

# CAVANAUGH TOCCI ASSOCIATES, INCORPORATED

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May 31, 2007

Bob Montione  
Vice President, Save our Schoharie (SOS)  
PO Box 856  
Schoharie, NY 12157

Subject: Cobleskill Stone Products, Inc. – Schoharie Quarry Expansion  
Cavanaugh Tocci Associates Sound Monitoring Data

Dear Mr. Montione,

Cavanaugh Tocci Associates, Inc. has reviewed the environmental noise impact sections of the Draft Environmental Impact Statement (DEIS) for the Cobleskill Stone Products, Inc (CSP) – Schoharie Quarry Expansion (dated November 30, 2005).

Based on this review, we issued a letter, dated March 26, 2007, which identified deficiencies in the assessment of noise impact for the proposed project. It was our conclusion that the noise assessment of the proposed project fails to consider the acoustic impact of the project in context with the existing environment.

We further concluded that ambient sound levels reported in the DEIS have been understated because of inadequate sampling, inappropriate acoustic descriptors and the presence of quarry activity sound during ambient measurements. This has lead to a significant underestimate of acoustic impact to the neighboring community.

The full text of our March 26<sup>th</sup> letter is contained in this report as Appendix A. The end of our March 26<sup>th</sup> letter contains a glossary of acoustical terminology.

## Applicable Criteria

Evaluation of the acoustic impact of the proposed mine expansion has been completed based on the New York State Department of Environmental Conservation (NYSDEC) Program Policy Memorandum “Assessing and Mitigating Noise Impacts.”

The basic premise of the NYSDEC document is that judgments with respect to the acoustic impact of a project should be based on relative increases in environmental sound levels that are produced by the project. Typical human reactions to sound level increases are summarized in Table 1.

Increase in Sound Pressure (dB)	Human Reaction
Under 5	Unnoticed to tolerable
5-10	Intrusive
10-15	Very noticeable
15-20	Objectionable
Over 20	Very objectionable to intolerable

Table 1: Human Reaction to Increases in Sound Pressure Level <sup>1</sup>

### Environmental Levels Measured by Cavanaugh Tocci Associates, Inc.

In order to gain a better understanding of the existing acoustic environment in the vicinity of the quarry, we recommended that a more thorough sampling of environmental sound levels be conducted. SOS retained Cavanaugh Tocci Associates, Inc. to provide equipment and expertise to conduct such a study.

Continuous sound level monitoring was conducted for 8 days (192 hours), beginning on May 5, 2007 at 10 AM. Rion NL-31 environmental sound monitors were used. The monitors were calibrated before and after use, and installed with wind screens. These instruments and their use conform to ANSI S1.4 Type 1 Precision Sound Measurement Instrumentation.

Figure 1 shows the sound monitoring locations. These locations may be described as follows:

- Residence on Eastern Avenue, near quarry entrance - Figure 2 shows the sound monitoring location in the backyard of a residence on Eastern Avenue, close to the quarry entrance.
- Walker residence on Old Rickard Hill Road, overlooking existing quarry – Figure 3 shows the sound monitoring location in the backyard of the Walker residence on Old Rickard Hill Road, overlooking the existing quarry.

Figures 4 and 5 present the hourly average A-weighted sound levels ( $L_{A,eq,1-hr}$ ) measured during the monitoring period. Typical quarry operating hours are Monday – Saturday, 7am – 7pm, and are shown shaded in Figures 4 and 5.

Data presented in Figures 4 and 5 includes daytime sound levels measured on Sunday, May 6, 2007, at which time the quarry was not operating. The average sound level ( $L_{A,eq,12-hr}$ ) from 7am – 7pm on this day was 48 dBA at the house on Eastern Avenue near the quarry entrance, and 44 dBA at the house on Old Rickard Hill Road overlooking the quarry.

The ambient sound level measured in the absence of quarrying operations on Sunday, May 6 is shown as a dashed line in Figures 4 and 5. These average levels constitute a reasonable baseline for ambient sound, upon which any determination of impact should be based.

By gathering ambient sound levels when the existing quarry was in operation, the DEIS has indicated a noise baseline roughly 10 dBA higher than measured during this study. Thereby, the assessment of impact stated in the DEIS has been significantly skewed in the favor of the project proponent. For the purposes of indicating the baseline ambient level, a more conservative methodology would consider the acoustic environment in the absence of quarry noise.

Based on the measured sound levels, current quarrying activities regularly increase sound levels at nearby residences by more than 20 dBA ( $L_{A,eq,1-hr}$ ). This results in an impact that would be classified as Very Objectionable to Intolerable according to the NYSDEC Program Policy document. Quarry activity noise such as this presently interferes with speech communication and disrupts recreational land use for village residents.

<sup>1</sup> NYSDEC Program Policy Memorandum “Assessing and Mitigating Noise Impacts” Table B. From Down, C.G. and Stocks, J.; Environmental Impact of Mining. Applied Science Publishers Ltd., ISBN 0853347166, 1978

## Conclusion

Based on our analysis and extended sound monitoring data gathered in the vicinity of the project site, we conclude that expanded quarrying activities would further exacerbate an existing acoustic impact that could be judged by the NYSDEC Program Policy document as Very Objectionable to Intolerable. Expansion of mining areas and activities will increase the severity of the noise impact and the number of village residents affected by quarry noise.

It has been a pleasure providing these services to Save our Schoharie. Please don't hesitate to contact us if you have any comments or questions.

Sincerely,

Cavanaugh Tocci Associates, Inc.



Andrew Carballeira  
*Senior Consultant*

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Figure 1: Site plan showing Cavanaugh Tocci Associates sound monitoring locations



Figure 2: Photograph showing sound monitor location on Eastern Avenue



Figure 3: Photograph showing sound monitor location on Old Rickard Hill Road

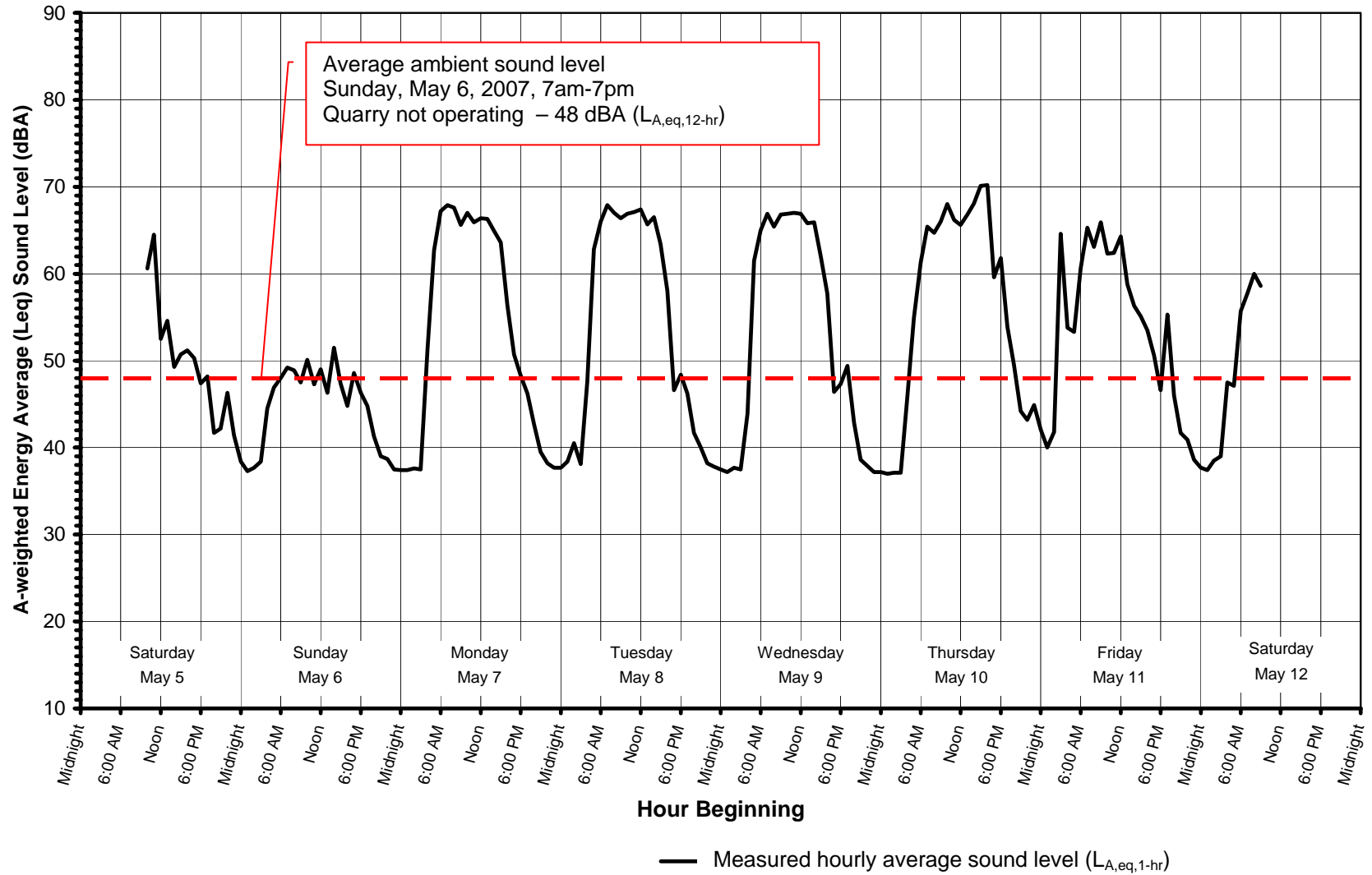


Figure 4: Sound monitoring data measured on Eastern Avenue, near quarry entrance

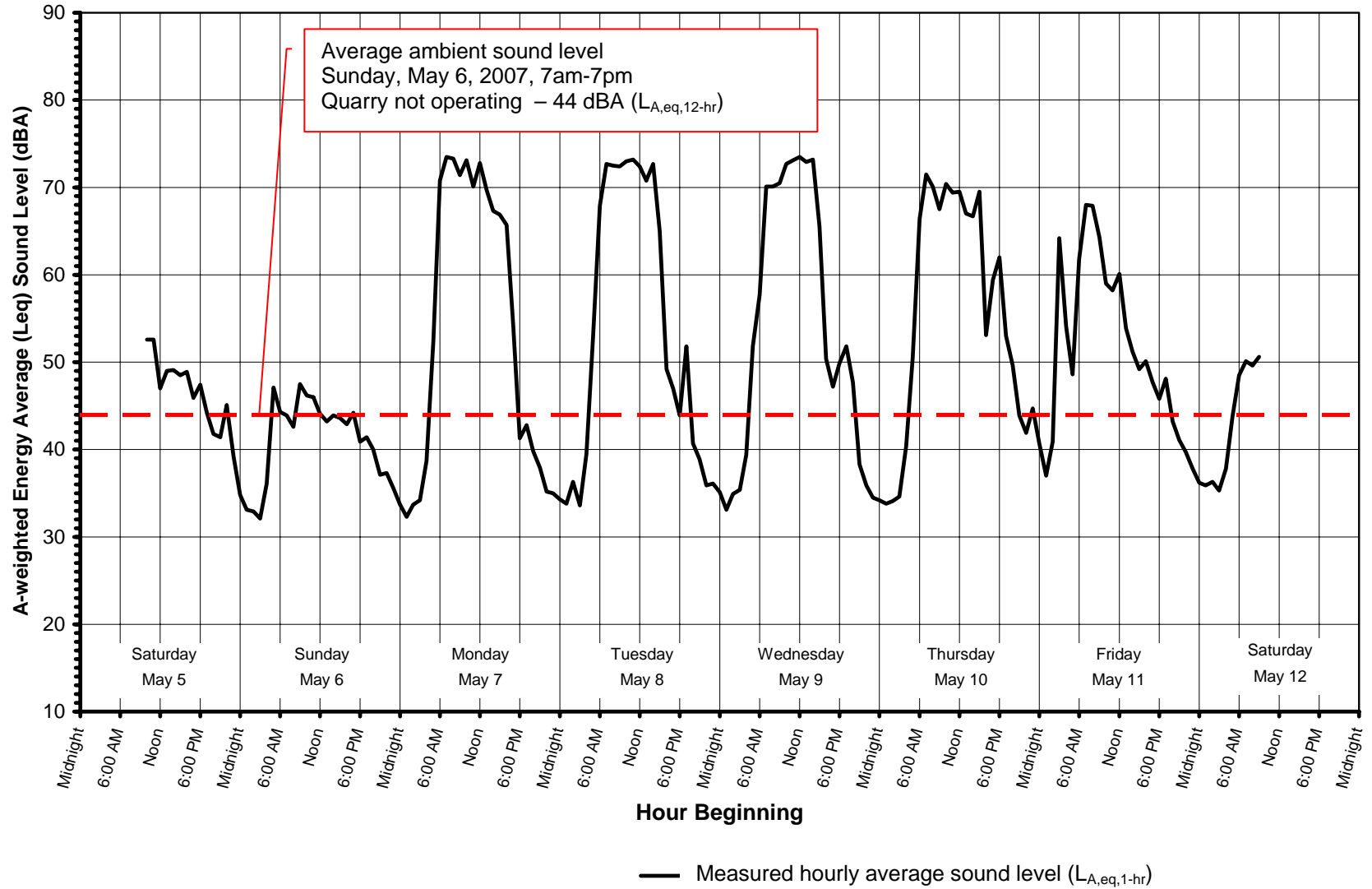


Figure 5: Sound monitoring data measured on Old Rickard Hill Road, at Walker residence, overlooking existing quarry

## **Appendix A**

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Cavanaugh Tocci Associates, Inc.  
Letter Report - March 26, 2007

# CAVANAUGH TOCCI ASSOCIATES, INCORPORATED

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March 26, 2007

Bob Montione  
Vice President, Save our Schoharie  
PO Box 856  
Schoharie, NY 12157

Subject: Cobleskill Stone Products, Inc. – Schoharie Quarry Expansion  
Review of Environmental Noise Impacts in Draft Environmental Impact Statement

Dear Bob,

Cavanaugh Tocci Associates, Inc. has reviewed the environmental noise impact sections of the Draft Environmental Impact Statement (DEIS) for the Cobleskill Stone Products, Inc (CSP) – Schoharie Quarry Expansion (dated November 30, 2005).

It is our opinion that the noise assessment of the proposed project fails to consider the acoustic impact of the project in context with the existing environment, and the conclusions of the assessment have been based on noise performance recommendations that will permit adverse impacts at residential properties.

### Acoustic Impact Assessment Methodology

Sound is a feature of all environments. Sound is only objectionable when it is inconsistent with its environment; by being either too loud or by being distinctive in character (i.e. tonally or temporally varying). To this end, Griggs-Lang Consulting Geologists, Inc. have failed to assess sound impact produced by the proposed project and failed to set appropriate standards in light of the existing acoustic environment.

Evaluation of the acoustic impact of the proposed mine expansion has been completed based on the New York State Department of Environmental Conservation (NYSDEC) Program Policy Memorandum “Assessing and Mitigating Noise Impacts.” The DEIS includes First, Second and Third Level Noise Impact Evaluations.

The basic premise of the NYSDEC document is that judgments with respect to the acoustic impact of a project should be based on relative increases in environmental sound levels that are produced by the project. Typical human reactions to sound level increases are summarized below in Table 1.

Along with relative increases in sound level, the characteristics of a sound are also important in determining the potential for an adverse impact. These characteristics include:

- Frequency and Tonality
- Time of occurrence (Day/Night Summer/Winter)
- Duration
- Intermittency

**Table 1**  
**Human Reaction to Increases in Sound Pressure Level <sup>1</sup>**

Increase in Sound Pressure (dB)	Human Reaction
Under 5	Unnoticed to tolerable
5-10	Intrusive
10-15	Very noticeable
15-20	Objectionable
Over 20	Very objectionable to intolerable

**Existing Background Sound Levels in the Project Area**

As discussed above, it is necessary to consider existing environmental sound levels when assessing the acoustic impact of a project. The DEIS contains repeated claims of conservative methodology in assessing project related noise. However, measurement and description of the existing ambient sound environment in the project area is inadequate and misleading, for the following reasons:

- Measurement time interval and environmental sampling is insufficient to quantify the ambient sound environment.  
**A conservative approach would make use of long-term continuous sound monitoring (minimum 1-week) to obtain more reliable estimates of the ambient sound level.**
- Ambient measurements are expressed in the DEIS as *average sound level* ( $L_{eq}$ ). A more appropriate descriptor of the steady-state ambient sound environment is the *90<sup>th</sup> percentile sound level* ( $L_{90}$ ). The NYSDEC Program Policy document alludes to this:

*Percentile of Sound Levels - Fluctuations of SPLs can be expressed as a percentile level designated as  $L(n)$  where a given decibel level is exceeded  $n$  % of the time. A designation of  $L(10) = 70$  dBA means the measured SPLs exceeded 70 dBA 10% of the time. A designation of  $L(90) = 70$  dBA means the measured SPLs were exceeded 90% of the time.  **$L(90)$  is often used to designate the background noise level.**<sup>2</sup>*

[emphasis ours]

- **A conservative approach would describe the ambient sound level in terms of  $L_{90}$ , which is typically significantly lower than the  $L_{eq}$  and is not affected by short duration transient events.**
- The quarry appears to have been in operation at the time the ambient sound measurements were taken (see Figure 1).  
**A conservative approach would make use of ambient measurements taken in the absence of quarry activity, resulting in a lower ambient sound level.**
- Measurement start and stop times are not reported. Community members report that current quarry operations can start as early as 4-5 AM and continue until 6-7 PM. Ambient sound measurements should encompass the full range of time that the expanded facility would be in operation.  
**A conservative approach would describe the ambient sound level as the hourly 90<sup>th</sup> percentile sound level to fully understand the temporal characteristics of the ambient sound environment.**

<sup>1</sup> NYSDEP Program Policy Memorandum “Assessing and Mitigating Noise Impacts” Table B. From Down, C.G. and Stocks, J.; Environmental Impact of Mining. Applied Science Publishers Ltd., ISBN 0853347166, 1978

<sup>2</sup> NYSDEP Program Policy Memorandum “Assessing and Mitigating Noise Impacts” Section B.1.a(6)

- Ambient sound measurements taken during summer and fall months can be up to 10 dBA higher than those taken during winter months on account of indigenous sources of noise including foliage rustling and insects noise.

**A conservative approach would describe the ambient sound level in terms of seasonal variations.**

Ambient Location 7 is representative of Receptor Location 7. Ambient Location 7 was chosen to measure a conservative ambient sound level that would be lower or at least no higher than the ambient levels at Receptor 7. In particular, Ambient Location 7 was chosen because the existing quarry was in operation at the time of monitoring—by taking measurements further removed from the quarry, the ambient readings were lower and, therefore, the analysis was more conservative.

#### 4.1.3 Ambient Sound Level Data

The following table outlines the ambient sound level data collected near each receptor location:

**Table 4. Ambient Sound Levels at Receptor Locations**

	Ambient Monitoring Location	Morning 10-minute $L_{eq}$		Afternoon 10-minute $L_{eq}$	
A1	Lasell Park	49.0	49.4	46.8	45.6
A2	Field N/F CSP, South of Expansion area	45.1	43.6	50.6	50.6
A3	NW-side Price prop	58.6	57.2	57.7	59.9
A4	SE-side Price prop	53.6	54.4	53.9	55.1
A5	Public Village Parking Lot	47.2	51.3	49.1	48.6
A6	Conboy - Llama Farm	46.4	47.4	45.5	47.0
A7	Conboy - Shale Pit Entrance	49.0	49.3	45.6	54.6

Figure 1: Excerpt from DEIS (pg. 13a)

#### Acoustic Modeling

Acoustic modeling presented in the DEIS does not provide adequate information to validate the conclusions that sound produced by the project will be as reported. Details including number of sources, characteristics of sources (tone, intermittency, impulsiveness, usage factor, etc.), and sound control features should be included in the report. Also, methods to assure that sound sources will actually meet the emission characteristics that predictive models have been based on should be described.

#### Noise Control Recommendations

The Second Level Noise Impact Evaluation described in the DEIS predicts increases in sound levels at residential receptors of as much as 20 dBA. As indicated in the NYSDEC Program Policy document, this increase in sound level would result in a “very objectionable to intolerable” reaction from the neighboring community.

The Third Level Noise Impact Evaluation includes calculated sound level reductions based on erection of earthen berms (as tall as 35 ft. in some areas), as well as a host of operational noise control measures (i.e. instructing drivers not to slam tail gates, no use of engine braking).

Since significant noise control is required, a post-expansion effort to evaluate the effectiveness of noise mitigation measures should be included in the DEIS. This should include a written protocol describing a post-expansion sound monitoring program to be completed by third-party experts.

A contingency plan describing the methods and timeline for further mitigation measures should be included in the DEIS, in the event that the facility sound levels exceed the levels indicated in the Third Level Noise Impact Evaluation.

## Conclusion

Based on our review of DEIS and supporting documents, we believe that the acoustic impact of the proposed project has been significantly underestimated. The following summarizes our comments:

- Judgments with respect to the acoustic impact of a project should be based on relative increases in environmental sound levels. Ambient sound levels reported in the DEIS have been significantly understated because of inadequate sampling, inappropriate acoustic descriptors and the presence of quarry activity sound during ambient measurements. This has led to a significant underestimate of acoustic impact to the neighboring community.
- The DEIS fails to consider the acoustic impact of truck traffic through the community. Truck traffic should be considered as a significant source of community noise.
- Documentation to validate the predictions contained in the DEIS is lacking.
- The DEIS fails to provide a post-expansion sound monitoring program to validate the predictions contained in the report.

As presented, it is our opinion that the proposed project will have adverse acoustic impacts in the surrounding community. The project needs to define more stringent and appropriate standards to preserve the quality of life in the community that will be impacted by this project. In addition, a more detailed analysis is required to substantiate that the project will meet these standards.

Yours sincerely,

Cavanaugh Tocci Associates, Inc.



Andrew Carballeira  
Staff Consultant

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# **Appendix A**

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## **Sound Measurement Terminology**

## **Sound Measurement Terminology**

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In order to quantify the amplitude, frequency, and temporal characteristics of sound, various acoustical descriptors are used. The following is an introduction to acoustic terminology that is used in this report.

### **Sound Level**

Sound levels are typically quantified using a logarithmic decibel (dB) scale. The use of a logarithmic scale helps to compress the wide range of human sensitivity to sound amplitude into a scale that ranges from approximately 0 to 180 dB. Note however, that the use of the logarithmic scale prevents simple arithmetic operations when combining the cumulative impact of sources. For example, two sources of equal sound level operated simultaneously results in a combined sound level that is only 3 dB higher than if only one source was operated alone. An important feature of the human perception of continuous sound is that an increase or decrease in sound pressure level by 3 dB or less is barely perceptible, and an increase or decrease by 10 dB is perceived as a doubling or halving of noise level.

### **A-weighting**

Generally, the sensitivity of human hearing is restricted to the frequency range of 20 Hz to 20,000 Hz. However, the human ear is most sensitive to sound in the 500 Hz to 5,000 Hz frequency range. Above and below this range, the ear becomes progressively less sensitive. To account for this feature of human hearing, sound level meters incorporate filtering of acoustic signals that corresponds to the varying sensitivity of the human ear to sound at different frequencies. This filtering is called A-weighting. Sound level measurements that are obtained using this filtering are referred to as A-weighted sound levels and are signified by the identifier, dBA. A-weighted sound levels are widely used for evaluating human exposure to environmental sounds. To help place A-weighted sound levels in perspective, Figure A-1 contains a scale showing typical sound levels for common interior and environmental sound sources.

### **Octave and 1/3 Octave Band Sound Levels**

To characterize a sound, it is often necessary to evaluate the frequency distribution of the sound energy. As mentioned before, the frequencies of most interest where human exposure is concerned range between 20 Hz and 20,000 Hz. This frequency range is commonly divided into octave bands, where an octave band is a range of frequencies. Each octave band is referred to by its center frequency and has a bandwidth of one octave (a doubling of frequency). To cover the full range of human hearing, it is necessary to measure sound in 10 separate octave bands. Typically, the lowest frequency band measured has a center frequency of 31.5 Hz. The next frequency band has a center frequency of 63 Hz. This geometric series continues to the highest frequency band that has a center frequency of 16,000 Hz. A set of octave band sound levels to describe a particular sound is called an octave band spectrum. Covering the full range of hearing, an octave band spectrum would have 10 values, one for each band.

Under certain circumstances, more frequency resolution in acoustical data is needed to identify the presence of tonal sounds. A 1/3-octave band spectrum uses filters that divide each octave band into 3 separate frequency bands. Note that octave band and 1/3-octave band sound levels are not usually A-weighted, with their units being dB.

## Environmental Noise Descriptors

Sound levels in the environment are continuously fluctuating and it is difficult to quantify these time-varying levels with single number descriptors. Statistical approaches, which use *percentile* sound levels and *equivalent* sound levels, are often used to quantify the temporal characteristics of environmental sound.

*Percentile sound levels* ( $L_n$ ) are the A-weighted sound levels that are exceeded for specific percentages of time within a noise measurement interval. For example if a measurement interval is one hour long, the 50th percentile sound level ( $L_{50}$ ) is the A-weighted sound level that is exceeded for 30 minutes of that interval. Similarly, the 90th percentile sound level ( $L_{90}$ ) is the A-weighted sound level that is exceeded for 54 minutes of the same one-hour long interval. The 90th percentile sound level represents the nominally lowest level reached during the monitoring interval and is typically influenced by sound of relatively low level, but nearly constant duration, such as distant traffic or continuously operating industrial equipment. The  $L_{90}$  is often used in standards to quantify the existing background or residual sound level. Conversely, the  $L_{10}$  represents the nominally highest sound levels reached during a monitoring interval. The  $L_{10}$  is typically influenced by sound of high level, but short duration, such as that produced by vehicles passing on a nearby road. The  $L_{10}$  is sometimes called the intrusive sound level. By using percentile sound levels, it is possible to characterize the sound environment in terms of the steady-state background sound ( $L_{90}$ ) and occasional transient sound ( $L_{10}$ ).

The *equivalent sound level* ( $L_{eq}$ ) is the energy average of the A-weighted sound level for the measurement interval. Sounds of low level and long duration, as well as sounds of high level and short duration influence this sound level descriptor. Noise levels at night generally produce greater annoyance than do the same levels which occur during the day. It is generally agreed that a given level of environmental noise during the day would appear to be 10 dBA louder at night – at least in terms of potential for causing community concern. The *day-night average* sound level ( $L_{dn}$ ) is a 24-hour average A-weighted sound level where a 10-dB “penalty” is applied to sound occurring between the hours of 10:00 p.m. and 7:00 a.m. The 10-dB penalty accounts for the heightened sensitivity of a community to noise occurring at night.

Figure A-1: Typical Sound Levels for Common Interior and Environmental Sources

