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MEMORANDUM

To: Steve Sharr
BuildLACCD

From: Zack Dennis
ATS Consulting

Date: March 7, 2012

Subject: Monthly Noise Report for Culver Crest Noise Monitors, February 2012

This memorandum presents the results of the noise monitoring in the Culver Crest neighborhood near the West Los Angeles College (WLAC) campus. There are three monitors positioned between Stocker Street and the Culver Crest neighborhood to monitor noise from construction activities on the WLAC campus. Each monitor is an independent station consisting of a microphone, sound level meter, cell phone modem, and assorted ancillary equipment. The locations of the monitors are shown in Appendix A.

Monitor 3: The average noise levels at Monitor 3 were high by about 10 decibels because the monitor was not set up correctly after it was sent in for calibration. The levels shown are C-weighted using a Fast detector speed instead of A-weighted using a Slow detector speed. The monitor also failed to reset its memory when automated download was complete causing the memory to run out on the 23rd. This problem was not identified until the beginning of the next week. Since the C-weighting favors tones noise between 100 and 2000 Hz, while the A-weighting favors noise around 2000 Hz, the normal peaks were not clearly identifiable. There were peaks observed on February 8, 13, and 16, but do not correlate to the normal noise sources for this site. Graphics of the data are shown, but numeric values are omitted to avoid confusion.

Monitor 4: Monitor 4 had been taken in for calibration and was restored to service at the beginning of March. No data was collected during the month of February.

Monitor 5: Monitor 5 has been reported as stolen.

Table 1. Summary of Monthly Results, Monitor 3				
Metric	**Sound Level, dBA**			
	Average	**Maximum[2]**	**Minimum[3]**	**Standard Deviation**
Day-Night Sound Level (Ldn)	53	55	48	1.7
Work Hours Leq[1]	48	52	39	3.0

Notes:
1. The Work Hours Leq is the energy average between 8 a.m. to 6 p.m. on weekdays and 9 a.m. to 5 p.m. on Saturdays.
2. The maximum Ldn or daytime hourly Leq value during the month.
3. The minimum Ldn or daytime hourly Leq value during the month.
4. On 4/12/12, the values here were corrected. Previously, the Work Hours Leq values were input in the Ldn row, and vice versa.

(Sound Level is in dBC not dBA, which explains the abnormally high levels for the entire month.)

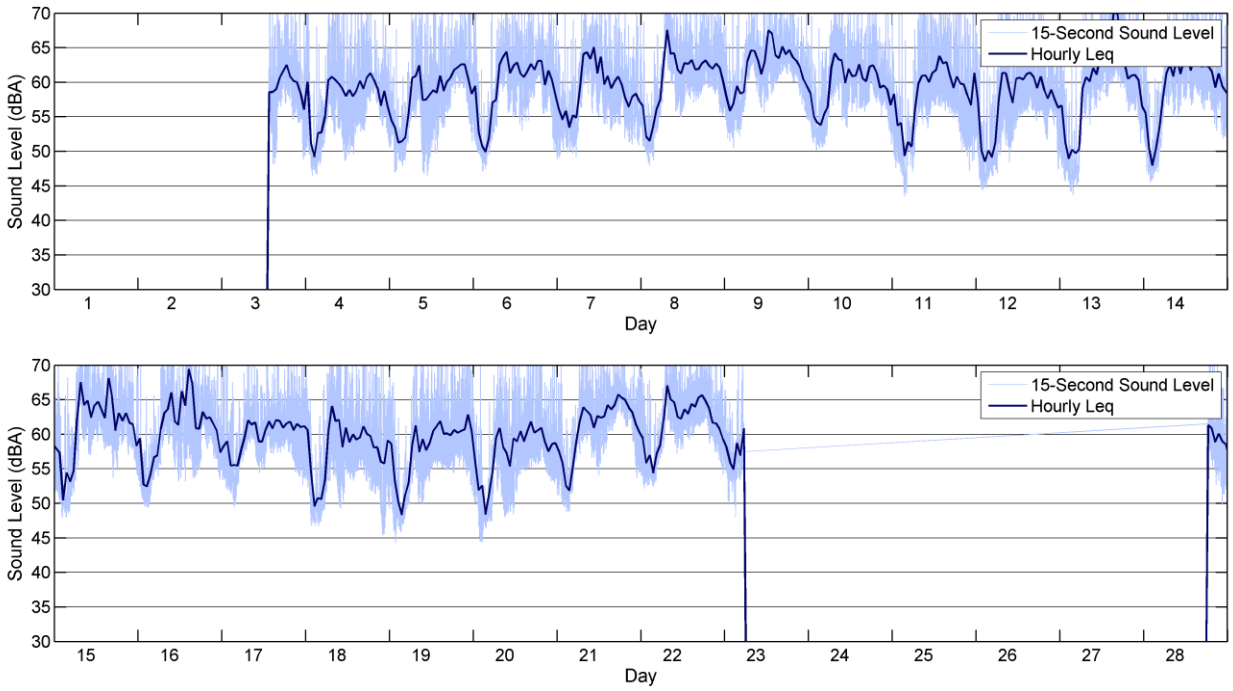

Figure 1: Monitor 3 Hourly Leq Results

Table 2. Summary of Monthly Results, Monitor 4				
Metric	**Sound Level, dBA**			
	Average	**Maximum[2]**	**Minimum[3]**	**Standard Deviation**
Day-Night Sound Level (Ldn)	--	--	--	--
Work Hours Leq[1]	--	--	--	--

Notes:
1. The Work Hours Leq is the energy average between 8 a.m. to 6 p.m. on weekdays and 9 a.m. to 5 p.m. on Saturdays.
2. The maximum Ldn or daytime hourly Leq value during the month.
3. The minimum Ldn or daytime hourly Leq value during the month.
4. On 4/12/12. This table was corrected to display no data to reflect that the monitor was in for calibration. Previously it presented the data for January 2012.

Figure 2: Monitor 4 Hourly Leq Results

APPENDIX A: RESULTS FOR INDIVIDUAL MONITOR SITES

Figure 3: Noise Monitor Locations

Monitor 3

Figure 4: Satellite Photograph of Noise Monitor 3

Monitor 3 is located in the back yard of 10621 Flaxton Street, to the south of the temporary sound wall on Stocker Street. The monitor is located approximately 450 from the center of the construction site at West Los Angeles College. Prior to construction activity, the primary noise sources in the area are local traffic, airplanes, residential activity, landscaping equipment and lawnmowers, and distant traffic noise from Interstate 405.

Table 3. Daily Results
Monitor 3, February 2012

Date	Sound Level, dBA			
	Work Hours Leq	Maximum[1]	Minimum[2]	Ldn
11/1/11	--	63	33	55
11/2/11	52	67	35	54
11/3/11	48	62	37	53
11/4/11	49	68	36	52
11/5/11	48	70	34	54
11/6/11	48	67	37	53
11/7/11	48	61	32	51
11/8/11	--	60	38	55
11/9/11	49	62	35	53
11/10/11	49	64	35	51
11/11/11	48	68	35	54
11/12/11	49	69	35	55
11/13/11	44	59	31	48
11/14/11	45	60	33	50
11/15/11	--	63	34	52
11/16/11	49	70	35	53
11/17/11	49	62	32	53
11/18/11	48	67	37	53
11/19/11	39	57	52	53
11/20/11	--[3]	--[3]	--[3]	--[3]
11/21/11	--[3]	--[3]	--[3]	--[3]
11/22/11	--[3]	--[3]	--[3]	--[3]
11/23/11	--[3]	--[3]	--[3]	--[3]
11/24/11	--[3]	--[3]	--[3]	--[3]
11/25/11	--[3]	--[3]	--[3]	--[3]
11/26/11	--[3]	--[3]	--[3]	--[3]
11/27/11	--[3]	--[3]	--[3]	--[3]
11/28/11	--[3]	--[3]	--[3]	--[3]
11/29/11	--[3]	--[3]	--[3]	--[3]
11/30/11	--[3]	--[3]	--[3]	--[3]
11/31/11	--[3]	--[3]	--[3]	--[3]

Notes:
1. The maximum sound level over a 5 second interval (5 second Leq) during the 24-hour period.
2. The minimum sound level over a 5 second interval (5 second Leq) during the 24-hour period.
3. The monitor was removed for calibration.

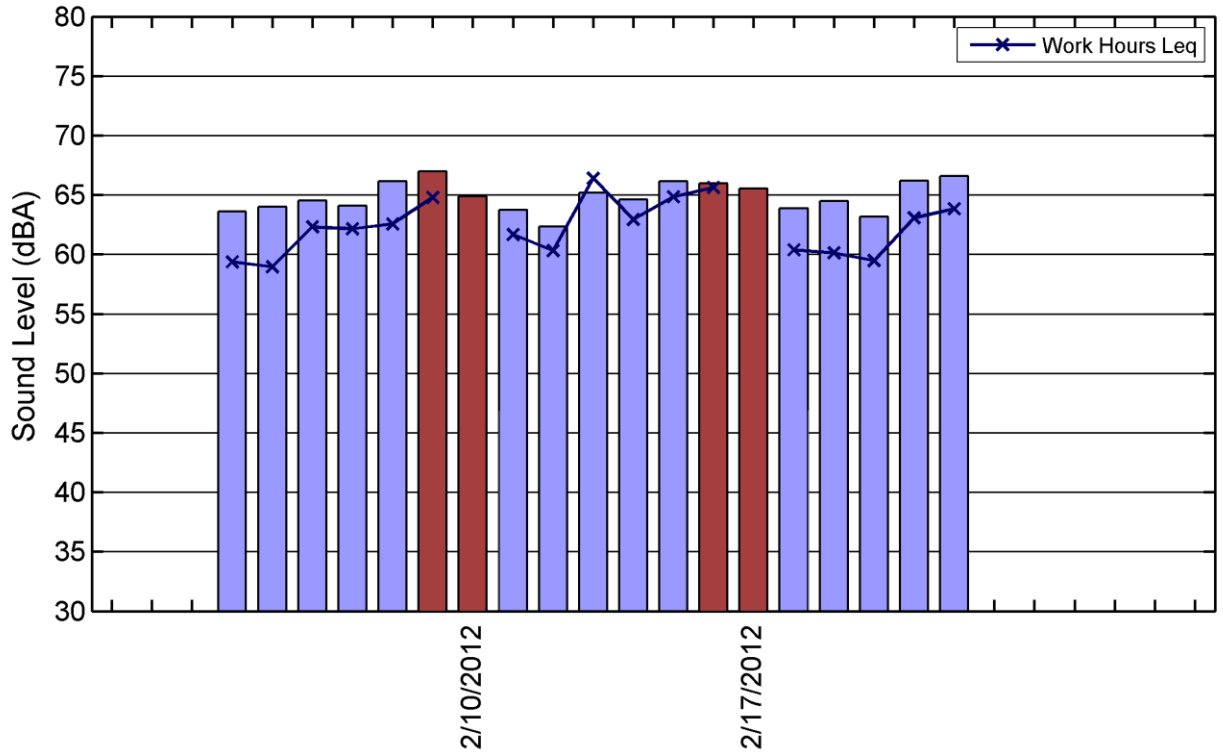

Figure 5: Monitor 3 Ldn and Daytime Leq Results

Units are incorrectly labeled. The C-weighting was used by mistake, not the A-weighting.

Table 4. Summary of Monthly Results, Monitor 3					
Month	**Year**	**Sound Level, dBA**			
		Work Hours Leq[1]	**Standard Deviation**	**Ldn**	**Standard Deviation**
Nov - Dec	2007	50	1.9	54	1.5
January	2008	52	4.1	55	2.4
February	2008	52	1.7	55	1.7
March	2008	51	1.8	53	1.2
April	2008	52	2.3	54	1.4
May	2008	52	3.4	54	2.1
June	2008	51	2.0	53	1.5
July	2008	51	2.0	53	1.9
August	2008	50	2.2	53	1.0
September	2008	50	1.8	56	1.7
October	2008	50	2.3	54	1.9
November	2008	50	1.6	54	2.1
December	2008	51	3.5	54	2.0
January	2009	48	0.6	54	0.9
February	2009	50	2.2	54	1.4
March	2009	51	4.5	53	2.7
April	2009	52	5.0	54	3.1
May	2009	51	2.2	54	2.3
June	2009	49	3.0	51	2.3
July	2009	49	2.0	53	1.3
August	2009	49	1.7	52	1.8
September	2009	49	1.5	52	1.5
October	2009	58	13.2	60	11.3
November	2009	50	2.6	53	1.4
December	2009	49	1.5	53	1.0
January	2010	49	0.9	52	3.5
February	2010	51	1.9	54	1.8
March	2010	50	2.4	54	1.8
April	2010	51	3.1	54	1.9
May	2010	51	4.4	53	2.6
June	2010	51	3.1	52	1.5
July	2010	50	3.4	51	2.0
August	2010	49	3.7	51	2.3

Table 4. Summary of Monthly Results, Monitor 3					
September	2010	50	2.1	53	2.4
October	2010	46	4.4	49	3.7
November	2010	43	4.9	48	4.9
December	2010	N/A[2]	N/A[2]	N/A[2]	N/A[2]
January	2011	49	1.2	54	2.0
February	2011	46[3]	2.9[3]	50[3]	2.3[3]
March	2011	44[3]	7.7[3]	50[3]	8.1[3]
April	2011	63[3]	3.7[3]	68[3]	2.0[3]
May	2011	N/A[4]	N/A[4]	N/A[4]	N/A[4]
June	2011	N/A[4]	N/A[4]	N/A[4]	N/A[4]
July	2011	49	1.5	53	1.6
August	2011	49	1.6	51	1.7
September	2011	52	5.0	53	3.1
October	2011	50	3.3	51	2.7
November	2011	49	2.1	52	1.9
December	2011	49	2.1	53	2.2
January	2012	48	1.8	53	1.8

Notes:
1. The work hours Leq is the energy average between 8 a.m. to 6 p.m. on weekdays and 9 a.m. to 5 p.m. on Saturdays.
2. The data during December 2010 was not recorded due to power issues.
3. The data for these months is suspect due to potential microphone calibration issues.
4. Microphone was removed from service for repair/replacement.

Monitor 4

Figure 6: Satellite Photograph of Noise Monitor 4

Monitor 4 is located in the back yard of the residence at 10769 Northgate Street. The monitor is located approximately 900 from the center of the construction site at West Los Angeles College. Prior to construction activity, the primary noise sources in the area are local traffic, airplanes, residential activity, landscaping equipment and lawnmowers, and distant traffic noise from Interstate 405.

Table 5. Daily Results
Monitor 4, February 2012

Date	Sound Level, dBA			
	Work Hours Leq	Maximum[1]	Minimum[2]	Ldn
11/1/11	--	69	41	57
11/2/11	50	67	35	54
11/3/11	53	82	39	55
11/4/11	49	64	36	53
11/5/11	48	71	34	53
11/6/11	50	70	38	53
11/7/11	49	66	30	52
11/8/11	--	63	39	56
11/9/11	51	70	36	54
11/10/11	49	63	38	52
11/11/11	49	64	36	54
11/12/11	50	71	36	55
11/13/11	47	64	36	51
11/14/11	46	60	31	50
11/15/11	--	63	34	53
11/16/11	50	71	33	53
11/17/11	55	83	32	54
11/18/11	50	69	36	53
11/19/11	50	66	39	53
11/20/11	51	68	29	53
11/21/11	54	63	29	54
11/22/11	--	74	35	53
11/23/11	53	73	32	54
11/24/11	51	69	38	54
11/25/11	51	72	37	54
11/26/11	51	66	39	54
11/27/11	51	73	32	52
11/28/11	47	63	36	52
11/29/11	--	59	33	53
11/30/11	52	72	37	52
11/31/11	55	82	33	53

Notes:
1. The maximum sound level over a 5 second interval (5 second Leq) during the 24-hour period.
2. The minimum sound level over a 5 second interval (5 second Leq) during the 24-hour period.

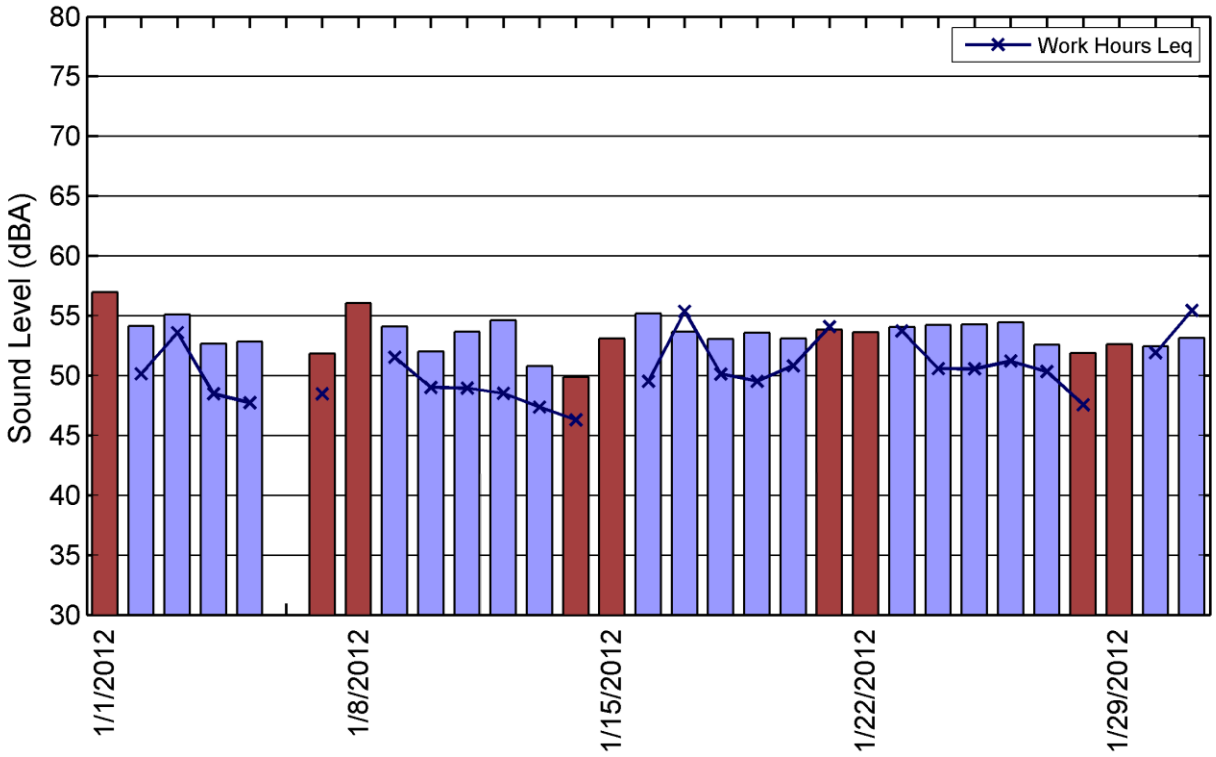

Figure 7: Monitor 4 Ldn and Daytime Leq Results

Table 6. Summary of Monthly Results, Monitor 4					
Month	**Year**	**Sound Level, dBA**			
		Work Hours Leq[1]	**Standard Deviation**	**Ldn**	**Standard Deviation**
Nov - Dec	2007	54	1.5	56	2.8
January	2008	54	1.8	56	2.5
February	2008	55	1.6	55	1.3
March	2008	55	1.4	55	1.5
April	2008	54	2.4	55	1.7
May	2008	54	1.9	54	1.4
June	2008	53	1.2	54	1.5
July	2008	52	2.1	54	2.0
August	2008	52	1.1	53	0.9
September	2008	52	1.3	54	1.4
October	2008	52	1.8	54	1.7
November	2008	53	1.6	56	2.1
December	2008	53	2.8	56	1.8
January	2009	52	2.2	55	2.3
February	2009	53	2.4	56	1.2
March	2009	52	1.9	54	1.5
April	2009	54	0.9	55	1.5
May	2009	53	1.0	54	1.2
June	2009	53	1.3	53	1.7
July	2009	53	3.1	54	1.8
August	2009	52	3.4	53	2.6
September	2009	52	2.2	54	1.7
October	2009	52	2.5	53	1.9
November	2009	53	3.3	54	2.4
December	2009	52	2.3	54	1.2
January	2010	52	2.4	54	1.7
February	2010	51	1.4	54	1.6
March	2010	53	2.3	54	1.3
April	2010	53	2.8	54	1.9
May	2010	53	1.8	53	1.3
June	2010	52	2.3	55	3.7
July	2010	52	1.7	55	3.7
August	2010	52	1.7	53	1.6

Table 6. Summary of Monthly Results, Monitor 4					
September	2010	51	1.3	53	2.1
October	2010	52	3.3	52	2.2
November	2010	50	3.3	53	1.8
December	2010	51	2.0	54	1.6
January	2011	50	1.3	54	1.6
February	2011	50	2.1	54	1.5
March	2011	52	4.8	55	2.4
April	2011	53	1.8	54	1.2
May	2011	53	2.4	53	1.5
June	2011	52	2.1	52	1.5
July	2011	50	2.3	52	2.0
August	2011	52	5.6	52	4.1
September	2011	53	5.7	54	3.2
October	2011	51	1.3	53	2.1
November	2011	50	2.5	53	1.5
December	2011	50	2.5	54	1.5
January	2012	51	2.2	53	1.4

Notes:
1. The work hours Leq is the energy average between 8 a.m. to 6 p.m. on weekdays and 9 a.m. to 5 p.m. on Saturdays.

Monitor 5

Figure 8: Satellite Photograph of Noise Monitor 5

Monitor 5 is located on the south side of Stocker Street, approximately 50 feet south of where the temporary noise barrier is to be erected. The microphone is located at the top of the slope leading down to the backyards of the residences on Northgate Street. Prior to construction activity, the primary noise source in the area is traffic noise on Stocker Street.

Table 7. Summary of Monthly Results, Monitor 5					
Month	**Year**	**Sound Level, dBA**			
		Work Hours Leq[1]	**Standard Deviation**	**Ldn**	**Standard Deviation**
January	2008	53	2.2	56	1.3
February	2008	57	2.4	57	1.5
March	2008	52	1.4	55	1.3
April	2008	53	1.8	55	1.6
May	2008	53	2.5	56	1.5
June	2008	53	1.1	55	1.4
July	2008	52	1.5	55	1.8
August	2008	52	1.2	55	2.6
September	2008	52	1.2	55	1.5
October	2008	51	2.5	56	2.3
November	2008	51	2.1	55	2.1
December	2008	51	1.2	54	1.8
January	2009	51	1.5	55	1.3
February	2009	52	1.8	56	1.0
March	2009	52	1.2	56	1.6
April	2009	52	1.3	55	1.0
May	2009	53	2.0	55	1.7
June	2009	54	1.4	56	1.7
July	2009	52	0.9	56	1.3
August	2009	52	1.4	55	1.9
September	2009	52	1.5	55	1.7
October	2009	52	1.6	56	1.3
November	2009	52	0.8	56	1.7
December	2009	52	1.4	56	0.8
January	2010	52	0.5	56	1.0
February	2010	53	1.5	56	1.1
March	2010	55	3.8	57	2.1
April	2010	53	1.8	56	1.3
May	2010	53	1.1	55	1.1
June	2010	53	1.7	55	1.0
July	2010	53	1.9	55	1.8
August	2010	53	1.7	55	1.8
September	2010	52	1.2	55	1.9

Table 7. Summary of Monthly Results, Monitor 5					
October	2010	52	1.7	54	1.4
November	2010	51	2.1	55	1.7
December	2010	52	1.4	56	1.8
January	2011	53	1.4	57	1.6
February	2011	52	2.3	56	1.2
March	2011	52	3.6	57	1.8
April	2011	52	1.3	55	1.2
May	2011	52	1.3	56	1.5
June	2011	52	1.0	55	1.2
July	2011	52	1.0	55	1.5
August	2011	52	1.6	55	1.5
September	2011	59	12.4	60	9.2
October	2011	--[2]	--[2]	--[2]	--[2]

Notes:
1. The work hours Leq is the energy average between 8 a.m. to 6 p.m. on weekdays and 9 a.m. to 5 p.m. on Saturdays.
2. Monitor was not in service.

APPENDIX B: BACKGROUND OF NOISE

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise is generally defined as unwanted or excessive sound. Sound can vary in intensity by over one million times within the range of human hearing. Therefore, a logarithmic scale, known as the decibel scale (dB), is used to quantify sound intensity and compress the scale to a more manageable range.

Sound is characterized by both its amplitude and frequency (or pitch). The human ear does not hear all frequencies equally. In particular, the ear deemphasizes low and very high frequencies. To better approximate the sensitivity of human hearing, the A-weighted decibel scale has been developed. A-weighted decibels are abbreviated as "dBA." On this scale, the human range of hearing extends from approximately 3 dBA to around 140 dBA. As a point of reference, Figure 9 includes examples of A-weighted sound levels from common indoor and outdoor sounds.

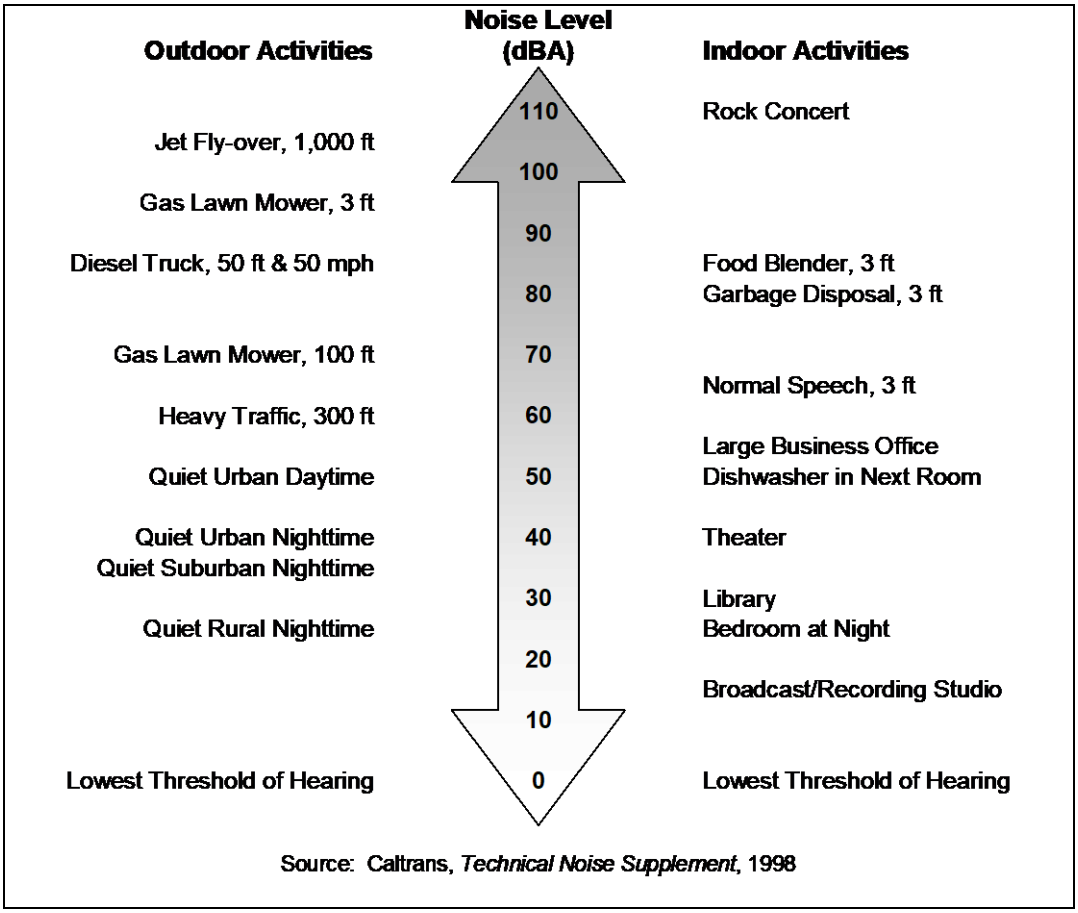

Figure 9. Typical Outdoor and Indoor Noise Sources

Using the decibel scale, sound levels from two or more sources cannot be directly added together to determine the overall sound level. Rather, the combination of two sounds at the same level yields an

increase of 3 dBA. The smallest recognizable change in sound level is approximately 1 dBA. A 3-dBA increase is generally considered perceptible, whereas a 5-dBA increase is readily perceptible. A 10-dBA increase is judged by most people as an approximate doubling of the perceived loudness.

Two of the primary factors that reduce levels of environmental sounds are increasing the distance between the sound source and the receiver and having intervening obstacles, such as walls, buildings or terrain features, that block the direct path between the sound source and the receiver. Factors that act to increase the loudness of environmental sounds include the proximity of the sound source to the receiver, sound enhancements caused by reflections, and focusing caused by various meteorological conditions.

Brief definitions of the measures of environmental noise used in this report are:

- **Equivalent Sound Level (Leq)**: Environmental sound fluctuates constantly. The equivalent sound level (Leq), sometimes referred to as the energy-average sound level, is the most common means of characterizing community noise. Leq represents a constant sound that, over the specified period, has the same sound energy as the time-varying sound. The noise monitors currently measure sound in 15 second intervals and these are used to calculate the 1-hour Leqs.
- **Day-Night Sound Level (Ldn):** Ldn is basically a 24-hour Leq with an adjustment to reflect the greater sensitivity of most people to nighttime noise. The adjustment is a 10-dB penalty for all sound that occurs between the hours of 10 p.m. and 7 a.m. The effect of the penalty is that, when calculating Ldn, any event that occurs during the nighttime is equivalent to 10 of the same event during the daytime. Ldn is the most common measure of total community noise over a 24-hour period.
- **Work Hours Sound Level:** The work hours sound level is effectively a sound level based on the hours the haul road is expected to be used. For weekdays Monday through Friday, it consists of the Leq for the period between 8 a.m. and 6 p.m. For Saturdays, it consists of the Leq for the period between 9 a.m. and 5 p.m. The road is not expected to be used on Sunday.
- **Maximum Sound Level (Lmax):** The maximum sound level over a period of time or for a specific event can also be a useful parameter for characterizing specific noise sources. Standard sound level meters have two settings, FAST and SLOW, which represent different time constants. Lmax using the FAST setting will typically be 1 to 3 dB greater than Lmax using the SLOW setting.
- **Sound Exposure Level (SEL):** SEL is a measure of the total sound energy of an event. In essence, all sound from the event is compressed into a one-second period. This means that SEL increases as the event duration increases and as the event sound level increases. SEL is useful for estimating the Ldn that would be caused by individual events such as train passbys. Although the SEL values for the fifteen-second intervals are recorded (and reported along with the Leq values on the website), we are not using SEL's in any of our calculations.