
MEMORANDUM

To: Karl Schrader
BuildLACCD

From: Zack Dennis

Date: August 8, 2017

Subject: Monthly Noise Report for Raintree Noise Monitors, July 2017

This memorandum presents the results of the noise monitoring at the Raintree residential complex near the West Los Angeles College (WLAC) campus. There are four monitors positioned near the property lines of the Raintree complex to monitor construction-related truck and equipment noise from the north end of the campus as well as from College Boulevard which runs from the northwest corner of campus to Jefferson Boulevard. 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 1: At some point during the month of May the monitor was stolen. The monitor has not yet been replaced.

Monitor 2: Due to connectivity and access issues, it was not possible to collect any data from Monitor 2. The monitor was removed from service on August 4 and will be replaced as part of the equipment refurbishment in August, potentially in a new location.

Monitor 6: Monitor 6 was shut down due to equipment issues.

Monitor 7: Monthly noise levels at Monitor 7 were similar to those observed in previous months at this location. Peaks of greater than 60 dBA were observed on July 4 (due to the holiday). Additional peaks were observed on July 7, 13, and 21 that are most likely related to a regularly scheduled Friday activity.

Table 1. Summary of Monthly Results, Monitor 7				
Metric	Sound Level, dBA			
	Average	Maximum²	Minimum³	Standard Deviation
Day-Night Sound Level (Ldn)	53	71	47	4.3
Work Hours Leq ¹	48	52	44	2.1

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.

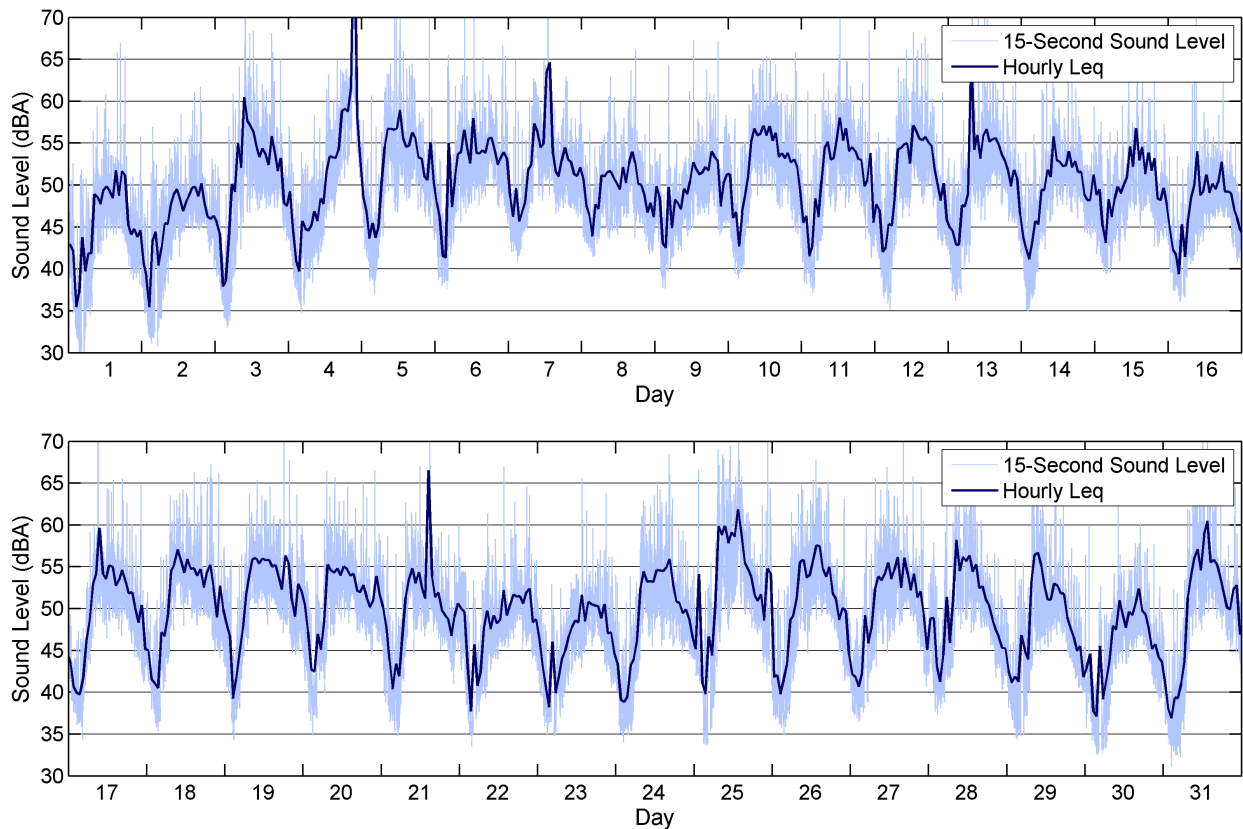


Figure 1: Monitor 7 Hourly Leq Results

APPENDIX A: RESULTS FOR INDIVIDUAL MONITOR SITES

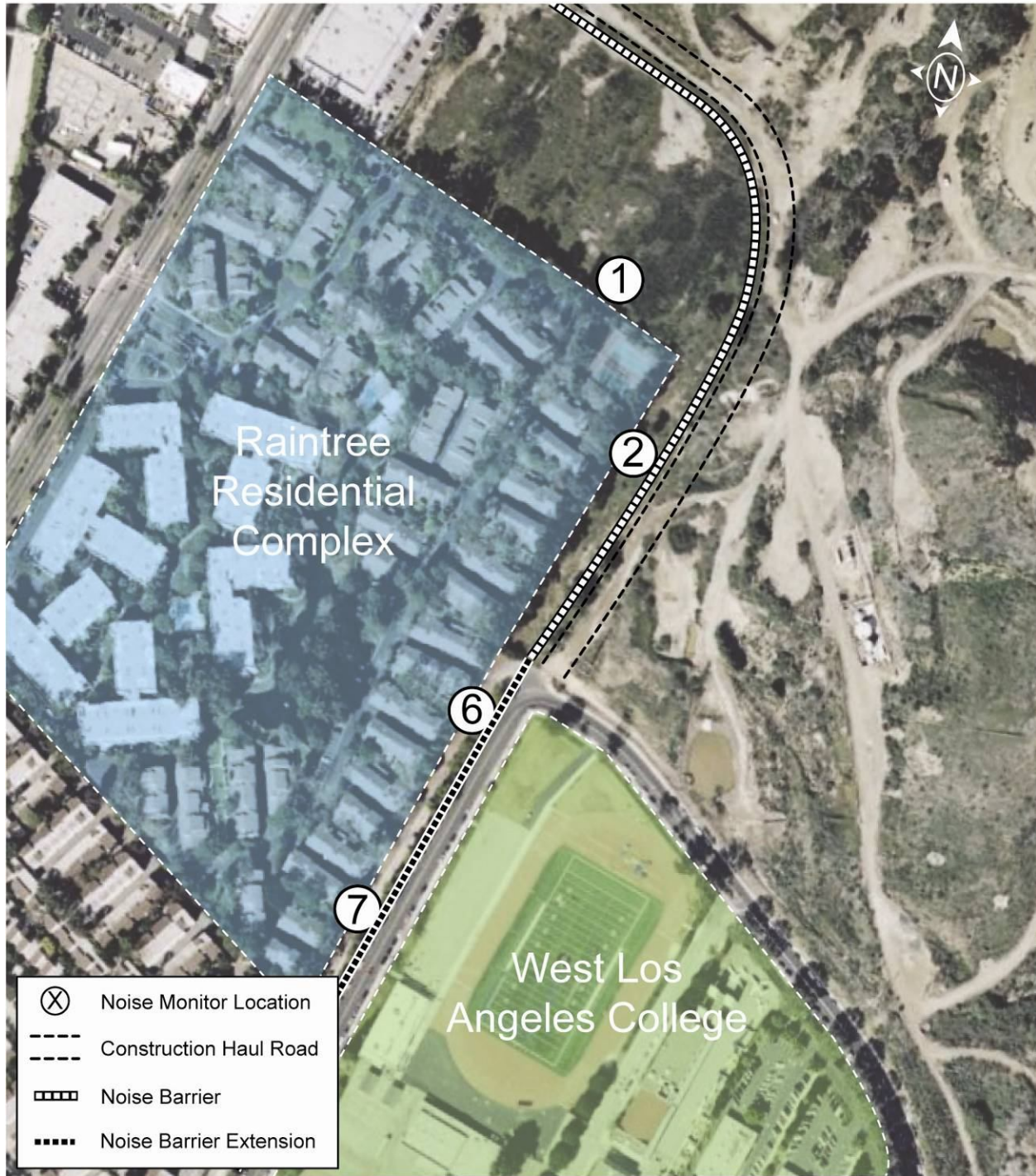


Figure 2: Noise Monitor Locations

Monitor 1

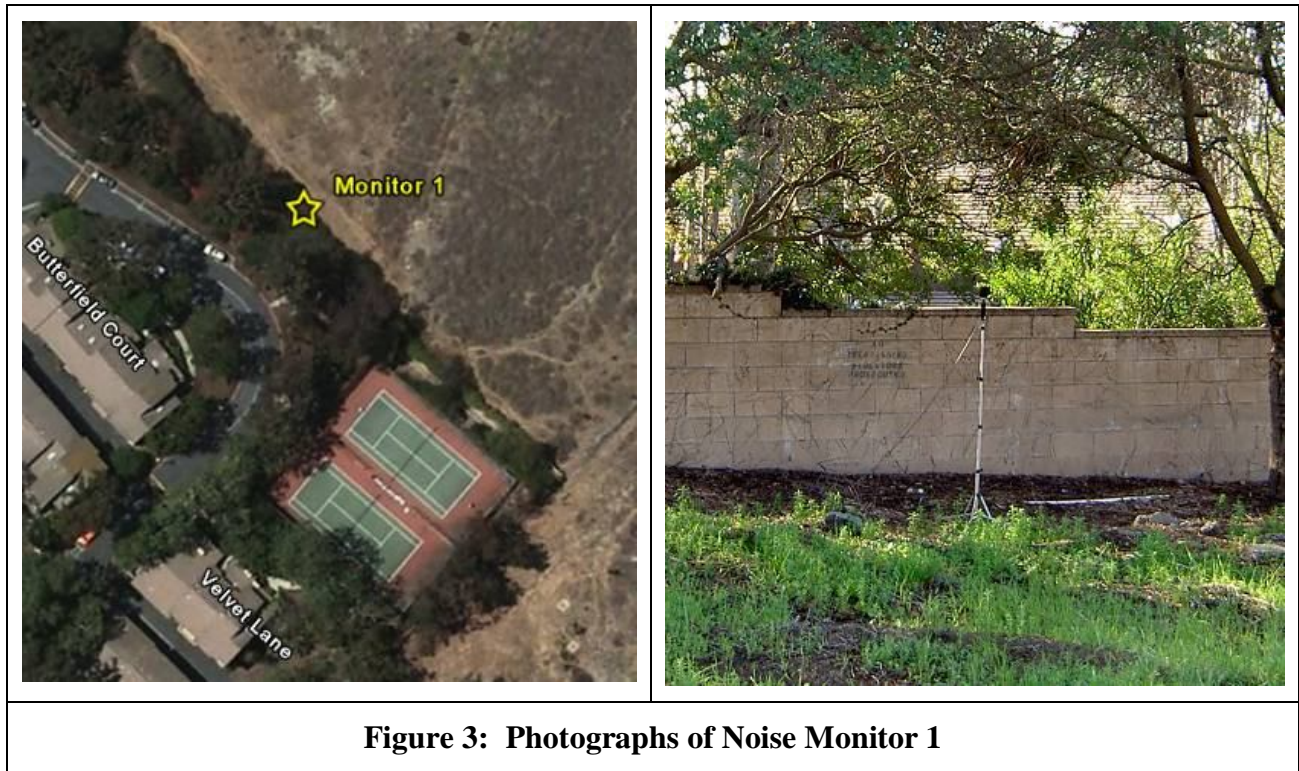


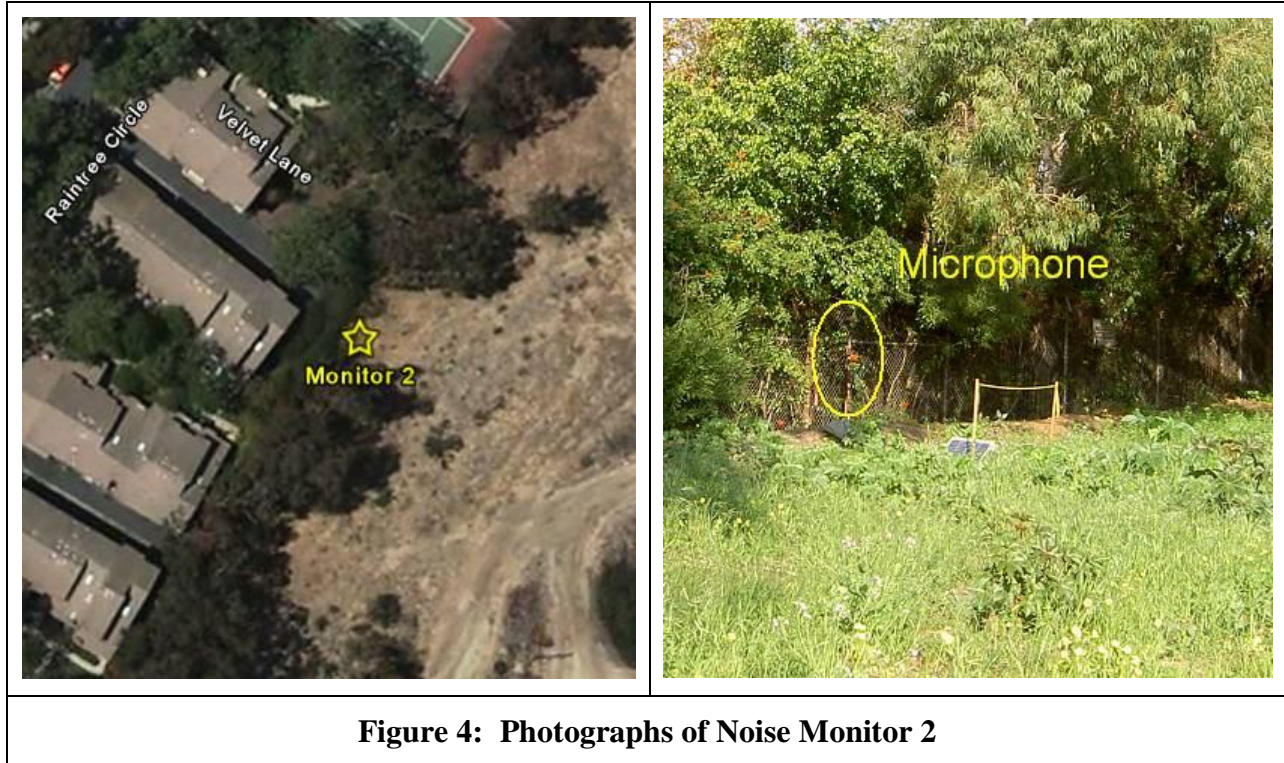
Figure 3: Photographs of Noise Monitor 1

Monitor 1 is located to the northeast of the Raintree complex, near the property wall that separates Raintree Circle from where the haul road cuts through to Jefferson Boulevard. Due to topography, the microphone head is approximately level with the upper stories of the Raintree residences. The monitor is located about 250 feet away from the closest point on the haul road. Prior to construction activity, the primary noise sources in this area were residential activity, landscaping equipment and lawnmowers, airplanes, athletic activity on the nearby tennis courts, and traffic noise from Jefferson Boulevard.

Table 2. Summary of Monthly Results¹, Monitor 1					
Month	Year	Sound Level, dBA			
		Work Hours Leq²	Standard Deviation	Ldn	Standard Deviation
January	2012	50	2.1	54	1.5
February	2012	51	1.6	54	1.4
March	2012	51	1.7	54	1.5
April	2012	52	3.3	54	1.7
May	2012	51	1.7	55	1.0
June	2012	50	1.3	52	1.0
July	2012	50	2.1	52	1.3
August	2012	49	1.2	52	1.5
September	2012	47 ²	0.2 ²	51 ²	0.3 ²
October	2012	49	1.7	53	2.1
November	2012	50	2.0	53	1.8
December	2012	--	--	--	--
January	2013	49	2.4	54	2.2
February	2013	48	6.0	53	4.0
March	2013	49	1.6	53	1.9
April	2013	50	2.7	53	1.8
May	2013	50	1.4	53	1.3
June	2013	49	1.3	52	1.1
July	2013	48	0.9	53	1.1
August	2013	49	2.3	52	1.3
September	2013	-- ³	-- ³	-- ³	-- ³
October	2013	49	3.0	52	1.7
November	2013	50	1.7	53	1.4
December	2013	50	1.6	54	1.4
January	2014	49	1.1	53	1.4
February	2014	50	1.4	53	1.9
March	2014	50	3.7	53	2.3
April	2014	50	2.0	53	1.9
May	2014	51	4.4	54	2.5
June	2014	49	1.5	52	1.2
July	2014	48	2.7	51	2.0
August	2014	47	2.1	50	2.0
September	2014	45	1.7	49	2.6
October	2014	47	1.5	51	1.7
November	2014	48	2.1	53	2.1
December	2014	49	2.6	54	3.3
January	2015	49	3.9	53	2.1

February	2015	47	1.3	51	2.3
March	2015	47	1.7	52	1.9
April	2015	55	5.9	57	5.7
May	2015	52	7.1	53	5.0
June	2015	46	1.9	49	1.4
July	2015	48	5.1	51	3.4
August	2015	47	1.7	50	1.2
September	2015	47	1.5	50	1.8
October	2015	48	3.2	52	2.8
November	2015	49	2.9	53	2.2
December	2015	49	2.6	54	3.3
January	2016	49	3.9	53	2.1
February	2016	44 ⁴	1.7 ⁴	51 ⁴	6.5 ⁴
March	2016	-- ⁵	-- ⁵	-- ⁵	-- ⁵
April	2016	53	5.8	57	6.4
May	2016	51	3.0	52	2.6
June	2016	49	1.6	52	1.2
July	2016	48	2.7	51	2.0
August	2016	46	1.5	50	2.0
September	2016	45	1.7	49	2.6
October	2016	47	1.4	51	1.7
November	2016	47	2.0	53	2.1
December	2016	49	1.4	55	3.2
January	2017	49	1.2	53	1.4
February	2017	50	1.7	53	1.9
March	2017	50	3.6	52	3.6
April	2017	55	6.4	57	5.7
May	2017	-- ⁶	-- ⁶	-- ⁶	-- ⁶
June	2017	-- ⁶	-- ⁶	-- ⁶	-- ⁶
July	2017	-- ⁶	-- ⁶	-- ⁶	-- ⁶
Notes:					
1. Data from prior to March 3012 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. Data was recorded but not reported due to microphone cable damage.					
4. Microphone suspected to be out of calibration.					
5. Data not available due to modem connectivity issues.					
6. Monitor was stolen.					

Monitor 2



Monitor 2 is located near the northeast corner of the Raintree complex, south of the tennis courts and close to the property fence on the eastern edge of the Raintree complex. The microphone head is approximately level with the lower stories of the Raintree residences. The monitor is located about 100 feet away from the closest point on the haul road. 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. Summary of Monthly Results¹, Monitor 2					
Month	Year	Sound Level, dBA			
		Work Hours Leq²	Standard Deviation	Ldn	Standard Deviation
January	2012	52	3.3	53	1.7
February	2012	51	2.4	53	1.3
March	2012	51	2.9	53	1.7
April	2012	53	5.3	54	2.9
May	2012	53 ³	3.8 ³	53 ³	2.0 ³
June	2012	-- ⁴	-- ⁴	-- ⁴	-- ⁴
July	2012	-- ⁴	-- ⁴	-- ⁴	-- ⁴
August	2012	-- ⁴	-- ⁴	-- ⁴	-- ⁴
September	2012	52	2.7	53	1.1
October	2012	52	3.5	53	1.8
November	2012	50	2.0	53	1.8
December	2012	-- ⁴	-- ⁴	-- ⁴	-- ⁴
January	2013	-- ⁴	-- ⁴	-- ⁴	-- ⁴
February	2013	50	2.8	54	3.3
March	2013	56	4.7	56	6.8
April	2013	55	4.5	54	2.5
May	2013	50	2.1	51	2.0
June	2013	50	2.4	52	1.4
July	2013	45	3.7	51	1.2
August	2013	-- ⁵	-- ⁵	-- ⁵	-- ⁵
September	2013	51	3.3	52	1.8
October	2013	51	4.3	53	1.8
November	2013	51	4.5	53	2.5
December	2013	49	6.7	52	3.8
January	2014	49	3.5	52	1.8
February	2014	52	8.1	56	10.6
March	2014	51	6.0	53	4.6
April	2014	51	2.4	54	6.2
May	2014	51	2.6	53	1.3
June	2014	49	0.5	52	0.6
July	2014	50	2.6	52	1.4
August	2014	50	3.1	52	2.1
September	2014	50	2.1	53	2.2
October	2014	51	3.4	53	1.7
November	2014	50	4.1	53	2.0
December	2014	51	4.4	54	1.0
January	2015	52	3.8	54	1.6

February	2015	50	3.7	53	2.3
March	2015	52	3.5	53	1.6
April	2015	51	3.1	53	1.7
May	2015	51	2.0	54	1.3
June	2015	50	1.9	52	1.3
July	2015	54	4.8	55	4.6
August	2015	52	6.7	53	3.9
September	2015	-- ⁶	-- ⁶	-- ⁶	-- ⁶
October	2015	52	4.0	54	2.1
November	2015	51	2.4	53	1.1
December	2015	51	2.5	54	4.0
January	2016	52	7.1	55	6.5
February	2016	52	3.9	54	4.0
March	2016	55	5.9	56	7.4
April	2016	55	3.7	55	2.0
May	2016	54	4.0	54	2.2
June	2016	51	3.0	52	1.7
July	2016	51	2.5	53	2.4
August	2016	52	1.6	52	1.2
September	2016	49	1.5	53	2.2
October	2016	50	3.1	53	1.7
November	2016	49	3.7	53	2.0
December	2016	51	3.5	55	4.2
January	2017	49	4.2	52	1.7
February	2017	52	8.1	55	10.6
March	2017	52	6.1	53	4.3
April	2017	50	2.6	54	6.3
May	2017	51	2.7	53	1.3
June	2017	-- ⁷	-- ⁷	-- ⁷	-- ⁷
July	2017	-- ⁷	-- ⁷	-- ⁷	-- ⁷
Notes:					
1. Data from prior to February 2012 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 data during May was reduced to the first week due to monitor issues.					
4. Monitor not in service.					
5. Data not reported due to microphone cable damage.					
6. Monitor shut down due to equipment issues.					
7. Data not available due to connectivity and access issues.					

Monitor 6



Figure 5: Photographs of Noise Monitor 6

Monitor 6 is located hanging from a tree at a height of approximately 15 feet above ground level near the residence at 5111 Wilderness Lane. The microphone head is approximately level with the second story of the nearby Raintree residences. The monitor is located about 65 feet away from Freshman Drive and about 140 feet away from where the haul road diverges from Sophomore Drive. Prior to construction activity, the primary noise source in the area was local traffic on Freshman Drive and Sophomore Drive.

Table 4. Summary of Monthly Results¹, Monitor 6					
Month	Year	Sound Level, dBA			
		Work Hours Leq²	Standard Deviation	Ldn	Standard Deviation
April	2013	51	2.0	53	1.4
May	2013	52	3.3	54	1.9
June	2013	50	3.1	53	1.5
July	2013	51	3.4	53	2.1
August	2013	52	5.8	53	3.8
September	2013	52	4.3	53	2.4
October	2013	52	4.3	53	2.3
November	2013	50	3.5	53	1.9
December	2013	50	4.4	54	2.2
January	2014	52	4.5	54	2.1
February	2014	52	4.0	54	2.8
March	2014	53	3.1	55	1.3
April	2014	53	2.8	56	2.4
May	2014	56	3.8	59	2.1
June	2014	58 ³	6.3 ³	62 ³	2.4 ³
July	2014	55 ³	5.8 ³	57 ³	4.2 ³
August	2014	53 ³	4.5 ³	59 ³	5.9 ³
September	2014	54 ³	3.6 ³	68 ³	3.3 ³
October	2014	-- ⁴	-- ⁴	-- ⁴	-- ⁴
November	2014	-- ⁴	-- ⁴	-- ⁴	-- ⁴
December	2014	-- ⁴	-- ⁴	-- ⁴	-- ⁴
January	2015	-- ⁴	-- ⁴	-- ⁴	-- ⁴
February	2015	-- ⁴	-- ⁴	-- ⁴	-- ⁴
March	2015	-- ⁴	-- ⁴	-- ⁴	-- ⁴
April	2015	-- ⁴	-- ⁴	-- ⁴	-- ⁴
May	2015	41 ⁵	3.8	44 ⁵	1.8
June	2015	42 ⁵	5.0	44 ⁵	2.4
July	2015	53	3.6	57	2.7
August	2015	56	8.2	62	9.1
September	2015	68 ³	3.8 ³	80 ³	8.2 ³

Notes:
 1. Data from prior to March 3012 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. Monitor was spiking periodically; data not considered valid.
 4. Data was not recorded due to power failure.
 5. Microphone was out of calibration and reported values were lower than true levels.

Monitor 7



Figure 6: Photographs of Noise Monitor 7

Monitor 7 is located hanging from a tree at a height of approximately 30 feet above ground level near the residence at 5111 Gaslight Lane. The microphone head is approximately level with the second story of the nearby Raintree residences. The monitor is located about 75 feet away from Freshman Drive and about 500 feet away from where the haul road diverges from Sophomore Drive. Prior to construction activity, the primary noise source in the area was local traffic on Freshman Drive.

Table 5. Daily Results Monitor 7, July 2017				
Date	Sound Level, dBA			
	Work Hours Leq	Maximum¹	Minimum²	Ldn
7/1/17	44	60	30	47
7/2/17	--	65	30	48
7/3/17	46	62	32	51
7/4/17	46	98	33	71
7/5/17	48	62	35	52
7/6/17	51	69	35	54
7/7/17	51	69	38	55
7/8/17	51	58	39	59
7/9/17	--	62	36	59
7/10/17	48	61	35	58
7/11/17	48	62	34	52
7/12/17	48	61	33	51
7/13/17	51	69	33	52
7/14/17	50	72	33	52
7/15/17	47	60	37	52
7/16/17	--	55	34	50
7/17/17	49	61	35	52
7/18/17	48	61	34	51
7/19/17	48	56	34	52
7/20/17	49	69	35	54
7/21/17	49	68	34	52
7/22/17	44	64	34	52
7/23/17	--	56	33	50
7/24/17	47	56	34	49
7/25/17	46	58	34	50
7/26/17	48	60	34	51
7/27/17	50	70	36	52
7/28/17	52	73	36	52
7/29/17	47	59	34	50
7/30/17	--	60	32	49
7/31/17	47	56	33	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.

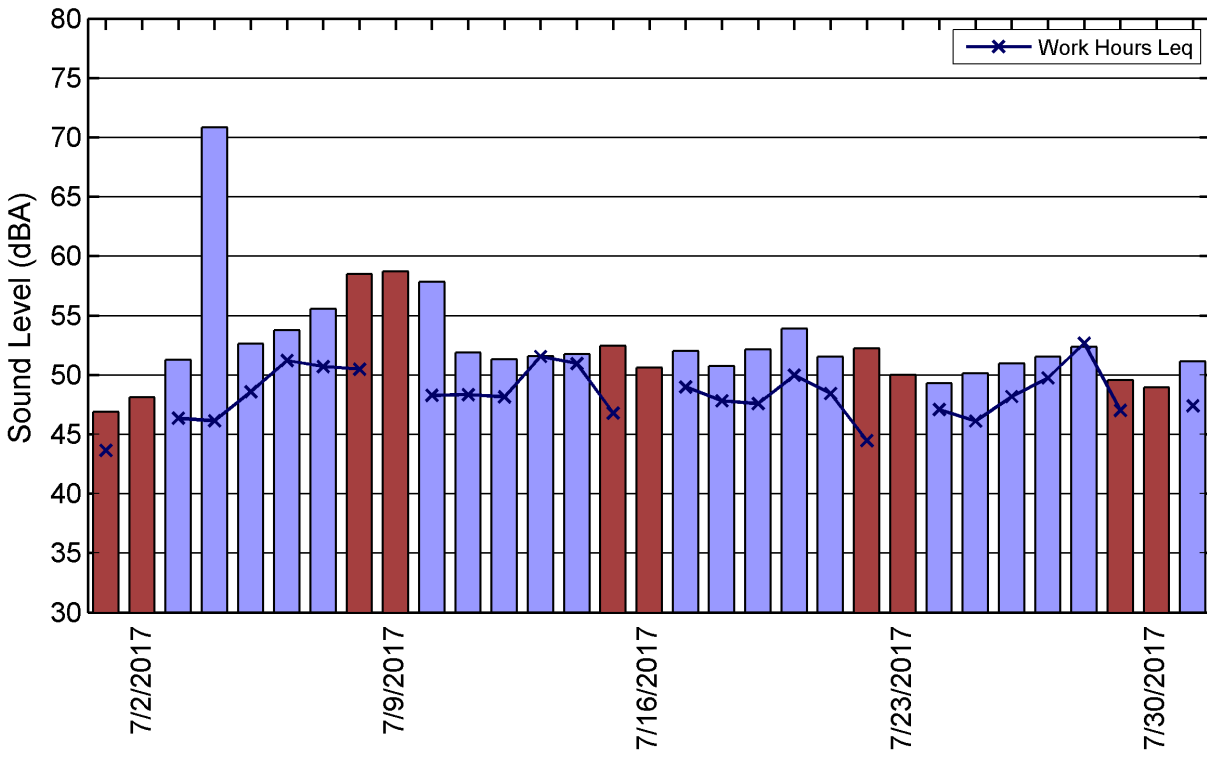


Figure 7: Monitor 7 Ldn and Daytime Leq Results

Table 6. Summary of Monthly Results, Monitor 7					
Month	Year	Sound Level, dBA			
		Work Hours Leq²	Standard Deviation	Ldn	Standard Deviation
January	2012	48	1.9	51	1.6
February	2012	-- ³	-- ³	-- ³	-- ³
March	2012	51	5.1	53	3.7
April	2012	50	2.4	53	1.7
May	2012	50	1.4	52	1.3
June	2012	48	1.4	50	1.5
July	2012	48	2.1	52	2.6
August	2012	52	1.4	55	1.5
September	2012	51	1.3	55	1.5
October	2012	50	1.6	53	1.3
November	2012	53	4.6	53	2.6
December	2012	48	2.3	52	2.5
January	2013	49	2.3	52	2.1
February	2013	51	3.7	52	1.7
March	2013	52	5.0	54	6.0
April	2013	52	5.7	53	3.9
May	2013	-- ⁴	-- ⁴	-- ⁴	-- ⁴
June	2013	-- ⁴	-- ⁴	-- ⁴	-- ⁴
July	2013	50	3.8	55	3.1
August	2013	59 ⁵	8.1 ⁵	67 ⁵	10.7 ⁵
September	2013	55 ⁵	5.8 ⁵	55 ⁵	5.5 ⁵
October	2013	56 ⁵	2.9 ⁵	59 ⁵	2.4 ⁵
November	2013	-- ⁶	-- ⁶	-- ⁶	-- ⁶
December	2013	48	2.3	52	1.2
January	2014	49	1.7	53	1.0
February	2014	52	5.3	54	4.3
March	2014	49	2.0	52	1.5
April	2014	49	1.4	52	1.3
May	2014	50	1.7	52	2.0
June	2014	49	2.0	51	1.3
July	2014	51	4.7	55	4.3
August	2014	51	2.2	53	2.1
September	2014	51	2.0	54	2.5
October	2014	50	2.3	52	2.0
November	2014	49	2.1	52	2.0
December	2014	51	3.7	54	4.5
January	2015	51	3.7	53	2.2

February	2015	50	2.3	52	2.0
March	2015	57 ⁷	4.5 ⁷	59 ⁷	4.1 ⁷
April	2015	58 ⁷	2.7	61 ⁷	1.7
May	2015	50	3.0	52	1.8
June	2015	49	4.6	51	2.8
July	2015	52	4.0	55	4.7
August	2015	53	3.4	55	2.4
September	2015	53	2.0	56	2.2
October	2015	53	2.8	55	2.3
November	2015	53	3.7	54	2.2
December	2015	51	3.7	54	4.1
January	2016	49	2.1	52	2.0
February	2016	49	6.0	52	2.0
March	2016	50	1.7	53	1.6
April	2016	58	2.7	62	1.7
May	2016	49	1.7	52	2.0
June	2016	49	1.7	51	1.3
July	2016	52	3.7	55	4.7
August	2016	51	1.9	53	2.1
September	2016	51	2.1	54	2.5
October	2016	50	2.2	52	2.0
November	2016	50	2.2	52	2.0
December	2016	51	3.6	54	4.2
January	2017	52	4.6	54	2.1
February	2017	51	5.5	54	4.3
March	2017	49	2.0	52	2.8
April	2017	49	1.1	52	1.3
May	2017	50	1.8	52	2.0
June	2017	49	2.0	52	1.9
July	2017	48	2.1	53	4.3

Notes:

1. Data from prior to March 3012 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. No data could be collected due to incorrectly setting up the monitor after in-lab calibration.
4. Monitor communications circuit was damaged; was not possible to obtain data.
5. Monitor was exhibiting extraneous peaks.
6. Monitor had been removed for servicing.
7. Monitor had been switched and was not calibrated prior to use; data is very questionable.

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

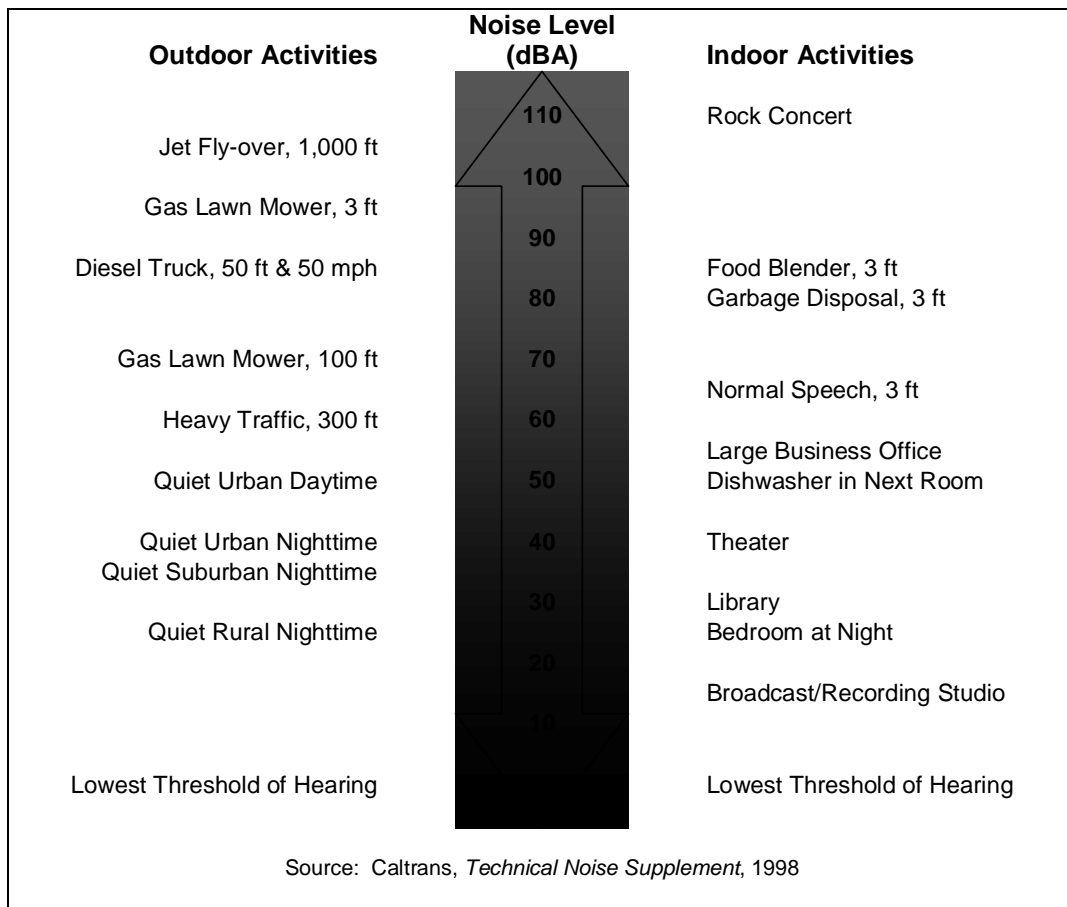


Figure 8. Typical Outdoor and Indoor Noise Sources

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 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.