M E M O R A N D U M

To: Diana Johnson
BuildLACCD

From: Zack Dennis

Date: March 2, 2016

Subject: Monthly Noise Report for Culver Crest Noise Monitors, February 2016

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.

Two monitors were removed (Monitor 1 and Monitor 8) during April for calibration, and this caused disruption of the software that normally downloads data from monitors on a nightly basis. This issue was corrected on April 27; some of the data prior to this fix was overwritten and not saved.

Monitor 3: Some data at the beginning of the month was lost at Monitor 3 due to communication issues. Of the data collected, monthly noise levels at Monitor 3 were higher than those observed during the previous months at this location primarily due to extremely high noise levels on February 17. Peaks were observed on February 10, 17, and 24 that are consistent with a regularly scheduled Wednesday activity. Additional peaks were observed on February 11, 18, and 25 that are consistent with a regularly scheduled Thursday activity.

Monitor 4: Monthly noise levels at Monitor 4 were similar to those observed during the previous months at this location. No peaks of greater than 60 dBA were observed during the month.

Monitor 5: Monthly noise levels at Monitor 5 were similar to those observed in previous months at this location. Peaks were observed on February 2, 9, 16, and 23 that are consistent with a regularly scheduled Tuesday activity. An additional peak was observed on February 19.

Table 1. Summary of Monthly Results, Monitor 3				
Metric	**Sound Level, dBA**			
	Average	**Maximum[2]**	**Minimum[3]**	**Standard Deviation**
Day-Night Sound Level (Ldn)	61	87	56	7.7
Work Hours Leq[1]	56	83	51	7.3

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.

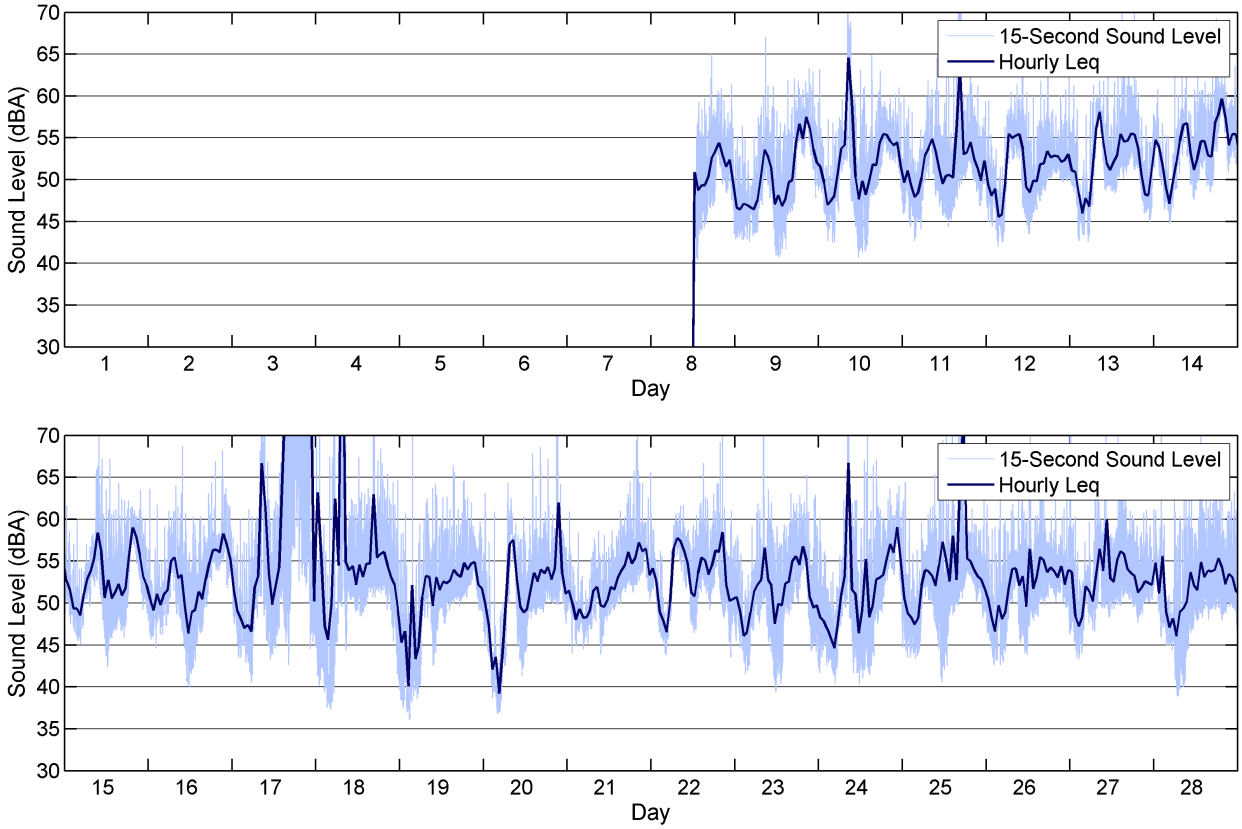

Figure 1: Monitor 3 Hourly Leq Results

Table 2. Summary of Monthly Results, Monitor 4				
Metric	**Sound Level, dBA**			
	Average	**Maximum[2]**	**Minimum[3]**	**Standard Deviation**
Day-Night Sound Level (Ldn)	54	57	51	1.6
Work Hours Leq[1]	51	54	47	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 maximum Ldn or daytime hourly Leq value during the month.
3. The minimum Ldn or daytime hourly Leq value during the month.

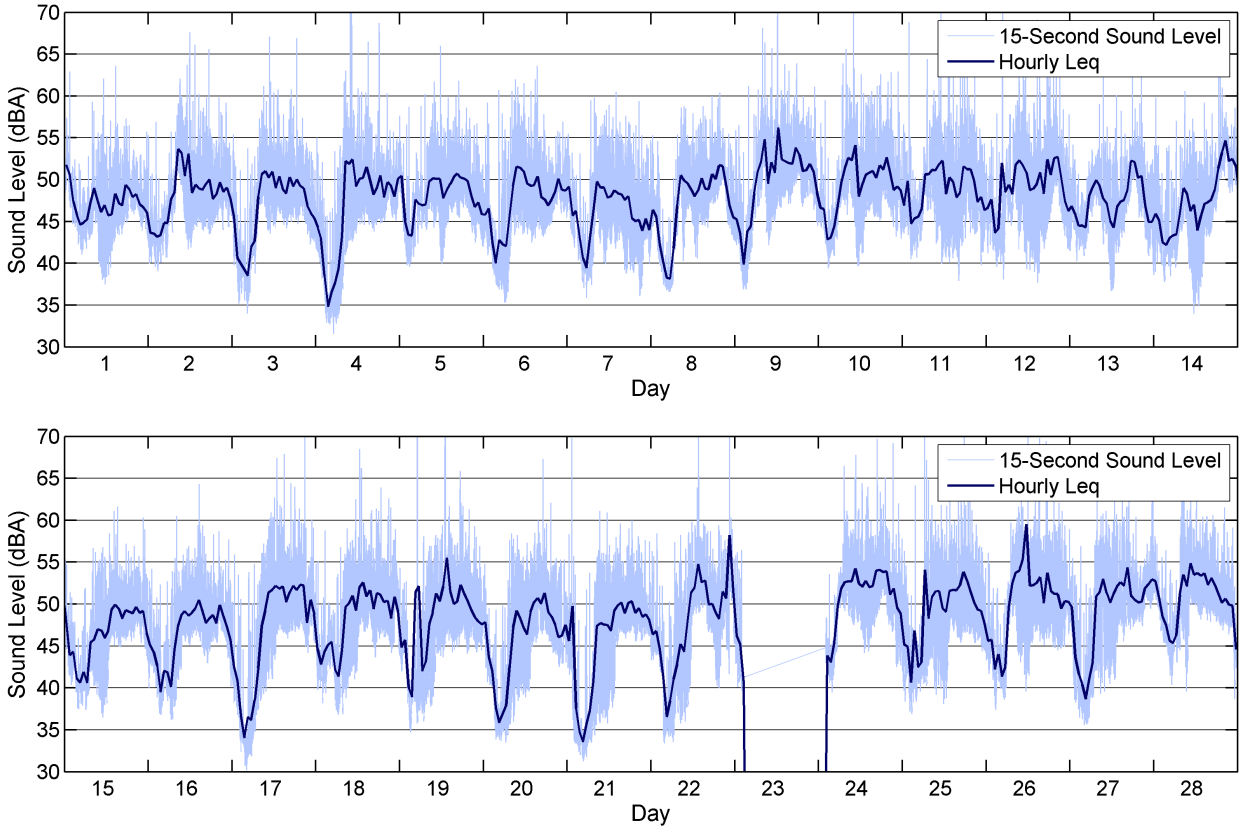

Figure 2: Monitor 4 Hourly Leq Results

Table 3. Summary of Monthly Results, Monitor 5				
Metric	**Sound Level, dBA**			
	Average	**Maximum[2]**	**Minimum[3]**	**Standard Deviation**
Day-Night Sound Level (Ldn)	55	59	52	1.6
Work Hours Leq[1]	52	60	46	3.7

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.

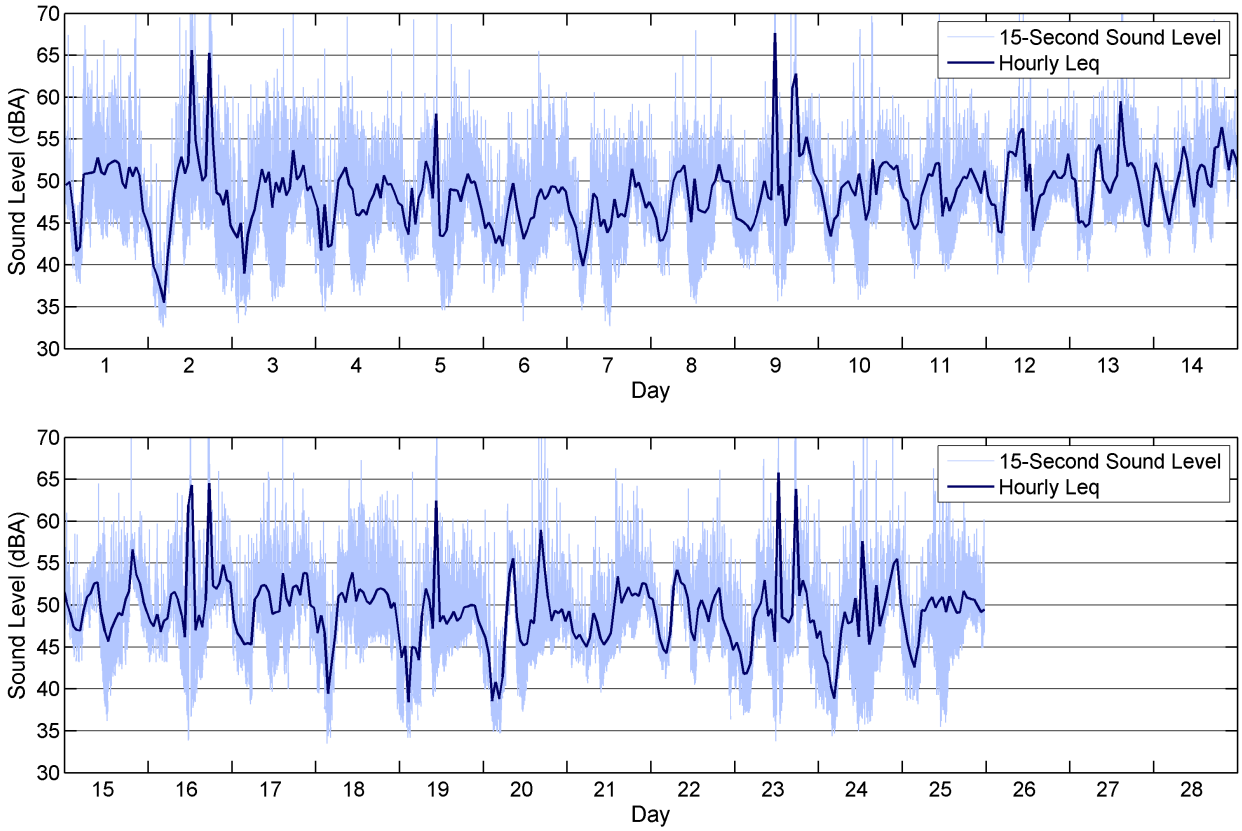

Figure 3: Monitor 5 Hourly Leq Results

APPENDIX A: RESULTS FOR INDIVIDUAL MONITOR SITES

Figure 4: Noise Monitor Locations

Monitor 3

Figure 5: 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 4. Daily Results
Monitor 3, February 2016

Date	Sound Level, dBA			
	Work Hours Leq	Maximum[1]	Minimum[2]	Ldn
2/1/16	--[3]	--[3]	--[3]	--[3]
2/2/16	--[3]	--[3]	--[3]	--[3]
2/3/16	--[3]	--[3]	--[3]	--[3]
2/4/16	--[3]	--[3]	--[3]	--[3]
2/5/16	--[3]	--[3]	--[3]	--[3]
2/6/16	--[3]	--[3]	--[3]	--[3]
2/7/16	--[3]	--[3]	--[3]	--[3]
2/8/16	--[3]	--[3]	--[3]	--[3]
2/9/16	51	67	41	56
2/10/16	57	76	41	59
2/11/16	56	78	43	58
2/12/16	53	67	42	58
2/13/16	54	74	43	57
2/14/16	--	69	45	60
2/15/16	54	71	42	59
2/16/16	52	69	40	60
2/17/16	83	104	41	87
2/18/16	56	107	37	79
2/19/16	53	75	36	56
2/20/16	52	85	37	57
2/21/16	--	72	44	58
2/22/16	55	81	44	59
2/23/16	53	73	39	57
2/24/16	58	75	40	60
2/25/16	63	95	41	62
2/26/16	54	74	43	58
2/27/16	56	73	43	58
2/28/16	--	78	39	59
2/29/16	55	71	39	57

Notes:
1. The maximum sound level over a 15 second interval (15 second Leq) during the 24-hour period.
2. The minimum sound level over a 15 second interval (15 second Leq) during the 24-hour period.
3. Data lost due to a communication issues.

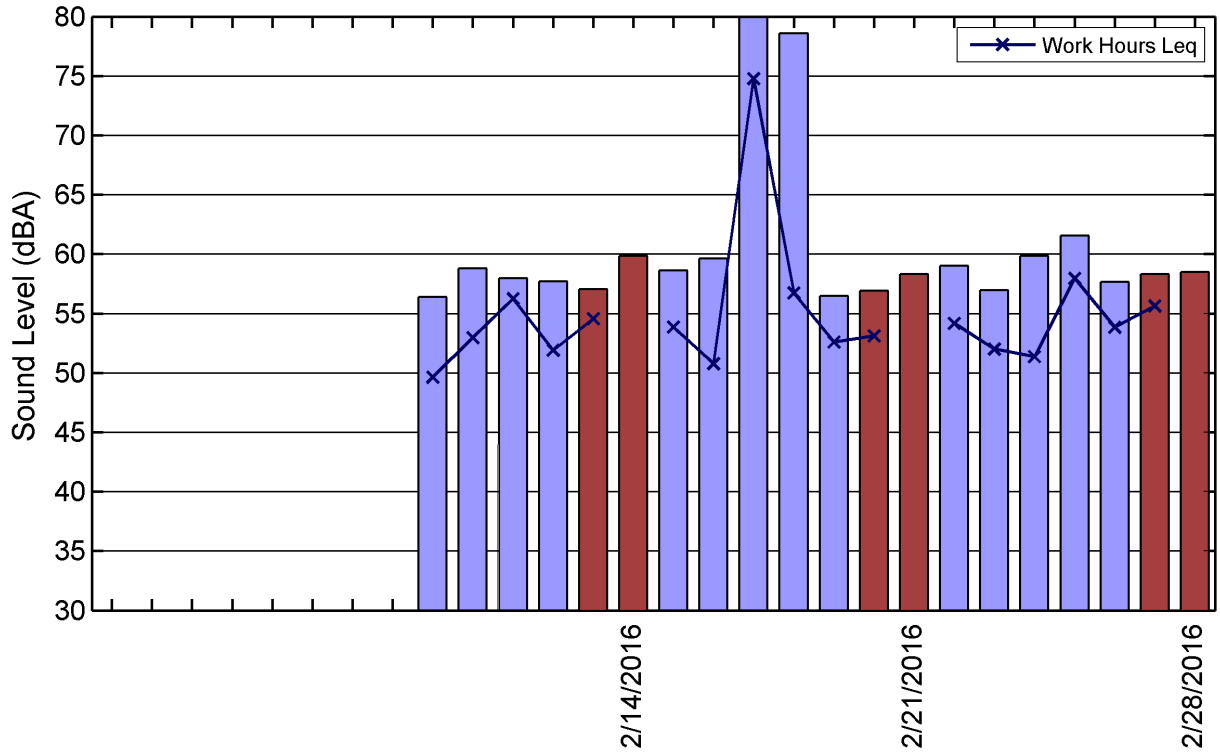

Figure 6: Monitor 3 Ldn and Daytime Leq Results

Table 5. Summary of Monthly Results[1], Monitor 3					
Month	**Year**	**Sound Level, dBA**			
		Work Hours Leq[2]	**Standard Deviation**	**Ldn**	**Standard Deviation**
January	2012	48	1.8	53	1.8
February	2012	--[3]	--[3]	--[3]	--[3]
March	2012	50[4]	2.2	53[4]	2.1
April	2012	48	2.7	51	2.0
May	2012	48	0.9	50	1.2
June	2012	49	3.4	50	2.1
July	2012	46	1.4	49	1.7
August	2012	47	2.9	50	1.5
September	2012	46	1.8	49	1.1
October	2012	48	2.1	51	2.2
November	2012	49	1.8	52	1.9
December	2012	49	1.7	52	1.7
January	2013	49	2.3	53	2.1
February	2013	50	1.6	53	1.6
March	2013	50	2.1	53	2.3
April	2013	51	1.9	53	1.5
May	2013	51	1.5	53	1.4
June	2013	50	1.6	52	1.3
July	2013	49	1.6	52	1.4
August	2013	49	1.0	51	1.9
September	2013	49	1.6	52	1.4
October	2013	49	2.4	53	1.4
November	2013	49	2.9	52	2.4
December	2013	48	4.3	52	2.2
January	2014	45	3.7	50	2.1
February	2014	48	4.4	51	6.4
March	2014	48	5.7	51	4.4
April	2014	46	1.8	51	1.9
May	2014	49	5.5	51	2.9
June	2014	48	0.2	51	0.5
July	2014	50	1.5	52	1.0
August	2014	50	2.2	52	1.4
September	2014	50	2.8	55	7.7
October	2014	50	2.8	53	2.0
November	2014	50	2.9	53	1.7

Table 5. Summary of Monthly Results[1], Monitor 3					
December	2014	53	8.3	56	7.4
January	2015	52	6.6	55	5.3
February	2015	50	3.8	53	2.3
March	2015	50	2.6	53	2.9
April	2015	56	10.0	57	7.2
May	2015	53	4.2	56	8.0
June	2015	53	4.6	54	2.4
July	2015	54	7.2	57	6.6
August	2015	54	2.1	56	1.3
September	2015	54	3.5	58	8.1
October	2015	55	2.6	58	2.2
November	2015	55	3.1	59	4.2
December	2015	54	8.0	58	7.9
January	2016	54	5.7	56	4.0
February	2016	56	7.3	61	7.7

Notes:
1. Data from prior to January, 2012 is available upon request.
2. 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.
3. The values for the month of February were C-weighted due to incorrect configuration, thus monthly values could not be presented.
4. The microphone was out of calibration by 2.6 dBA, leading to reported noise levels that were likely to be higher than actual noise levels.

Monitor 4

Figure 7: Satellite Photograph of Noise Monitor 4

Monitor 4 is located at the southeast edge of campus near the intersection of Stocker Street and Sophomore Drive. The monitor is located approximately 400 from an area where construction is expected to occur. 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 6. Daily Results
Monitor 4, February 2016

Date	Sound Level, dBA			
	Work Hours Leq	Maximum[1]	Minimum[2]	Ldn
2/1/16	48	64	38	54
2/2/16	51	68	39	53
2/3/16	50	67	34	51
2/4/16	51	71	32	52
2/5/16	50	66	40	53
2/6/16	50	64	35	53
2/7/16	--	61	36	52
2/8/16	49	60	37	52
2/9/16	53	75	37	55
2/10/16	51	72	39	54
2/11/16	50	70	38	54
2/12/16	51	70	38	55
2/13/16	47	67	37	53
2/14/16	--	65	34	54
2/15/16	48	62	37	52
2/16/16	49	64	36	51
2/17/16	51	71	30	53
2/18/16	51	69	37	54
2/19/16	52	73	35	55
2/20/16	49	67	34	51
2/21/16	--	70	31	52
2/22/16	51	80	33	57
2/23/16	--[3]	--[3]	--[3]	--[3]
2/24/16	53	70	40	55
2/25/16	52	73	37	55
2/26/16	54	78	37	55
2/27/16	52	68	36	55
2/28/16	--	64	39	56
2/29/16	49	64	36	51

Notes:
1. The maximum sound level over a 15 second interval (15 second Leq) during the 24-hour period.
2. The minimum sound level over a 15 second interval (15 second Leq) during the 24-hour period.
3. Data lost due to modem transfer error.

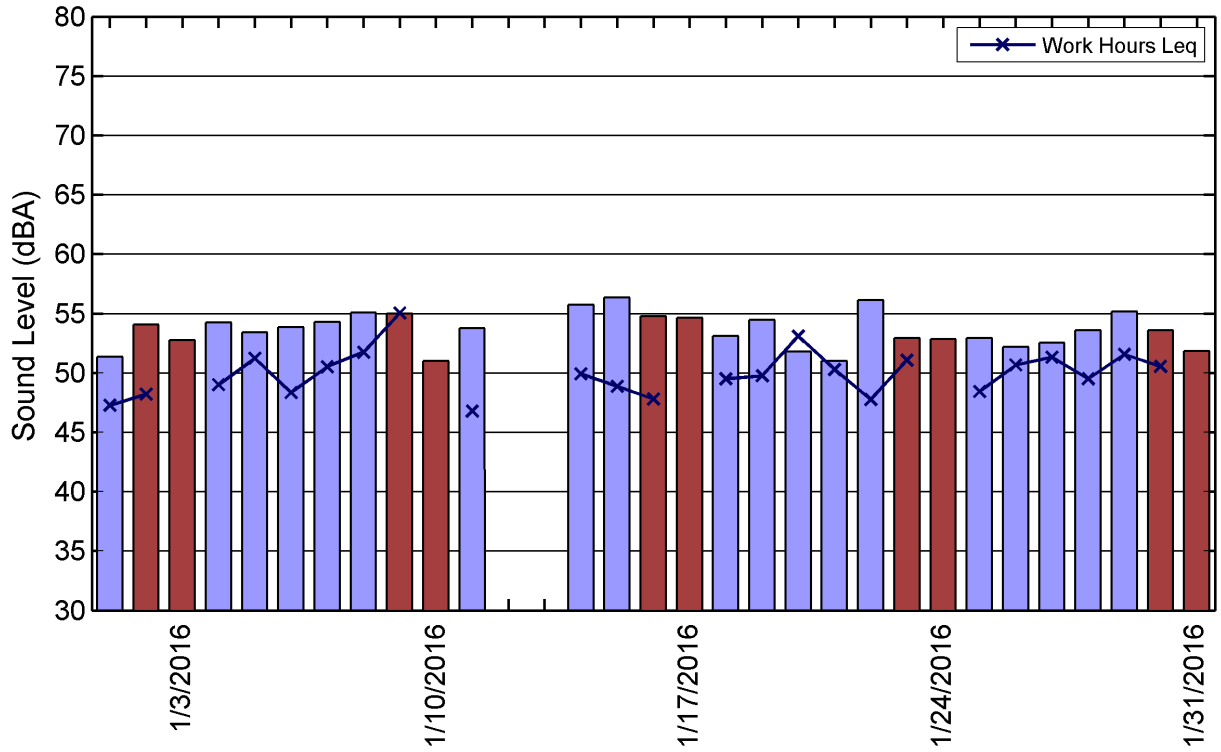

Figure 8: Monitor 4 Ldn and Daytime Leq Results

Table 7. Summary of Monthly Results[1], Monitor 4					
Month	**Year**	**Sound Level, dBA**			
		Work Hours Leq[2]	**Standard Deviation**	**Ldn**	**Standard Deviation**
August	2014	50	2.0	54	1.4
September	2014	51	2.6	55	2.2
October	2014	51	3.0	53	2.0
November	2014	50	2.1	53	1.7
December	2014	50	3.8	54	3.2
January	2015	50	2.0	53	1.7
February	2015	51	1.8	54	1.6
March	2015	52	1.4	55	1.5
April	2015	56	1.6	58	1.3
May	2015	54	2.0	58	2.1
June	2015	52	1.7	55	3.1
July	2015	51	1.2	55	3.1
August	2015	49	1.2	53	1.0
September	2015	50	1.8	54	1.5
October	2015	51	1.5	53	1.5
November	2015	51	1.5	53	1.5
December	2015	50	2.1	54	3.2
January	2016	50	2.1	53	1.7

Notes:
1. Data from prior to August 2014 is available upon request – the monitor was at a different location until this time.
2. 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.
3. The values for the month of February were C-weighted due to incorrect configuration, thus monthly values could not be presented.
4. The microphone was out of calibration by 2.6 dBA, leading to reported noise levels that were likely to be higher than actual noise levels.

Monitor 5

Figure 9: Satellite Photograph of Noise Monitor 5

Monitor 5 is located at the end of Galvin Street, approximately 100 feet south of the temporary noise barrier. The microphone is located at the bottom of the slope leading down to the backyards of the residences on Northgate Street near the base of a power pole. Prior to construction activity, the primary noise source in the area is traffic noise on Stocker and Northgate Streets.

Table 8. Daily Results
Monitor 5, February 2016

Date	Sound Level, dBA			
	Work Hours Leq	Maximum[1]	Minimum[2]	Ldn
2/1/16	51	71	38	55
2/2/16	59	78	33	57
2/3/16	50	72	33	53
2/4/16	48	70	35	54
2/5/16	51	79	35	54
2/6/16	46	66	33	53
2/7/16		61	33	52
2/8/16	49	68	35	54
2/9/16	60	84	36	58
2/10/16	50	70	36	55
2/11/16	50	71	38	55
2/12/16	52	75	38	56
2/13/16	54	80	39	55
2/14/16		69	41	57
2/15/16	50	74	36	56
2/16/16	59	81	34	59
2/17/16	51	72	38	55
2/18/16	52	67	34	55
2/19/16	54	83	34	54
2/20/16	52	79	35	54
2/21/16		66	40	55
2/22/16	50	66	36	55
2/23/16	58	83	34	57
2/24/16	51	76	34	55
2/25/16	50	68	36	54
2/26/16	--[3]	--[3]	--[3]	--[3]
2/27/16	--[3]	--[3]	--[3]	--[3]
2/28/16	--[3]	--[3]	--[3]	--[3]
2/29/16	--[3]	--[3]	--[3]	--[3]

Notes:
1. The maximum sound level over a 15 second interval (5 second Leq) during the 24-hour period.
2. The minimum sound level over a 15 second interval (5 second Leq) during the 24-hour period.
3. Data was lost because monitor's memory was full.

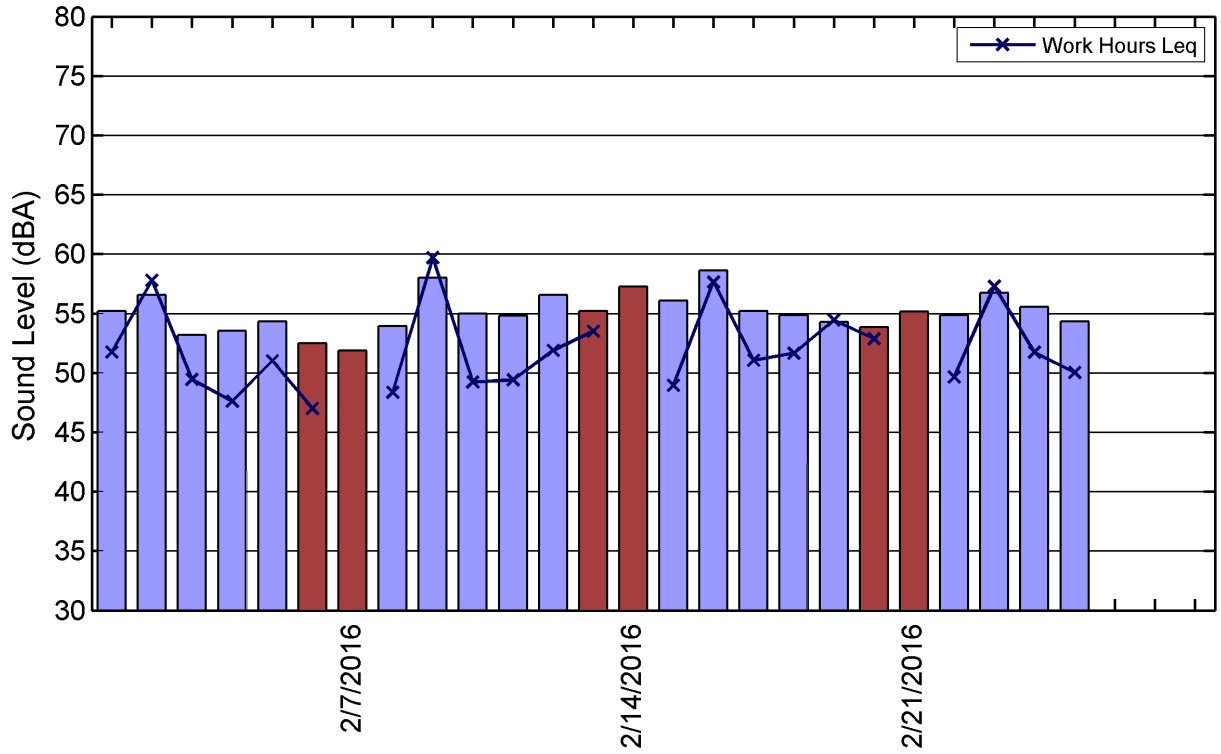

Figure 10: Monitor 5 Ldn and Daytime Leq Results

Table 9. Summary of Monthly Results, Monitor 5					
Month	**Year**	**Sound Level, dBA**			
		Work Hours Leq[1]	**Standard Deviation**	**Ldn**	**Standard Deviation**
April	2013	52	4.7	54	4.1
May	2013	52	2.9	54	1.7
June	2013	51	3.9	53	2.1
July	2013	53	4.8	55	2.9
August	2013	52	3.9	54	2.2
September	2013	52	2.7	54	1.6
October	2013	51	3.4	53	1.6
November	2013	51	3.3	54	2.5
December	2013	52	3.7	53	1.8
January	2014	50	2.6	53	1.5
February	2014	51	2.9	53	1.9
March	2014	52	2.8	53	1.4
April	2014	52	3.1	54	2.0
May	2014	50	1.2	54	1.7
June	2014	51	3.0	54	1.2
July	2014	51	2.8	54	2.8
August	2014	51	3.4	54	1.6
September	2014	52	4.9	54	2.8
October	2014	51	2.9	54	1.5
November	2014	52	3.3	53	1.5
December	2014	51	3.1	54	2.4
January	2015	51	2.6	53	1.4
February	2015	50	2.9	53	1.7
March	2015	51	2.4	53	1.3
April	2015	51	3.0	54	1.3
May	2015	53	3.3	55	1.8
June	2015	52	3.0	54	1.5
July	2015	54	4.9	55	4.2
August	2015	53	3.6	54	1.8
September	2015	52	2.8	55	1.5
October	2015	54	4.0	55	1.9
November	2015	53	4.1	55	1.9
December	2015	52	3.9	56	3.7
January	2016	52	3.9	54	2.2
February	2016	52	3.7	55	1.6

Table 9. Summary of Monthly Results, Monitor 5

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.

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 11 includes examples of A-weighted sound levels from common indoor and outdoor sounds.

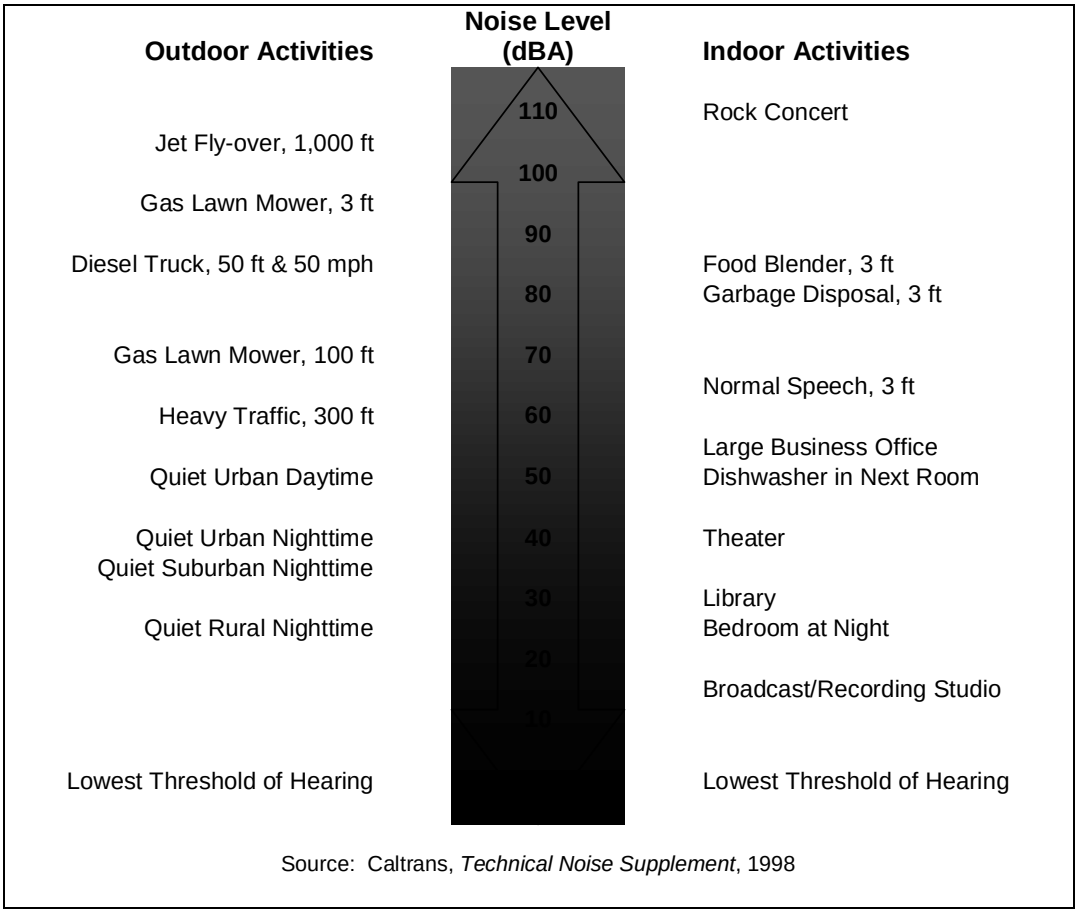

Figure 11. Typical Outdoor and Indoor Noise Sources

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.