors. These thresholds are based on the California Department of Transportation (Caltrans) "Transportation and Construction-Induced Vibration Guidance Manual" (June 2004).

**Activity Level Likely to Exceed Threshold:** The vibration potential of pile driving equipment varies widely, and depends on the type of pile driver and the soil conditions. Any use of pile driving within 2,000 feet of a sensitive land use, depending on the size and type of pile driver, could result in an exceedance of either criteria and an analysis specific to the proposed pile driving operation should be undertaken. Use of heavy construction equipment within 50 feet of the property line of sensitive uses could exceed the 0.04 in/sec criteria (see analysis in "West Parcel Solar Project - Vibration Analysis," by Greve & Associates, September 18, 2015).

**Discussion:** The recommended thresholds are based on data contained in the California Department of Transportation (Caltrans) "Transportation and Construction-Induced Vibration Guidance Manual" (June 2004).

### 4. TRAFFIC NOISE GENERATED BY OPERATIONS

**Issue:** Vehicular traffic and the corresponding noise generated by long-term operations can result in a significant impact. The traffic noise increases on public roadways can be considered a significant impact for noise sensitive land uses.

**Threshold:** Project generated traffic increasing the CNEL noise level by 3 dB or more AND resulting in noise levels of 65 CNEL or greater at the property line of sensitive receptors. This is the standard threshold used in many environmental documents.

**Activity Level Likely to Exceed Threshold:** Any project increasing the existing daily traffic by 25% on any roadway link has the potential to exceed the threshold. A project that increases the traffic by 25% over existing levels will normally increase the noise level by 1 dB. This assumes that the project-generated traffic is primarily automobiles, that traffic lanes are not shifted closer to receptors, and that nighttime traffic is typical. Projects with a high percentage of trucks, or projects that add travel lanes, or projects that have an abnormal amount of nighttime traffic should always be analyzed.

**Discussion:** A 3 dB increase is barely perceptible by residents. The 65 CNEL criteria is commonly used for new residential construction and other sensitive uses in California. The threshold proposed is fairly standard and used in many environmental documents.

## 5. ON-SITE GENERATED NOISE

**Issue:** On-site activities that generate noise are associated with many operational projects. This includes a wide range of projects such as the operation of a new parking lot, sports facilities, outdoor amphitheatres, and mechanical equipment for heating and cooling.

**Threshold:** The project when in operation shall not exceed 55 dBA (Leq) during the day (7 a.m. to 10 p.m.) and 50 dBA (Leq) during the night (10 p.m. to 7 a.m.) at the property line of any noise sensitive land use. Nor shall the project exceed 75 dBA (Lmax) during the day or 70 dBA (Lmax) during the night at the property line of any noise sensitive land use. If the ambient noise levels are higher than the noise criteria, then the noise limits should be increased to the ambient noise levels. These noise level criteria should be applied at the property line of sensitive receptors affected by the project.

**Activity Level Likely to Exceed Threshold:** The type of project that may exceed these limits depends on the loudness of the operation, the distance to the sensitive receptor, and other factors. Therefore, any project with the potential of generating substantial noise should be examined. Examples of facilities that have the potential for generating substantial noise include parking lots or structures, sports facilities, outdoor amphitheatres, and mechanical equipment for heating and cooling.

**Discussion:** The College does not have a noise ordinance or noise standards that regulates on-site noise generation. Most communities do have a noise ordinance, and commonly the noise ordinance is used as a threshold to assess the potential impacts of on-site noise generators. The criteria proposed are slightly less restrictive than the City of Walnut Noise Ordinance. The Walnut Noise Ordinance uses an average noise level of 45 dBA as the limit for residential properties during the nighttime, whereas 50 dBA is being proposed here. Similarly, we are proposing a daytime limit that is 5 dB higher than the City's. However, the

proposed limits are consistent with the State of California "Model Noise Ordinance," and many municipalities.

## **6. COMPATIBILITY OF PROPOSED USES**

**Issue:** The compatibility of proposed on-campus developments with the noise environment is important. Sensitive land uses such as classrooms, laboratories, auditoriums, and libraries should avoid high noise areas or else an impact will result.

**Policy:** Sensitive uses; specifically, classrooms, campus housing, laboratories, auditoriums, and libraries, should not be located if feasible in areas where the noise environment is greater than 65 CNEL. Offices and commercial uses should not be located within a 70 CNEL noise zone. If these uses are located in higher noise zones, then a detailed analysis of potential impacts is warranted.

**Activity Level Likely to Exceed Policy:** Any sensitive use with 250 feet of a major roadway may be in a noise zone with levels greater than 65 CNEL. Offices and commercial uses within 100 feet of a major roadway could have noise levels that exceed 70 CNEL. Spreadsheets are included in the Appendix that support these distances.

**Discussion:** An indoor noise standard of 45 CNEL is commonly used for sensitive uses, and a 50 CNEL standard is used for commercial and office uses. Normal construction results in a minimum of 20 dB outdoor to indoor noise reduction. Therefore, any sensitive use within a 65 CNEL noise zone could require additional building upgrades to achieve a 45 CNEL indoor noise level. Similarly, an office or commercial use would need to be located in a noise zone less than 70 CNEL if feasible to avoid building upgrades. In most cases, the needed building upgrades would probably be limited to improved windows.

## Appendix

**CNEL PREDICTION WORKSHEET - CALVENO**

The data you need to enter is in *itallics*.

Roadway Name:	<i>Magic Mtn</i>
Vehicles per day	<i>10,000</i>
Speed (mph)	<i>45</i>
Grade Adj. (dB)	<i>0</i>
Vehicle Noise Red (dB)	<i>0</i>

<b>MT (%)</b>	<i>1.84%</i>
<b>HT (%)</b>	<i>0.74%</i>
<b>Day</b>	<i>78%</i>
<b>Evening</b>	<i>12%</i>
<b>Night</b>	<i>10%</i>

	<b>Day</b>	<b>Eve</b>	<b>Night</b>	<b>Equiv.</b>
<b>Auto</b>	75.99%	11.69%	9.74%	210.3%
<b>MT</b>	1.44%	0.22%	0.18%	4.0%
<b>HT</b>	0.58%	0.09%	0.07%	1.6%

***This is the CNEL at 15 m.***

	<b>Soft CNEL(15m)</b>	<b>Hard CNEL(15m)</b>
<b>Auto</b>	<i>65.7</i>	<i>66.9</i>
<b>Medium Trk.</b>	<i>56.7</i>	<i>57.9</i>
<b>Heavy Truck</b>	<i>57.3</i>	<i>58.5</i>
<b>Total</b>	<i>66.7</i>	<i>67.9</i>

***To get other noise levels,  
Put in other distances (ft).***

<b>Dist.</b>	<b>Soft</b>	<b>Hard</b>
<i>100</i>	<i>62.1</i>	<i>64.9</i>
<i>250</i>	<i>56.2</i>	<i>60.9</i>
<i>500</i>	<i>51.6</i>	<i>57.9</i>
<i>1000</i>	<i>47.1</i>	<i>54.9</i>

***To get other distances,  
Put in other noise levels.***

<b>CNEL</b>	<b>Soft</b>	<b>Hard</b>
<i>57</i>	<i>220</i>	<i>612</i>
<i>60</i>	<i>139</i>	<i>307</i>
<i>65</i>	<i>64</i>	<i>97</i>
<i>70</i>	<i>30</i>	<i>31</i>

*This is standard roadway mix.*

**CNEL PREDICTION WORKSHEET - CALVENO**

The data you need to enter is in *itallics*.

Roadway Name:	<i>Magic Mtn</i>
Vehicles per day	<i>10,000</i>
Speed (mph)	<i>45</i>
Grade Adj. (dB)	<i>0</i>
Vehicle Noise Red (dB)	<i>0</i>

<b>MT (%)</b>	<i>1.84%</i>
<b>HT (%)</b>	<i>7.00%</i>
<b>Day</b>	<i>78%</i>
<b>Evening</b>	<i>12%</i>
<b>Night</b>	<i>10%</i>

	<b>Day</b>	<b>Eve</b>	<b>Night</b>	<b>Equiv.</b>
<b>Auto</b>	71.10%	10.94%	9.12%	196.8%
<b>MT</b>	1.44%	0.22%	0.18%	4.0%
<b>HT</b>	5.46%	0.84%	0.70%	15.1%

***This is the CNEL at 15 m.***

	<b>Soft CNEL(15m)</b>	<b>Hard CNEL(15m)</b>
<b>Auto</b>	65.4	66.6
<b>Medium Trk.</b>	56.7	57.9
<b>Heavy Truck</b>	67.1	68.3
<b>Total</b>	69.6	70.8

***To get other noise levels,  
Put in other distances (ft).***

<b>Dist.</b>	<b>Soft</b>	<b>Hard</b>
<i>100</i>	64.9	67.7
<i>250</i>	59.0	63.7
<i>500</i>	54.5	60.7
<i>1000</i>	49.9	57.7

***To get other distances,  
Put in other noise levels.***

<b>CNEL</b>	<b>Soft</b>	<b>Hard</b>
<i>57</i>	338	1,170
<i>60</i>	214	587
<i>65</i>	99	185
<i>70</i>	46	59

*7% equates to 700 haul trucks per day and results in about a 3 dB increase. Reduce this to 500 trips to include some safety factor.*



**CNEL PREDICTION WORKSHEET - CALVENO**

The data you need to enter is in *itallics*.

Roadway Name:	<i>Large Road</i>
Vehicles per day	<i>40,000</i>
Speed (mph)	<i>50</i>
Grade Adj. (dB)	<i>0</i>
Vehicle Noise Red (dB)	<i>0</i>

	<b>Day</b>	<b>Eve</b>	<b>Night</b>	<b>Equiv.</b>
<b>Auto</b>	<i>75.51%</i>	<i>12.57%</i>	<i>9.34%</i>	<i>208.6%</i>
<b>MT</b>	<i>1.56%</i>	<i>0.09%</i>	<i>0.19%</i>	<i>3.7%</i>
<b>HT</b>	<i>0.64%</i>	<i>0.02%</i>	<i>0.08%</i>	<i>1.5%</i>

***This is the CNEL at 15 m.***

	<b>Soft</b>	<b>Hard</b>
	<b>CNEL(15m)</b>	<b>CNEL(15m)</b>
<b>Auto</b>	<i>73.0</i>	<i>74.2</i>
<b>Medium Trk.</b>	<i>63.2</i>	<i>64.4</i>
<b>Heavy Truck</b>	<i>63.5</i>	<i>64.7</i>
<b>Total</b>	<i>73.9</i>	<i>75.1</i>

***To get other noise levels,  
Put in other distances (ft).***

<b>Dist.</b>	<b>Soft</b>	<b>Hard</b>
<i>50</i>	<i>73.8</i>	<i>75.0</i>
<i>100</i>	<i>69.2</i>	<i>72.0</i>
<i>300</i>	<i>62.1</i>	<i>67.2</i>
<i>1000</i>	<i>54.2</i>	<i>62.0</i>

***To get other distances,  
Put in other noise levels.***

<b>CNEL</b>	<b>Soft</b>	<b>Hard</b>
<i>57</i>	<i>655</i>	<i>3,147</i>
<i>60</i>	<i>413</i>	<i>1,577</i>
<i>65</i>	<i>192</i>	<i>499</i>
<i>70</i>	<i>89</i>	<i>158</i>

Round highlighted values up to 250 and 100 to include some safety factor