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Franklin Converter Terminal – Sound Impact Assessment

Sound Report 3
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Sound Report 5
Project Construction – Sound Impact Assessment

October 5, 2015

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Northern Pass Project – Sound Report 1

Baseline Sound Monitoring

Proposed Transmission Line

Introduction

The following report presents the results and supporting data associated with baseline sound monitoring conducted along the transmission line for the Proposed Northern Pass Project. Annex A provides a glossary of the acoustic terminology used in this report.

Baseline Sound Survey

An environmental sound survey was conducted to characterize the existing acoustic environment in the vicinity of the proposed transmission line for the Northern Pass Project. In order to document the time-varying characteristics of ambient environmental sounds in the study area, the sound monitoring program implemented observed intermittent measurements (20-minute samples) at seventeen locations, and unattended continuous measurements for 3-day periods at two locations. The measurements were conducted during a cold weather season (March 24, 2014 – April 2, 2014) with leaves off the trees, and a warm weather season with foliage and insect sounds present (July 21, 2014 – July 25, 2014). The results of the survey allow both quantitative and qualitative analyses of the acoustical environment surrounding the Project.

Sound Measurement Locations

A thorough review of the existing land use in the vicinity of the proposed transmission line was conducted to select representative sound measurement locations throughout the entire Project area. On the basis of this review, seventeen intermittent and two continuous sound monitoring locations were selected, as shown in Figure 1. The coordinates of the sound monitoring locations are listed below in Table 1. Aerial photographs of each monitoring location are presented in Figures 2 through 15. It should be noted that since this survey was conducted an additional underground length of transmission line has been proposed in the vicinity of Locations 8, 8A, 9, 9 CM and 10. Although transmission line sound will not impact these locations, the data derived is relevant in characterizing similar environments along the route.

Table 1: Sound Measurement Locations

Location	Latitude	Longitude
1	43.13756	-71.27230
2	43.18769	-71.46931
2 CM	43.18812	-71.46907
3	43.22166	-71.49060
4	43.25492	-71.52259
5	43.30349	-71.57516
6	43.37864	-71.63875
6A	43.37841	-71.64346
7	43.45834	-71.67365
8	43.75934	-71.65546
8A	43.75993	-71.65960
9	43.85023	-71.64090
9 CM	43.85011	-71.64077
10	44.03571	-71.71114
11	44.21632	-71.78572
12	44.38330	-71.62527
13	44.62487	-71.39024
14	44.92540	-71.33007
15	45.01101	-71.42195

Intermittent Sound Monitoring

Intermittent sound measurements were performed for 20-minute intervals at seventeen measurement locations. The measurements were performed during both daytime and nighttime periods. These measurements were conducted with a Bruel and Kjaer Instruments Type 2250 sound level analyzer outfitted with a ½ inch electret microphone and windscreen. During all measurements, the meter was mounted on a tripod with the microphone situated approximately 1.5 meters above the ground. The instrument was calibrated before and after use with a Bruel and Kjaer Instruments Type 4231 acoustical calibrator. These instruments conform to ANSI S1.4 for Type 1 precision sound measurement instrumentation and have current calibration certificates traceable to the National Institute of Standards and Technology (NIST).

The results of the measurements are presented in Annexes B and C. The data presentation format has three chief elements:

- The first is a listing of A-weighted descriptors on the upper left hand side of the figures. Note that the statistical descriptors (L_n) are presented in order of decreasing value. Logically, the L_{max} is the highest sound level reached during the 20-minute interval; the L_{01} is the next highest since it is exceeded only 1 percent of the time interval, and so forth. The L_{eq} and L_{90} are shown shaded, as they are the key descriptors used in evaluating background sound levels.

- The second element in these figures is a 1/3 octave band spectrum of the L_{90} sound pressure level. This spectrum is used to identify the presence of distinct tonal characteristics and to quantify the frequency content associated with the background sounds.

- The third element at the bottom of the figures is a graphic level record, or time-history, of the A-weighted sound level in 1-second increments recorded over the 15-minute interval. The peaks in these figures are associated with transient sounds mainly produced by passing vehicles on local roads, dogs barking, and aircraft flying overhead.

Tables 2 through 5 below provide summaries of the measurement results:

Table 2: Summary of Winter Daytime Data

Location	Date	Time	Temp (°F)	Wind (MPH)	L_{90} (dBA)
1	03/27/14	10:49	31	3-7	35
2	03/27/14	11:41	31	1.5	32
3	03/27/14	12:23	33	1	45
4	03/27/14	13:39	35	0	33
5	03/27/14	14:11	39	0	38
6	03/25/14	14:13	32	0	28
6A	03/25/14	14:36	32	0	31
7	03/25/14	13:35	32	1	35
8	03/25/14	12:20	24	0	32
8A	03/25/14	12:43	32	1	34
9	03/25/14	11:10	24	1.5	38
10	03/25/14	10:30	22	1	22
11	03/24/14	15:55	22	5	34
12	03/24/14	15:03	22	2.5	29
13	03/24/14	13:59	16	6	34
14	03/24/14	12:28	16	0.5	30
15	03/24/14	11:15	15	1	31

Table 3: Summary of Winter Nighttime Data

Location	Date	Time	Temp (°F)	Wind (MPH)	L_{90} (dBA)
1	04/02/14	23:11	32	0	30
2	04/03/14	0:00	32	0	38
3	04/03/14	0:51	33	0	40
4	04/03/14	1:21	32	0	34
5	04/03/14	1:53	32	0	39
6	03/28/14	1:51	36	0	19
6A	03/28/14	2:14	36	0	18
7	03/28/14	1:13	32	0	26
8	03/27/14	23:34	34	0	20
8A	03/27/14	23:57	32	0	18
9	03/27/14	23:02	33	0	23
10	03/27/14	20:17	34	0	18
11	04/02/14	2:23	32	0	20
12	04/02/14	1:34	33	0	30
13	04/02/14	0:37	31	0	33
14	04/01/14	23:17	35	0	27
15	04/01/14	22:21	35	0	22

Table 4: Summary of Summer Daytime Data

Location	Date	Time	Temp (°F)	Wind (MPH)	L_{90} (dBA)
1	7/23/2014	12:03	86	0	34
2	7/23/2014	11:14	85	3	40
3	7/23/2014	10:45	80	0.5	45
4	7/23/2014	10:07	80	0.5	34
5	7/23/2014	9:36	75	0	41
6	7/22/2014	12:10	86	0	33
6A	7/22/2014	12:32	85	0	29
7					
8	7/22/2014	10:12	80	0	35
8A	7/22/2014	10:35	81	0	31
9	7/22/2014	9:37	77	0	44
10	7/22/2014	8:58	74	0	27
11	7/21/2014	15:03	85	0	30
12	7/21/2014	14:09	85	0	29
13	7/21/2014	13:04	80	1	40
14	7/21/2014	11:39	77	0	25
15	7/21/2014	10:39	75	1	29

Measurements at Location 7 were discontinued for this period due to sound produced by construction activities at an adjacent property.

Table 5: Summary of Summer Nighttime Data

Location	Date	Time	Temp (°F)	Wind (MPH)	L_{90} (dBA)
1	7/25/2014	2:43	58	0	22
2	7/25/2014	1:55	56	0	31
3	7/25/2014	1:24	59	0	35
4	7/25/2014	0:48	60	0	28
5	7/25/2014	0:12	63	0	37
6	7/23/2014	1:08	72	0	23
6A	7/23/2014	1:32	72	0	22
7	7/23/2014	0:29	72	0	29
8	7/22/2014	23:12	72	0	31
8A	7/22/2014	23:34	73	0	28
9	7/22/2014	22:39	74	0	41
10	7/22/2014	22:00	75	0	27
11	7/22/2014	2:45	62	0	21
12	7/22/2014	1:55	60	0	24
13	7/22/2014	0:52	64	0	40
14	7/21/2014	23:25	64	0	19
15	7/21/2014	22:30	63	0	20

Measurements at Location 9 were dominated by sound produced by an exhaust fan located at the rear of the building. Location 9 CM was shielded form this fan and data from this continuous monitor is more representative of typical background sound level in the area.

Continuous Sound Monitoring

To identify typical patterns in existing ambient environmental sound levels, and to quantify time-varying ambient sound levels in the community, continuous sound monitoring was performed at two locations along the proposed transmission line, as shown in Figures 3 and 10 (2-CM and 9-CM). For both the cold and warm weather seasons, data was gathered for approximately 3-day periods. The measurement periods were:

2-CM

- March 24, 2014, 8:00 a.m. to March 27, 2014, 12:00 noon
- July 21, 2014, 9:00 a.m. to July 23, 2014, 12:00 midnight

9-CM

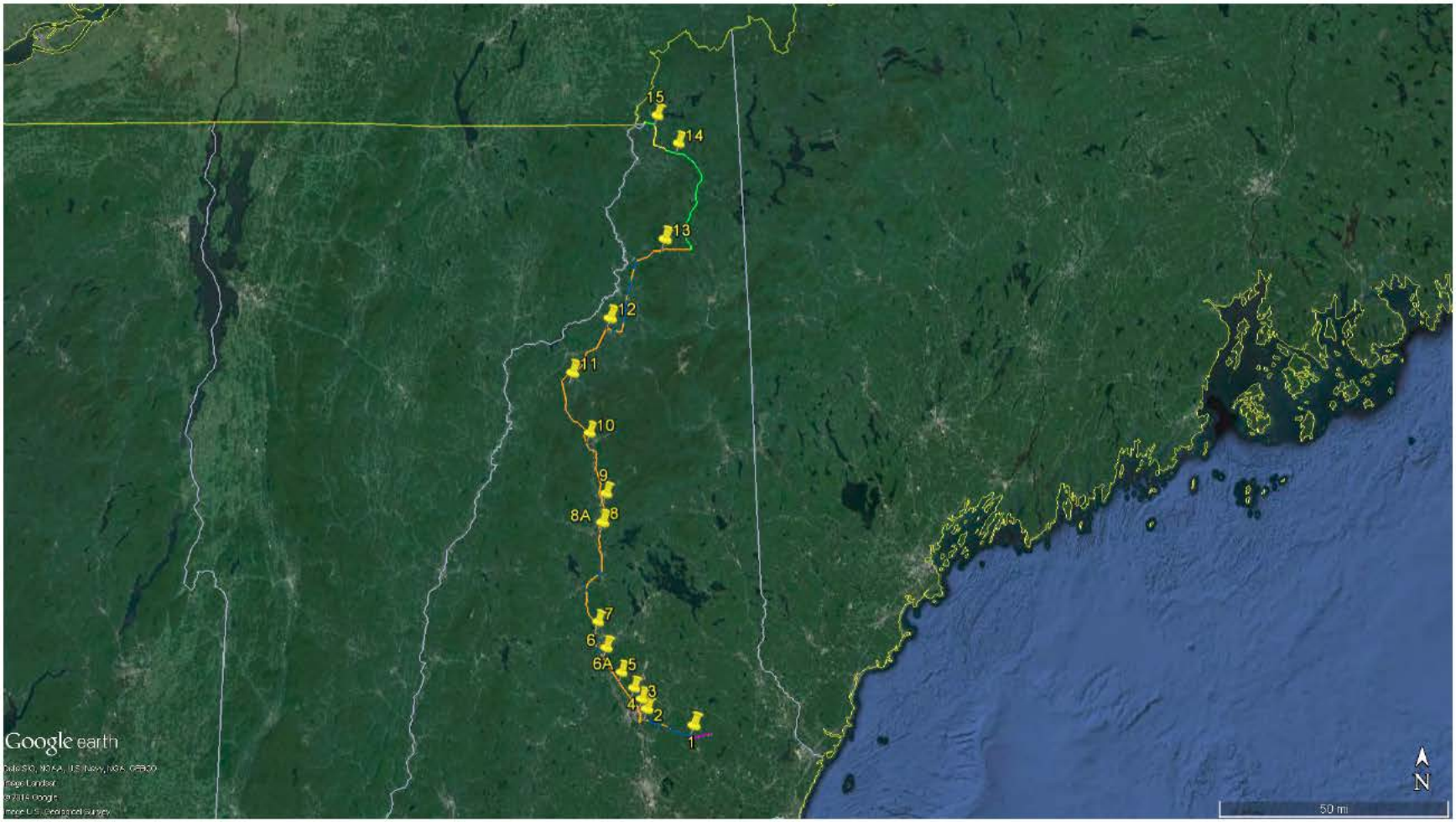
- March 24, 2014, 9:00 a.m. to March 27, 2014, 10:00 p.m.
- July 21, 2014, 11:00 a.m. to July 24, 2014, 7:00 a.m.

For these continuous measurements, sound levels were monitored using Larson Davis 831 sound levels meters outfitted with ½ inch electret microphones and windscreens. The microphones were mounted on tree branches that were approximately 1.5 meters above the ground. The instruments were calibrated before and after the measurement periods using a Larson Davis CA-250 acoustical calibrator. These instruments and their use conform to ANSI S1.4 for Type 1 precision sound measurement instrumentation, and have current calibration certificates traceable to National Institute of Standards and Technology (NIST).

For this study, the sound monitors were programmed to report the following A-weighted environmental noise descriptors on an hourly basis:

- Maximum and minimum sound levels (L_{max}, L_{min})
- Percentile sound levels (L_{99}, L_{90}, L_{50}, L_{10}, L_{01})
- Equivalent sound level (L_{eq})

Figures 17 through 20 present selected results from the continuous monitoring. The sound level measurement data included in the plots are the hourly L_{01} (nominal maximum level), the hourly L_{eq} (energy average level), and the hourly L_{90} (background level). A complete listing of all of the hourly metrics that were recorded can be found in Annexes D and E.



Sound Measurement Location Overview

Figure 1

Sound Measurement Location 1

Figure 2

Sound Measurement Locations 2 & 2CM

Figure 3

Sound Measurement Location 3

cta

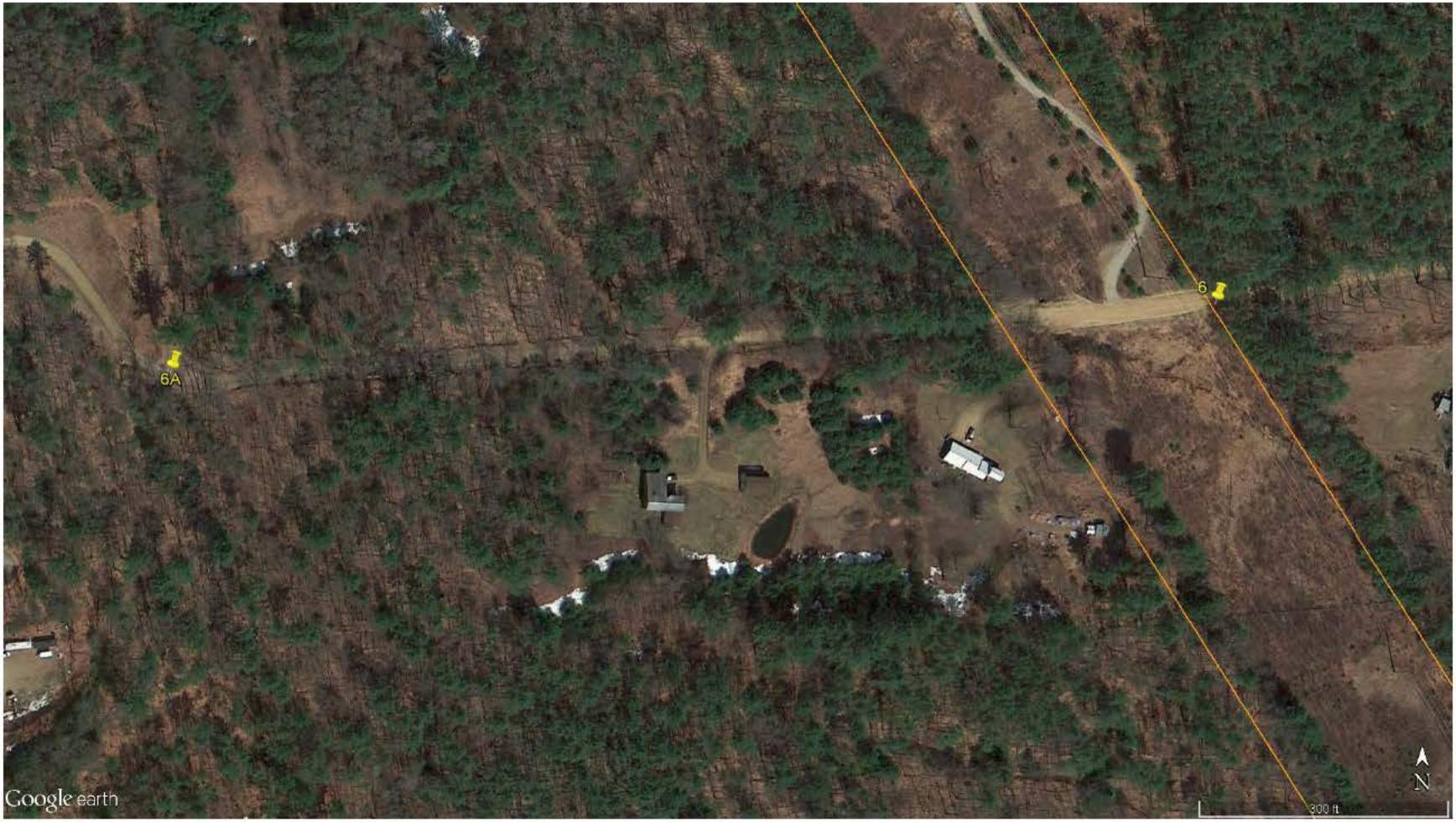
Figure 4

Sound Measurement Location 4

Figure 5

Sound Measurement Location 5

Figure 6



Sound Measurement Location 6 & 6A

Figure 7

Sound Measurement Location 7

Figure 8

Sound Measurement Location 8 & 8A

Figure 9

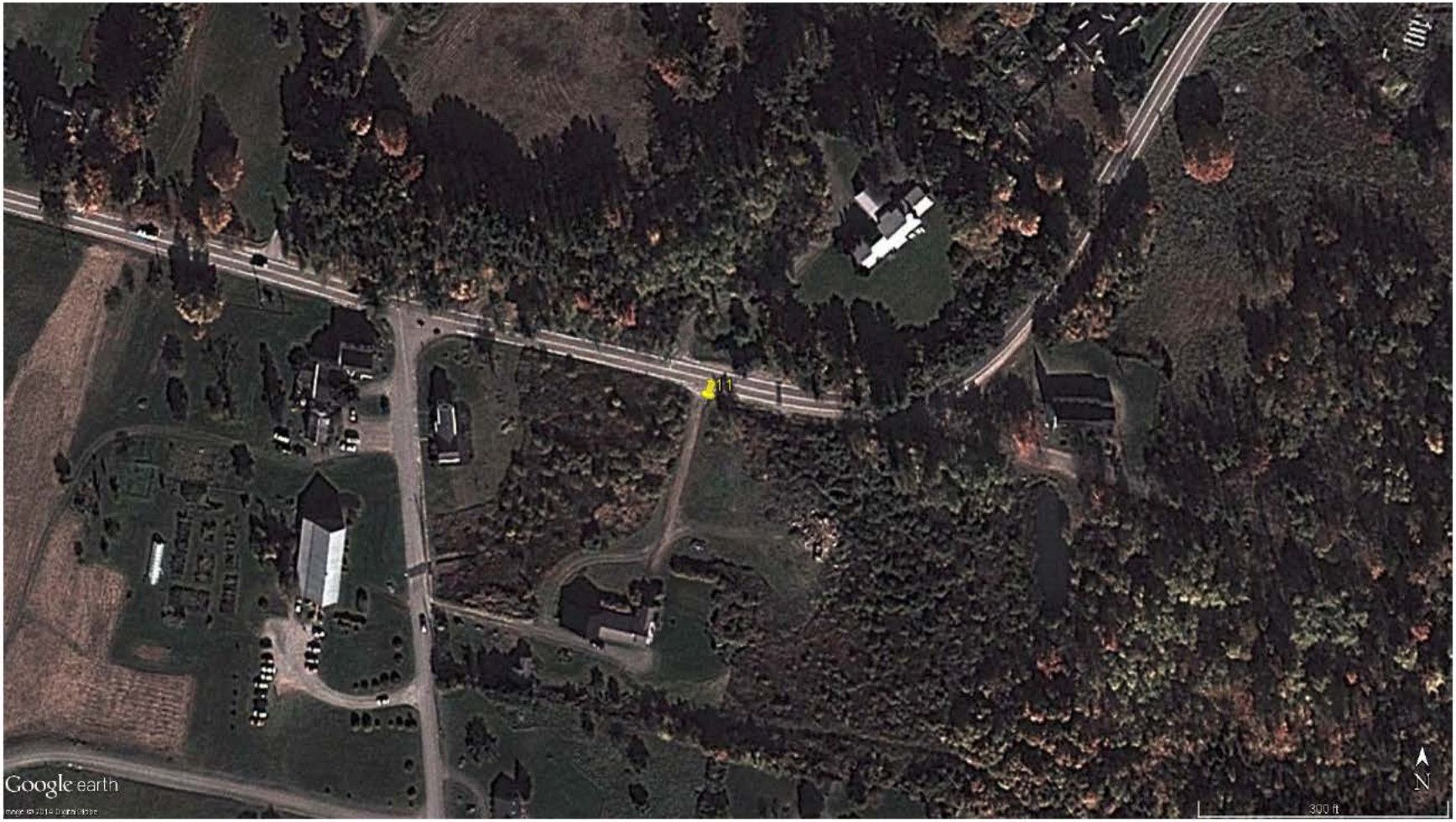
Sound Measurement Location 9 & 9CM

cta

Figure 10

Sound Measurement Location 10

Figure 11



Sound Measurement Location 11

cta

Figure 12

Sound Measurement Location 12

Figure 13

Sound Measurement Location 13

Figure 14

Sound Measurement Location 14

Figure 15

Sound Measurement Location 15

Figure 16

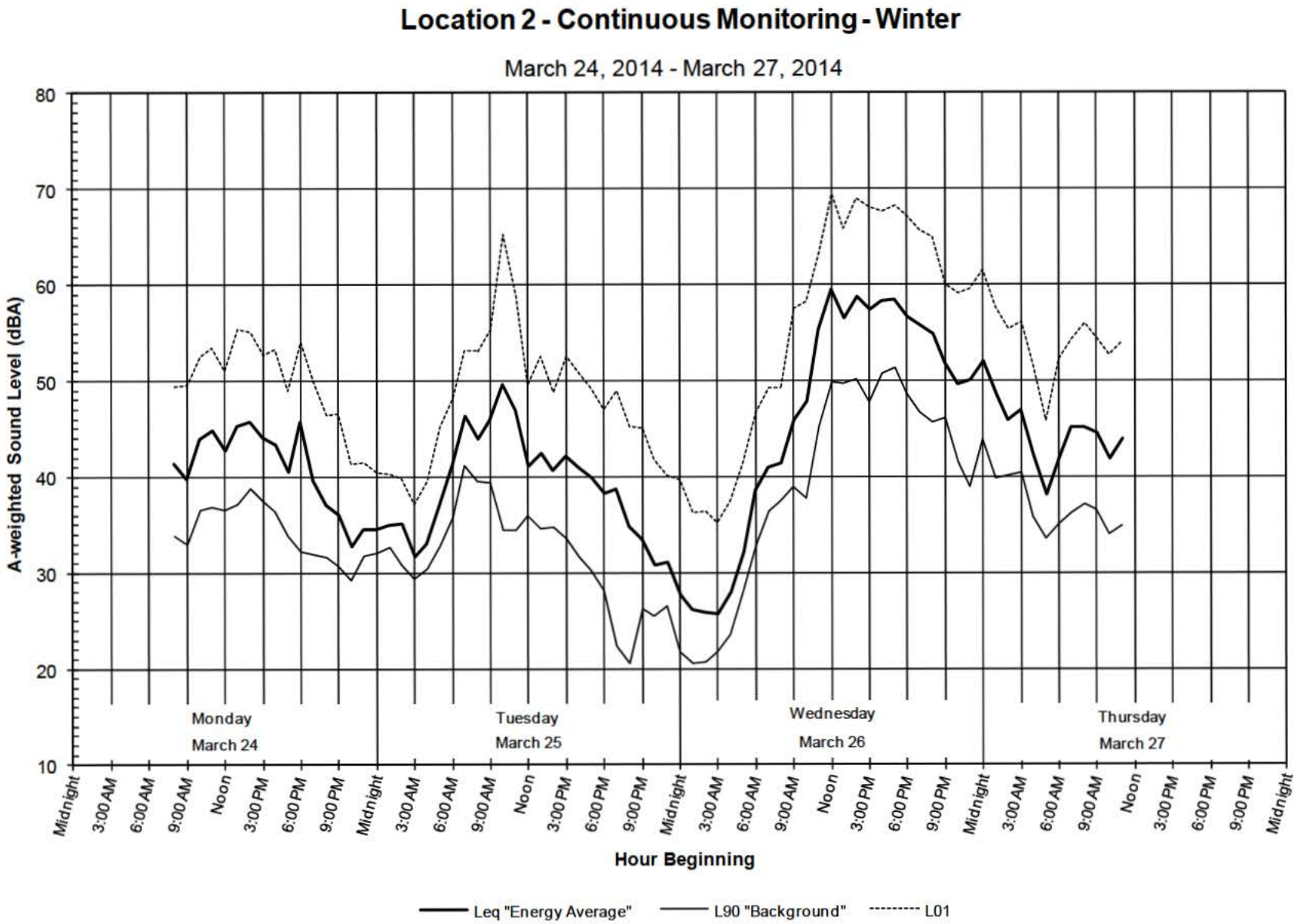

Location 2 - Continuous Monitoring - Winter
March 24, 2014 - March 27, 2014
A-weighted Sound Level (dBA)
80
70
60
50
40
30
20
10
Monday
March 24
Tuesday
March 25
Wednesday
March 26
Thursday
March 27
Midnight
3:00 AM
6:00 AM
9:00 AM
Noon
3:00 PM
6:00 PM
9:00 PM
Hour Beginning
Leq "Energy Average"
L90 "Background"
L01

Figure 17

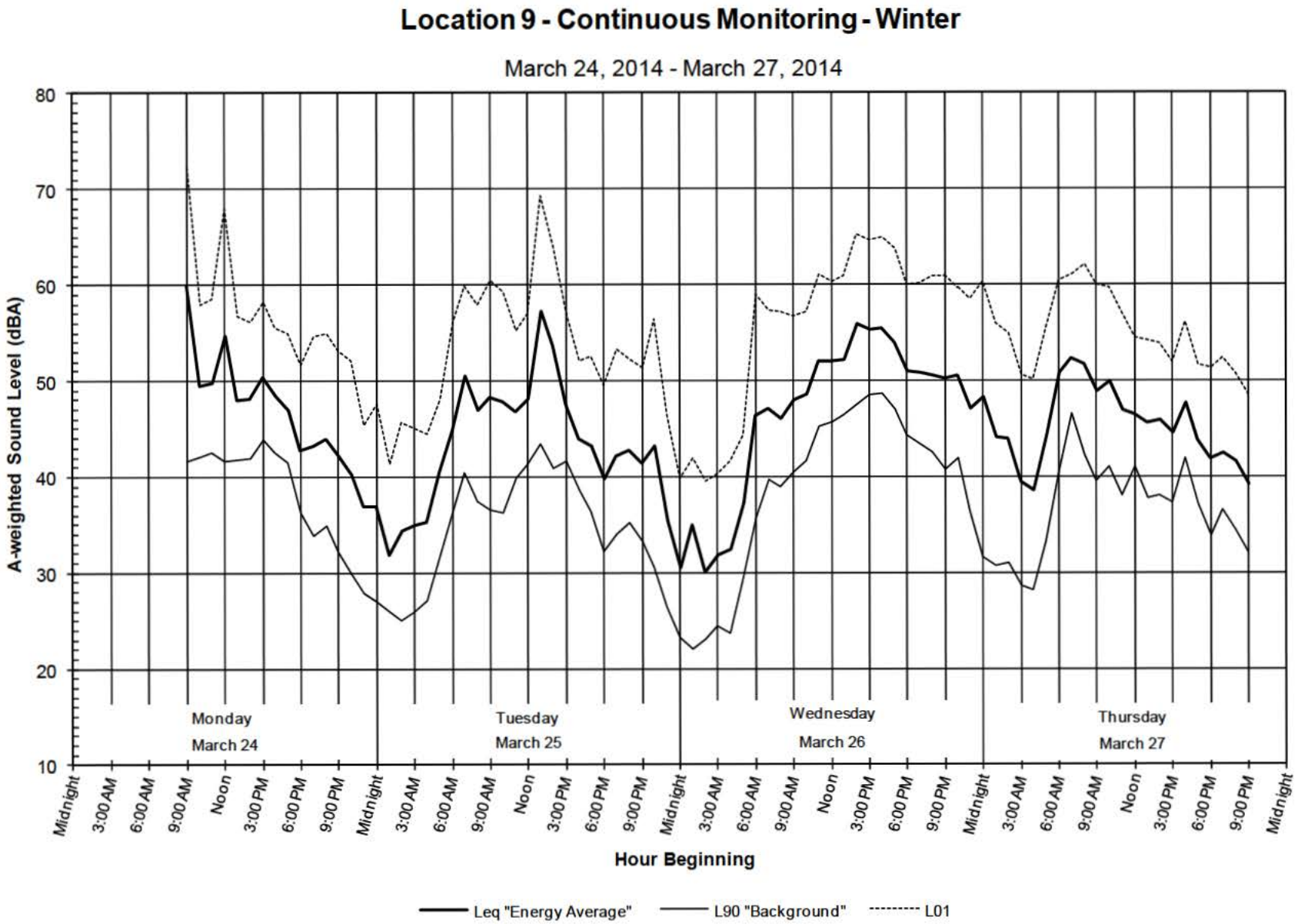

Location 9 - Continuous Monitoring - Winter
March 24, 2014 - March 27, 2014
A-weighted Sound Level (dBA)
80
70
60
50
40
30
20
10
Monday
March 24
Tuesday
March 25
Wednesday
March 26
Thursday
March 27
Midnight
3:00 AM
6:00 AM
9:00 AM
Noon
3:00 PM
6:00 PM
9:00 PM
Hour Beginning
Leq "Energy Average"
L90 "Background"
L01

Figure 18

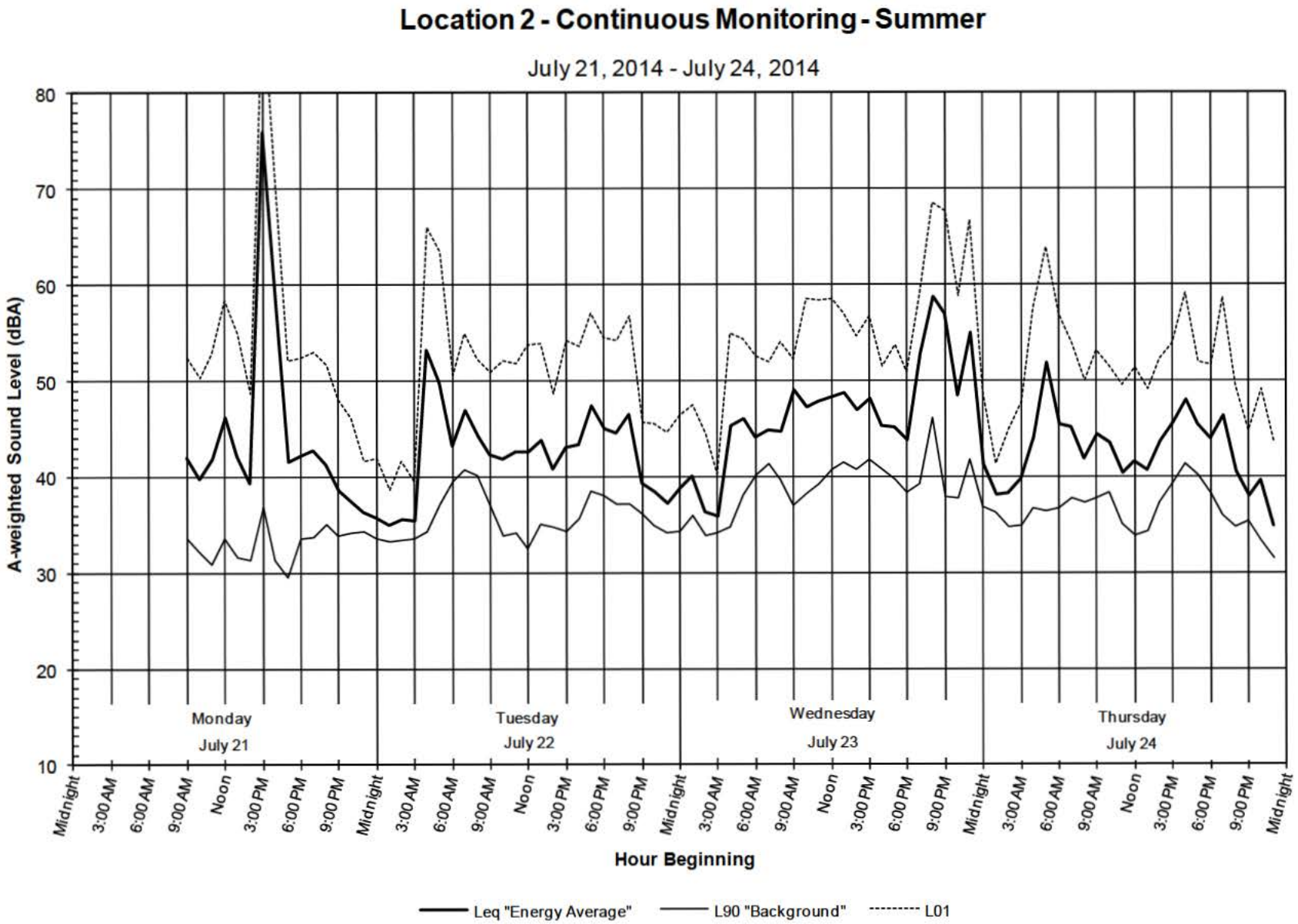

Location 2 - Continuous Monitoring - Summer
July 21, 2014 - July 24, 2014
A-weighted Sound Level (dBA)
80
70
60
50
40
30
20
10
Monday
July 21
Tuesday
July 22
Wednesday
July 23
Thursday
July 24
Midnight
3:00 AM
6:00 AM
9:00 AM
Noon
3:00 PM
6:00 PM
9:00 PM
Hour Beginning
Leq "Energy Average"
L90 "Background"
L01

Figure 19

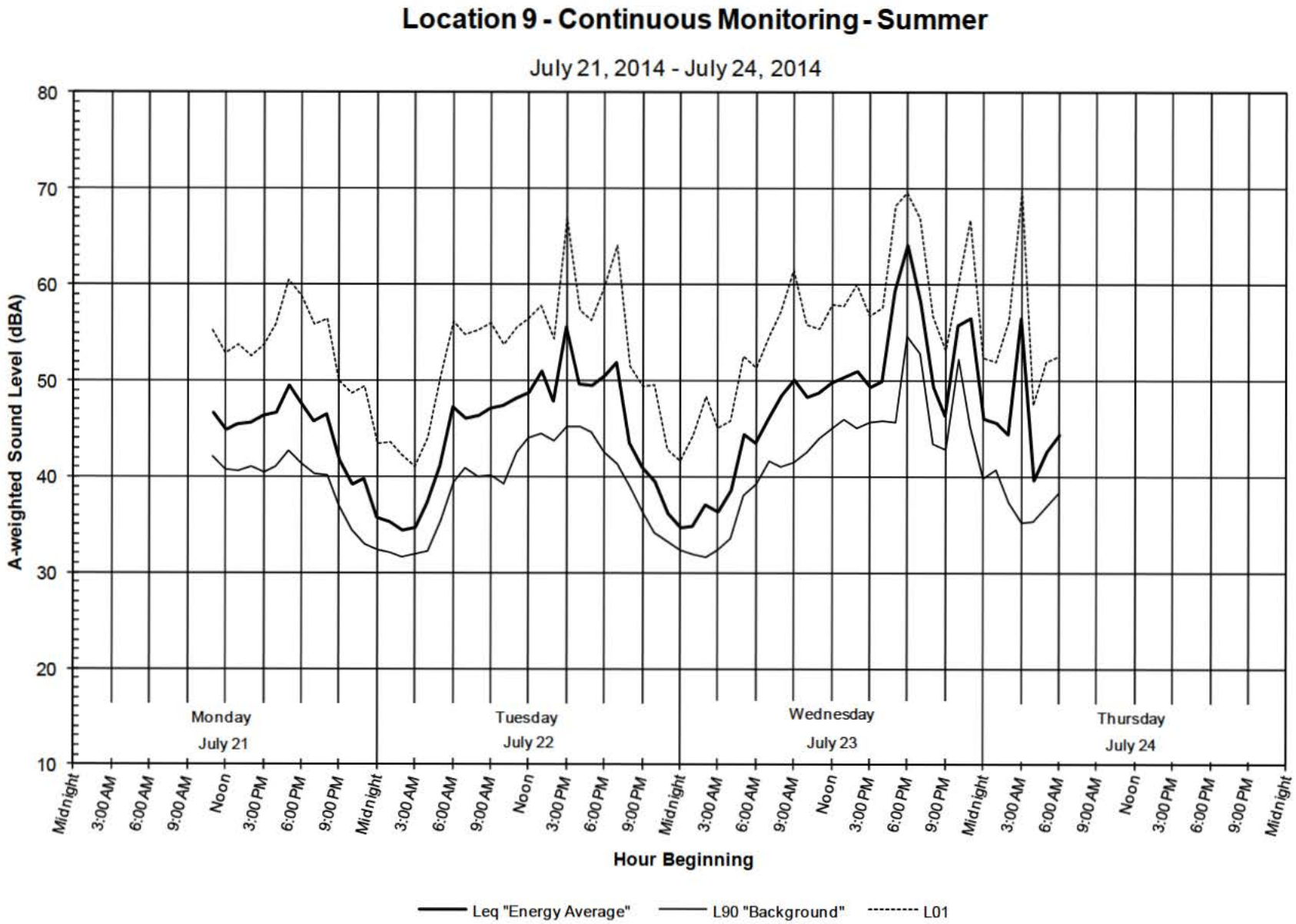

Location 9 - Continuous Monitoring - Summer
July 21, 2014 - July 24, 2014
A-weighted Sound Level (dBA)
80
70
60
50
40
30
20
10
Monday
July 21
Tuesday
July 22
Wednesday
July 23
Thursday
July 24
Midnight
3:00 AM
6:00 AM
9:00 AM
Noon
3:00 PM
6:00 PM
9:00 PM
Hour Beginning
Leq "Energy Average"
L90 "Background"
L01

Figure 20

Annex A

Sound Measurement Terminology

cta

SOUND MEASUREMENT TERMINOLOGY

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.

Spectral Characteristics – 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.

- L_{90} is the sound level in dBA exceeded 90 percent of the time during the measurement period. 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.

- L_{50} is the median sound level: the sound level in dBA exceeded 50 percent of the time during the measurement period.

- L_{10} is the sound level exceeded only 10 percent of the time. It is close to the maximum level observed during the measurement period. The L_{10} is sometimes called the *intrusive* sound level because it is caused by occasional louder noises like those from passing motor vehicles or aircraft.

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.

When a steady continuous sound is measured, the L_{10}, L_{50}, L_{90} and L_{eq} are all equal. For a constant sound level, such as from a power plant operating continuously for a 24-hour period, the L_{dn} is approximately 6 dBA higher than the directly measured sound level.

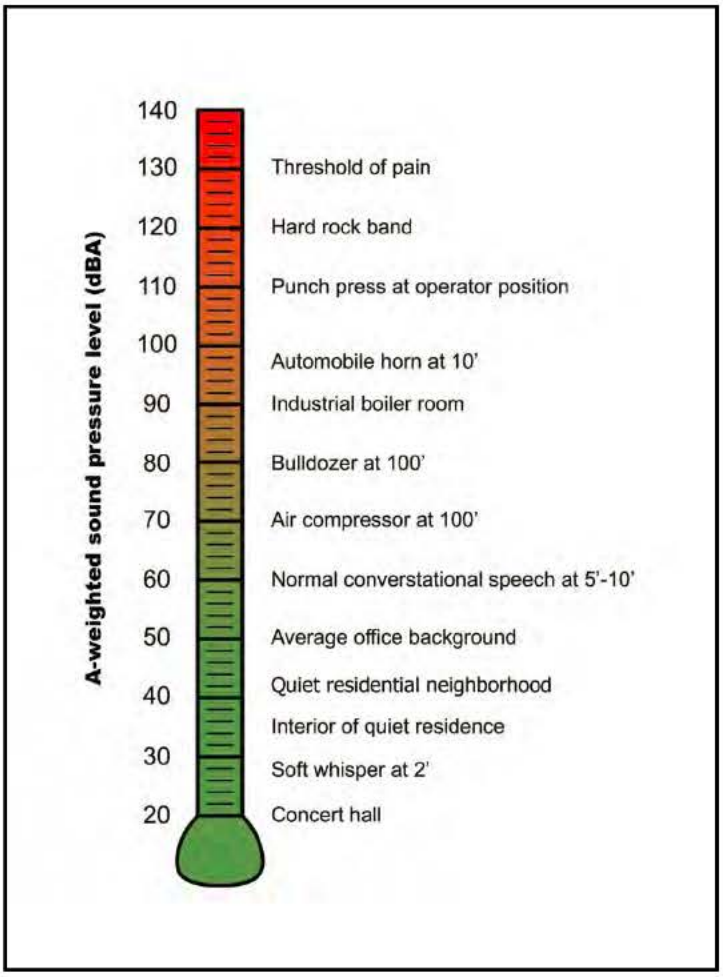


Figure A-1

Typical Sound Levels for Common Interior and Environmental Sources

Annex B

Intermittent Samples
Winter

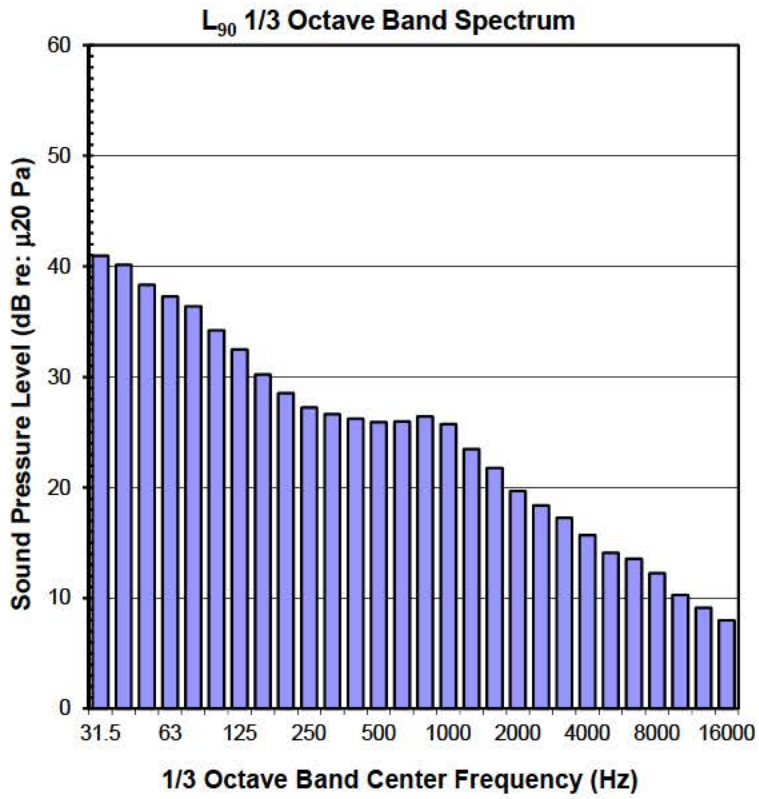
cta

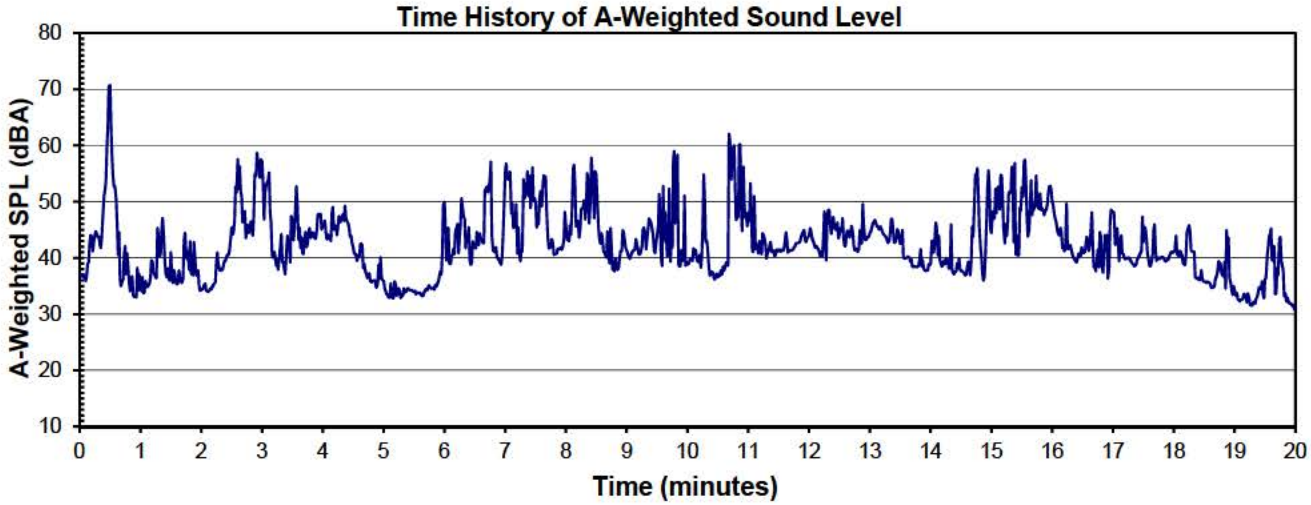
Location 1 - Winter - Day

Measured Thursday, March 27, 2014, Between 10:49 AM & 11:09 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**48.7**
L_{max}:	73.3
L_{01}:	59.8
L_{10}:	50.1
L_{50}:	41.2
L_{90}:	**34.8**
L_{99}:	32.0
L_{min}:	30.2





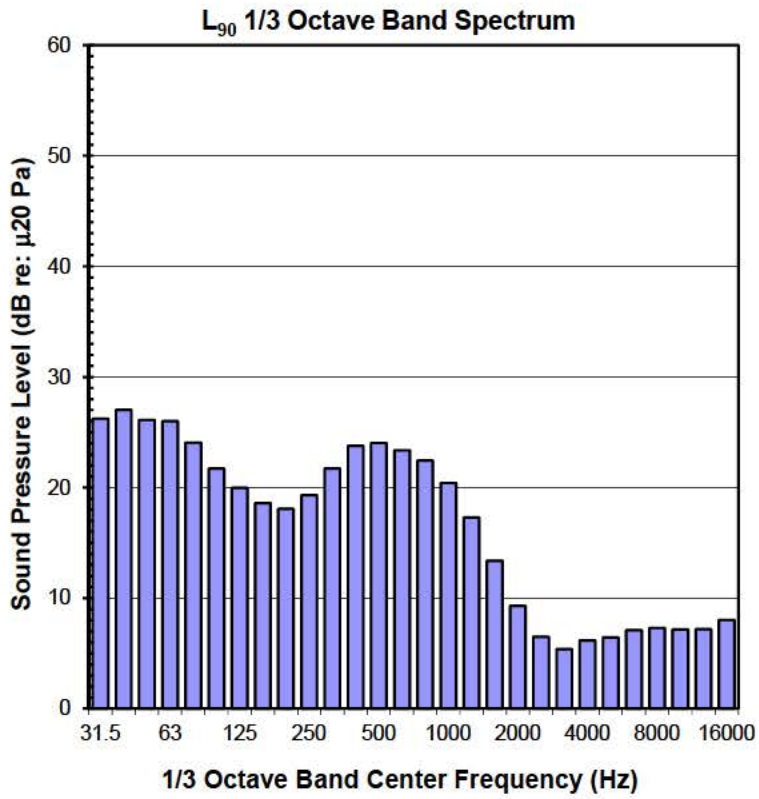
Run019

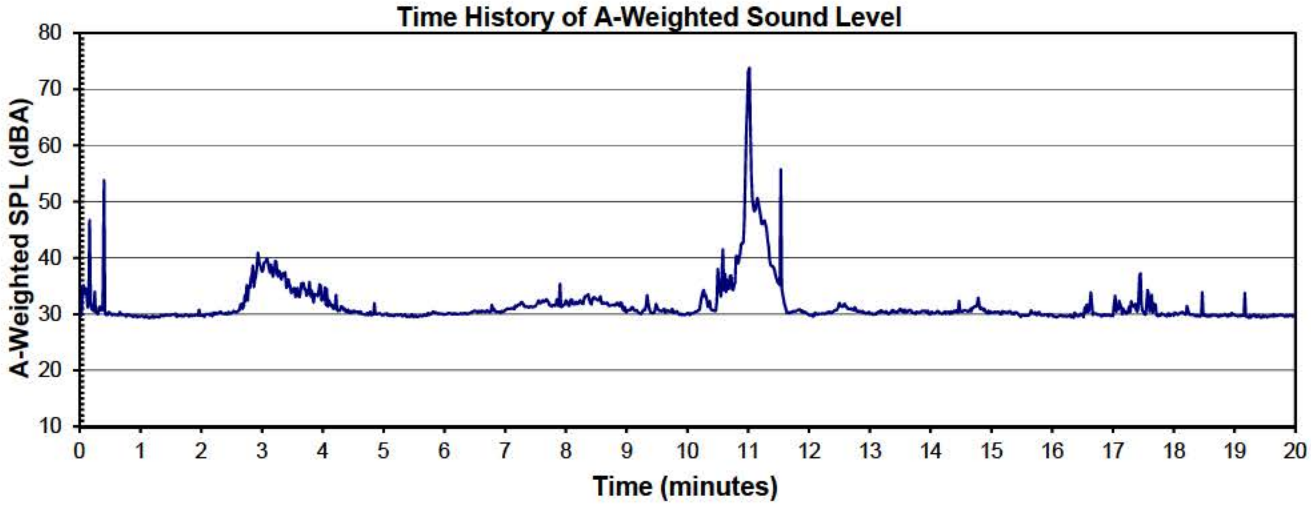
Location 1 - Winter - Night

Measured Wednesday, April 02, 2014, Between 11:11 PM & 11:31 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**46.8**
L_{max}:	76.3
L_{01}:	49.4
L_{10}:	34.2
L_{50}:	30.3
L_{90}:	**29.6**
L_{99}:	29.2
L_{min}:	28.6





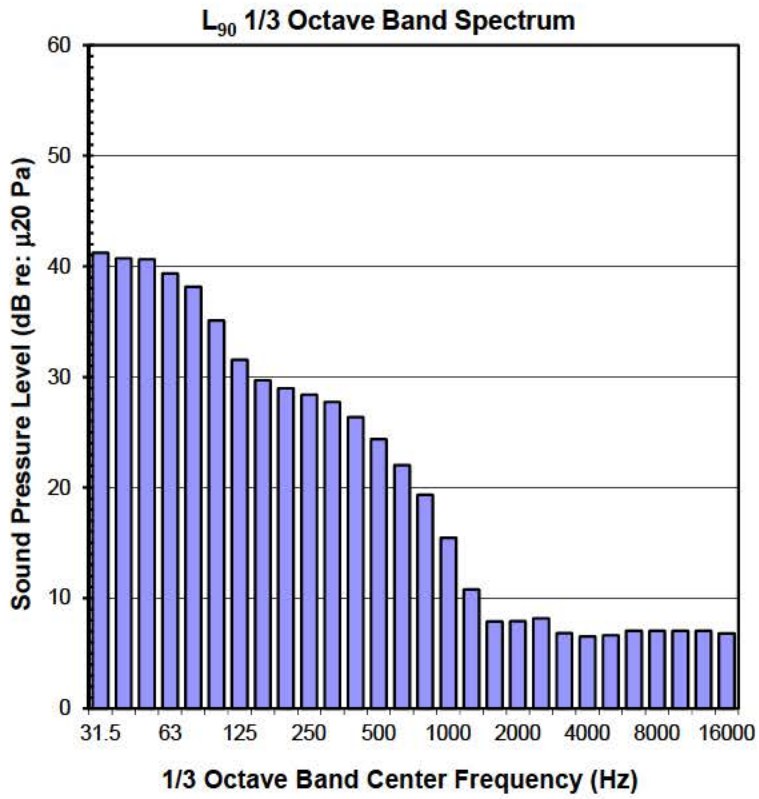
Run036

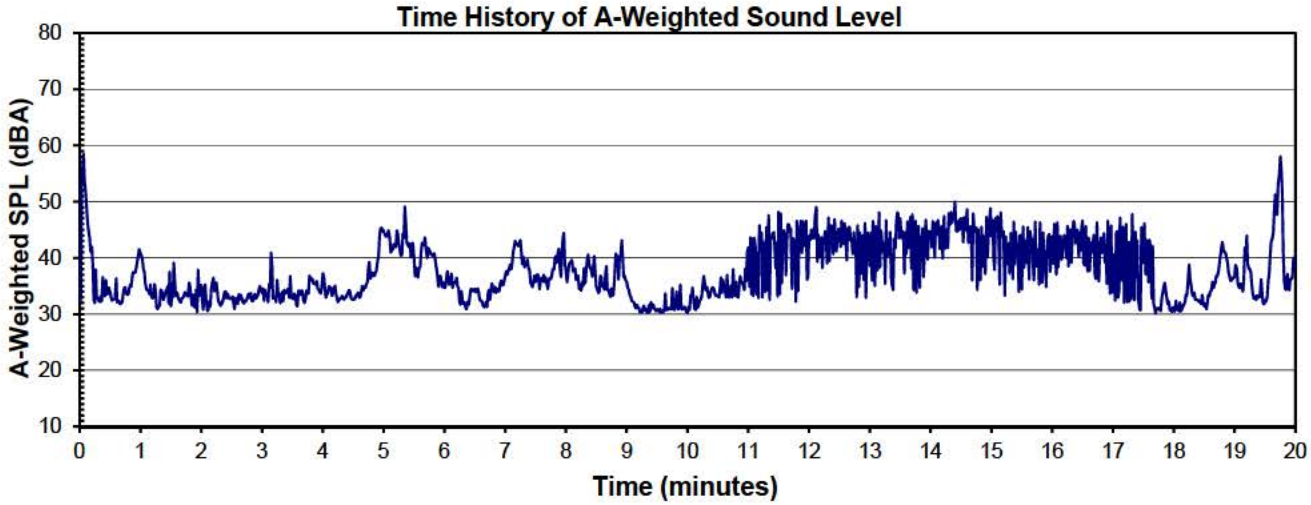
Location 2 - Winter - Day

Measured Thursday, March 27, 2014, Between 11:41 AM & 12:01 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**41.4**
L_{max}:	63.1
L_{01}:	50.6
L_{10}:	45.1
L_{50}:	35.8
L_{90}:	**31.7**
L_{99}:	30.3
L_{min}:	29.4





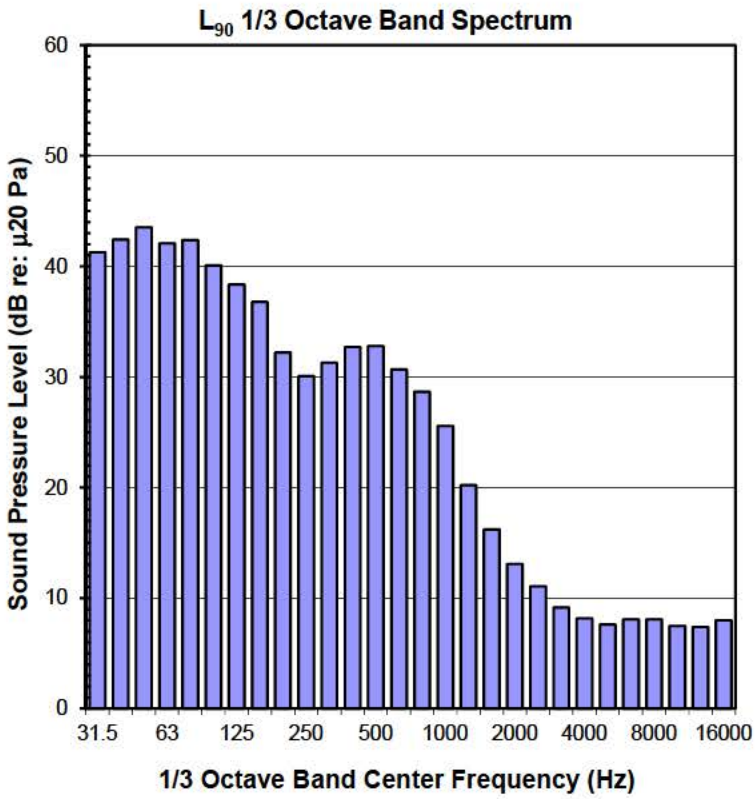
Run020

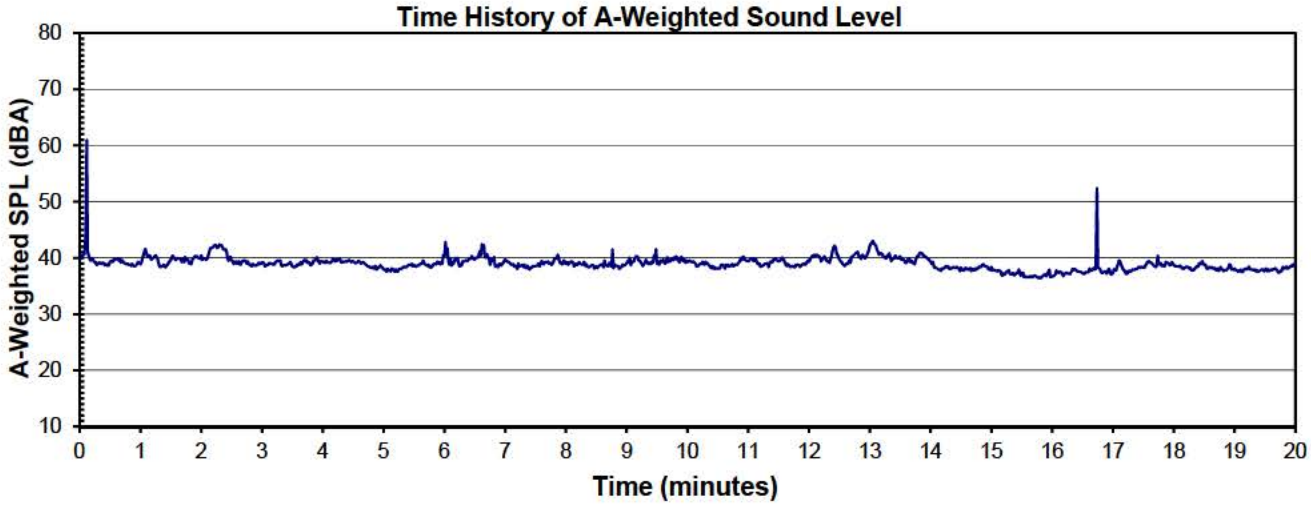
Location 2 - Winter - Night

Measured Thursday, April 03, 2014, Between 12:00 AM & 12:20 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**39.7**
L_{max}:	68.5
L_{01}:	42.4
L_{10}:	40.2
L_{50}:	38.9
L_{90}:	**37.6**
L_{99}:	36.6
L_{min}:	35.8





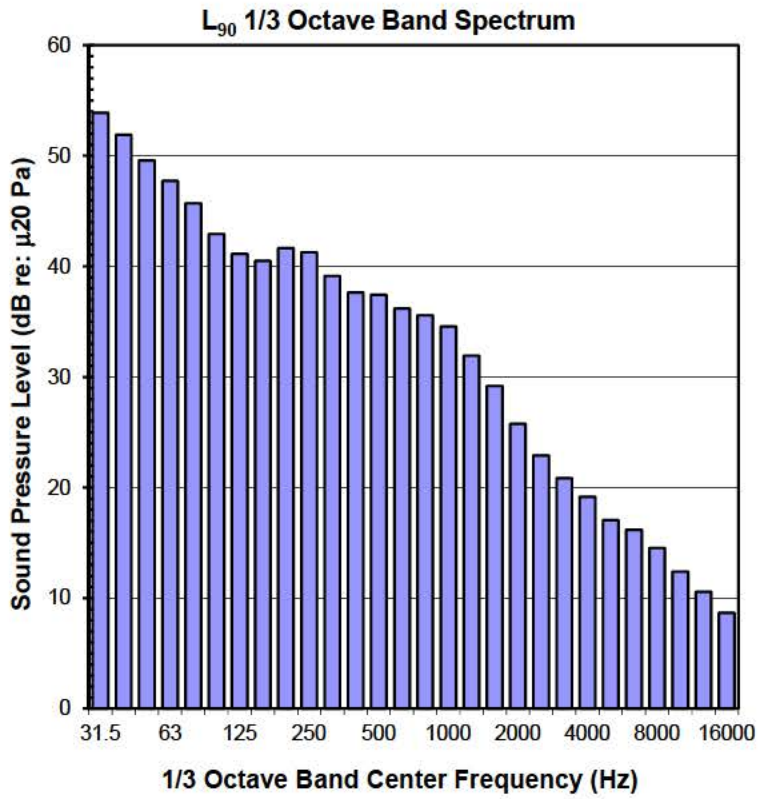
Run037

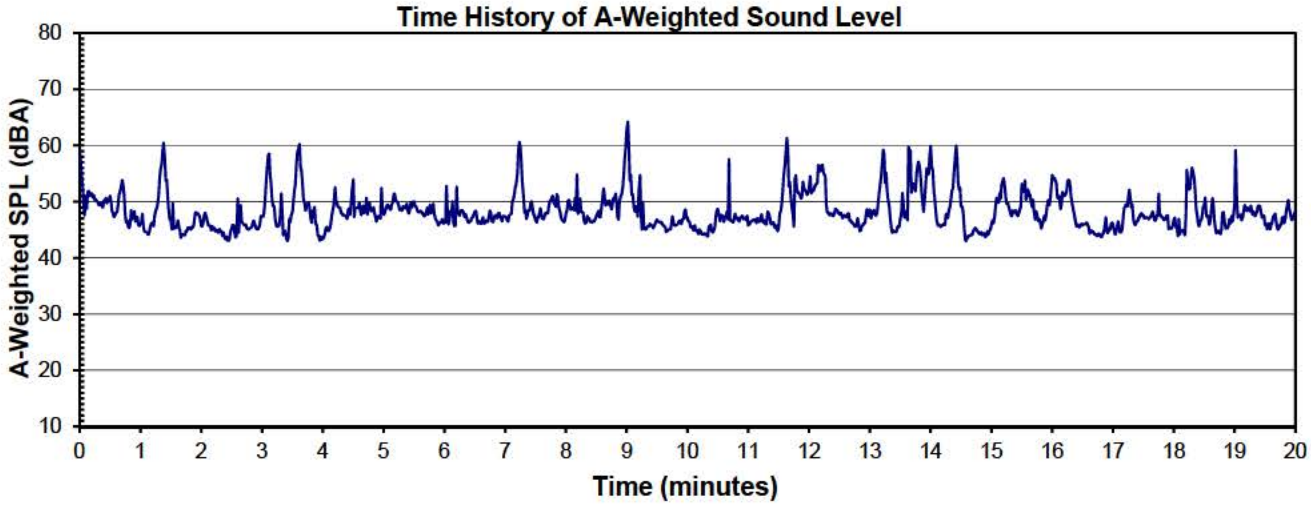
Location 3 - Winter - Day

Measured Thursday, March 27, 2014, Between 12:23 PM & 12:43 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**50.1**
L_{max}:	65.2
L_{01}:	59.7
L_{10}:	52.6
L_{50}:	47.5
L_{90}:	**44.8**
L_{99}:	43.4
L_{min}:	42.4





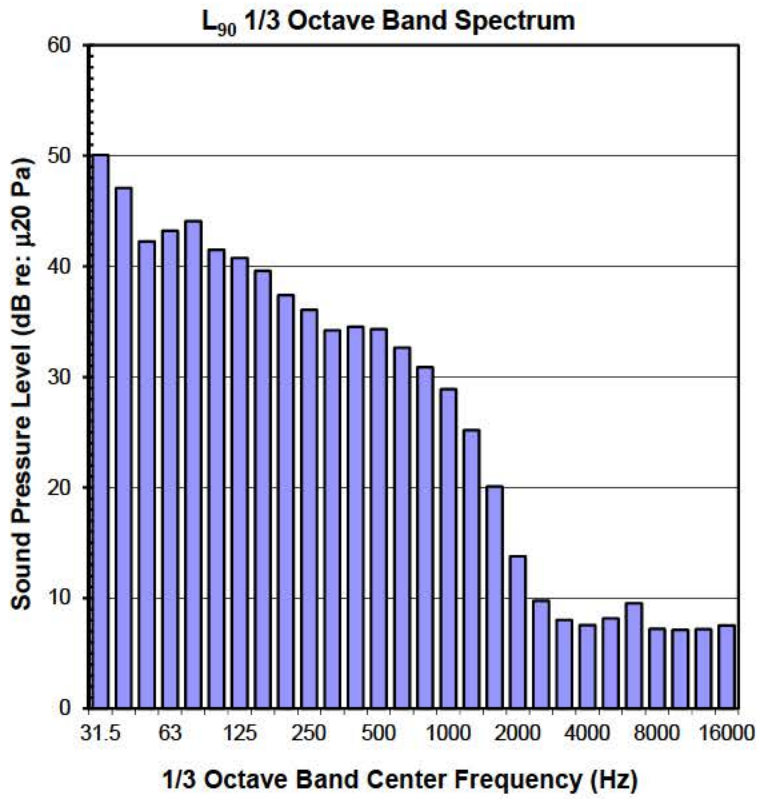
Run021

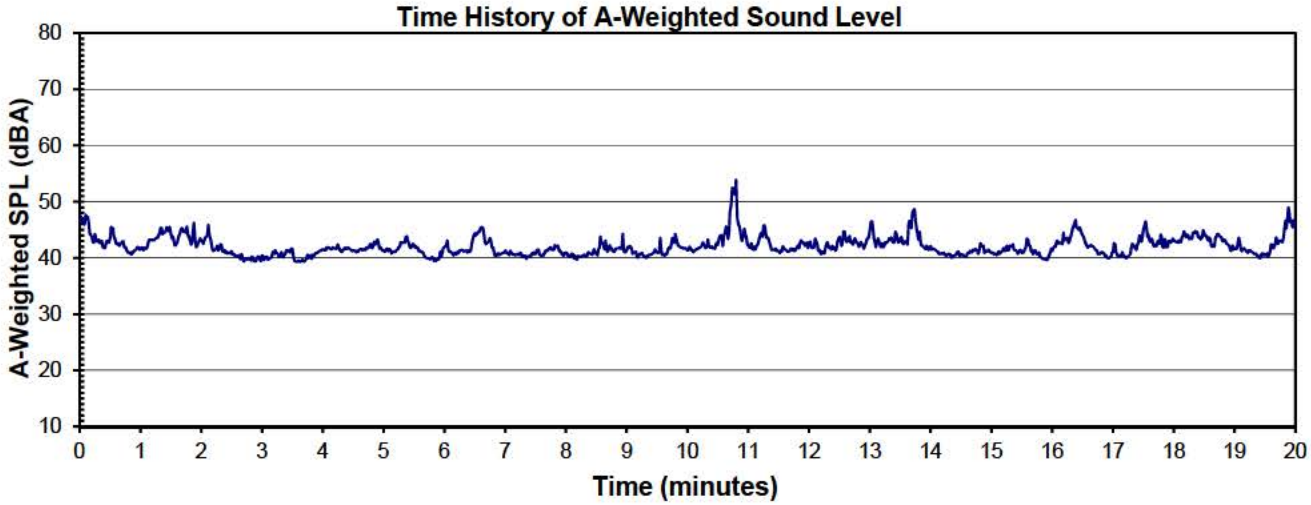
Location 3 - Winter - Night

Measured Thursday, April 03, 2014, Between 12:51 AM & 1:11 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**42.5**
L_{max}:	55.7
L_{01}:	47.8
L_{10}:	44.3
L_{50}:	41.7
L_{90}:	**40.3**
L_{99}:	39.4
L_{min}:	38.4





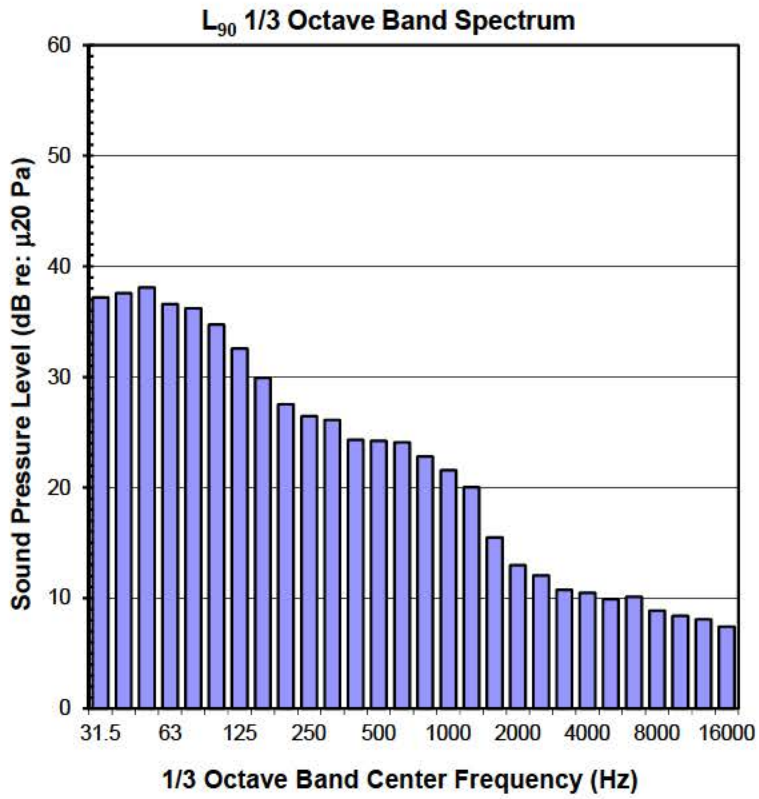
Run038

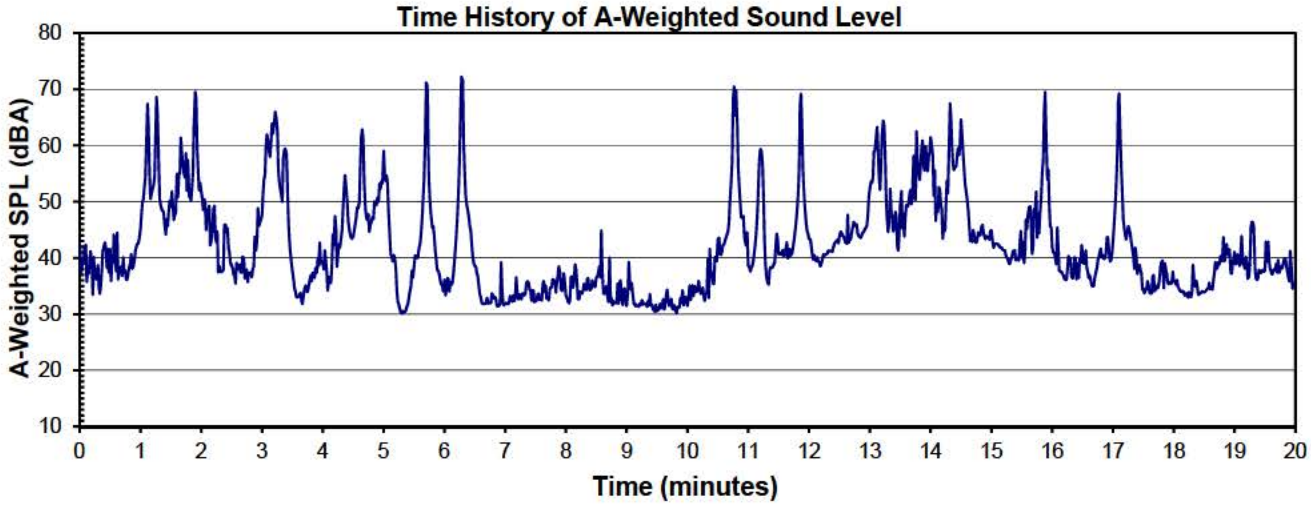
Location 4 - Winter - Day

Measured Thursday, March 27, 2014, Between 1:39 PM & 1:59 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**54.0**
L_{max}:	73.8
L_{01}:	68.1
L_{10}:	54.8
L_{50}:	40.0
L_{90}:	**32.7**
L_{99}:	30.7
L_{min}:	29.5





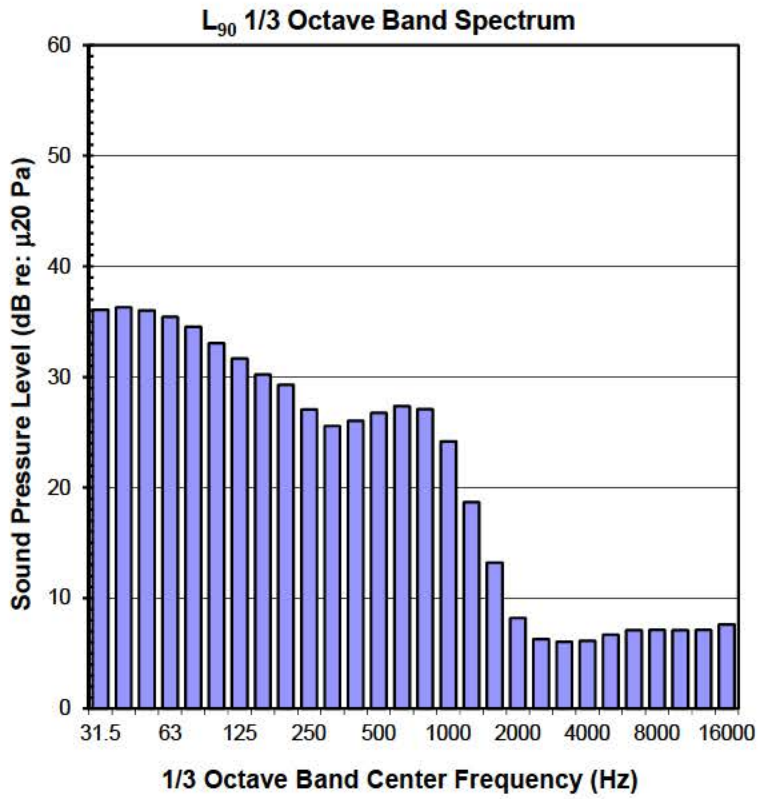
Run022

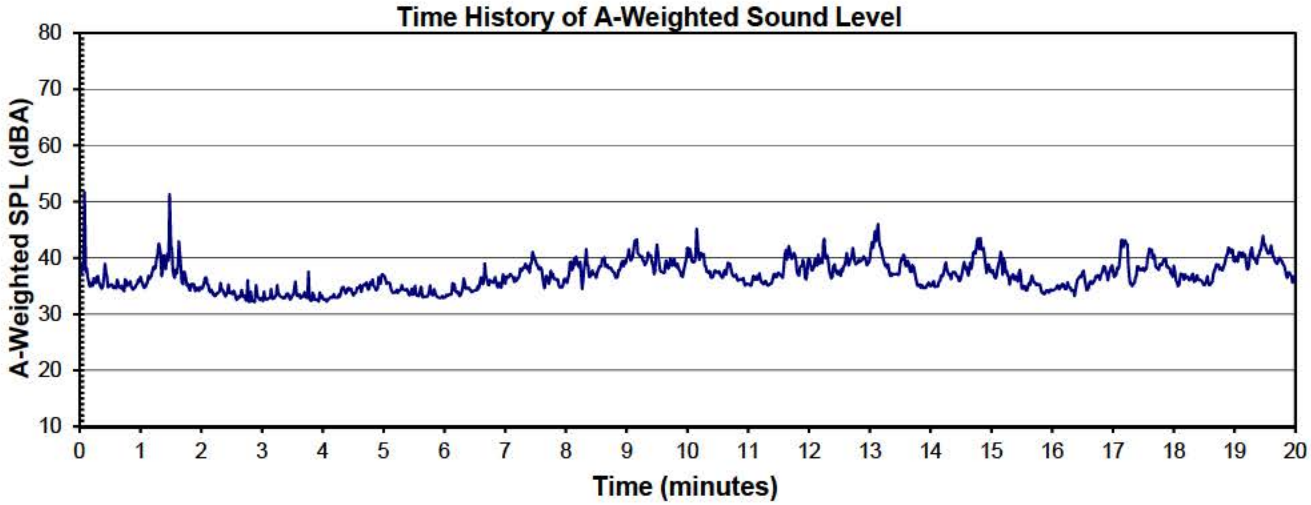
Location 4 - Winter - Night

Measured Thursday, April 03, 2014, Between 1:21 AM & 1:41 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**37.8**
L_{max}:	58.6
L_{01}:	43.4
L_{10}:	40.4
L_{50}:	36.6
L_{90}:	**33.5**
L_{99}:	32.4
L_{min}:	31.2





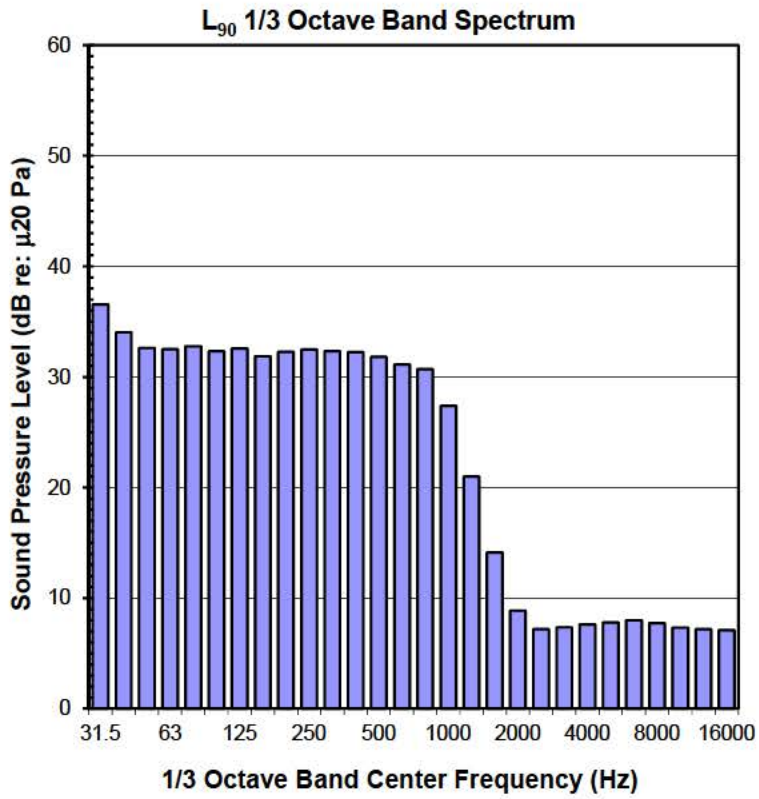
Run039

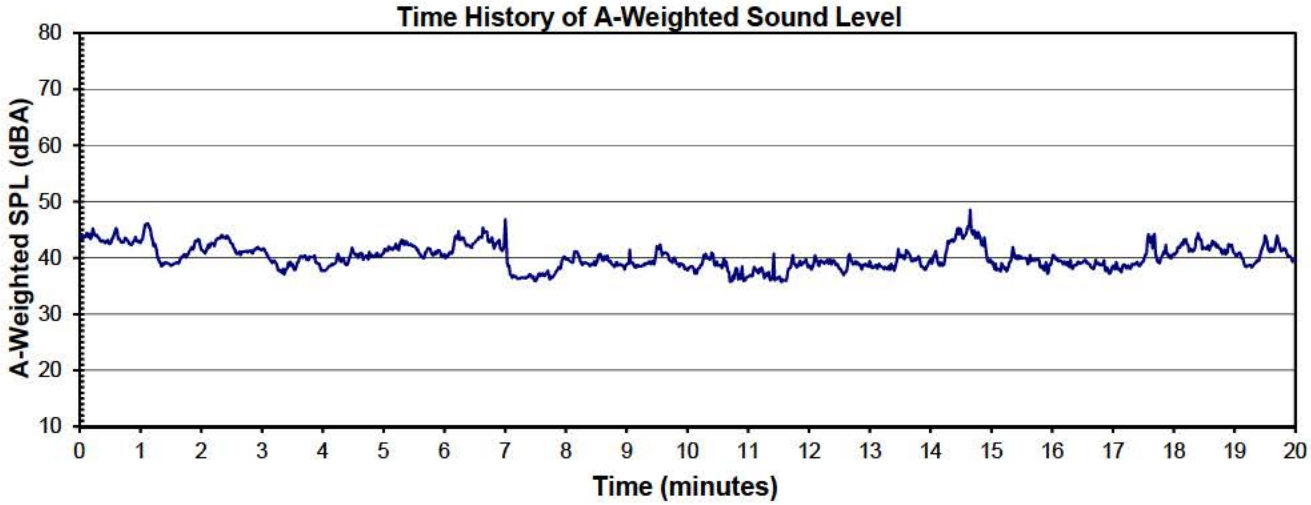
Location 5 - Winter - Day

Measured Thursday, March 27, 2014, Between 2:11 PM & 2:31 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**40.7**
L_{max}:	51.2
L_{01}:	45.4
L_{10}:	43.2
L_{50}:	39.8
L_{90}:	**37.6**
L_{99}:	36.0
L_{min}:	34.7





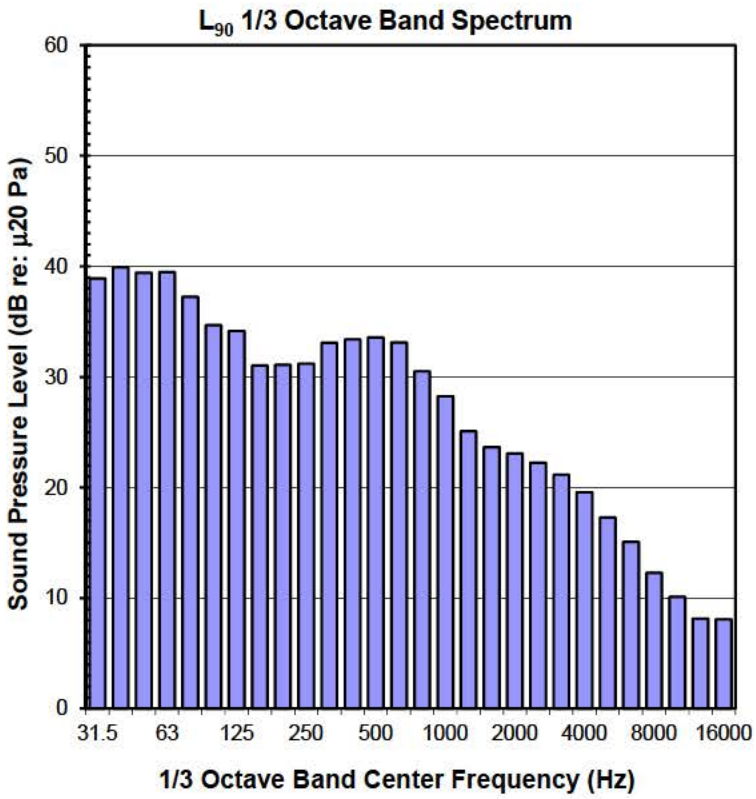
Run023

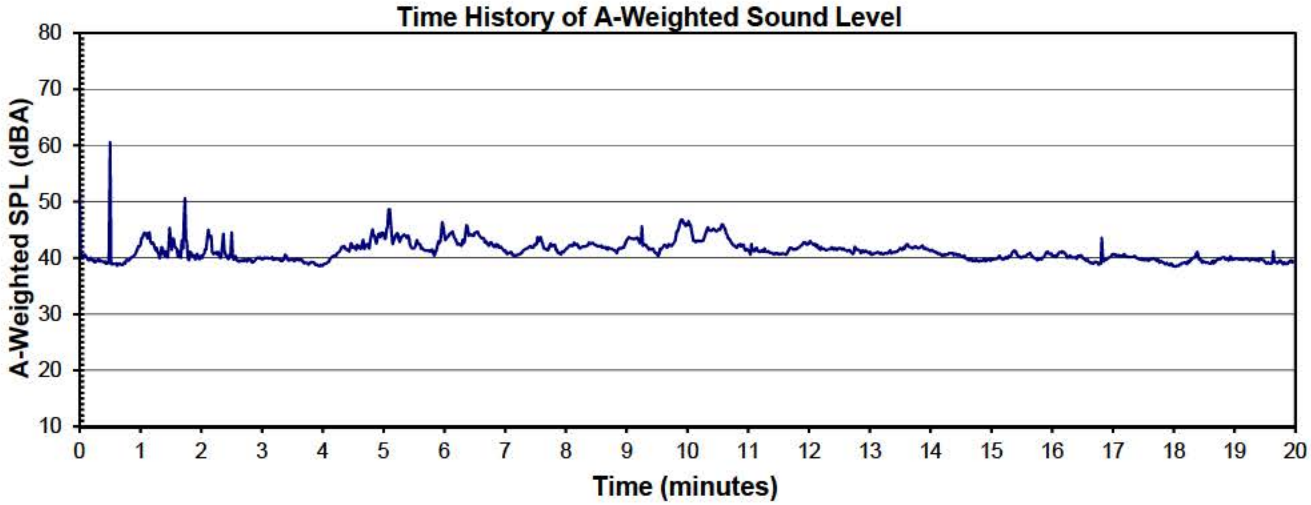
Location 5 - Winter - Night

Measured Thursday, April 03, 2014, Between 1:53 AM & 2:13 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**41.9**
L_{max}:	67.9
L_{01}:	46.3
L_{10}:	43.6
L_{50}:	40.9
L_{90}:	**39.3**
L_{99}:	38.6
L_{min}:	37.9





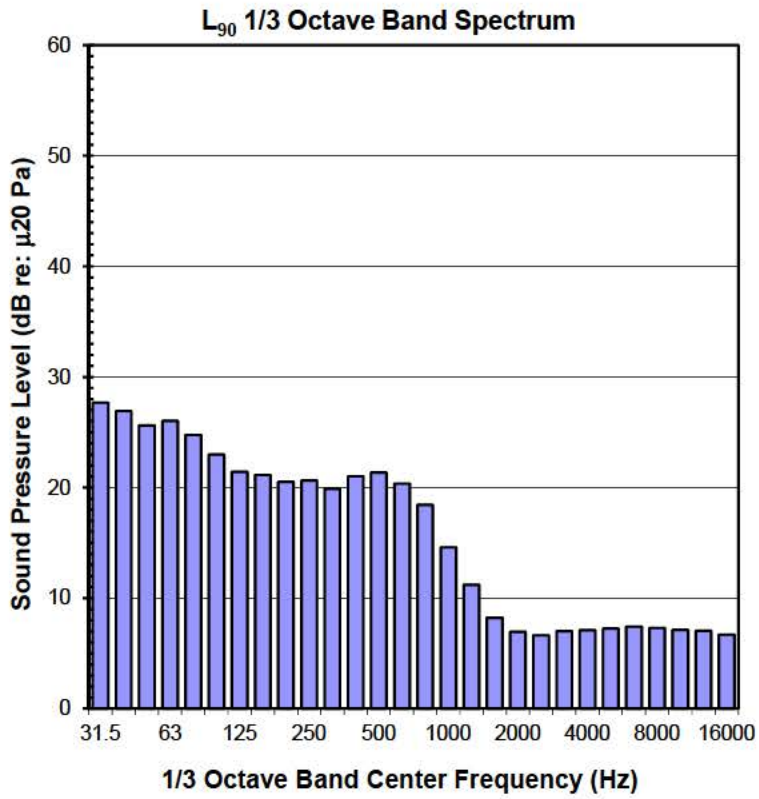
Run040

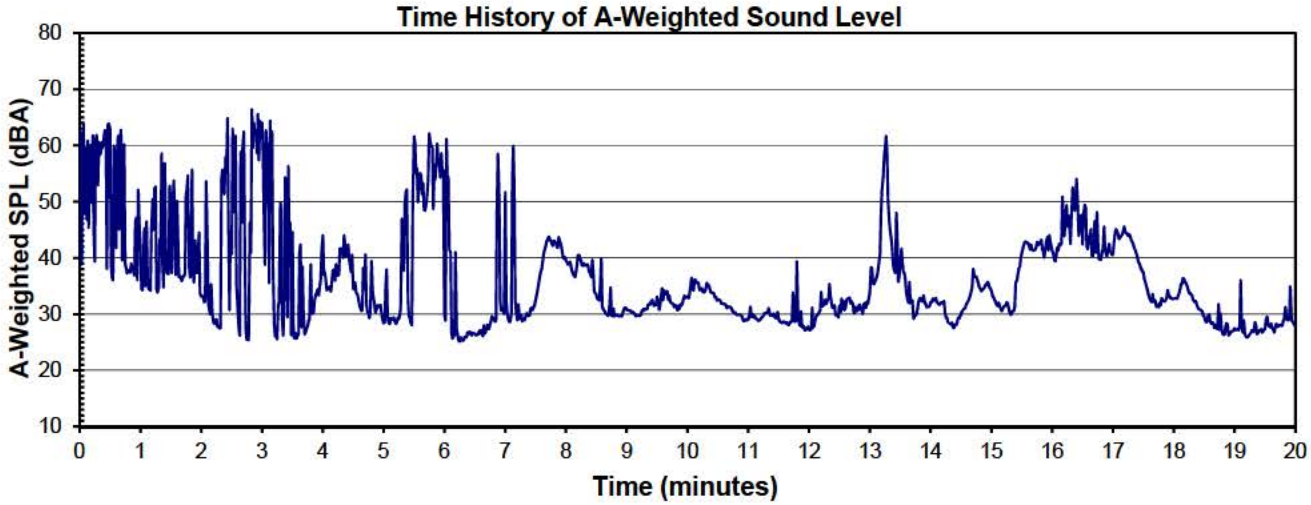
Location 6 - Winter - Day

Measured Tuesday, March 25, 2014, Between 2:13 PM & 2:33 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**50.0**
L_{max}:	71.4
L_{01}:	64.1
L_{10}:	47.3
L_{50}:	32.9
L_{90}:	**27.7**
L_{99}:	25.6
L_{min}:	23.1





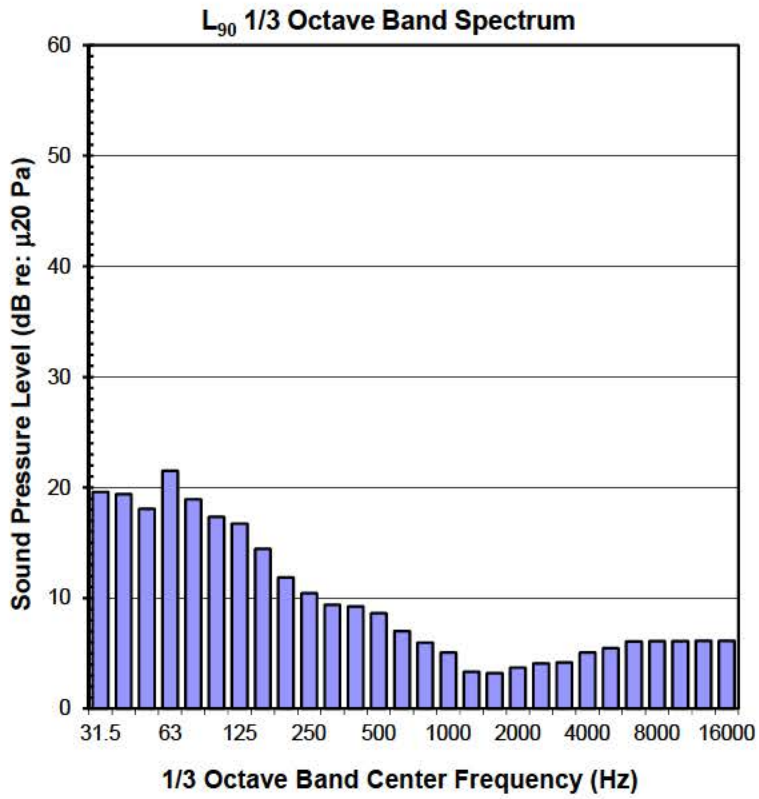
Run017

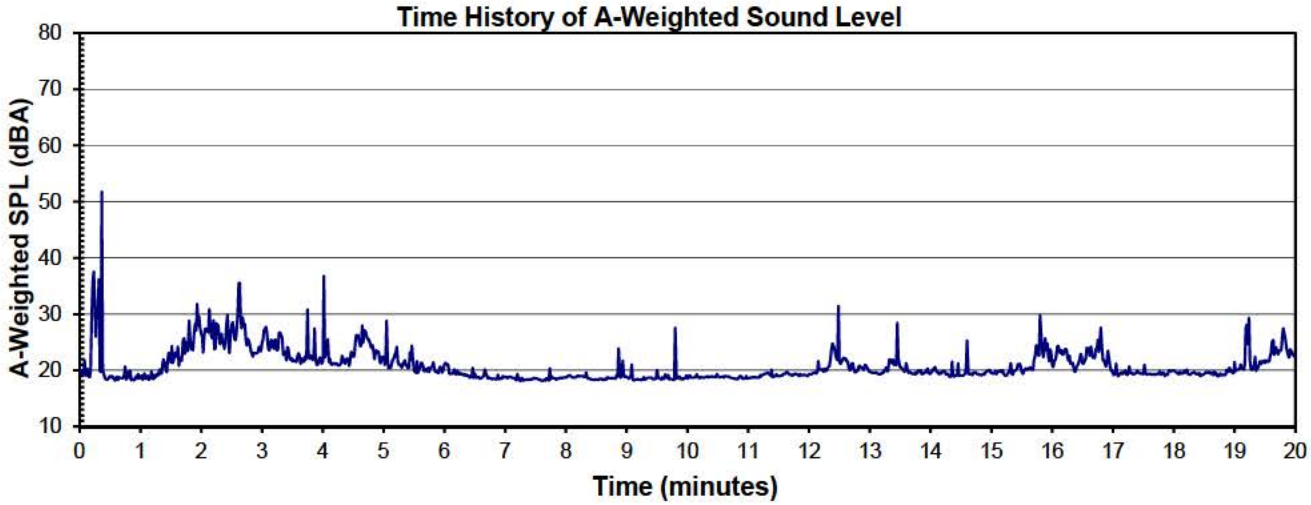
Location 6 - Winter - Night

Measured Friday, March 28, 2014, Between 1:51 AM & 2:11 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**24.7**
L_{max}:	59.2
L_{01}:	30.6
L_{10}:	24.4
L_{50}:	19.7
L_{90}:	**18.5**
L_{99}:	18.1
L_{min}:	17.8





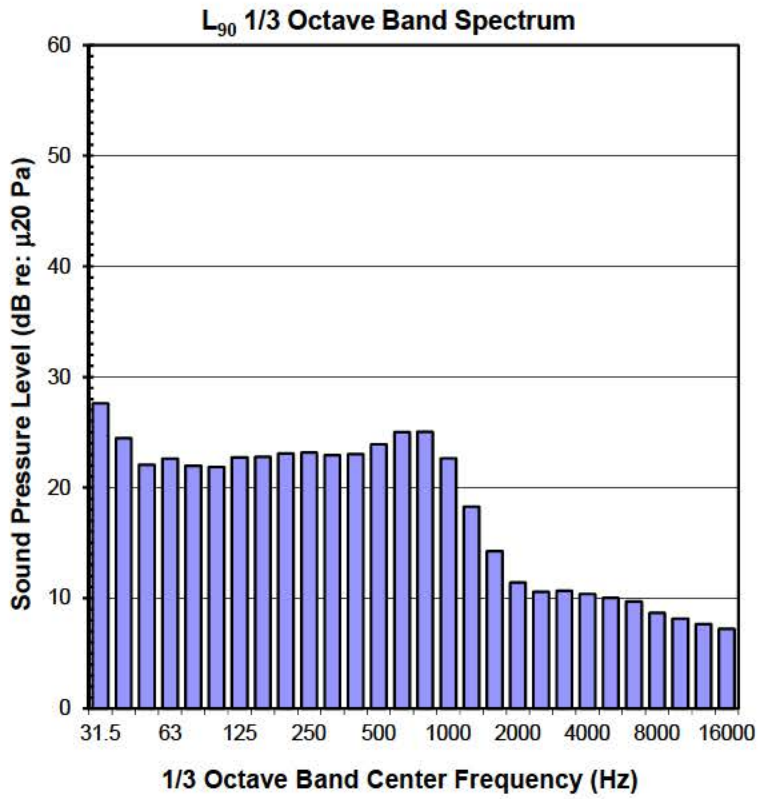
Run029

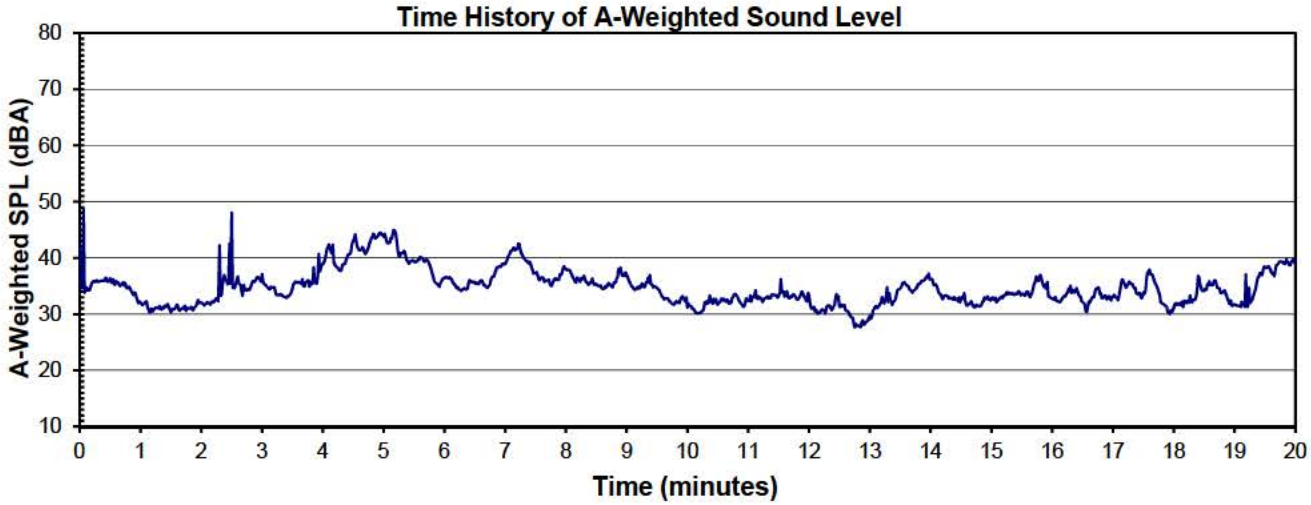
Location 6A - Winter - Day

Measured Tuesday, March 25, 2014, Between 2:36 PM & 2:56 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**36.2**
L_{max}:	55.9
L_{01}:	44.1
L_{10}:	39.3
L_{50}:	34.3
L_{90}:	**31.3**
L_{99}:	28.6
L_{min}:	27.1





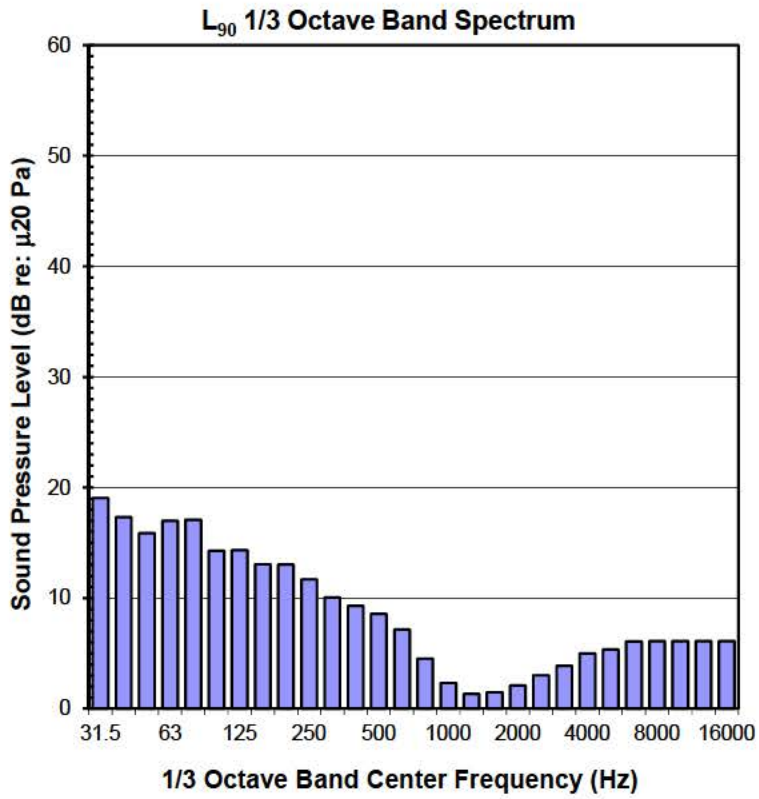
Run018

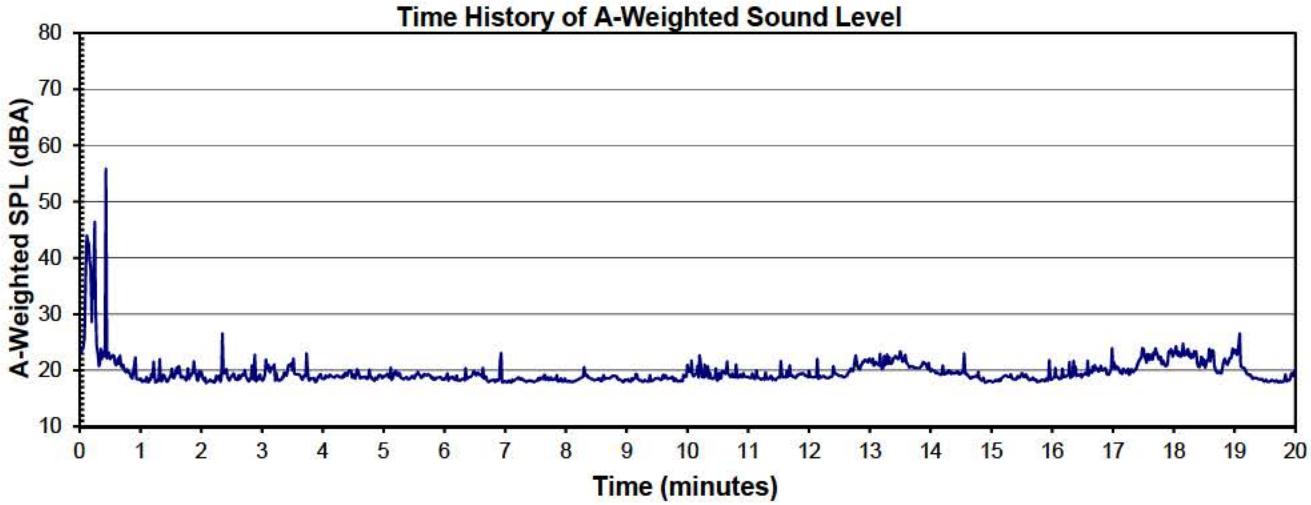
Location 6A - Winter - Night

Measured Friday, March 28, 2014, Between 2:14 AM & 2:34 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**27.3**
L_{max}:	63.4
L_{01}:	27.8
L_{10}:	21.9
L_{50}:	18.9
L_{90}:	**18.1**
L_{99}:	17.8
L_{min}:	17.3





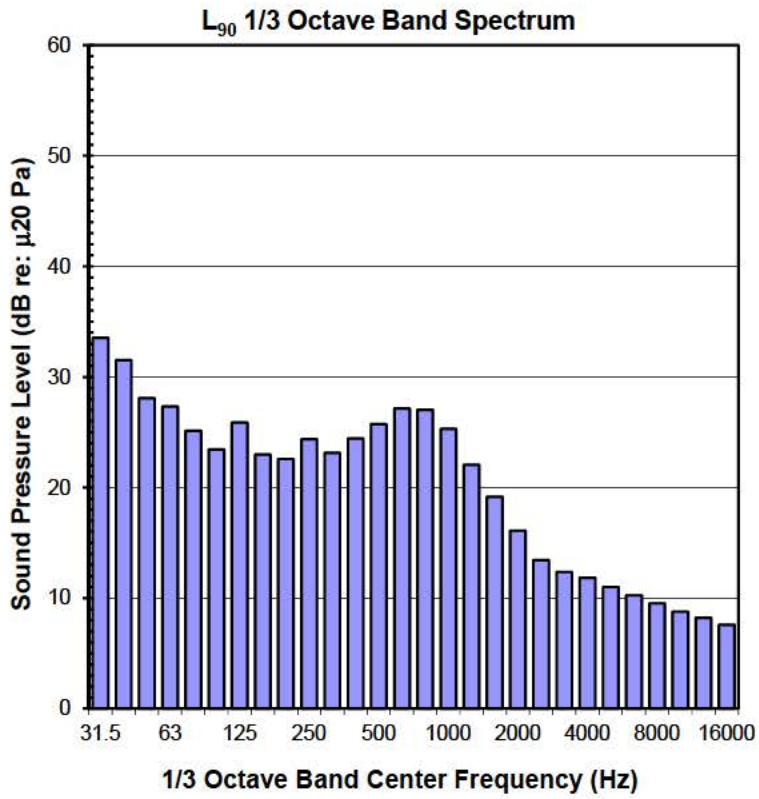
Run030

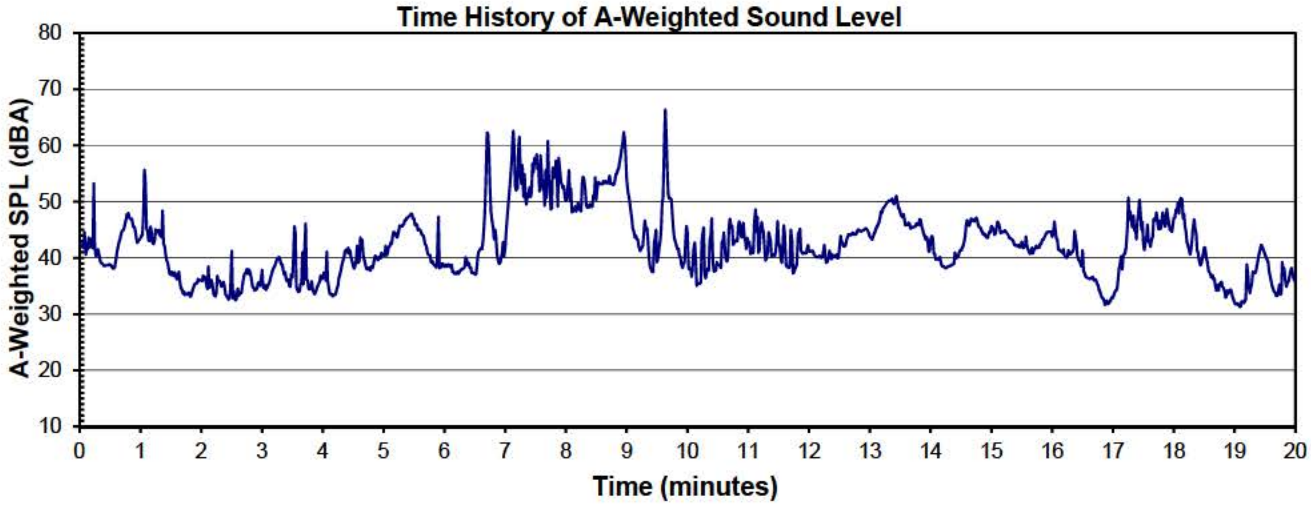
Location 7 - Winter - Day

Measured Tuesday, March 25, 2014, Between 1:35 PM & 1:55 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**47.7**
L_{max}:	67.7
L_{01}:	59.9
L_{10}:	49.8
L_{50}:	41.4
L_{90}:	**34.8**
L_{99}:	32.1
L_{min}:	30.8





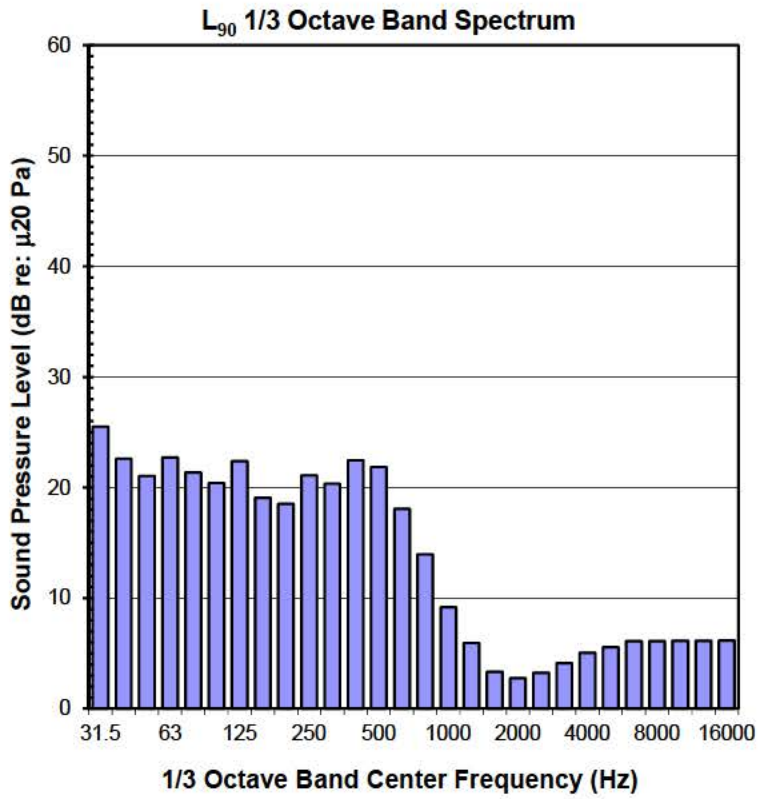
Run016

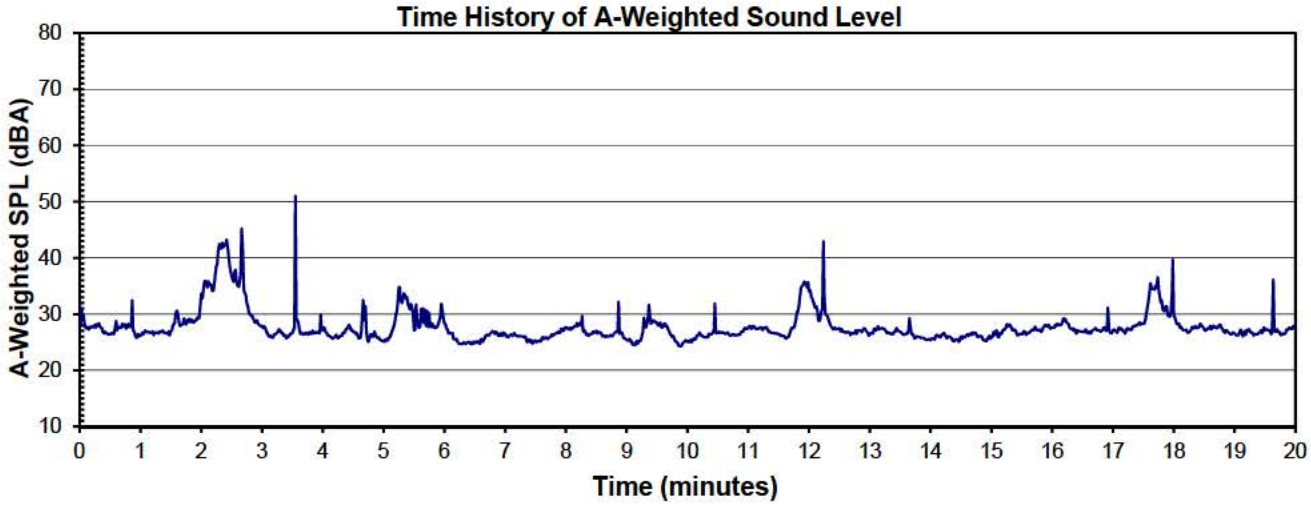
Location 7 - Winter - Night

Measured Friday, March 28, 2014, Between 1:13 AM & 1:33 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**30.1**
L_{max}:	58.6
L_{01}:	41.2
L_{10}:	30.5
L_{50}:	27.0
L_{90}:	**25.6**
L_{99}:	24.6
L_{min}:	23.5





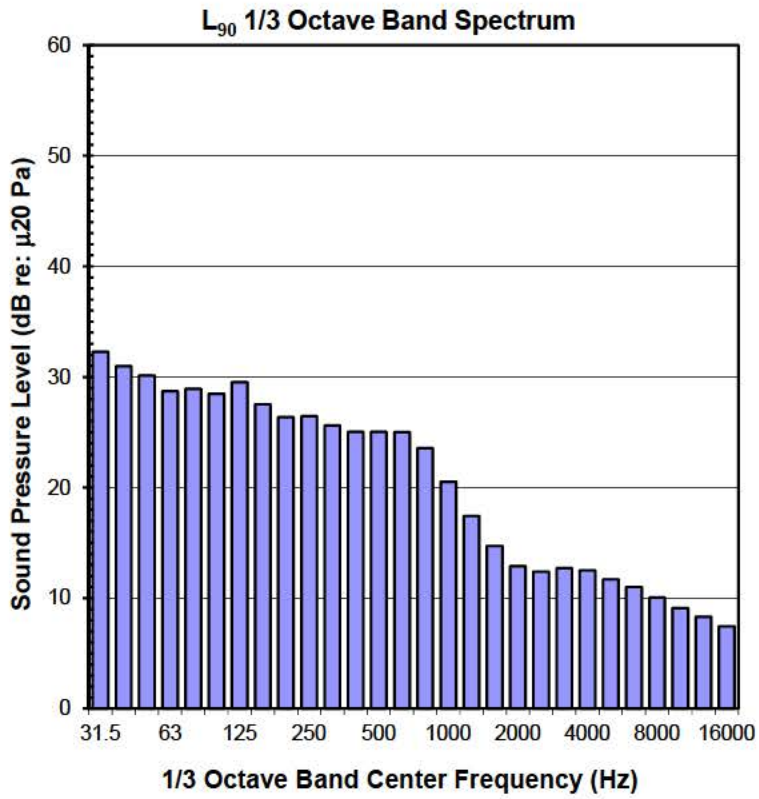
Run028

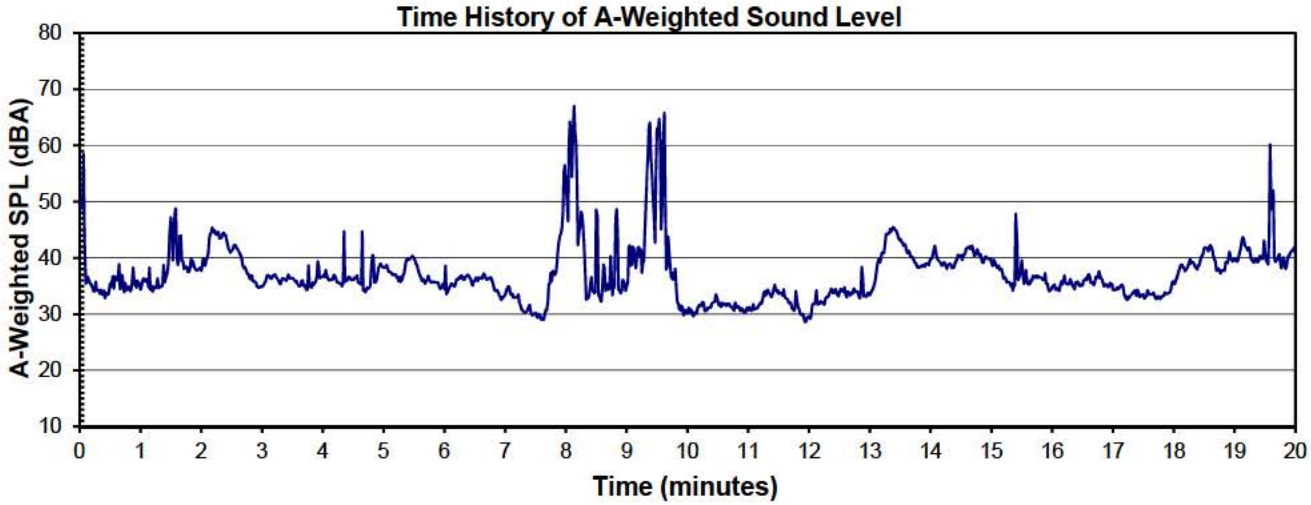
Location 8 - Winter - Day

Measured Tuesday, March 25, 2014, Between 12:20 PM & 12:40 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**45.9**
L_{max}:	70.0
L_{01}:	60.2
L_{10}:	42.1
L_{50}:	36.1
L_{90}:	**31.9**
L_{99}:	29.4
L_{min}:	28.1





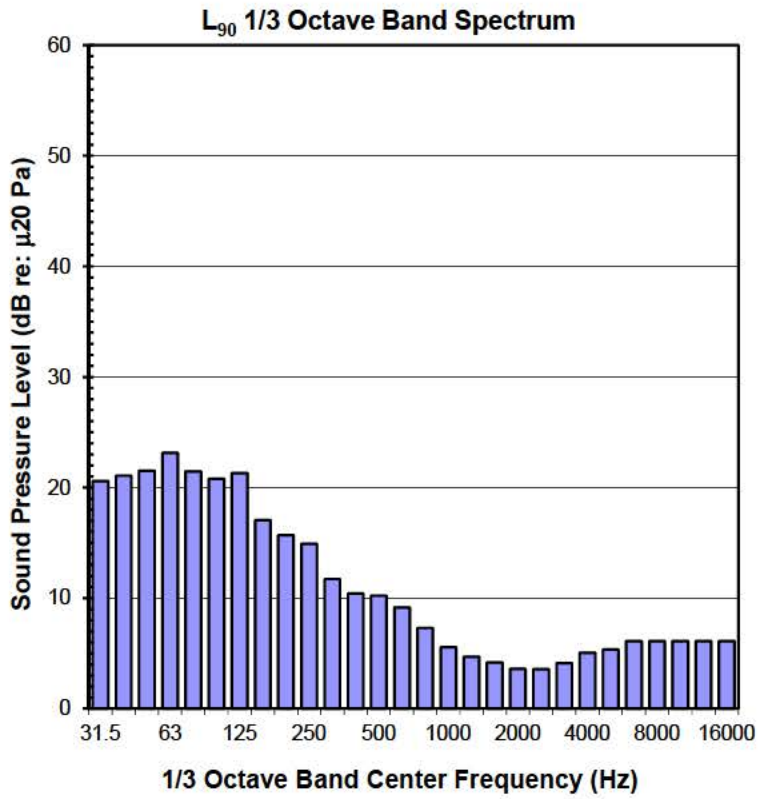
Run014

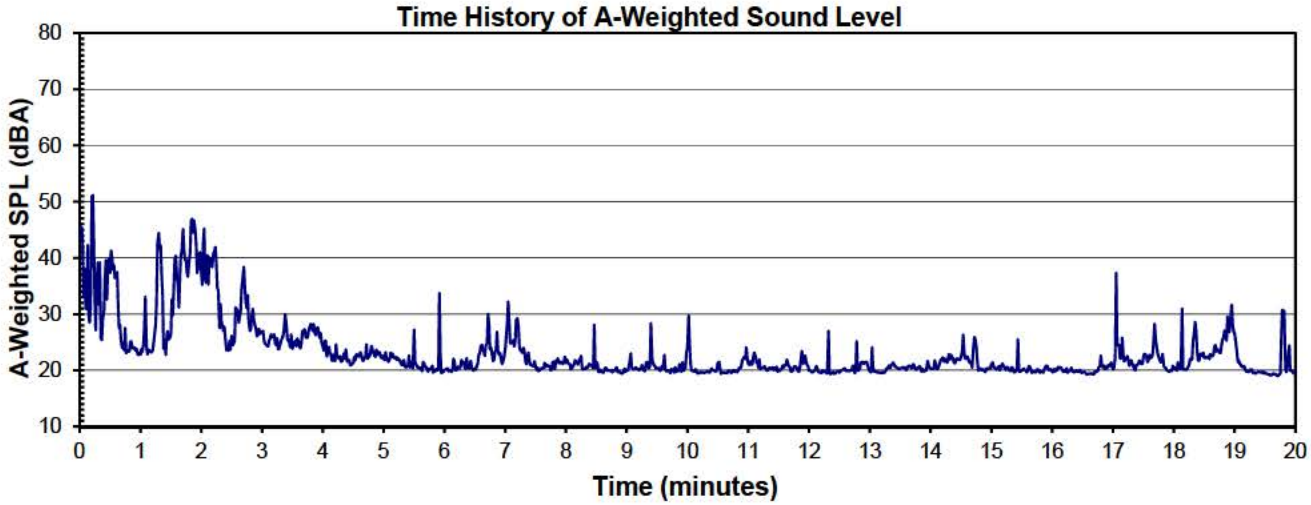
Location 8 - Winter - Night

Measured Thursday, March 27, 2014, Between 11:34 PM & 11:54 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**30.8**
L_{max}:	58.9
L_{01}:	43.6
L_{10}:	28.5
L_{50}:	21.1
L_{90}:	**19.7**
L_{99}:	19.2
L_{min}:	18.6





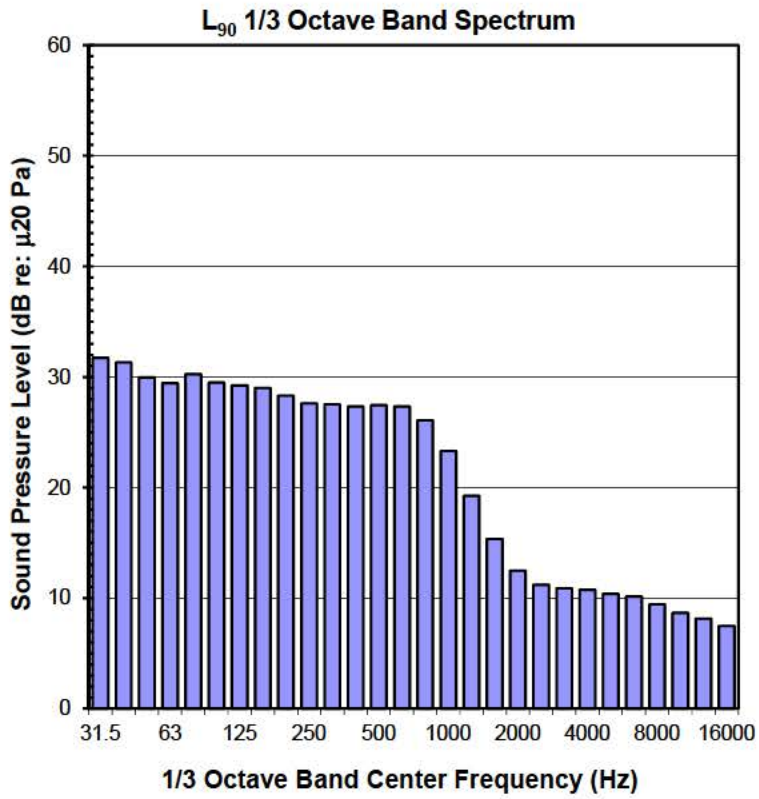
Run026

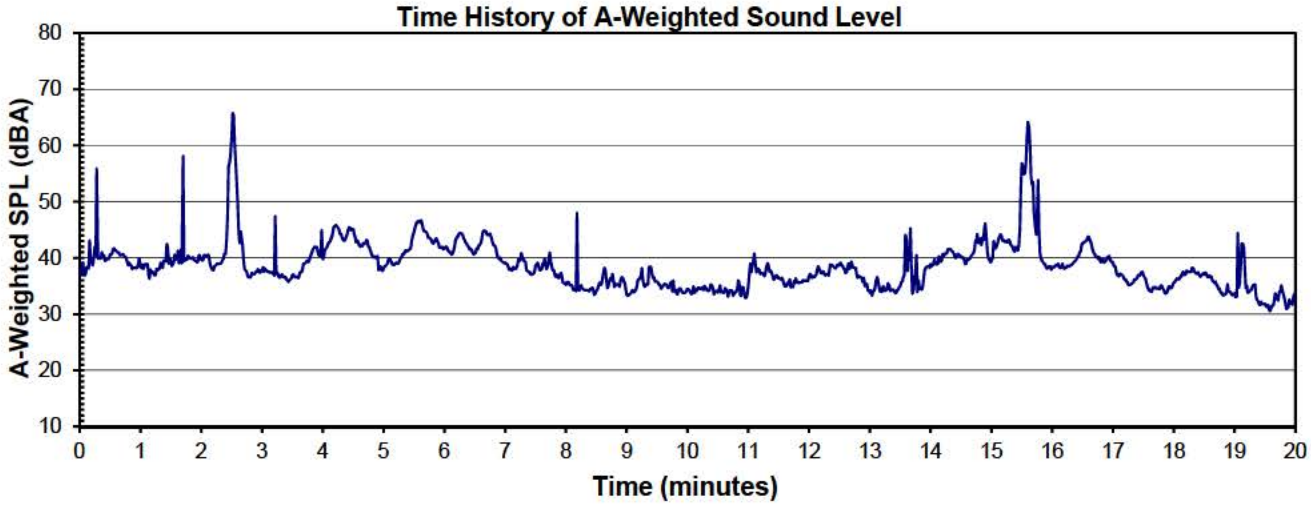
Location 8A - Winter - Day

Measured Tuesday, March 25, 2014, Between 12:43 PM & 1:03 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**44.5**
L_{max}:	67.9
L_{01}:	56.9
L_{10}:	43.2
L_{50}:	38.1
L_{90}:	**34.1**
L_{99}:	31.6
L_{min}:	29.9





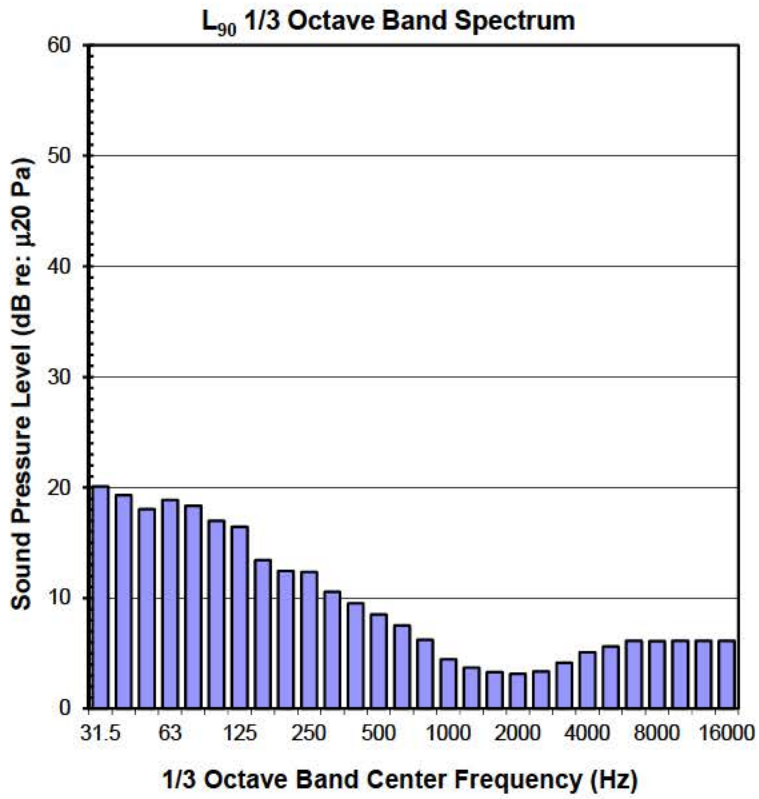
Run015

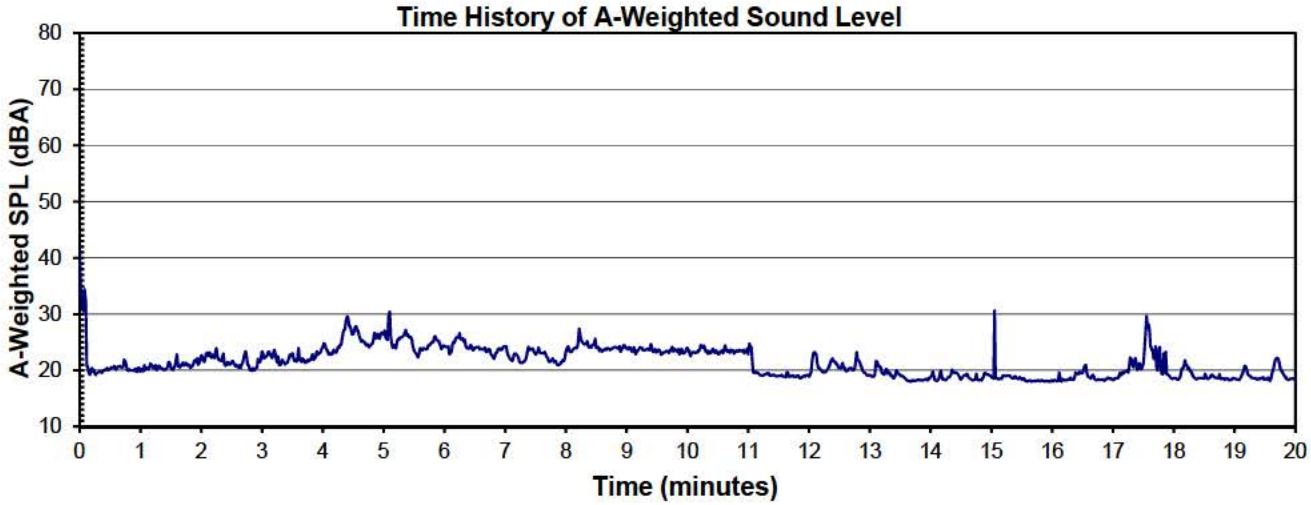
Location 8A - Winter - Night

Measured Thursday, March 27, 2014, Between 11:57 PM & 12:17 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**22.7**
L_{max}:	45.9
L_{01}:	28.4
L_{10}:	24.6
L_{50}:	21.0
L_{90}:	**18.4**
L_{99}:	18.0
L_{min}:	17.7





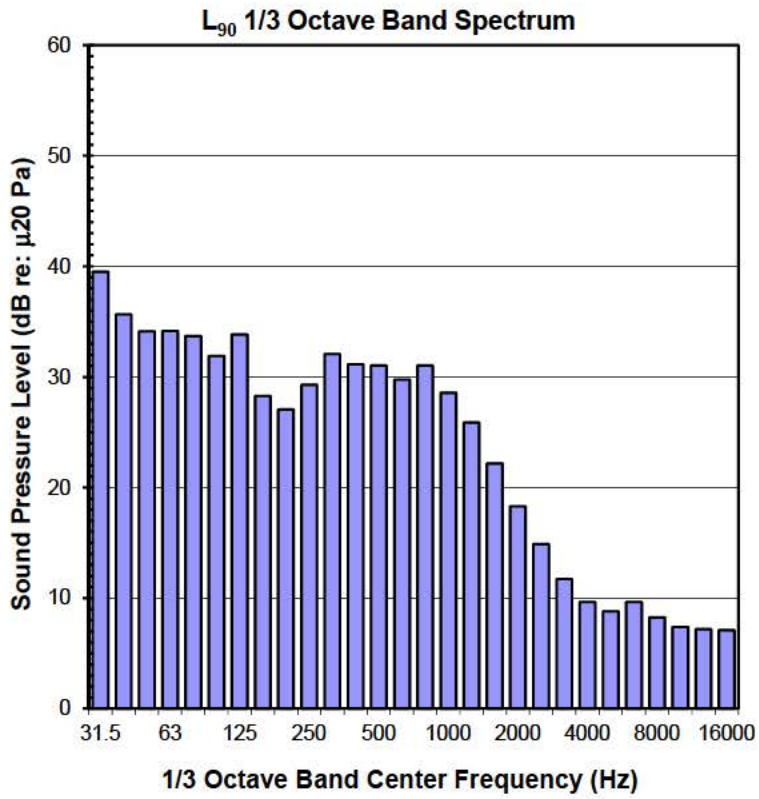
Run027

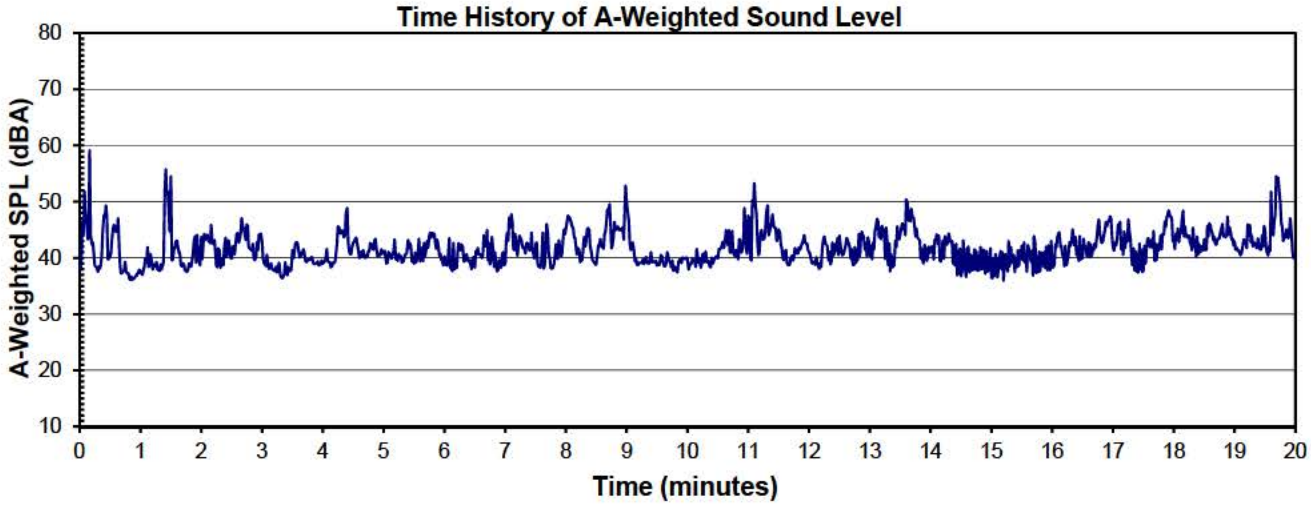
Location 9 - Winter - Day

Measured Tuesday, March 25, 2014, Between 11:10 AM & 11:30 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**43.1**
L_{max}:	66.4
L_{01}:	50.9
L_{10}:	45.6
L_{50}:	41.0
L_{90}:	**38.0**
L_{99}:	36.5
L_{min}:	35.1





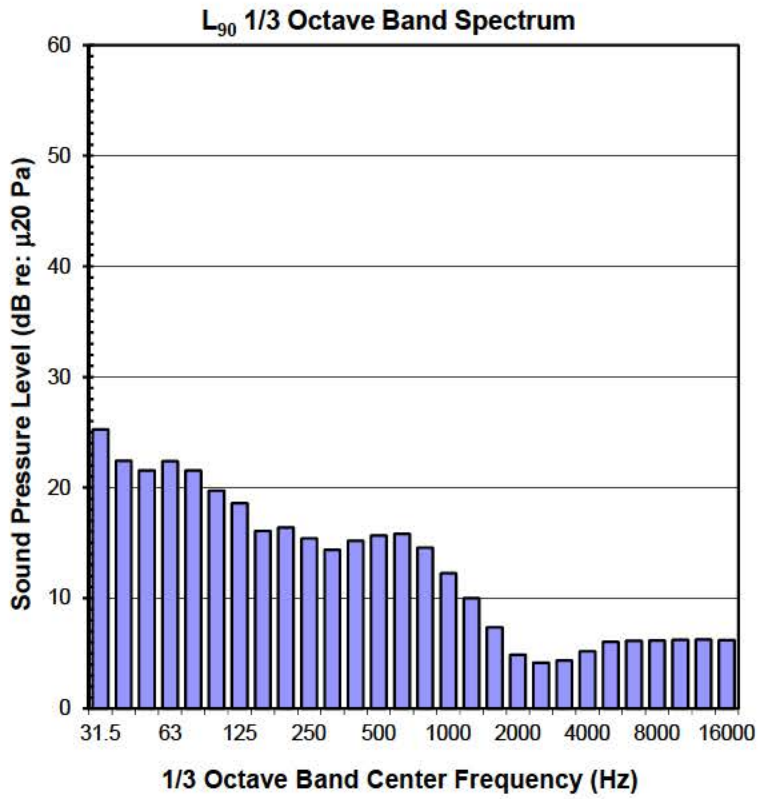
Run012

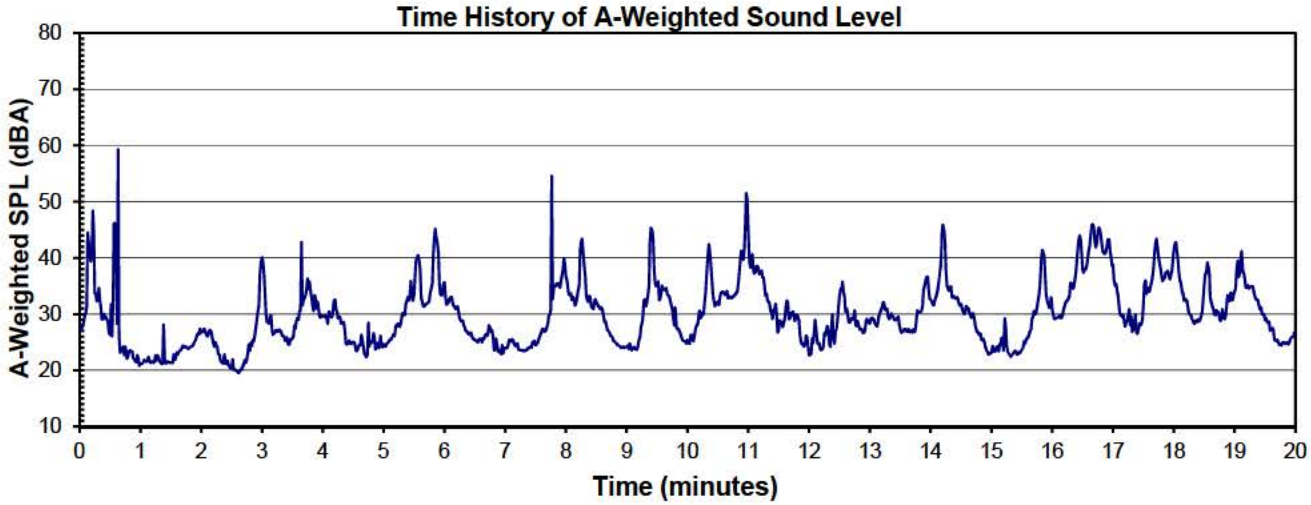
Location 9 - Winter - Night

Measured Thursday, March 27, 2014, Between 11:02 PM & 11:22 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**35.9**
L_{max}:	66.5
L_{01}:	45.3
L_{10}:	37.9
L_{50}:	29.2
L_{90}:	**23.4**
L_{99}:	20.6
L_{min}:	19.3





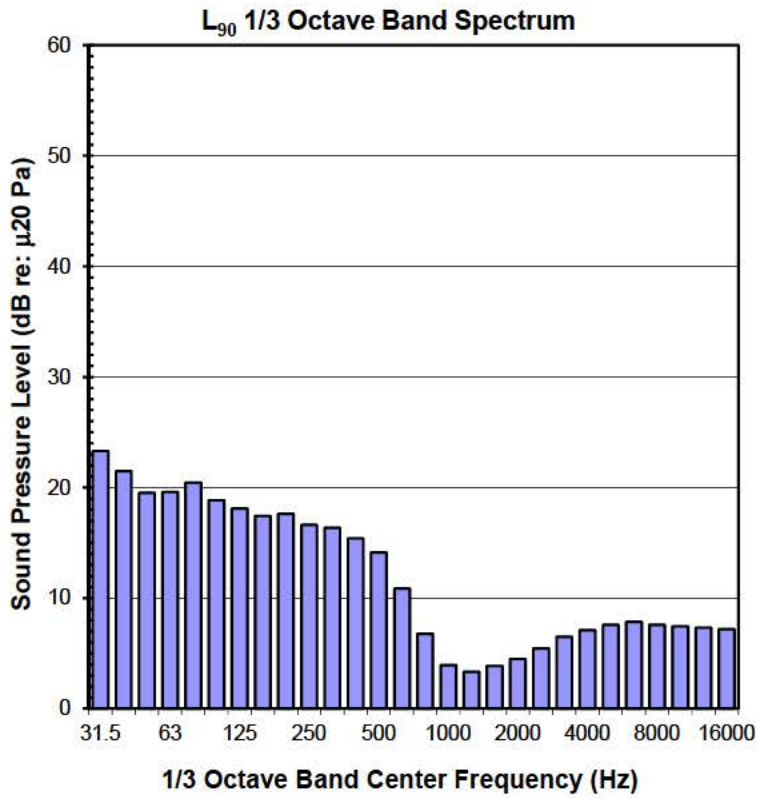
Run025

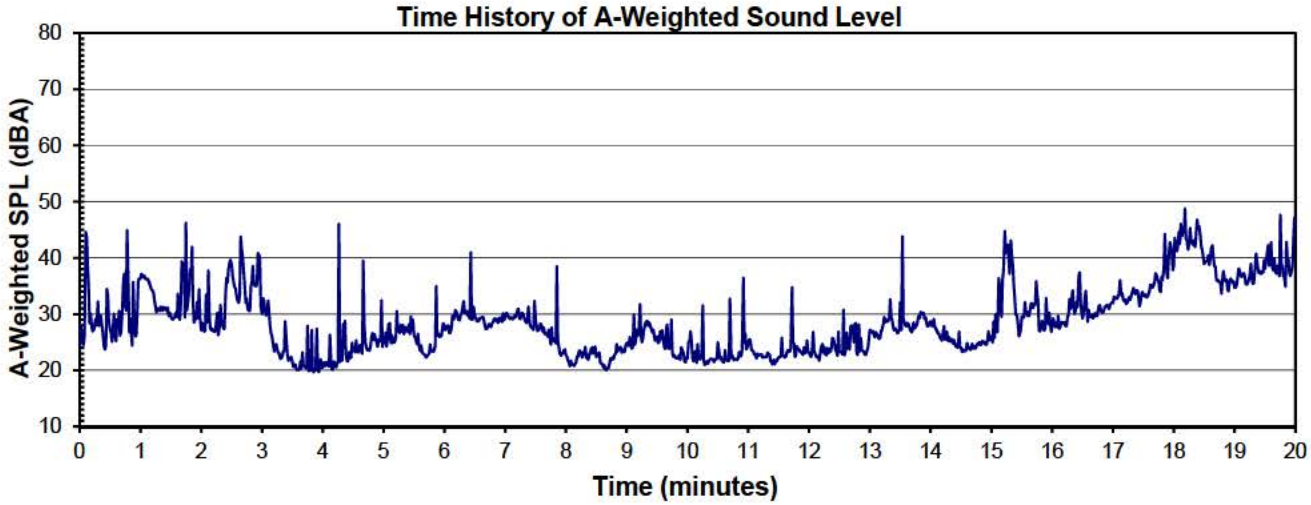
Location 10 - Winter - Day

Measured Tuesday, March 25, 2014, Between 10:30 AM & 10:50 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**33.8**
L_{max}:	54.8
L_{01}:	44.8
L_{10}:	37.3
L_{50}:	27.3
L_{90}:	**22.1**
L_{99}:	20.0
L_{min}:	19.1





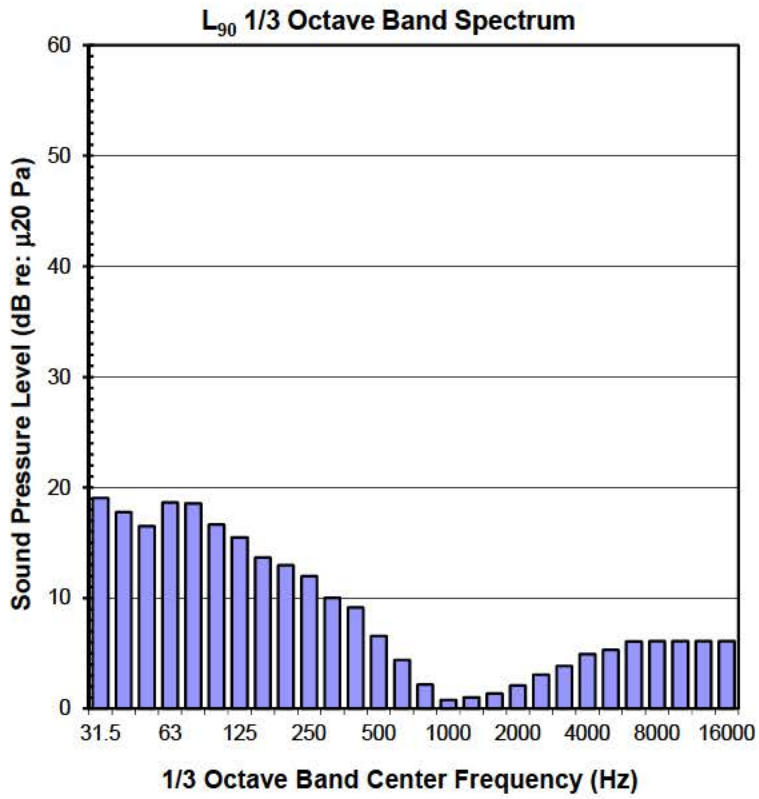
Run011

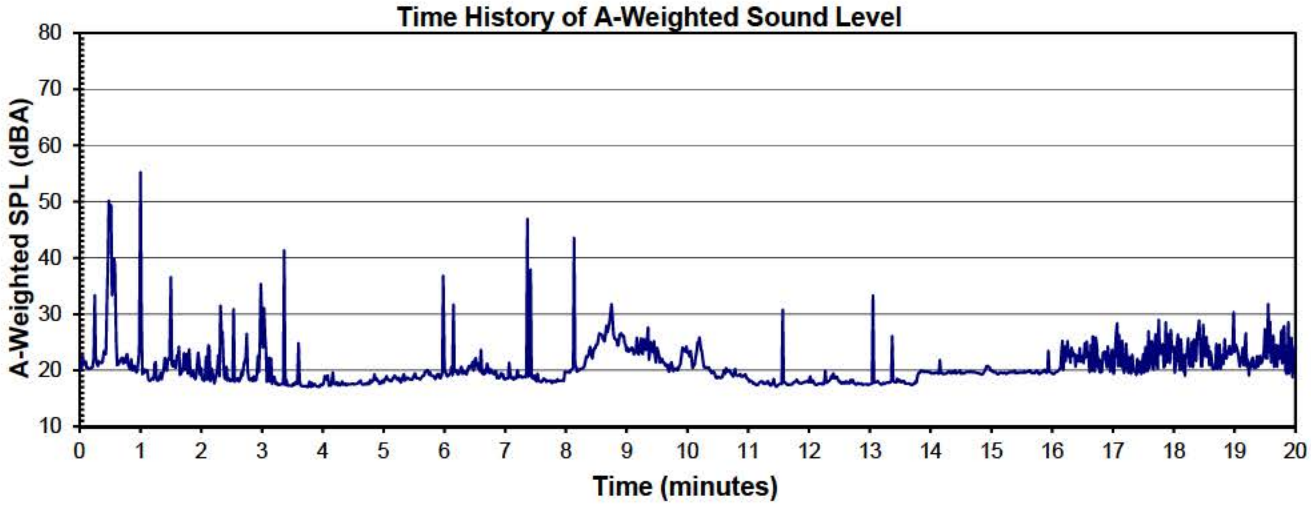
Location 10 - Winter - Night

Measured Thursday, March 27, 2014, Between 10:17 PM & 10:37 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**28.7**
L_{max}:	62.6
L_{01}:	34.1
L_{10}:	24.4
L_{50}:	19.6
L_{90}:	**17.6**
L_{99}:	17.1
L_{min}:	16.7





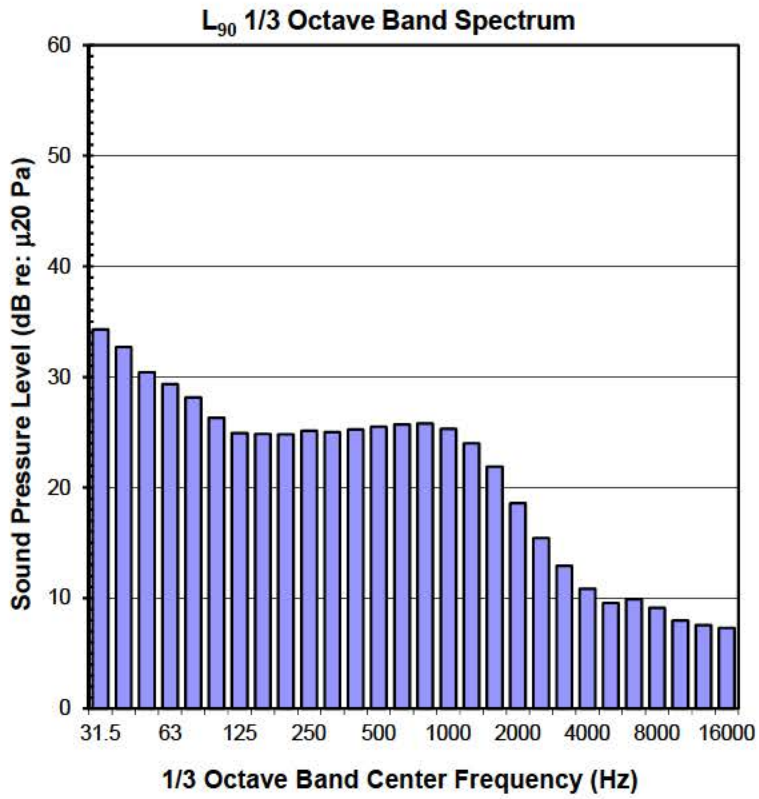
Run024

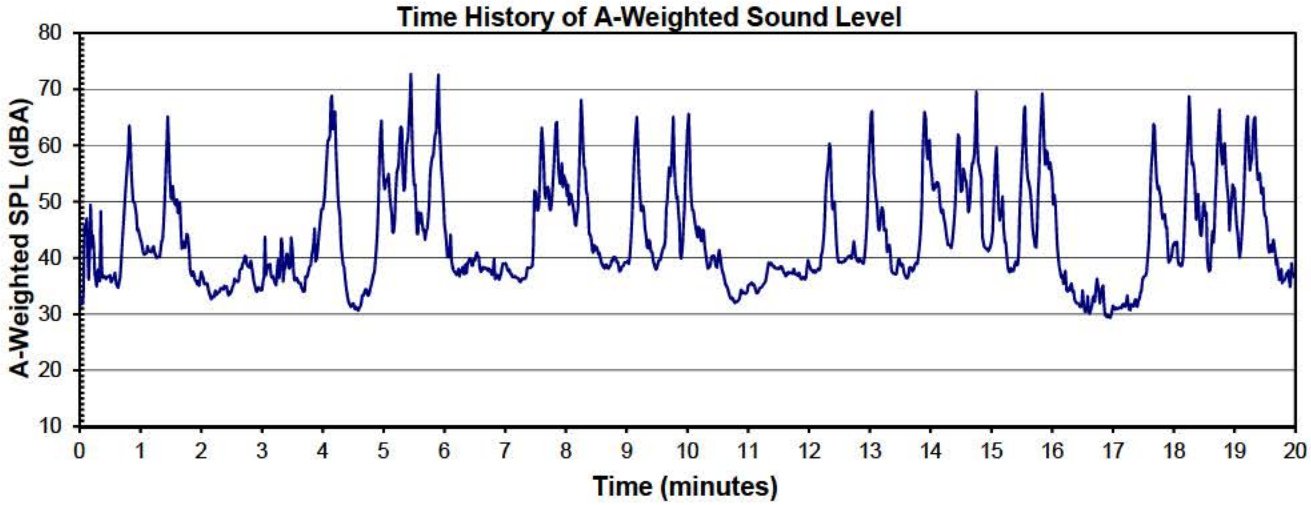
Location 11 - Winter - Day

Measured Monday, March 24, 2014, Between 3:55 PM & 4:15 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**54.5**
L_{max}:	75.2
L_{01}:	66.7
L_{10}:	57.2
L_{50}:	40.3
L_{90}:	**33.9**
L_{99}:	30.6
L_{min}:	28.8





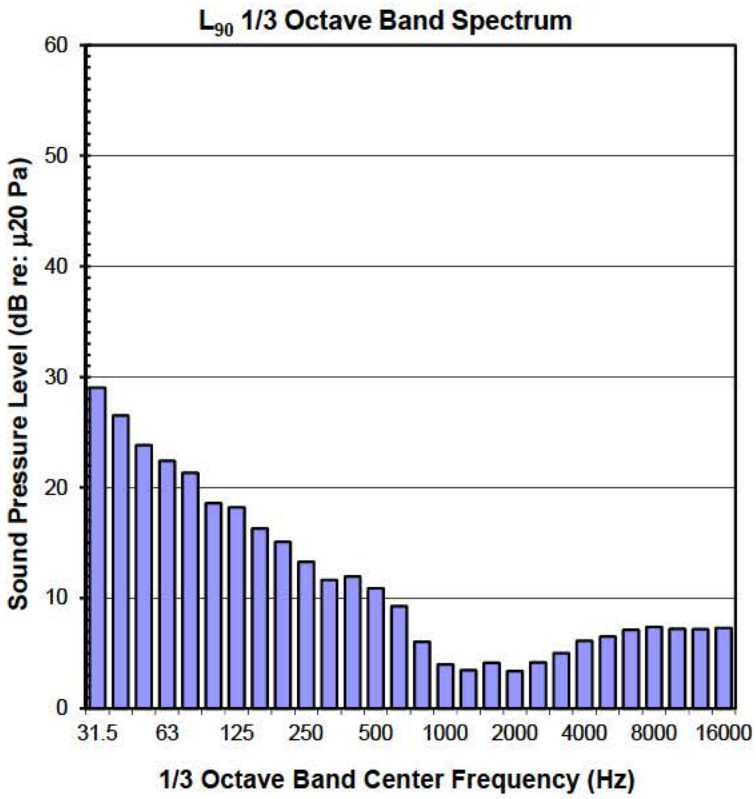
Run005

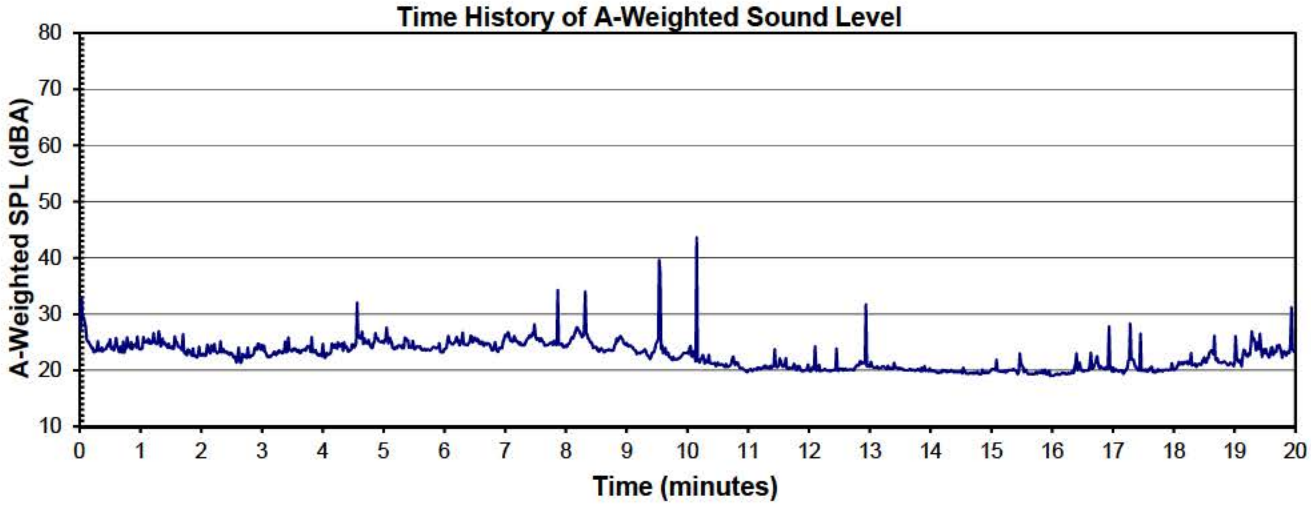
Location 11 - Winter - Night

Measured Wednesday, April 02, 2014, Between 2:23 AM & 2:43 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**23.8**
L_{max}:	52.4
L_{01}:	28.4
L_{10}:	25.2
L_{50}:	22.7
L_{90}:	**19.8**
L_{99}:	19.2
L_{min}:	18.8





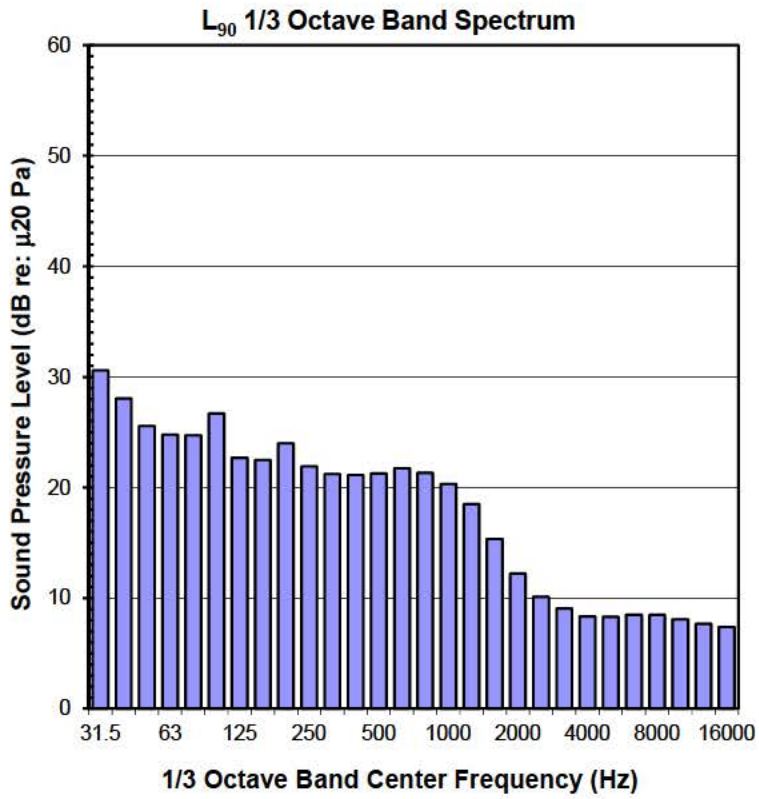
Run035

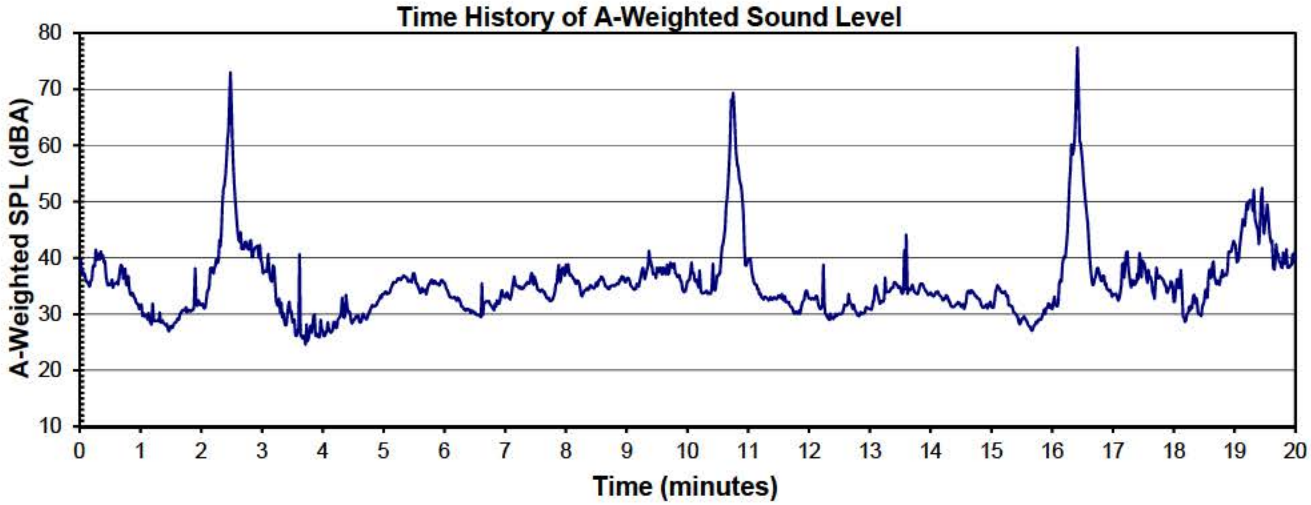
Location 12 - Winter - Day

Measured Monday, March 24, 2014, Between 3:03 PM & 3:23 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**51.2**
L_{max}:	79.5
L_{01}:	62.2
L_{10}:	41.5
L_{50}:	34.3
L_{90}:	**29.4**
L_{99}:	26.1
L_{min}:	23.9





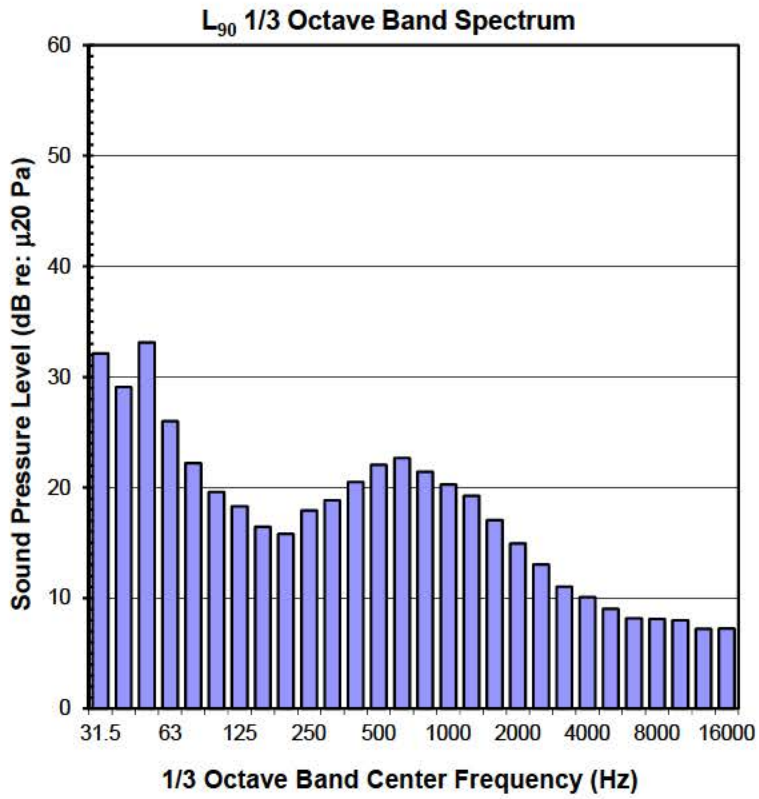
Run004

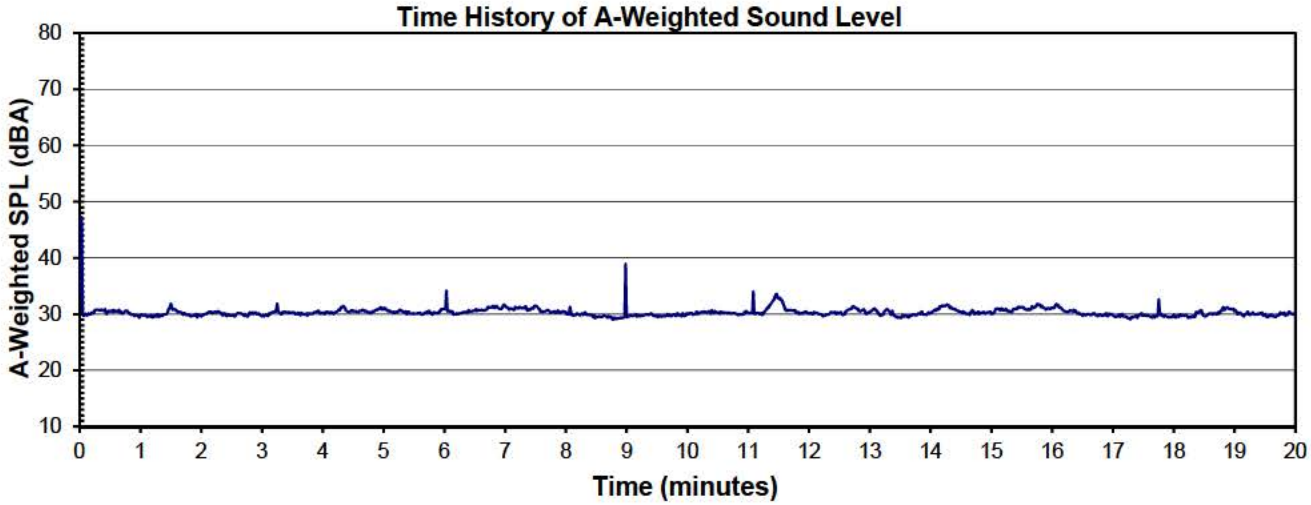
Location 12 - Winter - Night

Measured Wednesday, April 02, 2014, Between 1:34 AM & 1:54 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**30.6**
L_{max}:	54.3
L_{01}:	32.4
L_{10}:	31.1
L_{50}:	30.2
L_{90}:	**29.6**
L_{99}:	29.1
L_{min}:	28.6





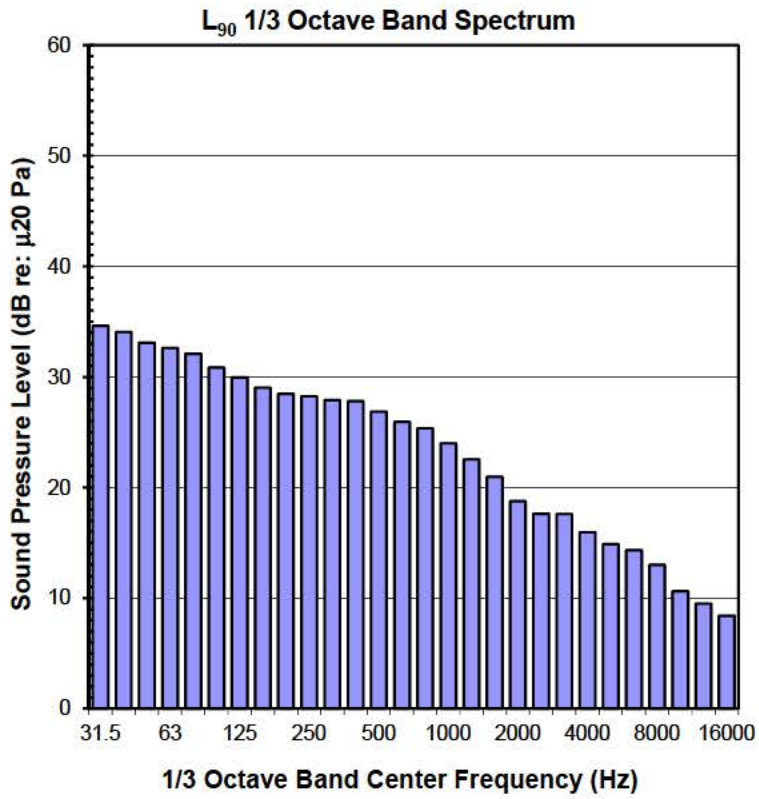
Run034

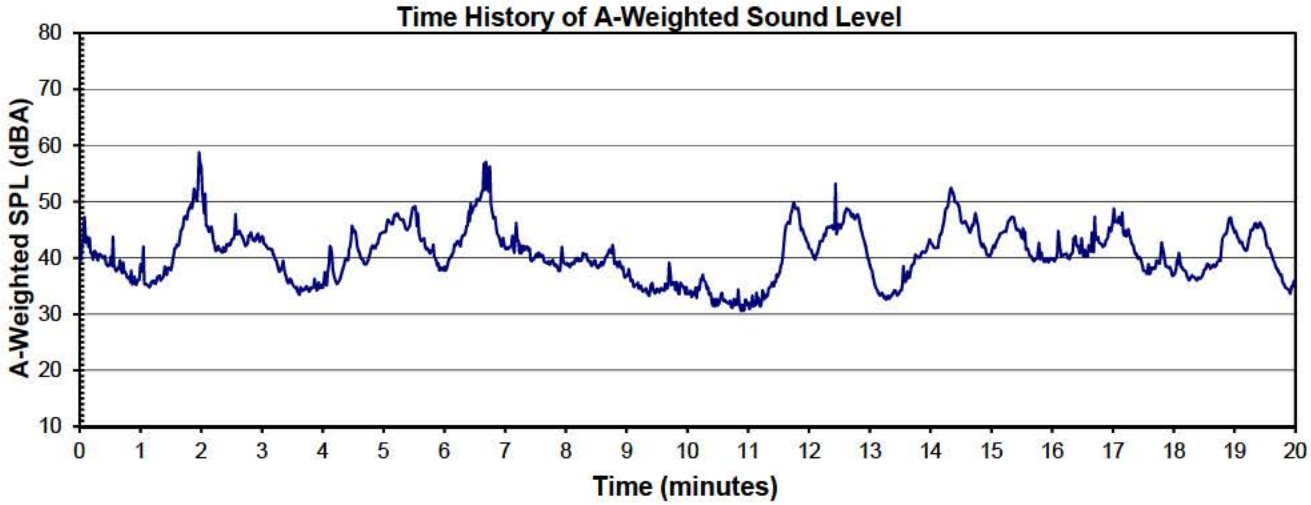
Location 13 - Winter - Day

Measured Monday, March 24, 2014, Between 1:59 PM & 2:19 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**43.6**
L_{max}:	63.3
L_{01}:	52.4
L_{10}:	46.8
L_{50}:	40.5
L_{90}:	**34.3**
L_{99}:	31.2
L_{min}:	29.8





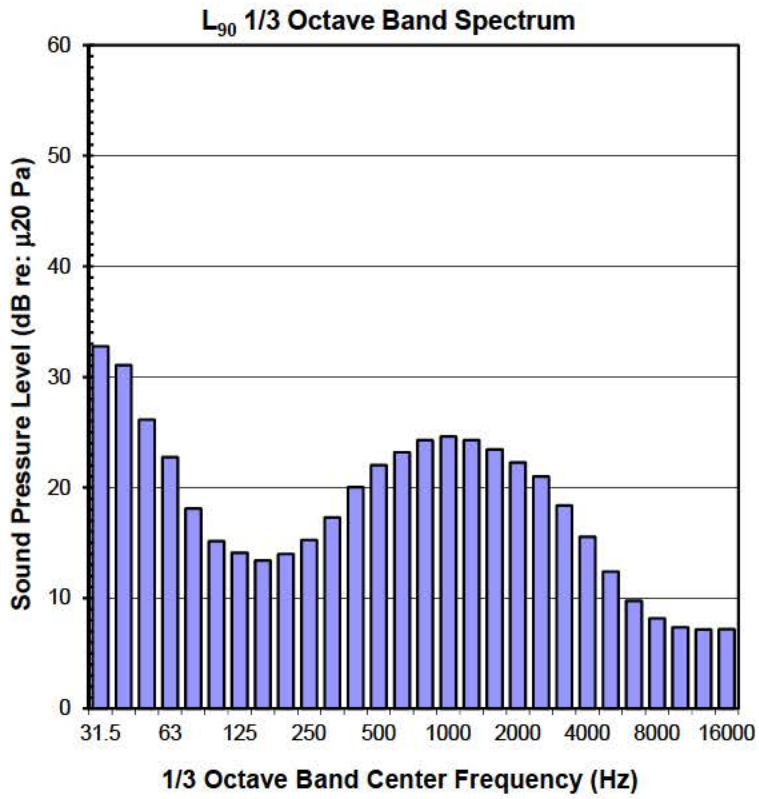
Run003

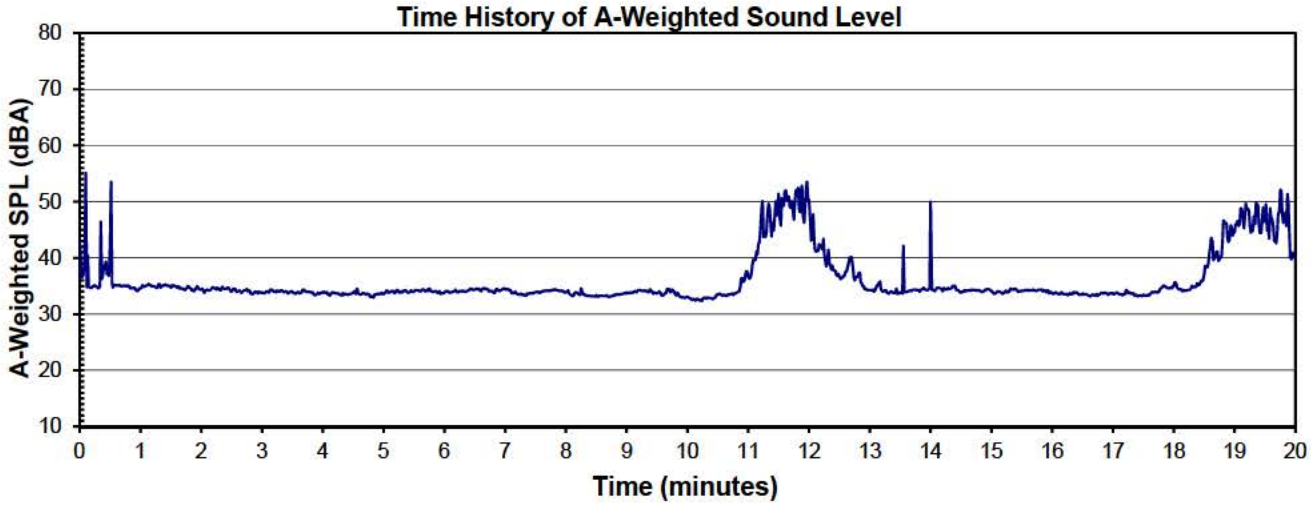
Location 13 - Winter - Night

Measured Wednesday, April 02, 2014, Between 12:37 AM & 12:57 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**40.1**
L_{max}:	62.6
L_{01}:	51.4
L_{10}:	43.2
L_{50}:	34.2
L_{90}:	**33.4**
L_{99}:	32.7
L_{min}:	32.0





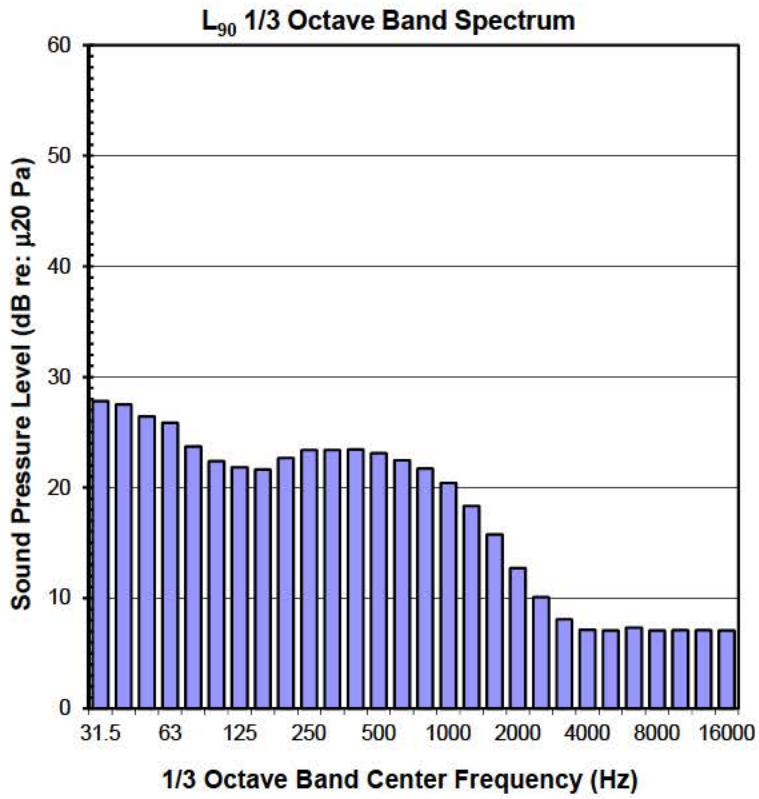
Run033

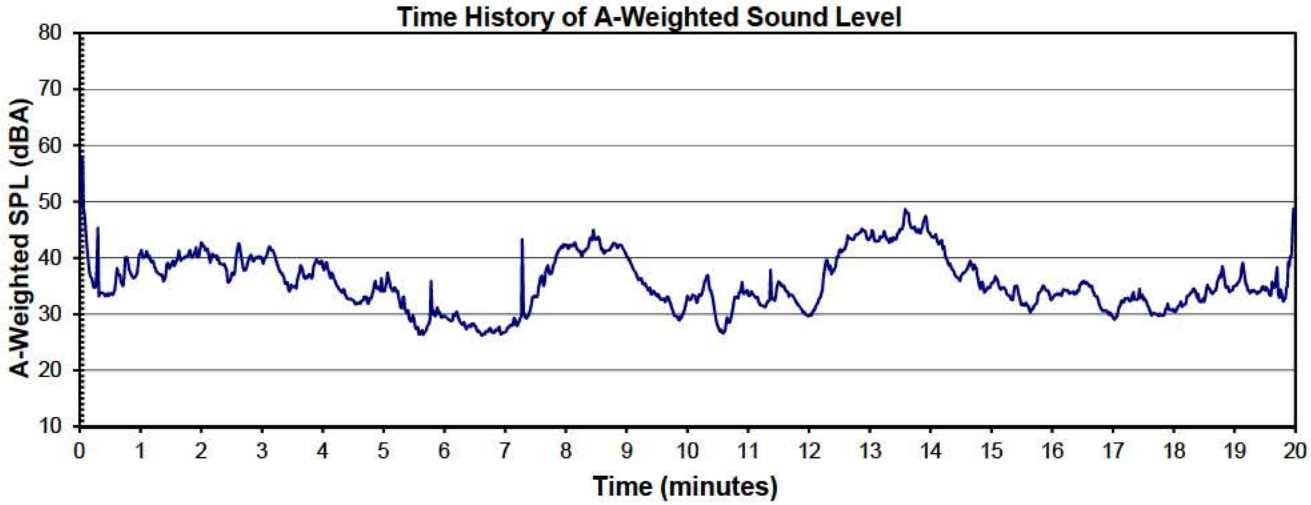
Location 14 - Winter - Day

Measured Monday, March 24, 2014, Between 12:28 PM & 12:48 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**38.9**
L_{max}:	62.3
L_{01}:	47.1
L_{10}:	42.5
L_{50}:	34.7
L_{90}:	**29.5**
L_{99}:	26.6
L_{min}:	25.7





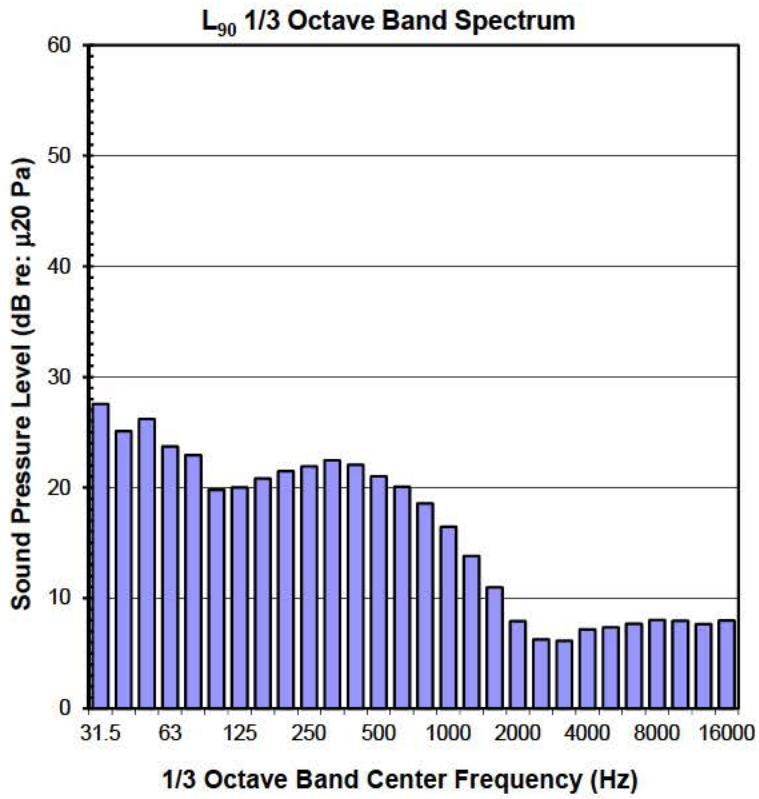
Run002

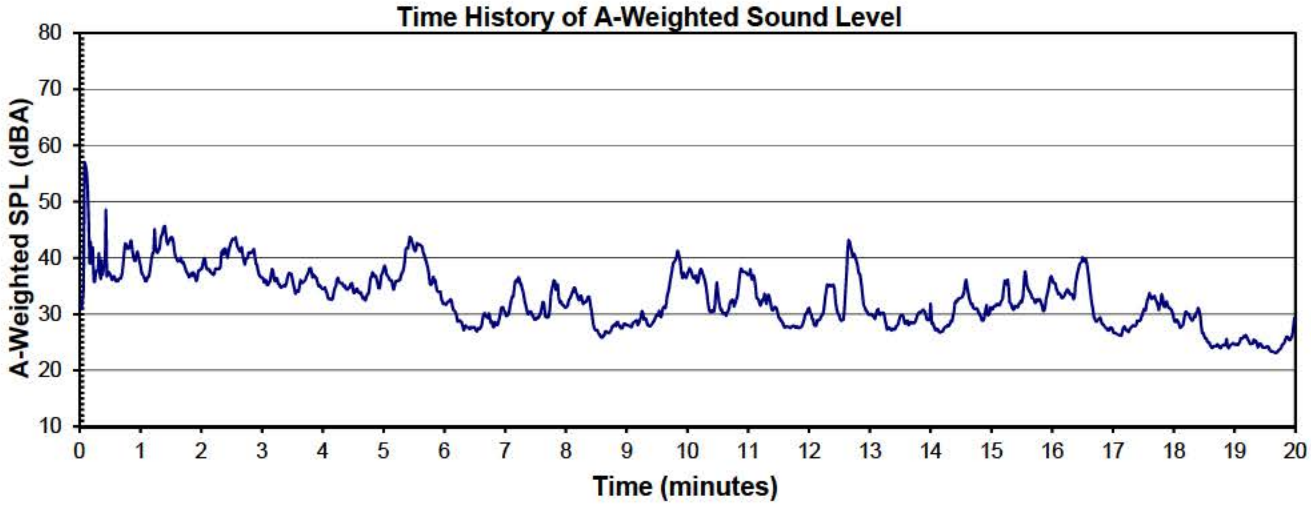
Location 14 - Winter - Night

Measured Tuesday, April 01, 2014, Between 11:17 PM & 11:37 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**36.8**
L_{max}:	61.5
L_{01}:	43.8
L_{10}:	39.6
L_{50}:	32.3
L_{90}:	**27.0**
L_{99}:	23.8
L_{min}:	22.7





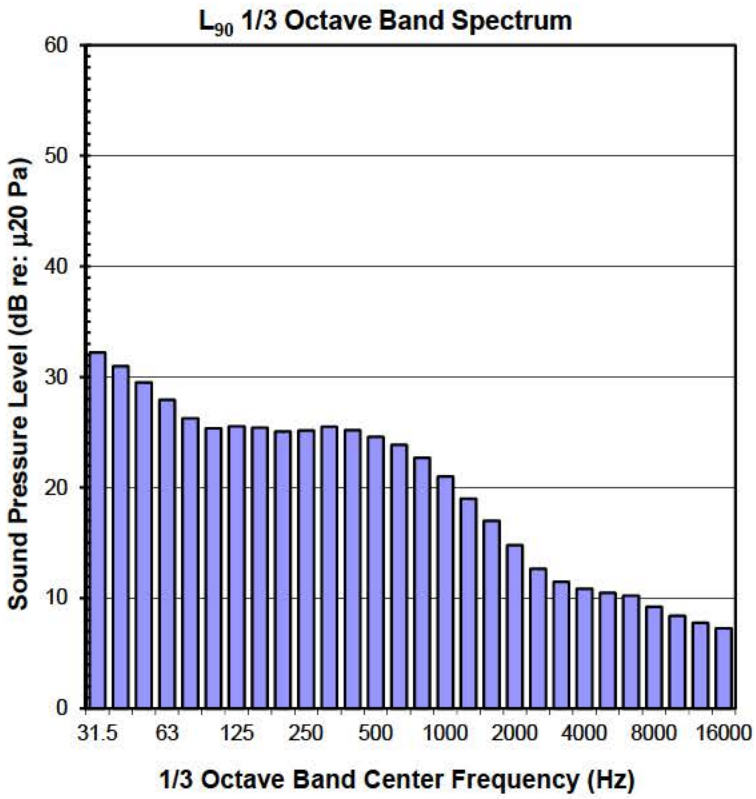
Run032

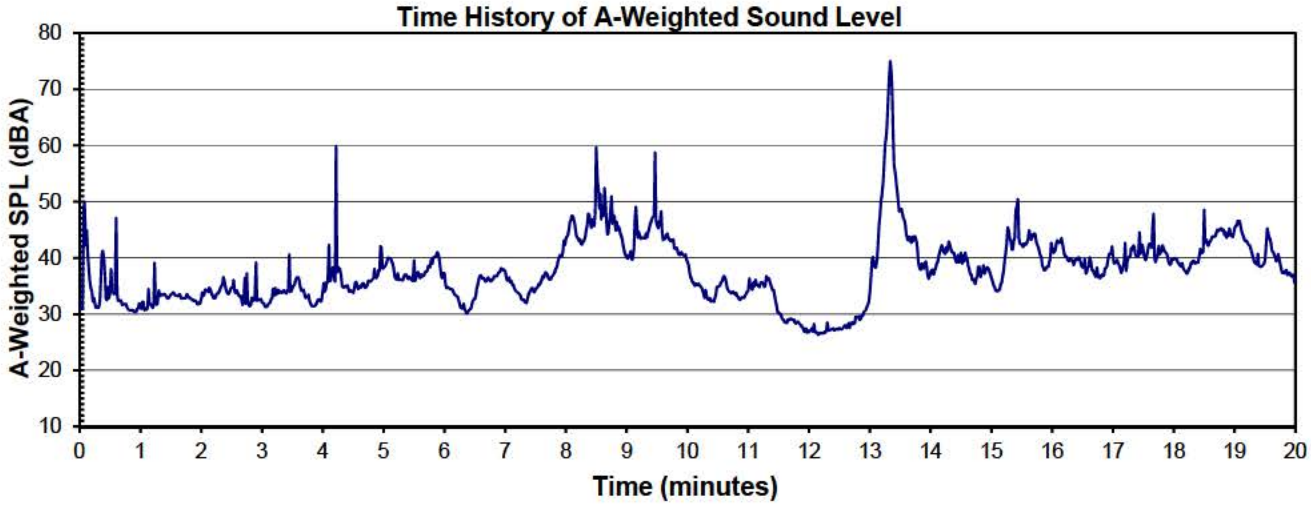
Location 15 - Winter - Day

Measured Monday, March 24, 2014, Between 11:15 AM & 11:35 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**49.6**
L_{max}:	76.9
L_{01}:	56.2
L_{10}:	44.3
L_{50}:	36.9
L_{90}:	**31.2**
L_{99}:	26.8
L_{min}:	25.7





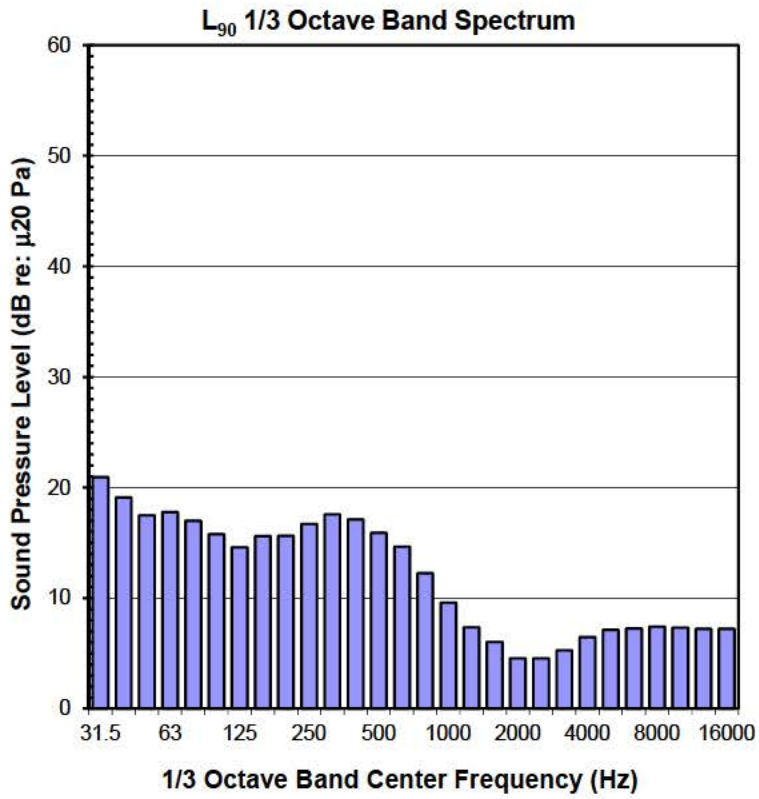
Run001

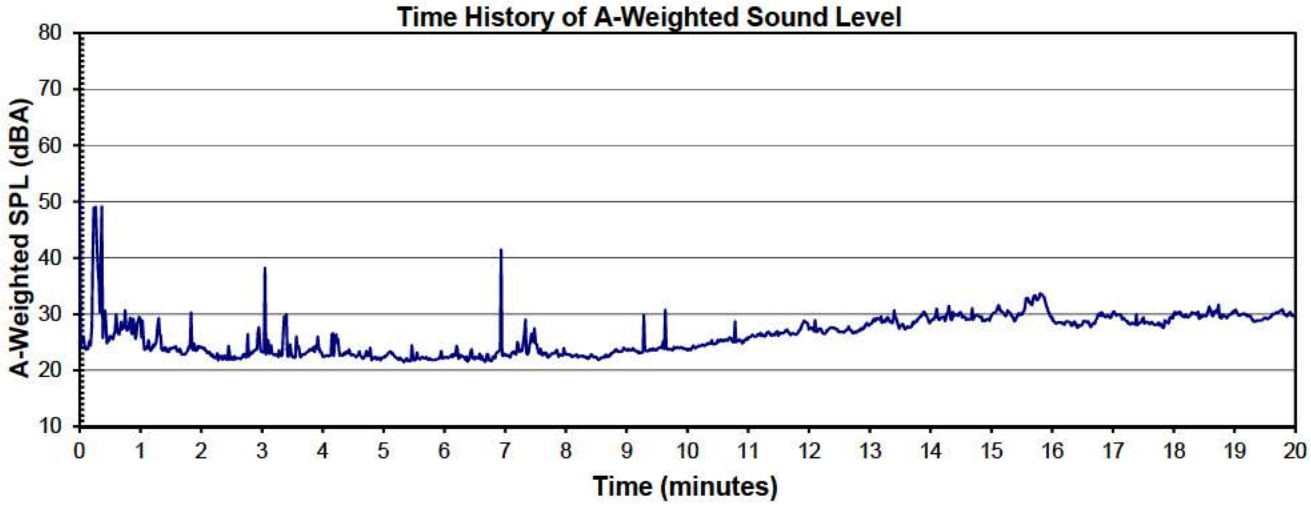
Location 15 - Winter - Night

Measured Tuesday, April 01, 2014, Between 10:21 PM & 10:41 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**30.0**
L_{max}:	59.6
L_{01}:	33.6
L_{10}:	30.1
L_{50}:	26.0
L_{90}:	**22.3**
L_{99}:	21.6
L_{min}:	21.0





Run031

Annex C

Intermittent Samples
Summer

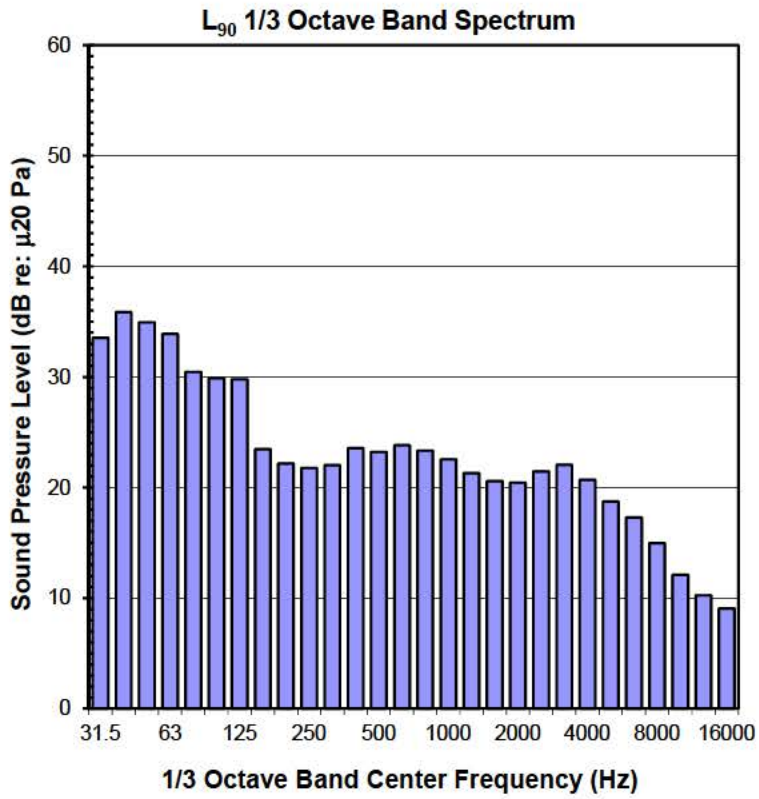
cta

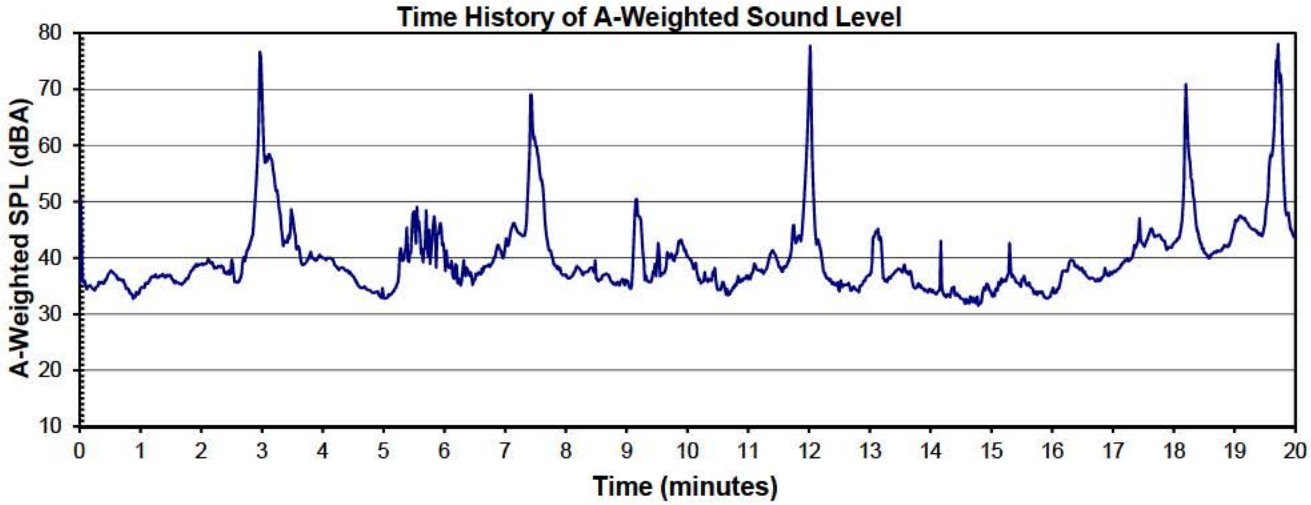
Location 1 - Summer - Day

Measured Wednesday, July 23, 2014, Between 12:03 PM & 12:23 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**55.6**
L_{max}:	79.7
L_{01}:	69.9
L_{10}:	46.6
L_{50}:	37.8
L_{90}:	**34.2**
L_{99}:	32.2
L_{min}:	31.0





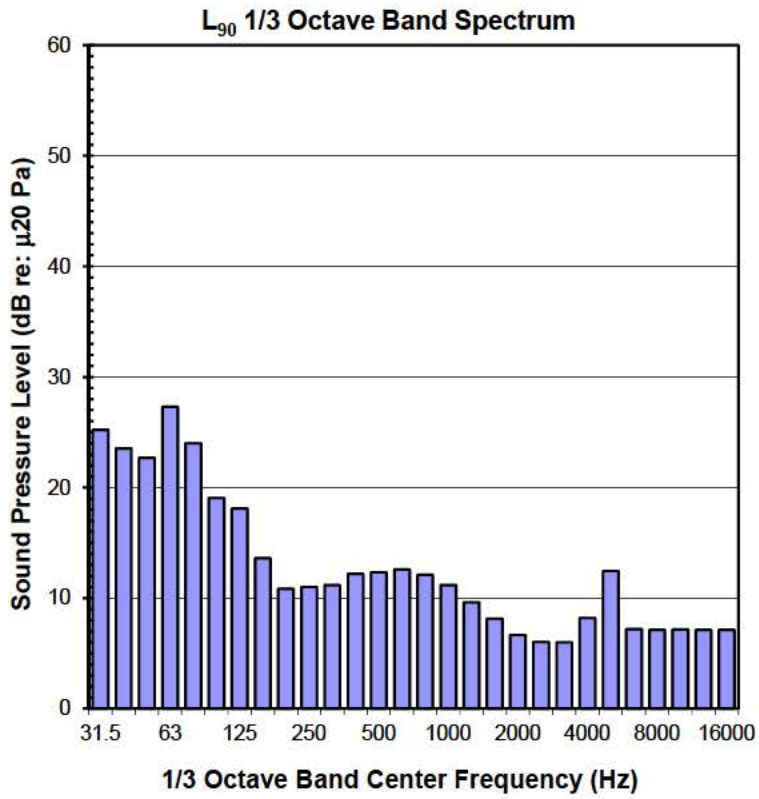
Run029

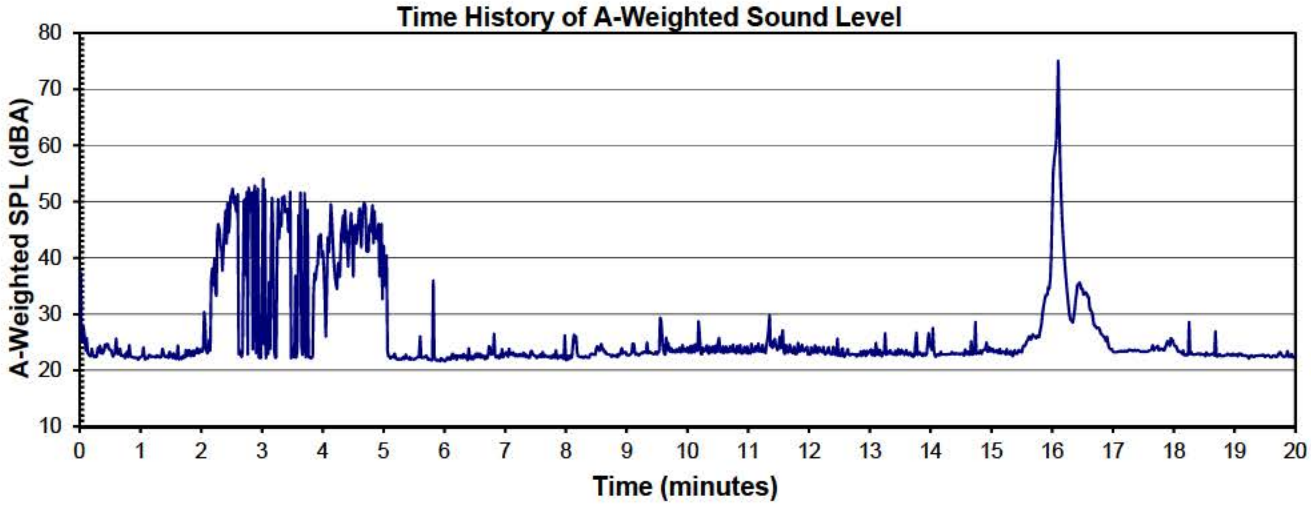
Location 1 - Summer - Night

Measured Friday, July 25, 2014, Between 2:43 AM & 3:03 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**46.3**
L_{max}:	76.4
L_{01}:	53.8
L_{10}:	37.3
L_{50}:	23.2
L_{90}:	**22.2**
L_{99}:	21.7
L_{min}:	21.2





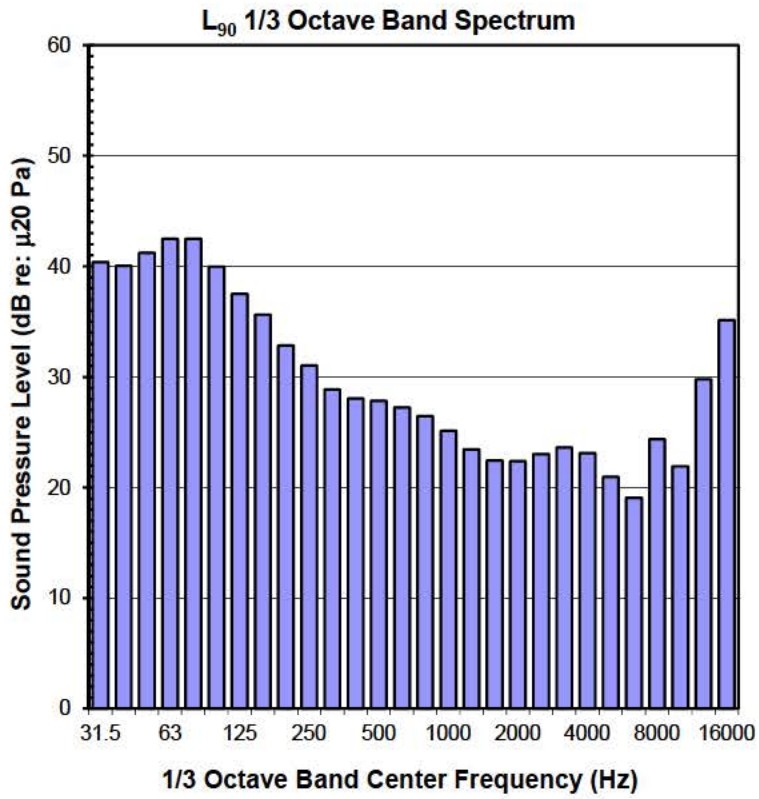
Run034

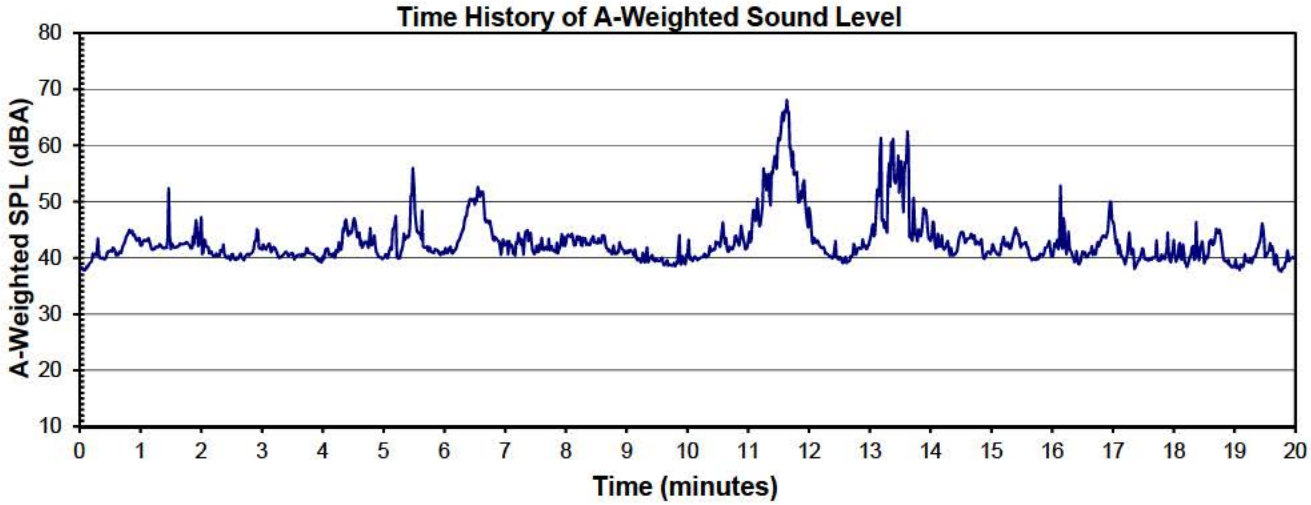
Location 2 - Summer - Day

Measured Wednesday, July 23, 2014, Between 11:14 AM & 11:34 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**48.4**
L_{max}:	70.5
L_{01}:	61.6
L_{10}:	47.0
L_{50}:	41.7
L_{90}:	**39.5**
L_{99}:	38.1
L_{min}:	37.0





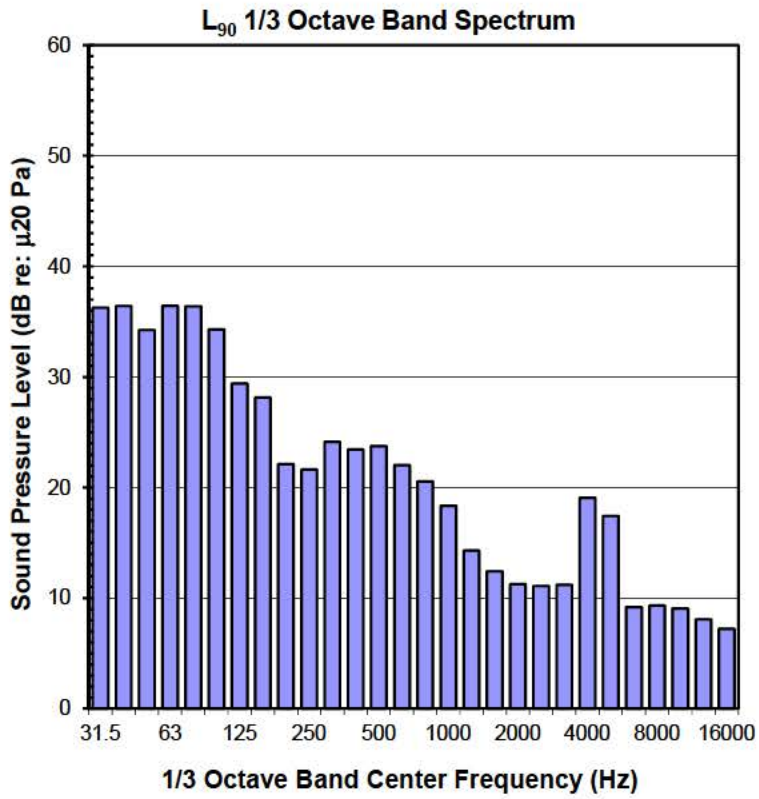
Run028

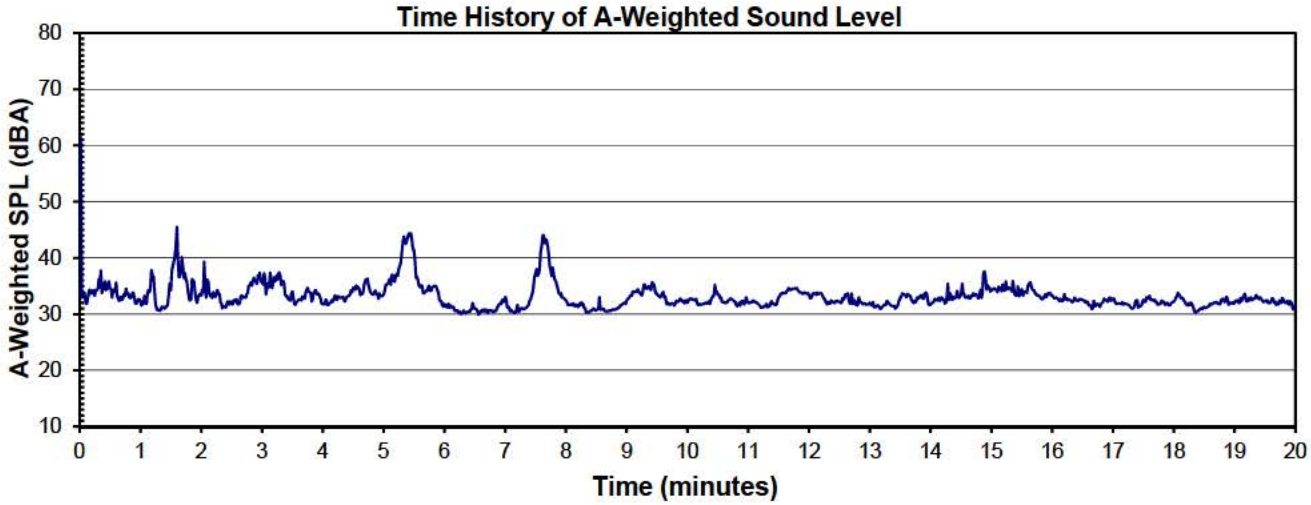
Location 2 - Summer - Night

Measured Friday, July 25, 2014, Between 1:55 AM & 2:15 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**36.2**
L_{max}:	70.3
L_{01}:	43.2
L_{10}:	35.5
L_{50}:	32.6
L_{90}:	**31.1**
L_{99}:	30.2
L_{min}:	29.0





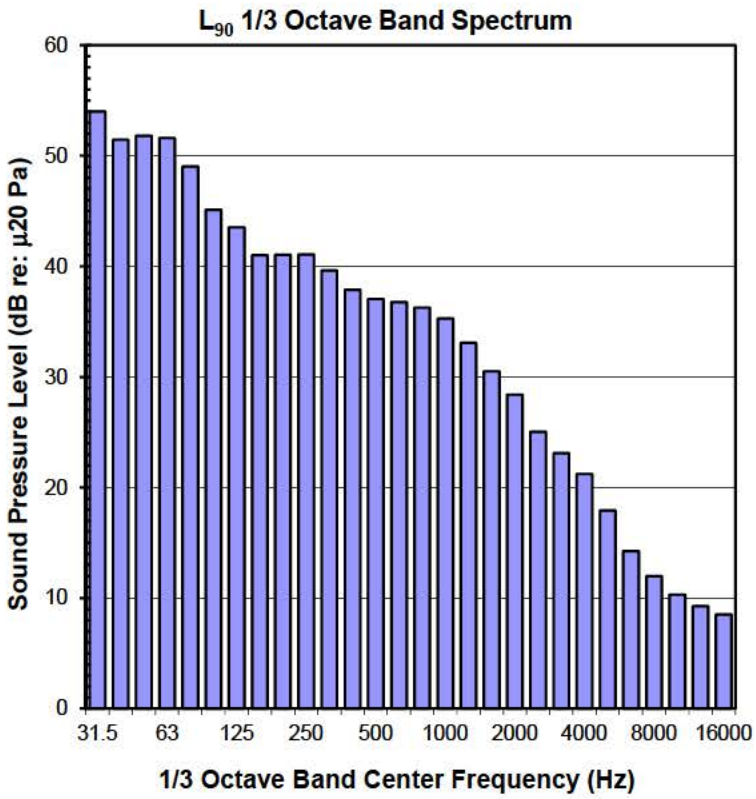
Run033

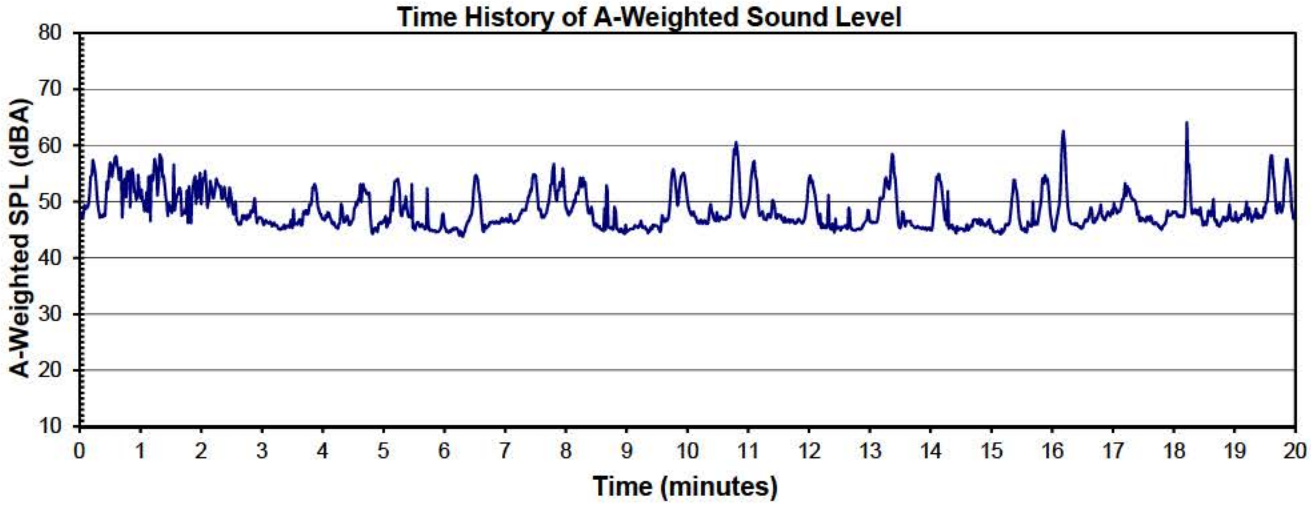
Location 3 - Summer - Day

Measured Wednesday, July 23, 2014, Between 10:45 AM & 11:05 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**50.2**
L_{max}:	70.6
L_{01}:	58.5
L_{10}:	53.7
L_{50}:	47.2
L_{90}:	**45.1**
L_{99}:	44.3
L_{min}:	43.3





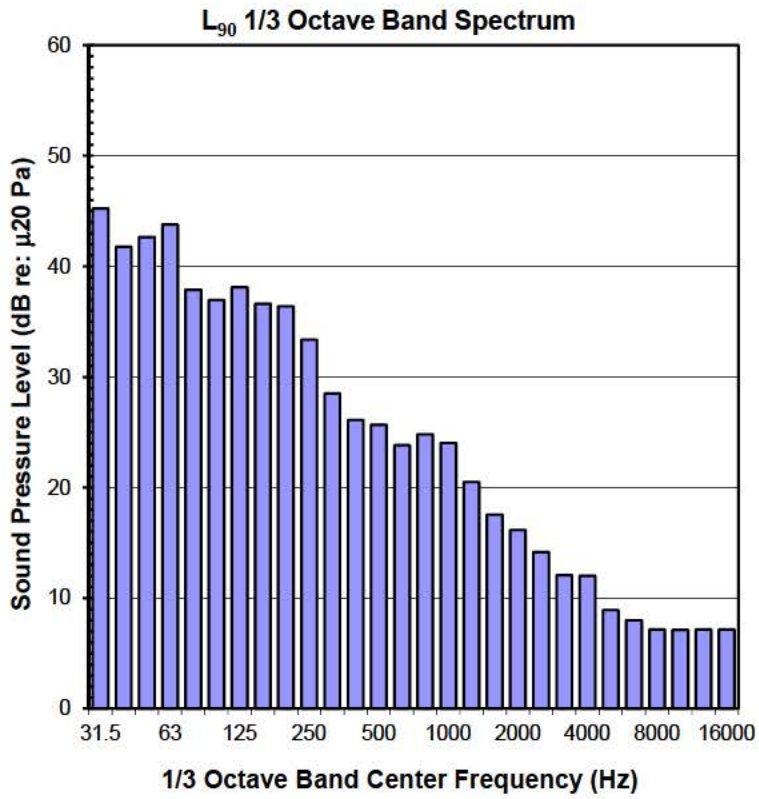
Run027

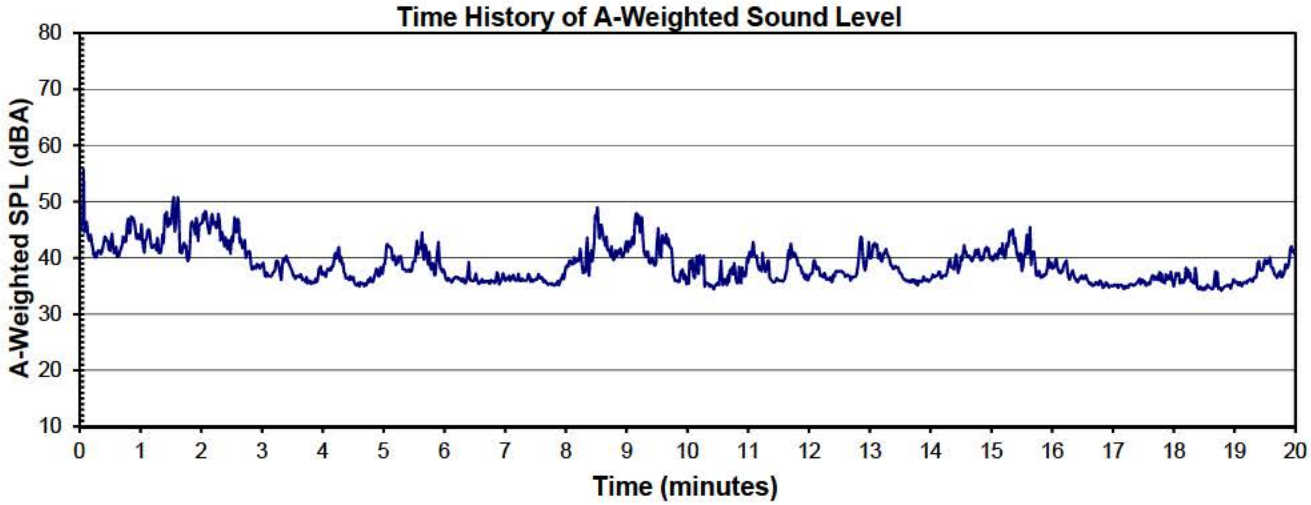
Location 3 - Summer - Night

Measured Friday, July 25, 2014, Between 1:24 AM & 1:44 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**40.4**
L_{max}:	62.5
L_{01}:	48.2
L_{10}:	43.5
L_{50}:	37.8
L_{90}:	**35.4**
L_{99}:	34.4
L_{min}:	33.5





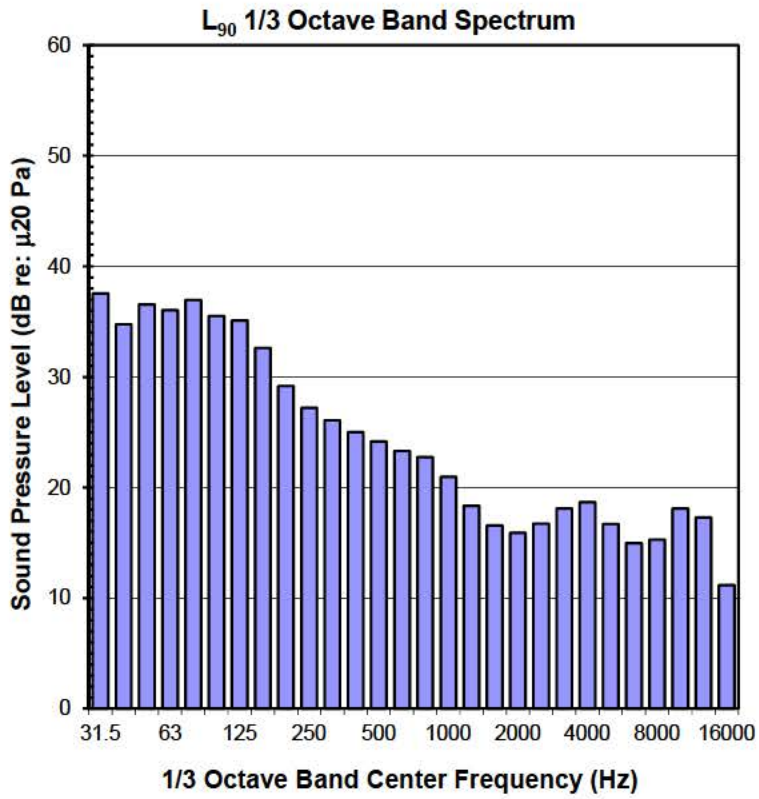
Run032

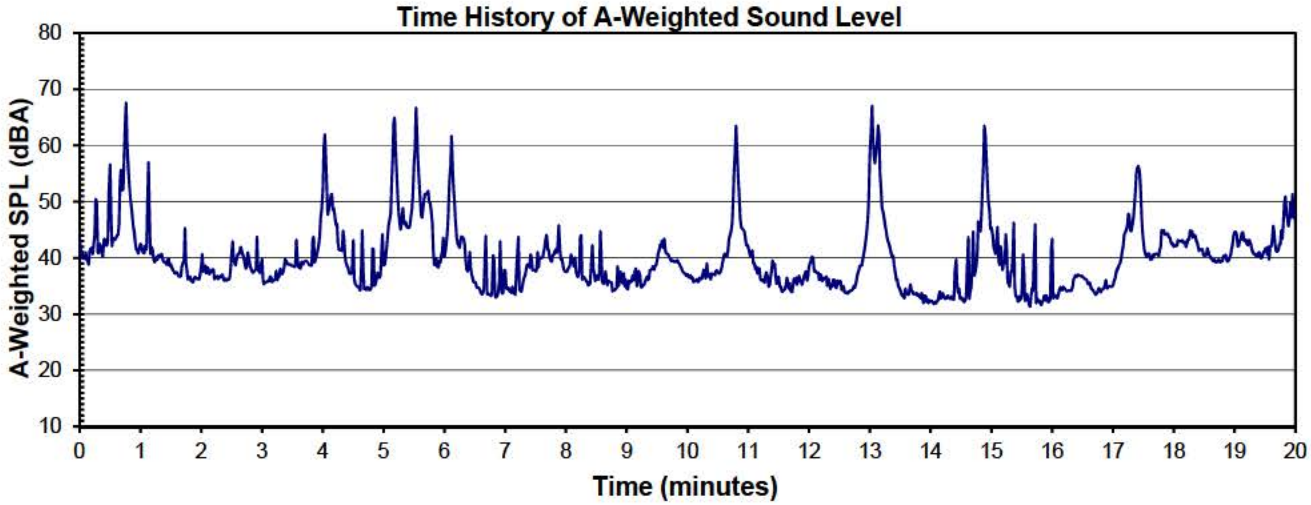
Location 4 - Summer - Day

Measured Wednesday, July 23, 2014, Between 10:07 AM & 10:27 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**48.1**
L_{max}:	70.2
L_{01}:	61.5
L_{10}:	47.2
L_{50}:	38.7
L_{90}:	**33.9**
L_{99}:	31.9
L_{min}:	30.7





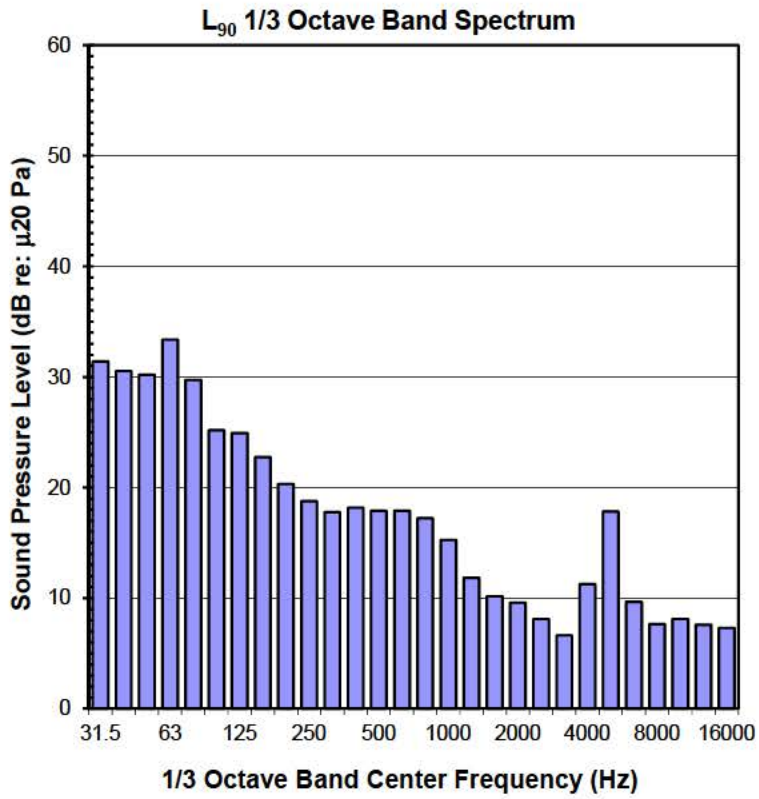
Run026

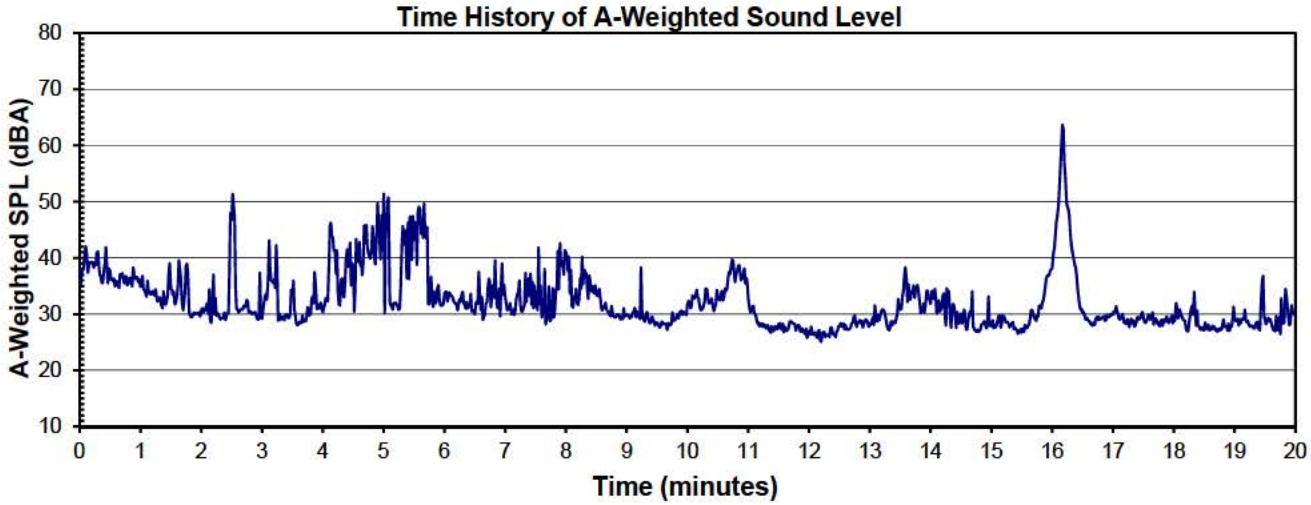
Location 4 - Summer - Night

Measured Friday, July 25, 2014, Between 12:48 AM & 1:08 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**39.9**
L_{max}:	65.8
L_{01}:	50.2
L_{10}:	38.7
L_{50}:	30.6
L_{90}:	**27.5**
L_{99}:	26.1
L_{min}:	24.7





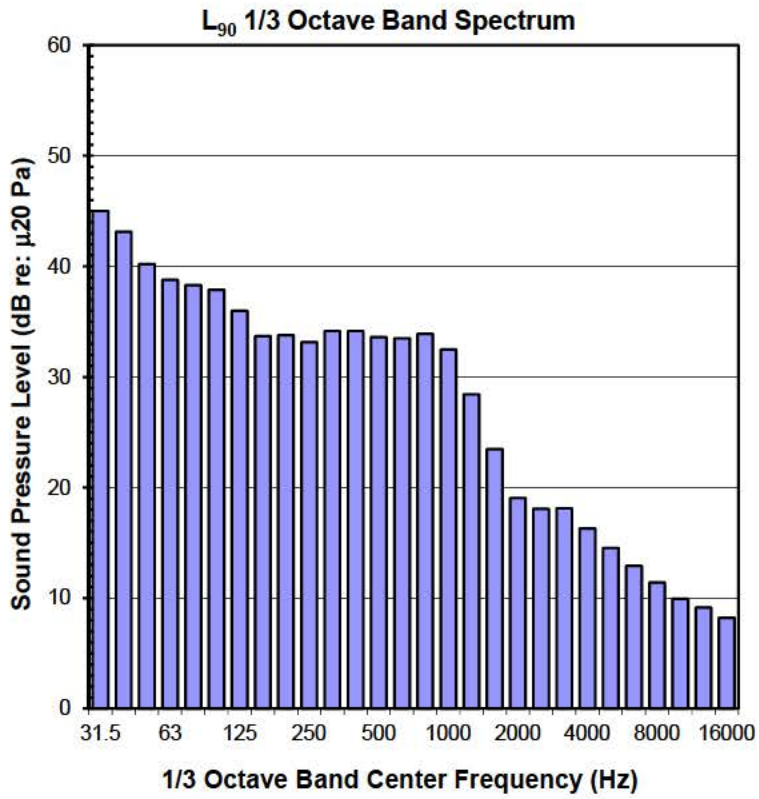
Run031

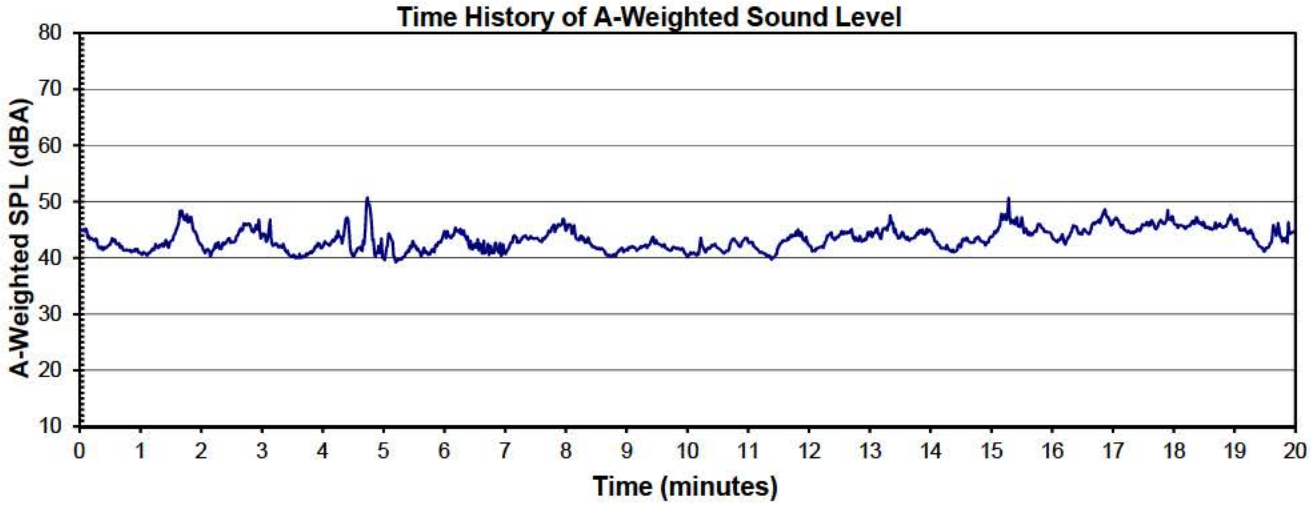
Location 5 - Summer - Day

Measured Wednesday, July 23, 2014, Between 9:36 AM & 9:56 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**43.9**
L_{max}:	52.1
L_{01}:	48.2
L_{10}:	46.1
L_{50}:	43.2
L_{90}:	**40.9**
L_{99}:	39.9
L_{min}:	38.4





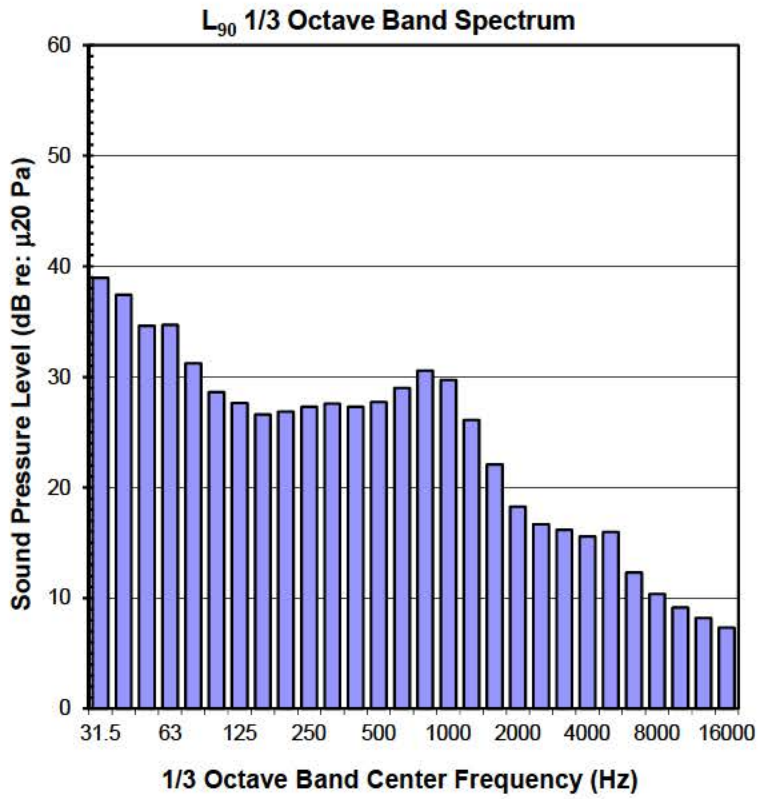
Run025

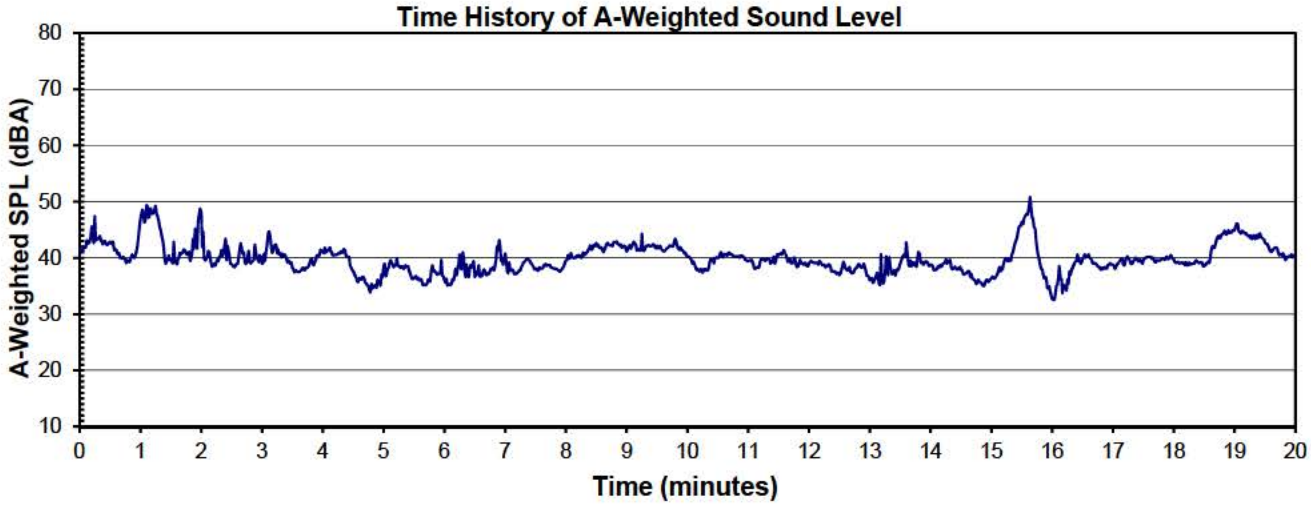
Location 5 - Summer - Night

Measured Friday, July 25, 2014, Between 12:12 AM & 12:32 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**40.8**
L_{max}:	53.2
L_{01}:	48.2
L_{10}:	43.1
L_{50}:	39.5
L_{90}:	**36.6**
L_{99}:	34.2
L_{min}:	32.0





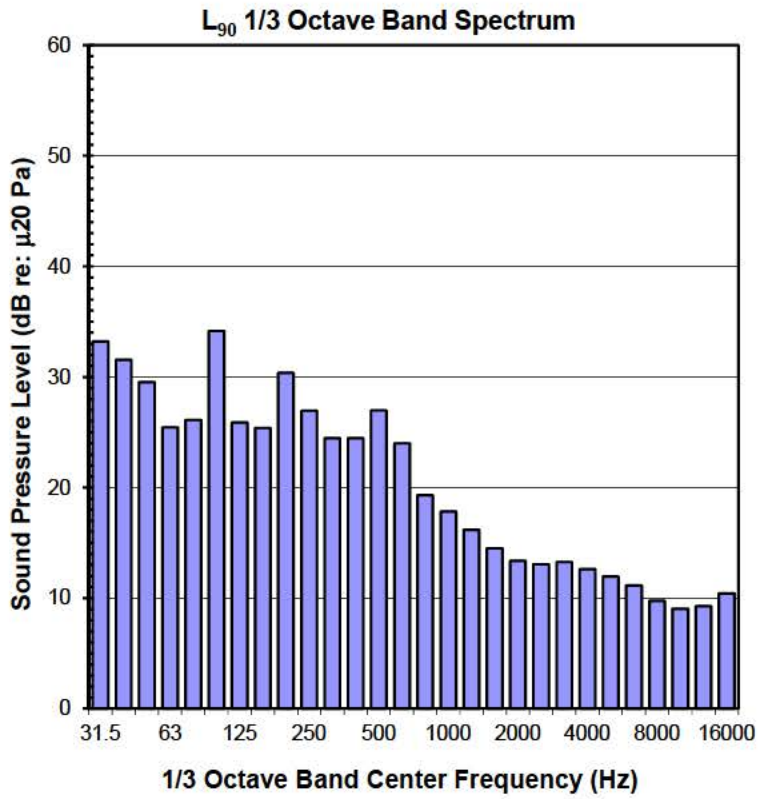
Run030

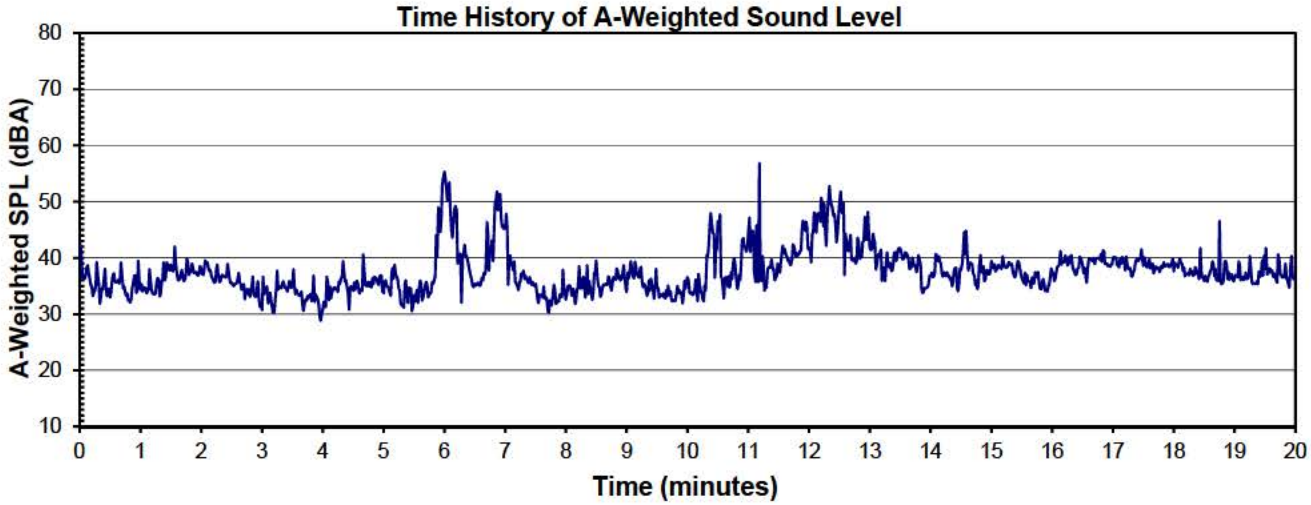
Location 6 - Summer - Day

Measured Tuesday, July 22, 2014, Between 12:10 PM & 12:30 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**40.4**
L_{max}:	65.5
L_{01}:	51.1
L_{10}:	41.8
L_{50}:	36.8
L_{90}:	**33.3**
L_{99}:	30.6
L_{min}:	28.0





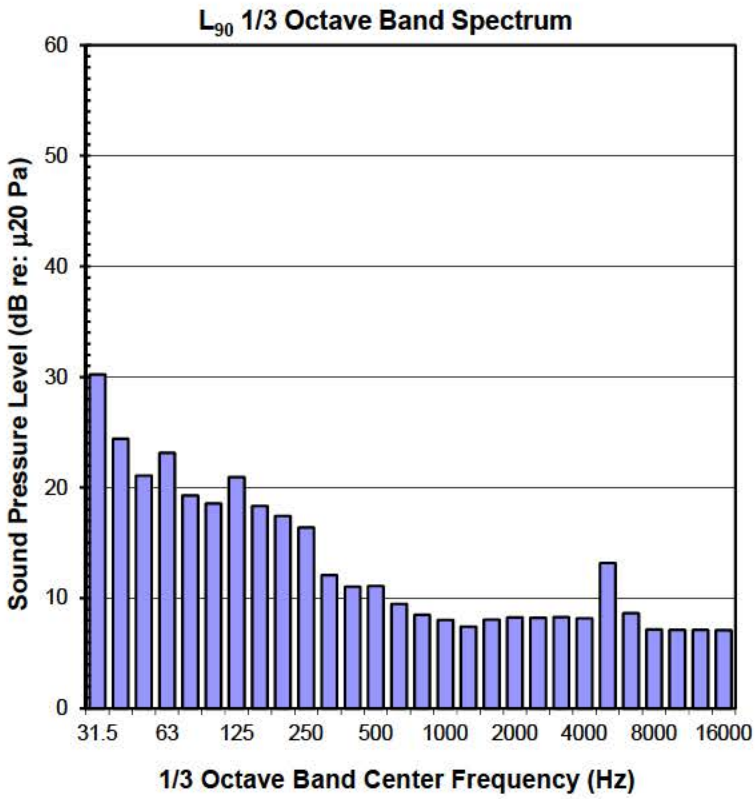
Run016

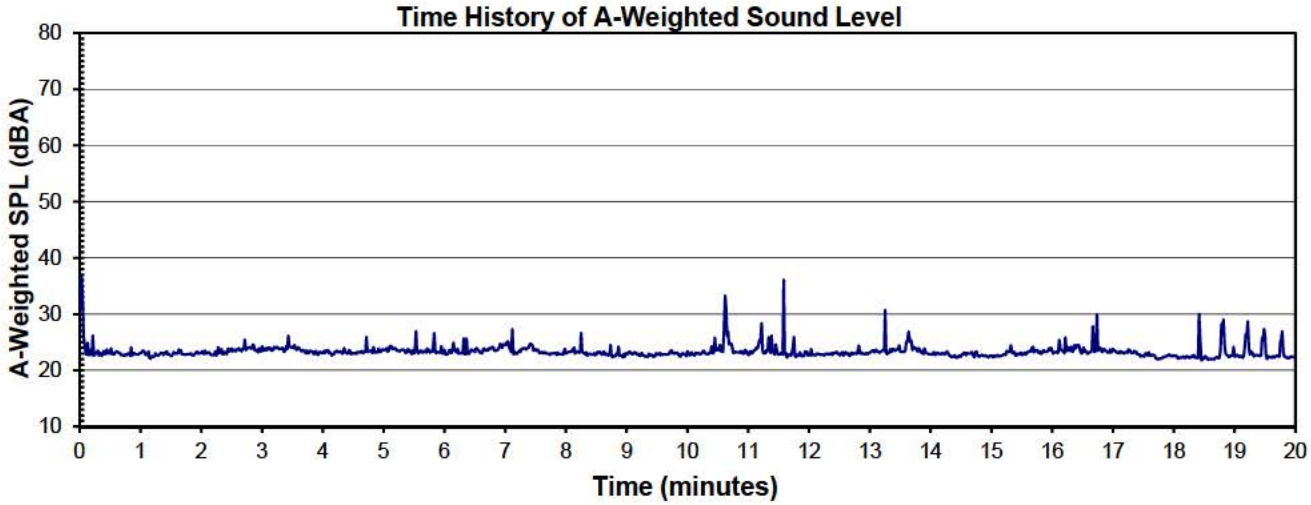
Location 6 - Summer - Night

Measured Wednesday, July 23, 2014, Between 1:08 AM & 1:28 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**23.7**
L_{max}:	43.0
L_{01}:	28.7
L_{10}:	24.1
L_{50}:	23.1
L_{90}:	**22.5**
L_{99}:	22.0
L_{min}:	21.5





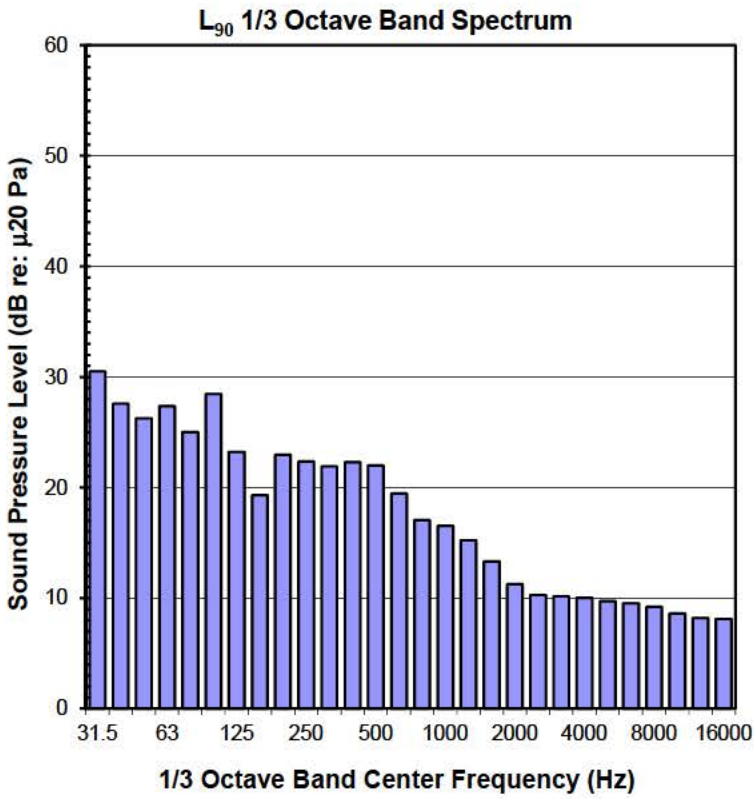
Run023

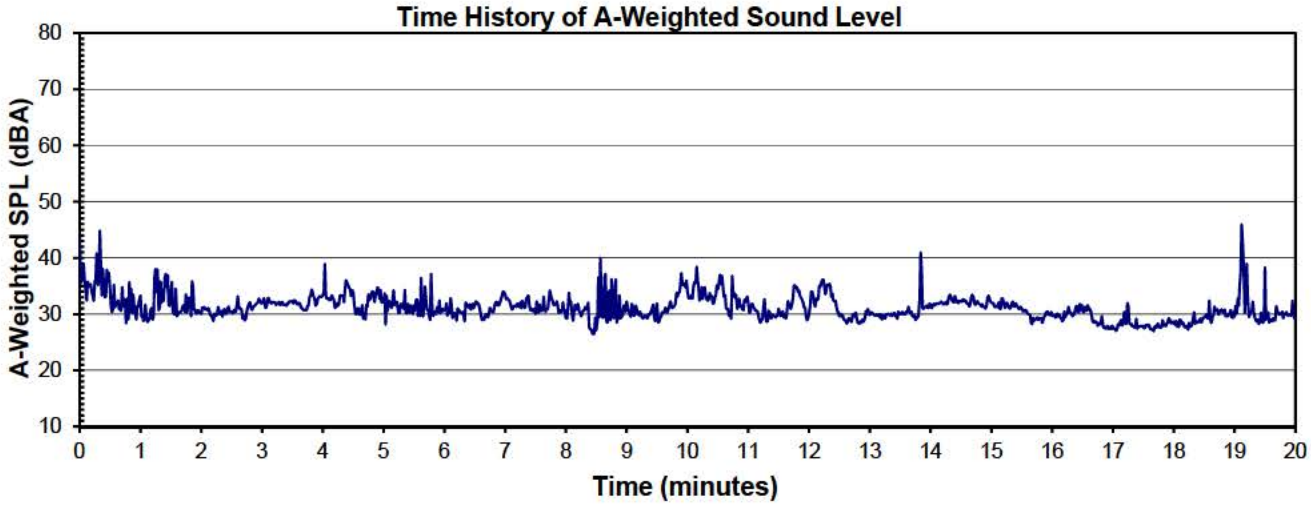
Location 6A - Summer - Day

Measured Tuesday, July 22, 2014, Between 12:32 PM & 12:52 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**32.0**
L_{max}:	53.0
L_{01}:	38.8
L_{10}:	33.9
L_{50}:	30.8
L_{90}:	**28.6**
L_{99}:	27.2
L_{min}:	25.9





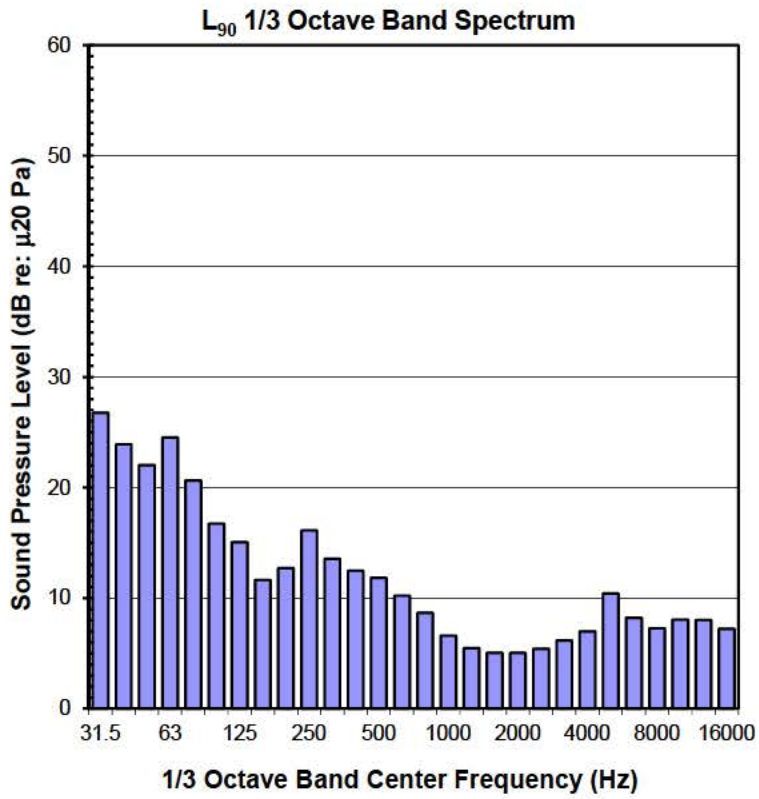
Run017

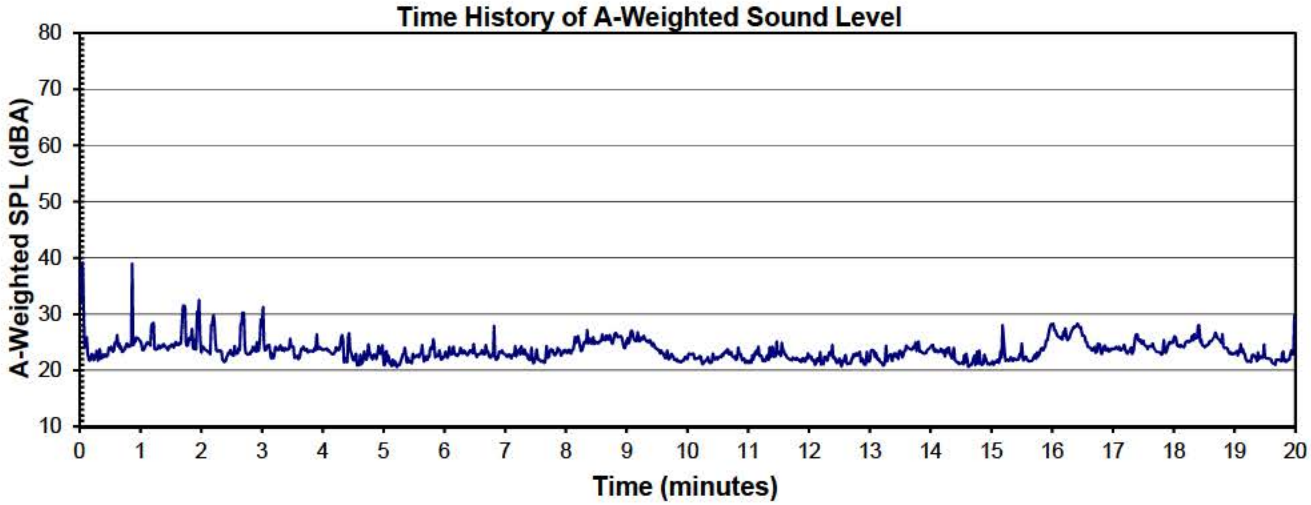
Location 6A - Summer - Night

Measured Wednesday, July 23, 2014, Between 1:32 AM & 1:52 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**24.3**
L_{max}:	46.1
L_{01}:	30.8
L_{10}:	25.7
L_{50}:	23.2
L_{90}:	**21.5**
L_{99}:	20.8
L_{min}:	20.2





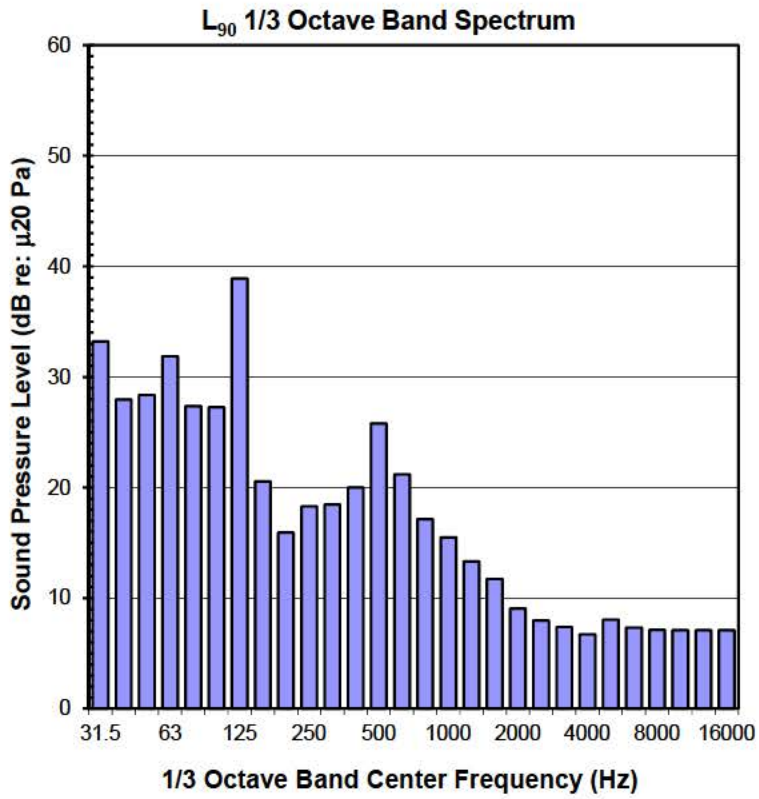
Run024

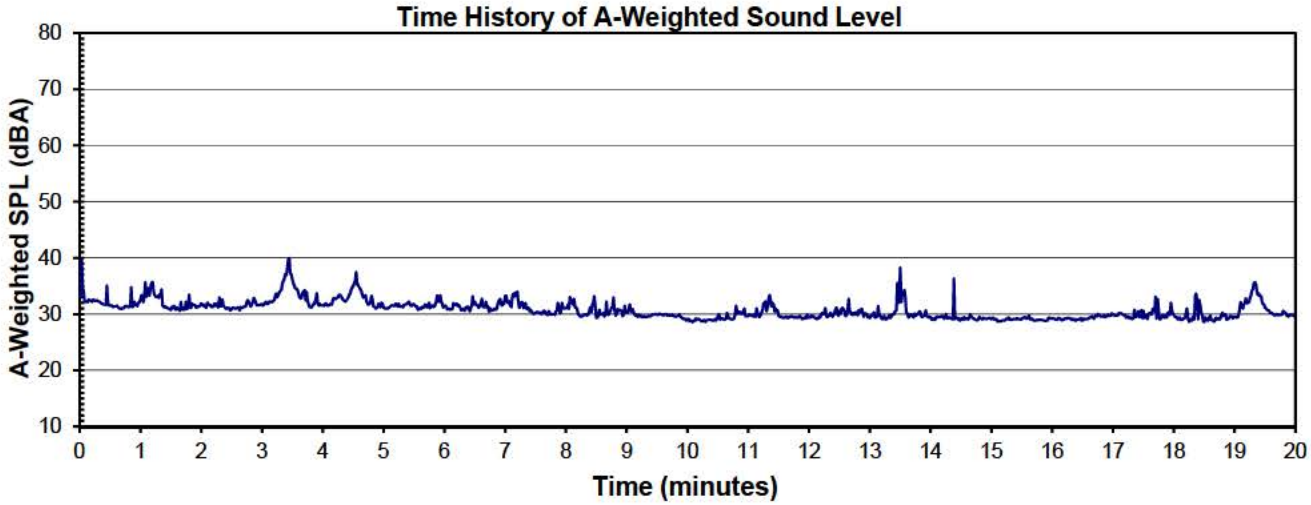
Location 7 - Summer - Night

Measured Wednesday, July 23, 2014, Between 12:29 AM & 12:49 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**31.2**
L_{max}:	44.7
L_{01}:	36.4
L_{10}:	32.8
L_{50}:	30.4
L_{90}:	**29.1**
L_{99}:	28.6
L_{min}:	28.0





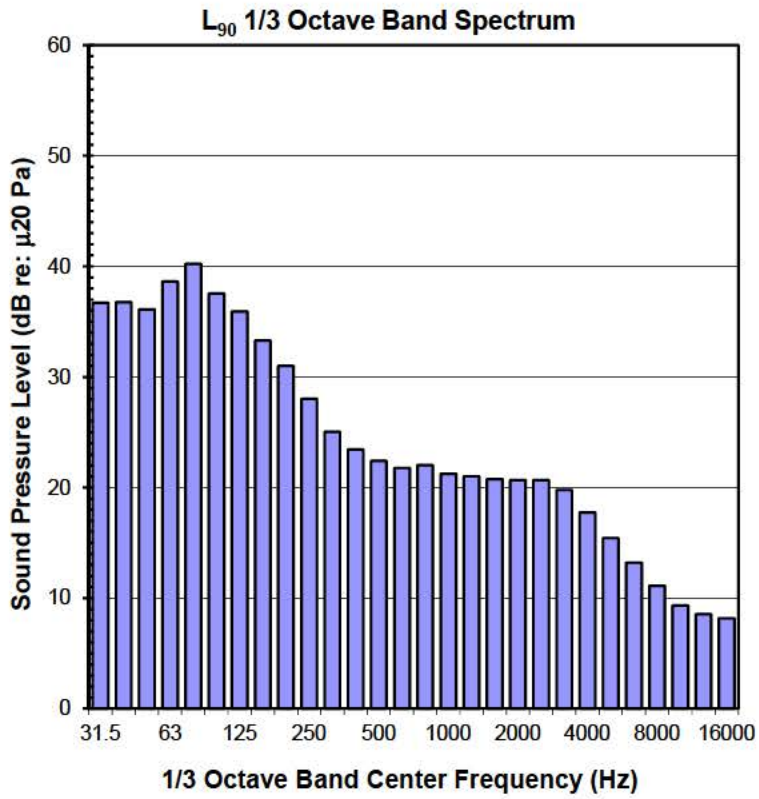
Run022

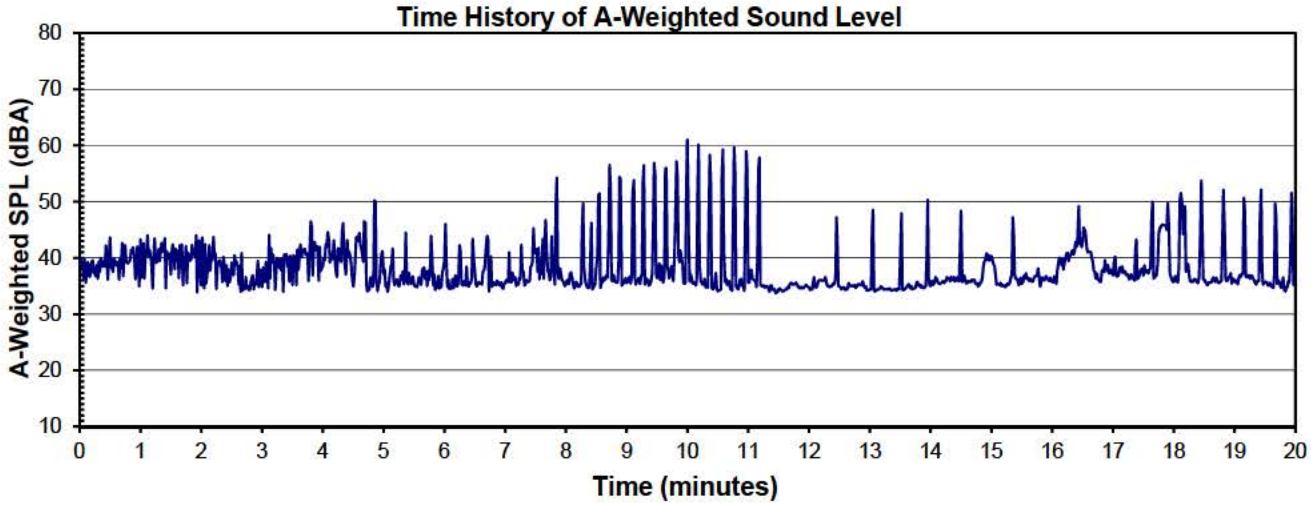
Location 8 - Summer - Day

Measured Tuesday, July 22, 2014, Between 10:12 AM & 10:32 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**43.0**
L_{max}:	63.9
L_{01}:	56.8
L_{10}:	43.3
L_{50}:	36.1
L_{90}:	**34.5**
L_{99}:	33.9
L_{min}:	33.3





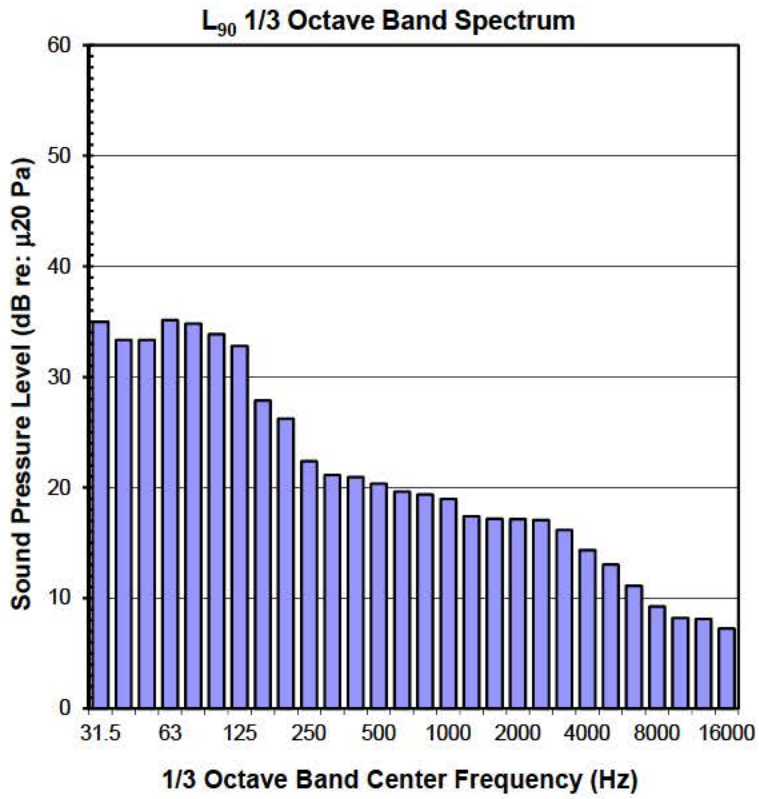
Run013

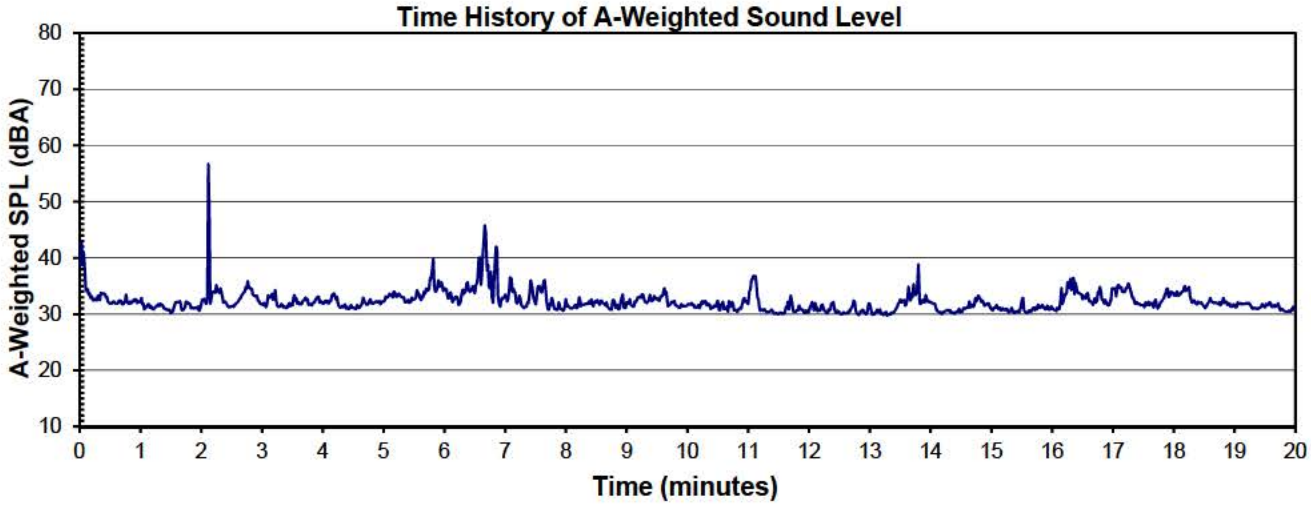
Location 8 - Summer - Night

Measured Tuesday, July 22, 2014, Between 11:12 PM & 11:32 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**33.7**
L_{max}:	64.5
L_{01}:	39.7
L_{10}:	34.2
L_{50}:	31.9
L_{90}:	**30.5**
L_{99}:	29.9
L_{min}:	29.3





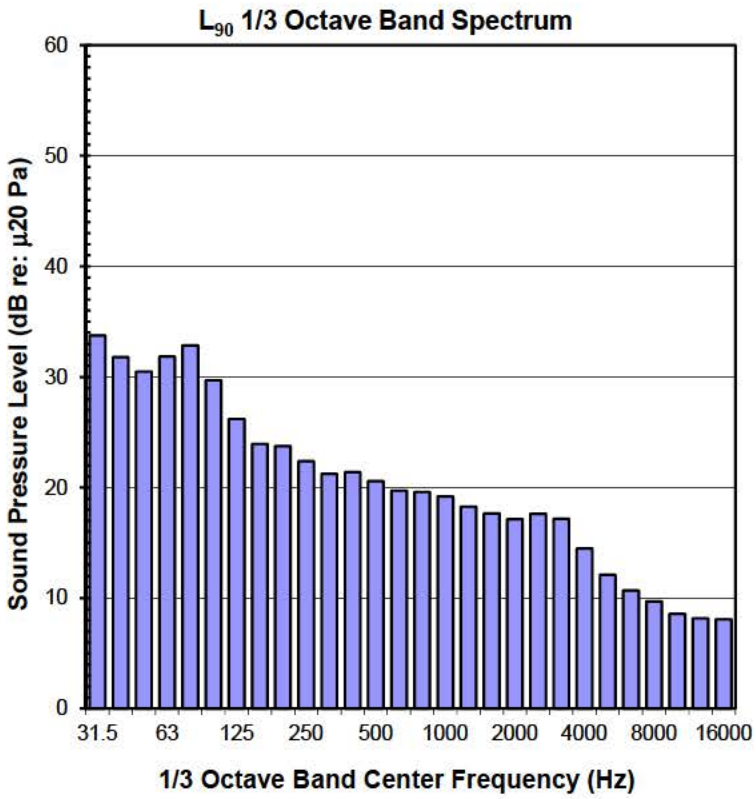
Run020

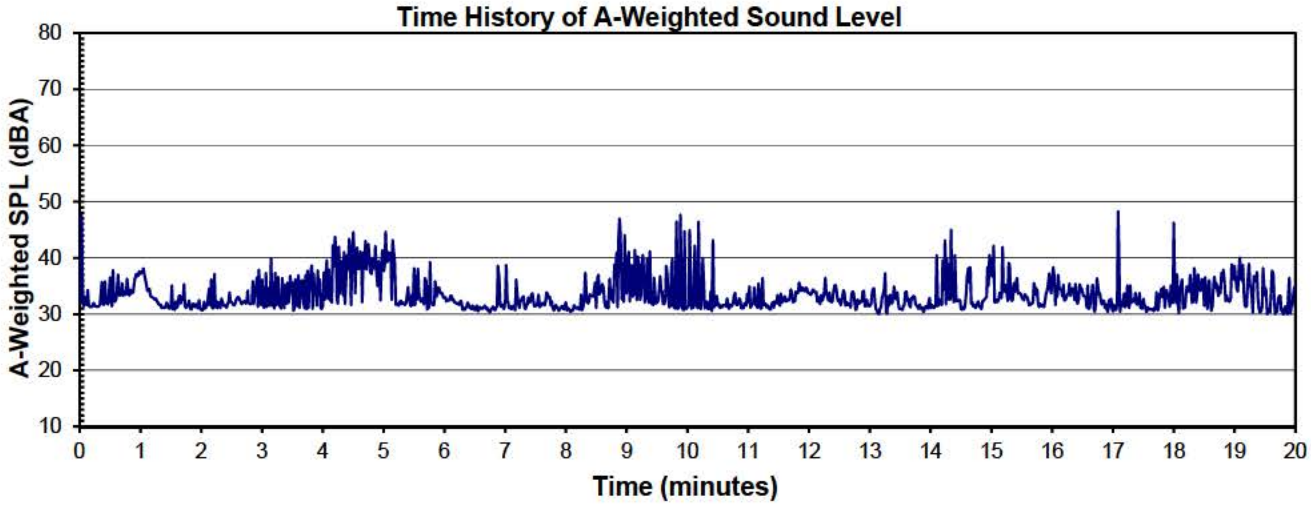
Location 8A - Summer - Day

Measured Tuesday, July 22, 2014, Between 10:35 AM & 10:55 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**35.1**
L_{max}:	55.2
L_{01}:	45.1
L_{10}:	36.8
L_{50}:	32.2
L_{90}:	**30.8**
L_{99}:	30.0
L_{min}:	29.1





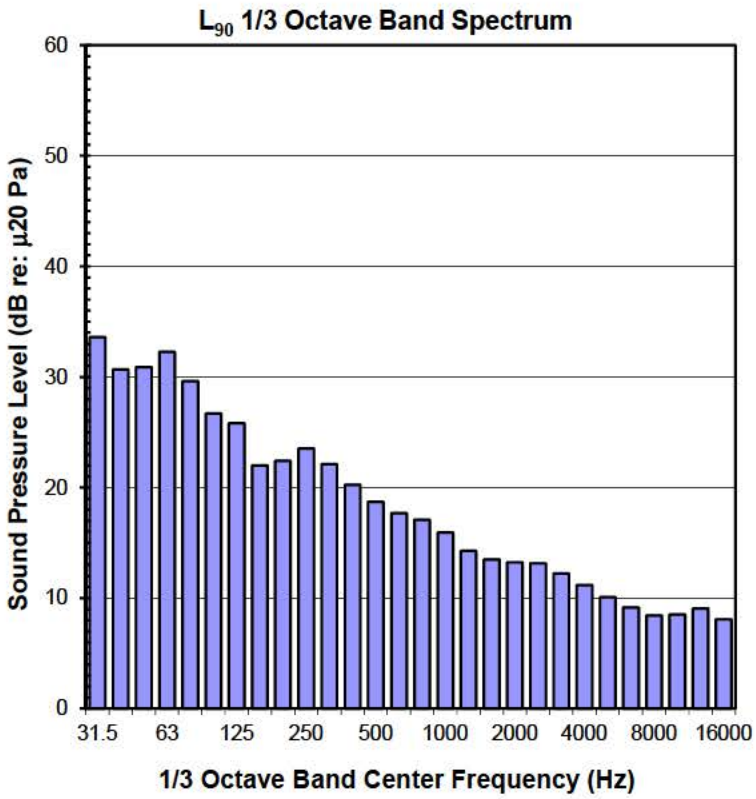
Run014

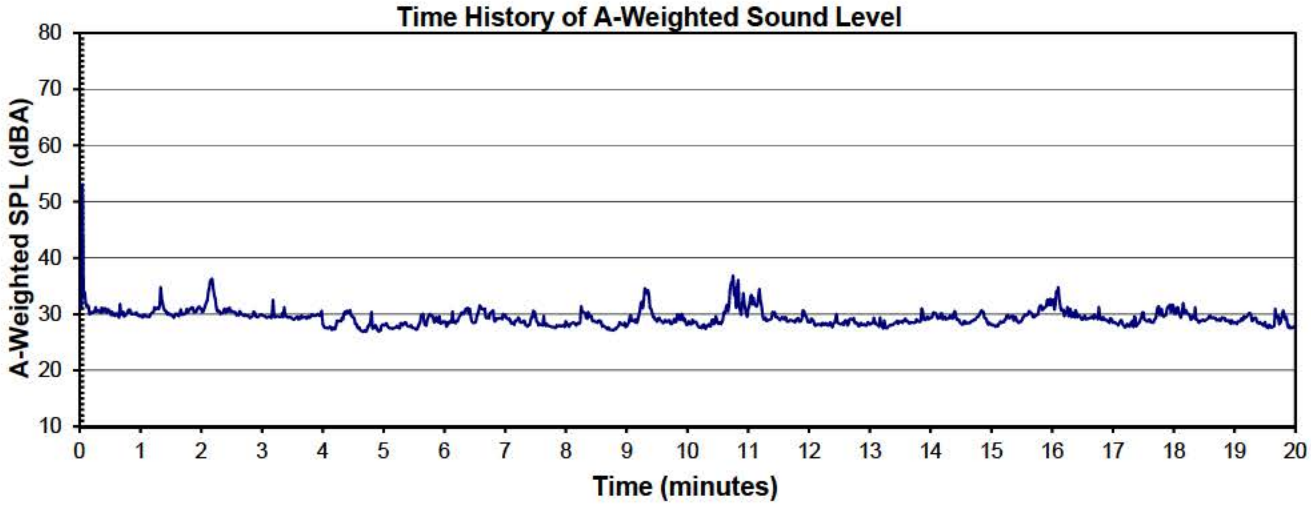
Location 8A - Summer - Night

Measured Tuesday, July 22, 2014, Between 11:34 PM & 11:54 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**30.4**
L_{max}:	61.0
L_{01}:	34.9
L_{10}:	31.0
L_{50}:	29.2
L_{90}:	**27.8**
L_{99}:	27.1
L_{min}:	26.4





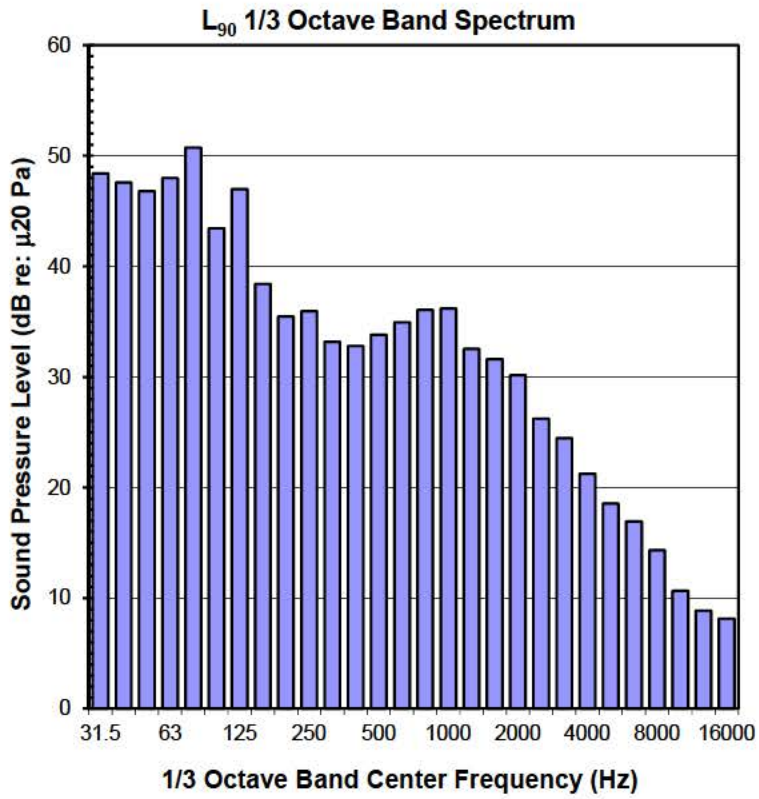
Run021

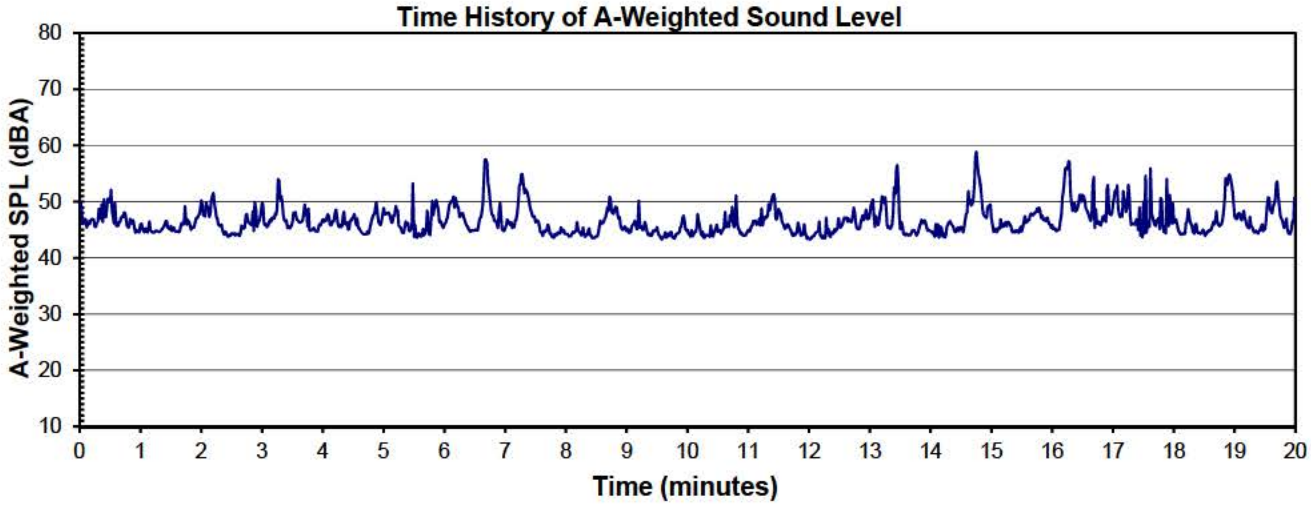
Location 9 - Summer - Day

Measured Tuesday, July 22, 2014, Between 9:37 AM & 9:57 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**47.6**
L_{max}:	62.0
L_{01}:	55.8
L_{10}:	49.8
L_{50}:	46.0
L_{90}:	**44.1**
L_{99}:	43.4
L_{min}:	42.6





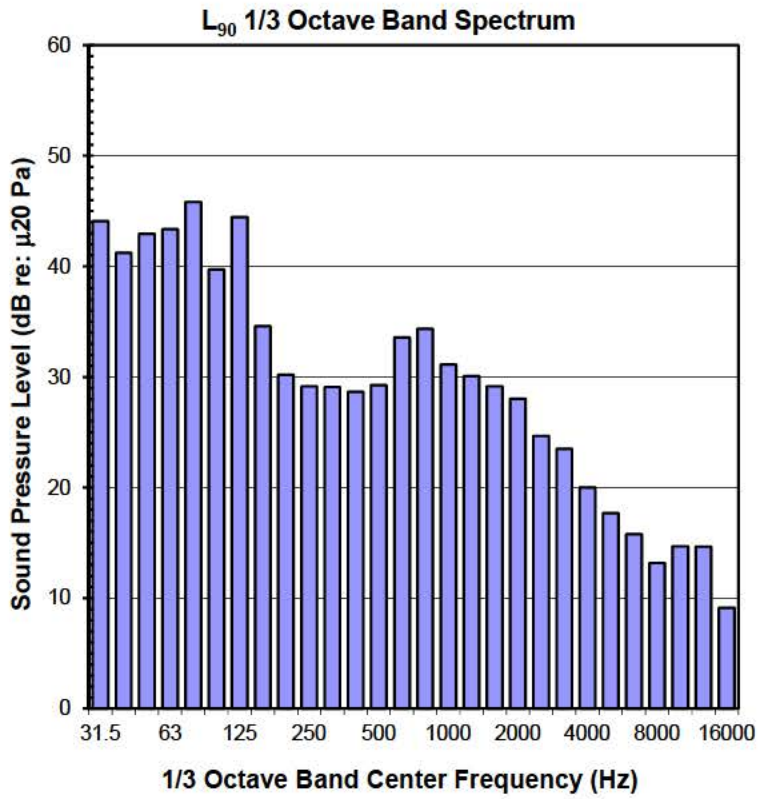
Run012

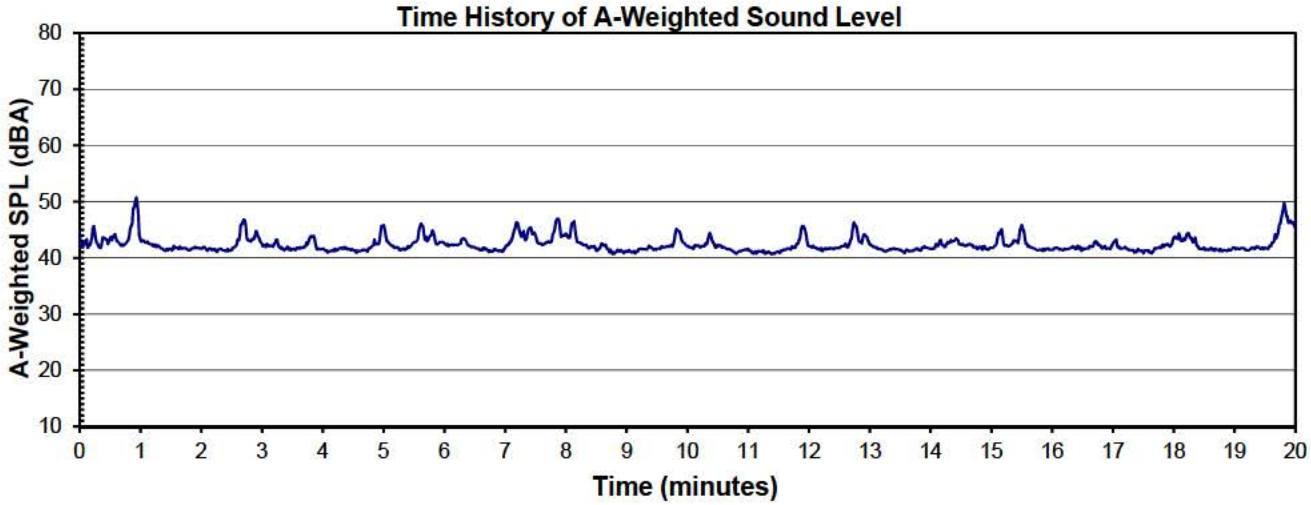
Location 9 - Summer - Night

Measured Tuesday, July 22, 2014, Between 10:39 PM & 10:59 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**42.6**
L_{max}:	51.8
L_{01}:	47.3
L_{10}:	44.1
L_{50}:	42.0
L_{90}:	**41.2**
L_{99}:	40.7
L_{min}:	40.1





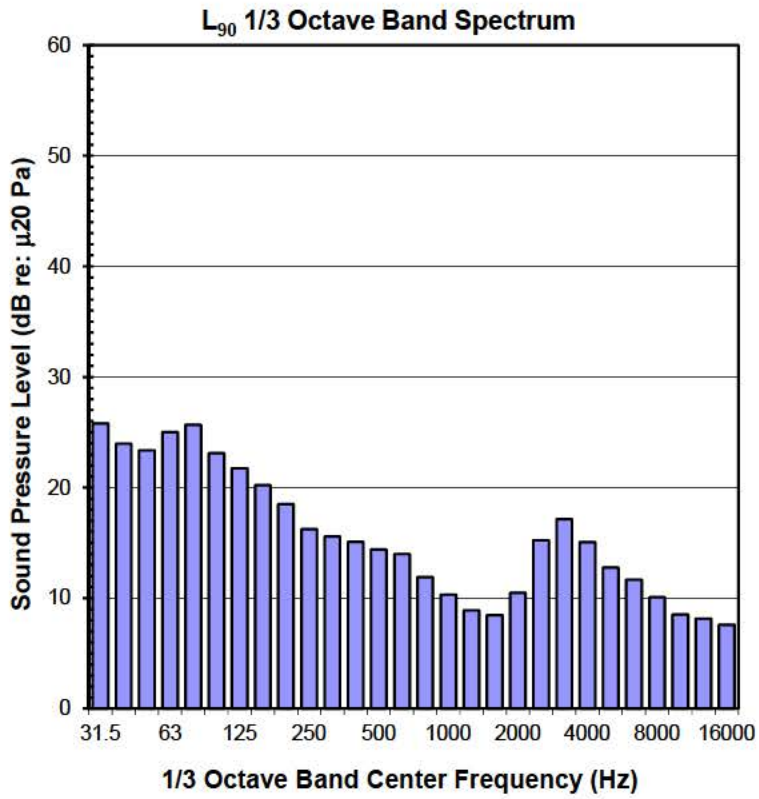
Run019

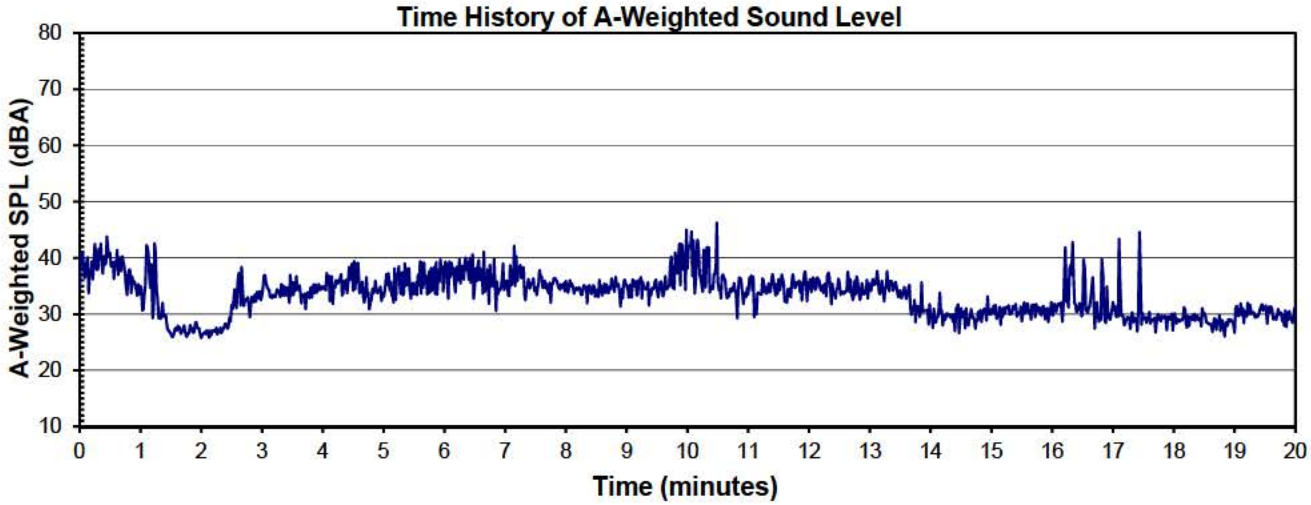
Location 10 - Summer - Day

Measured Tuesday, July 22, 2014, Between 8:58 AM & 9:18 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**35.0**
L_{max}:	51.5
L_{01}:	43.7
L_{10}:	38.2
L_{50}:	32.3
L_{90}:	**27.3**
L_{99}:	25.9
L_{min}:	24.9





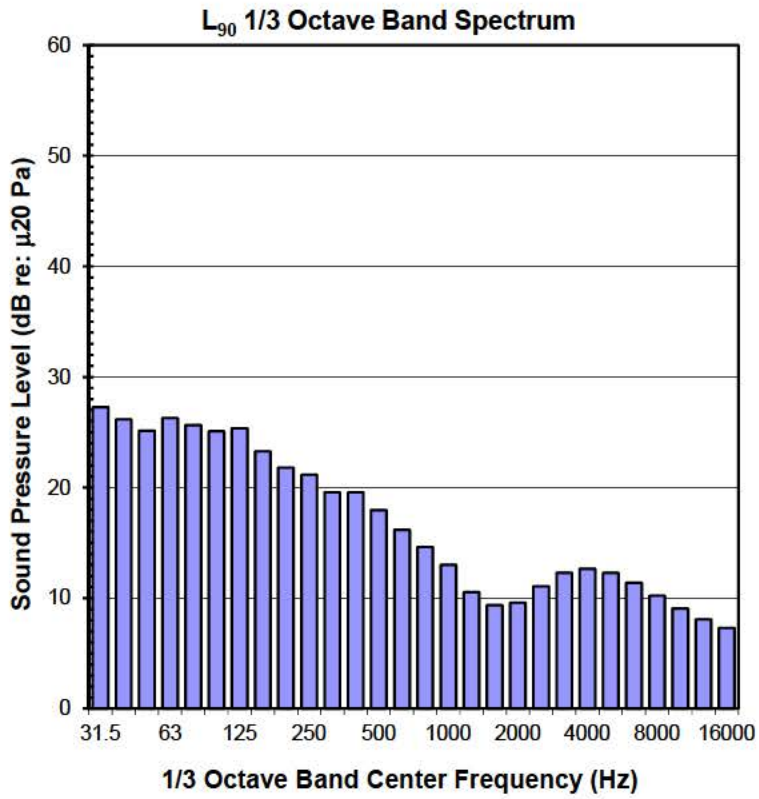
Run011

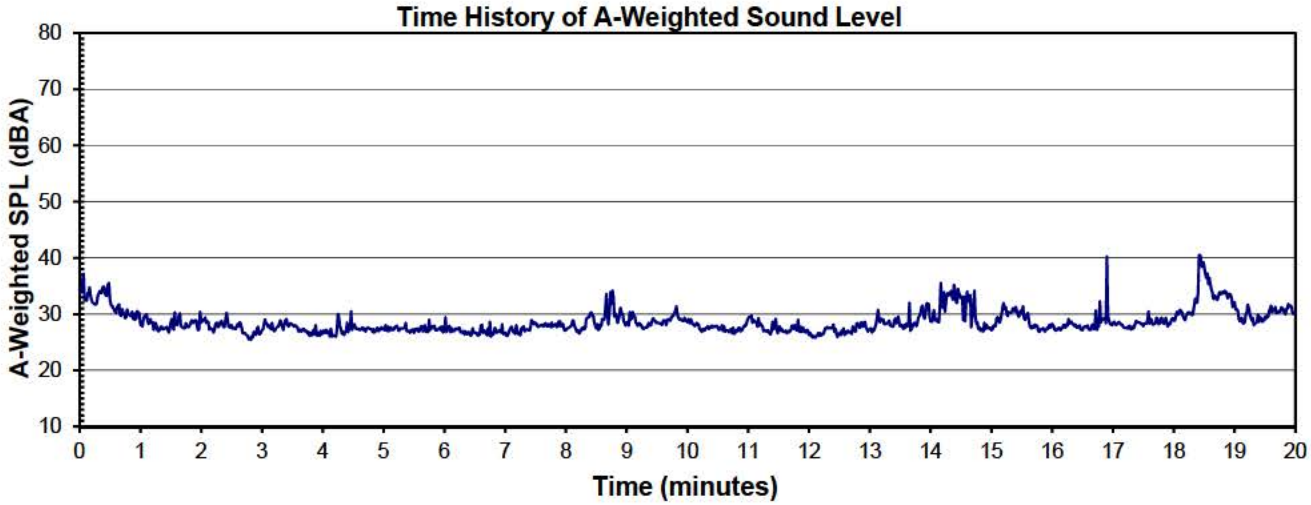
Location 10 - Summer - Night

Measured Tuesday, July 22, 2014, Between 10:00 PM & 10:20 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**29.4**
L_{max}:	48.3
L_{01}:	36.2
L_{10}:	31.4
L_{50}:	28.0
L_{90}:	**26.7**
L_{99}:	25.8
L_{min}:	24.9





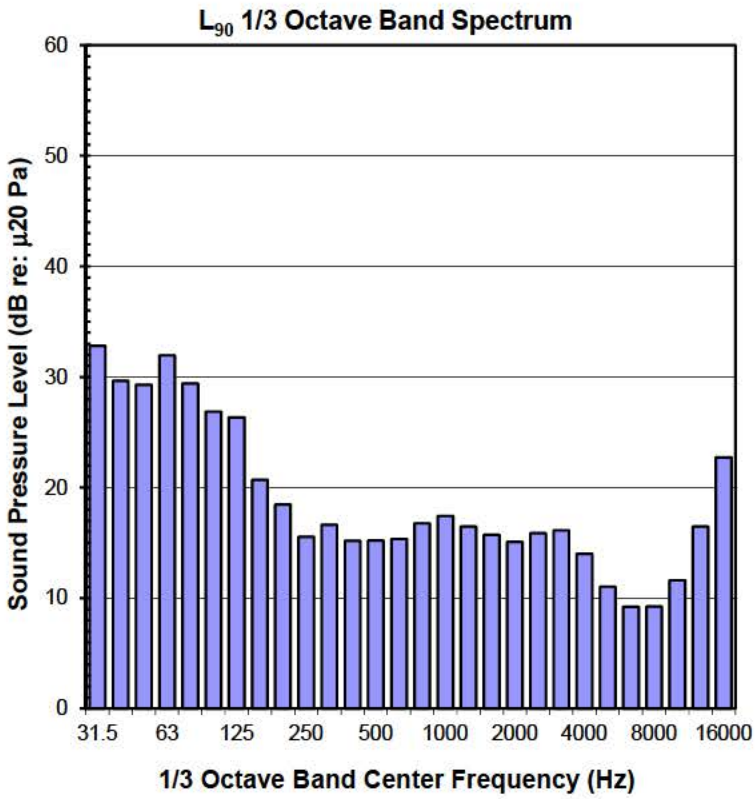
Run018

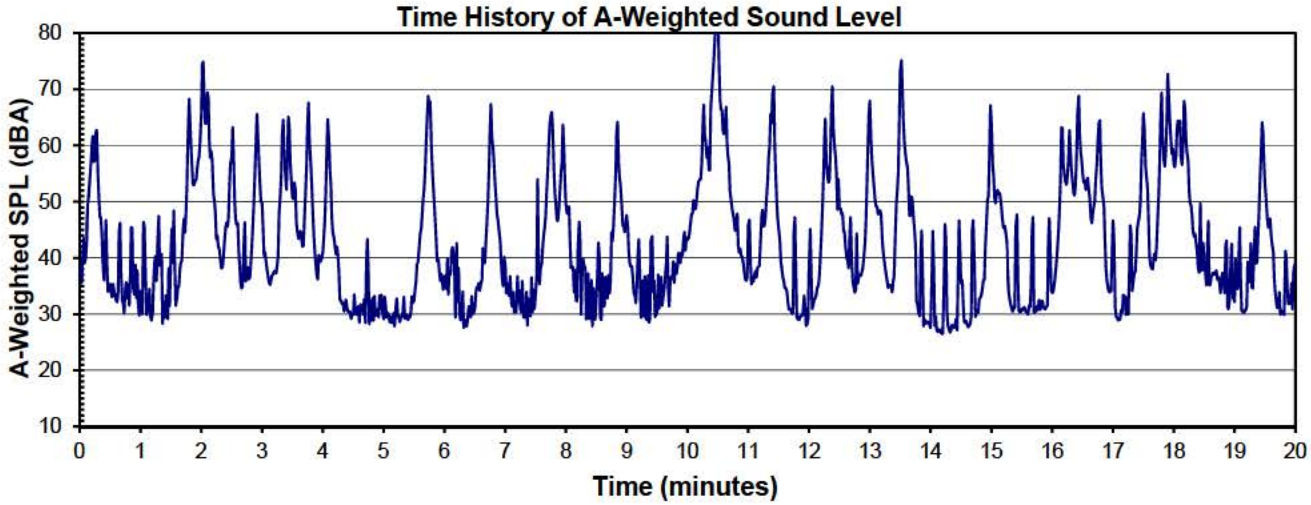
Location 11 - Summer - Day

Measured Monday, July 21, 2014, Between 3:03 PM & 3:23 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**63.1**
L_{max}:	91.7
L_{01}:	71.6
L_{10}:	59.4
L_{50}:	39.5
L_{90}:	**29.6**
L_{99}:	27.2
L_{min}:	25.8





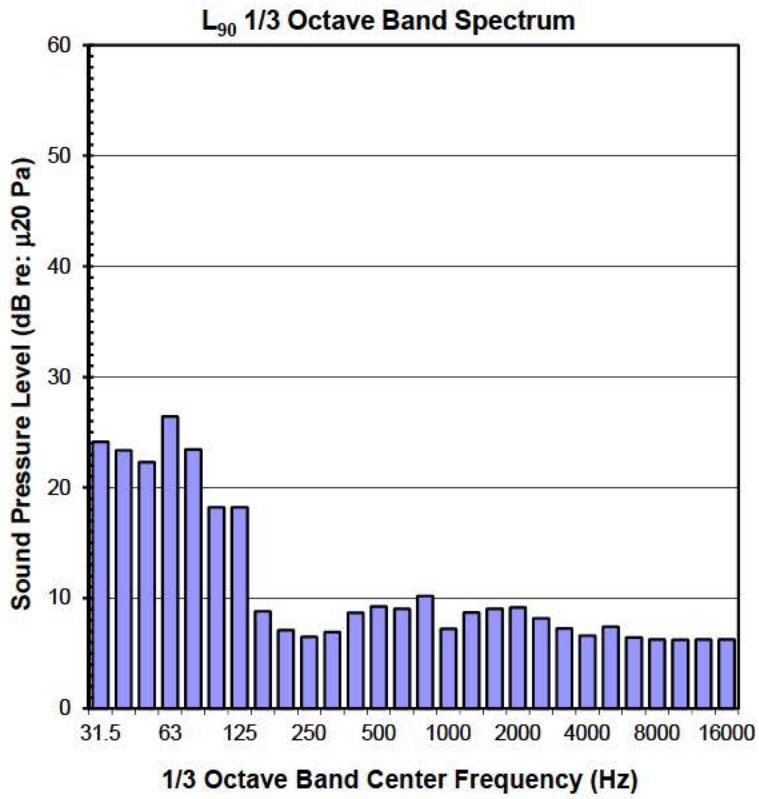
Run005

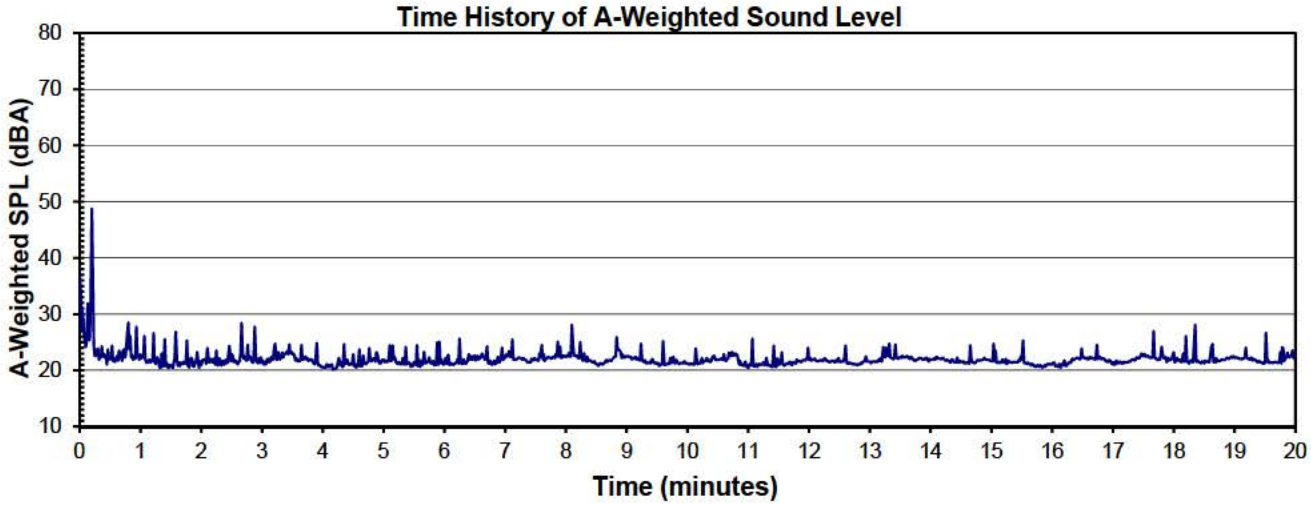
Location 11 - Summer - Night

Measured Tuesday, July 22, 2014, Between 2:45 AM & 3:05 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**23.8**
L_{max}:	56.4
L_{01}:	28.4
L_{10}:	22.9
L_{50}:	21.7
L_{90}:	**20.9**
L_{99}:	20.3
L_{min}:	19.6





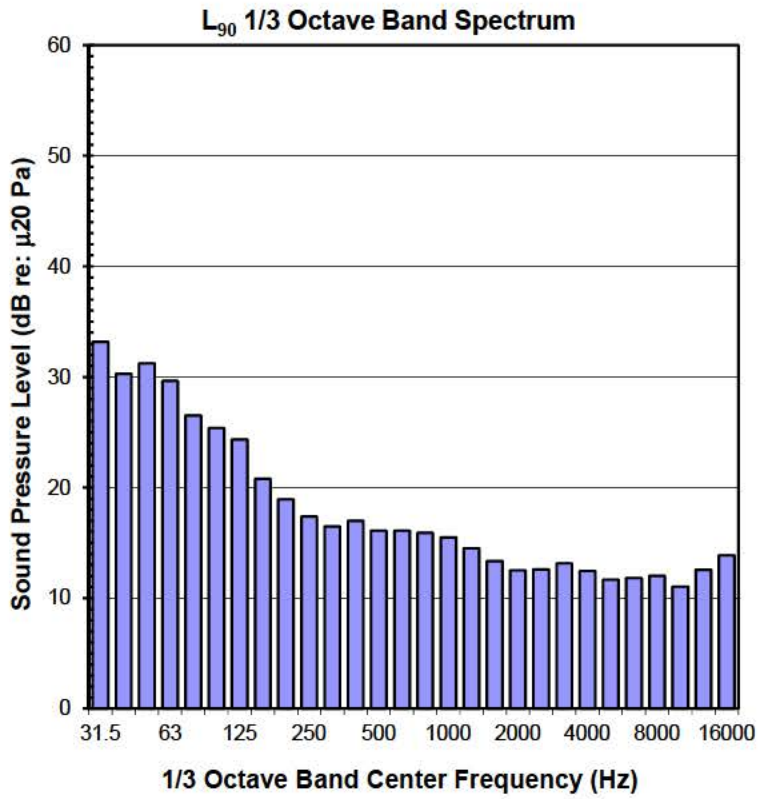
Run010

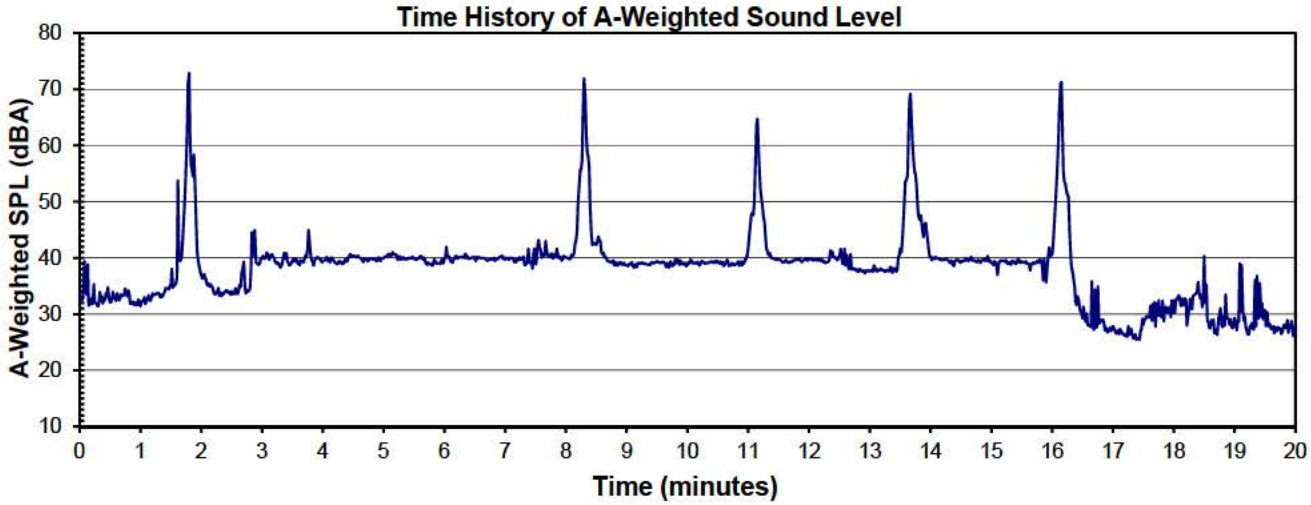
Location 12 - Summer - Day

Measured Monday, July 21, 2014, Between 2:09 PM & 2:29 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**50.7**
L_{max}:	74.7
L_{01}:	64.0
L_{10}:	41.6
L_{50}:	39.2
L_{90}:	**28.7**
L_{99}:	26.0
L_{min}:	24.3





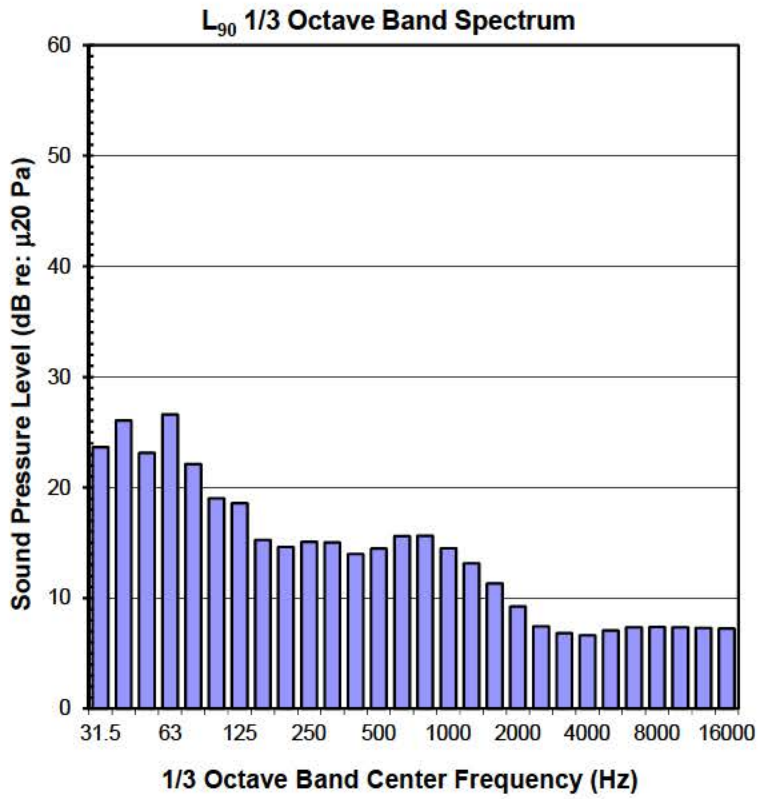
Run004

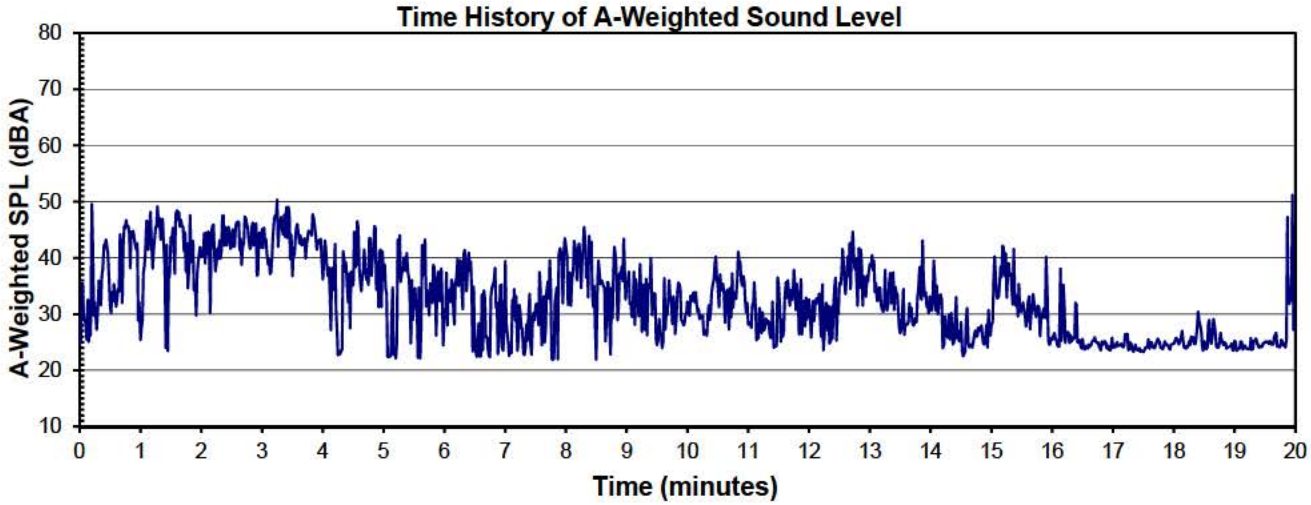
Location 12 - Summer - Night

Measured Tuesday, July 22, 2014, Between 1:55 AM & 2:15 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**38.3**
L_{max}:	58.4
L_{01}:	49.0
L_{10}:	42.7
L_{50}:	30.6
L_{90}:	**24.0**
L_{99}:	22.3
L_{min}:	21.6





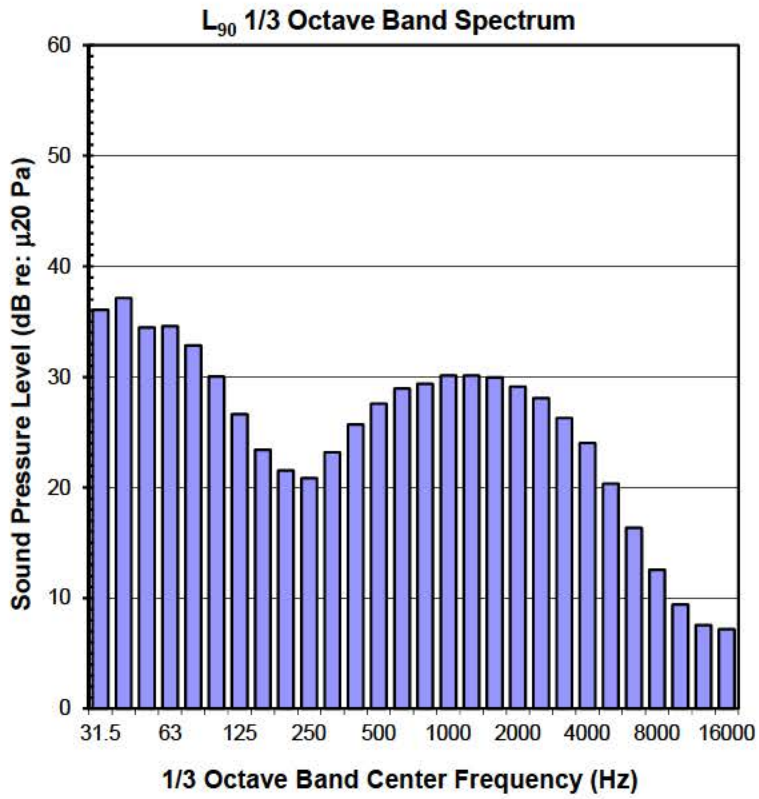
Run009

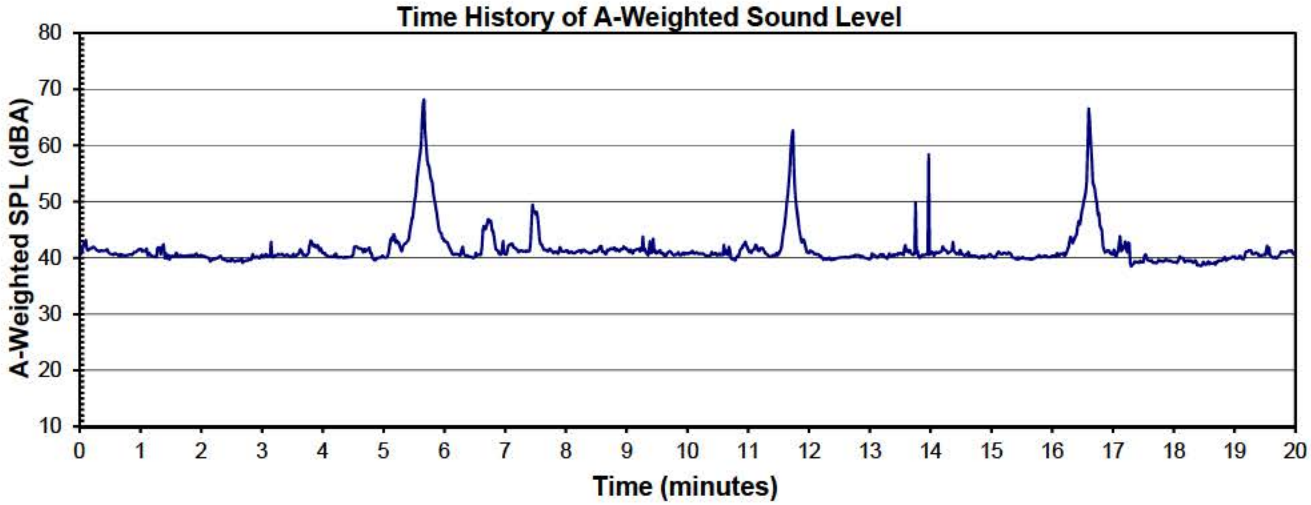
Location 13 - Summer - Day

Measured Monday, July 21, 2014, Between 1:04 PM & 1:24 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**46.8**
L_{max}:	69.6
L_{01}:	59.0
L_{10}:	43.2
L_{50}:	40.7
L_{90}:	**39.7**
L_{99}:	38.9
L_{min}:	38.1





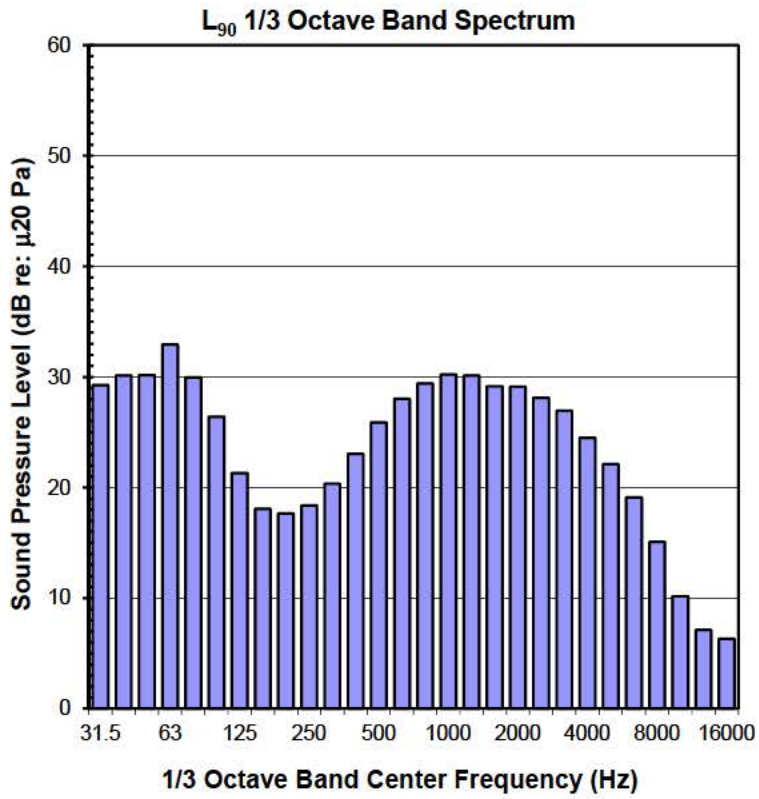
Run003

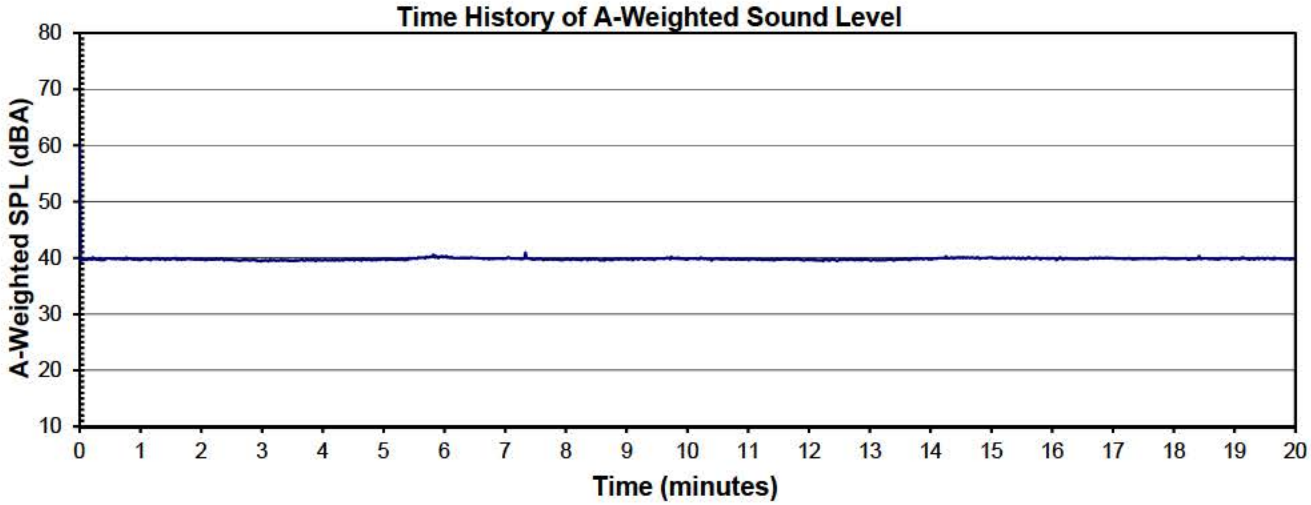
Location 13 - Summer - Night

Measured Tuesday, July 22, 2014, Between 12:52 AM & 1:12 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**40.2**
L_{max}:	67.2
L_{01}:	40.4
L_{10}:	40.1
L_{50}:	39.8
L_{90}:	**39.5**
L_{99}:	39.3
L_{min}:	39.0





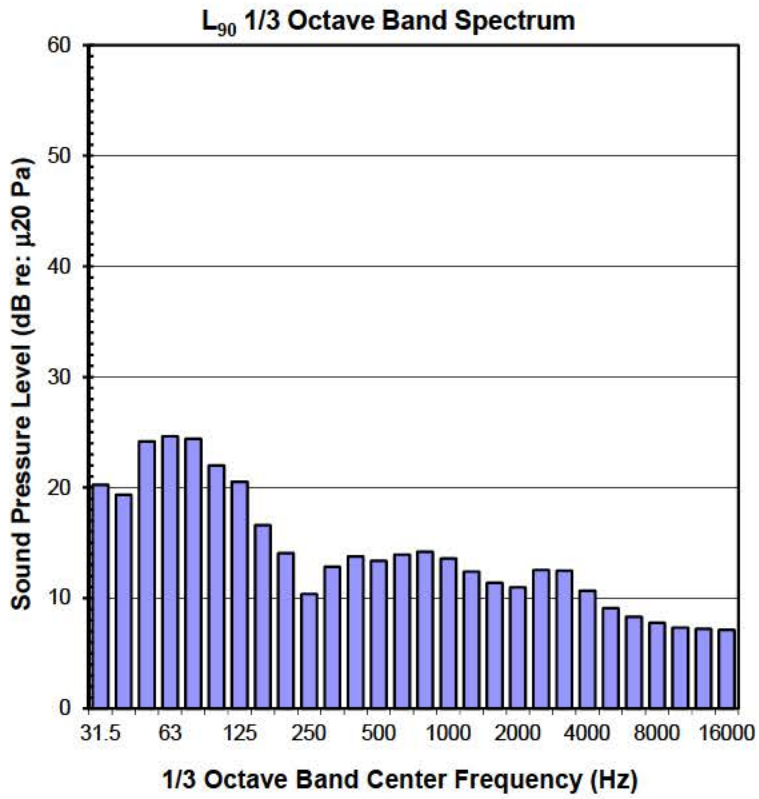
Run008

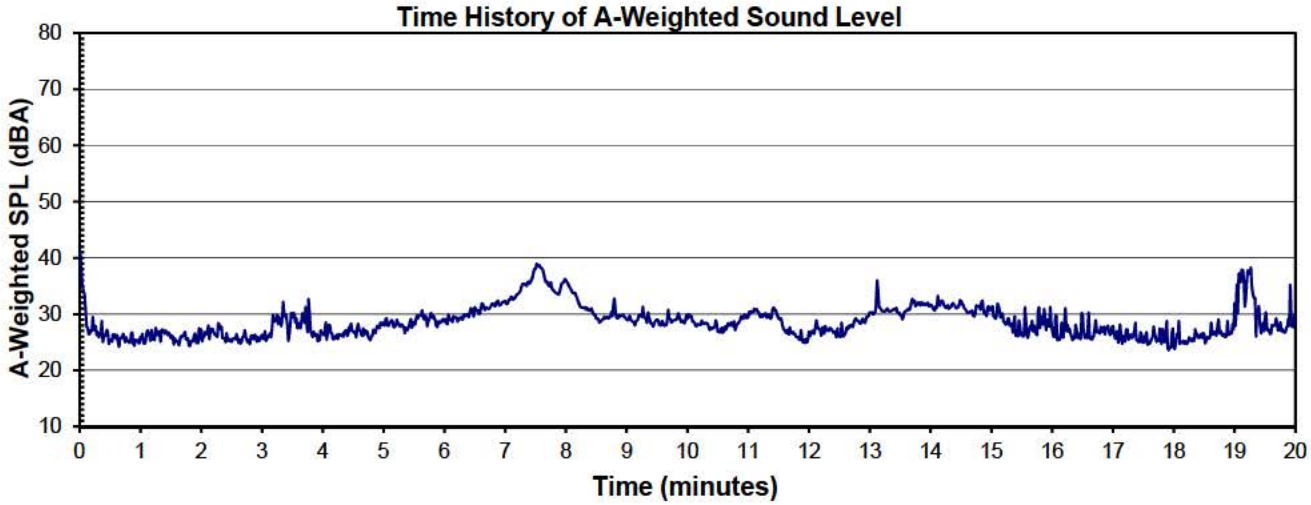
Location 14 - Summer - Day

Measured Monday, July 21, 2014, Between 11:39 AM & 11:59 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**29.8**
L_{max}:	48.5
L_{01}:	38.0
L_{10}:	32.0
L_{50}:	28.2
L_{90}:	**25.2**
L_{99}:	23.9
L_{min}:	22.9





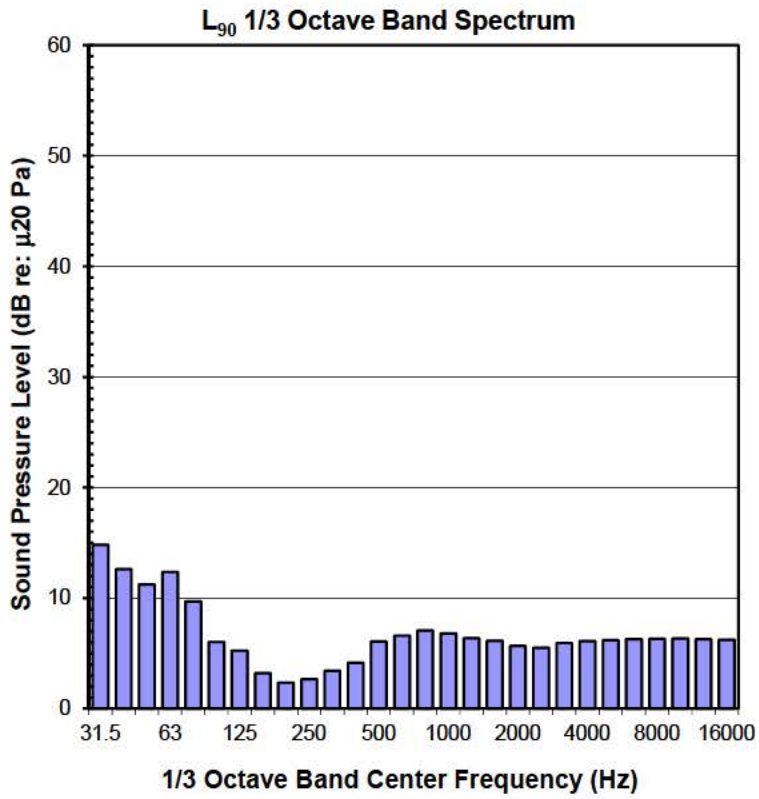
Run002

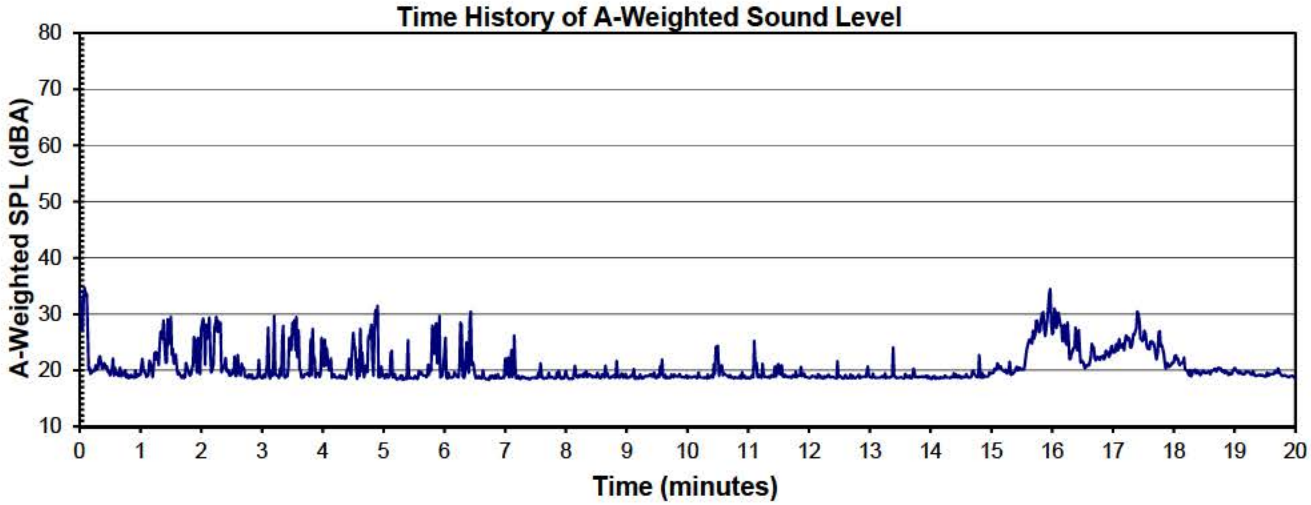
Location 14 - Summer - Night

Measured Monday, July 21, 2014, Between 11:25 PM & 11:45 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**22.2**
L_{max}:	41.0
L_{01}:	31.3
L_{10}:	25.0
L_{50}:	19.2
L_{90}:	**18.6**
L_{99}:	18.3
L_{min}:	18.1





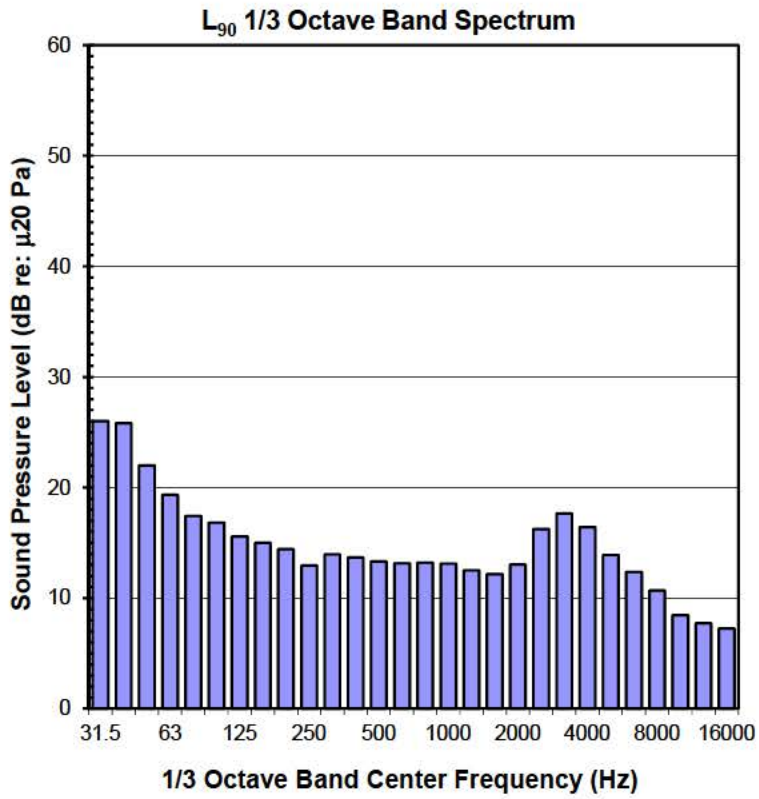
Run007

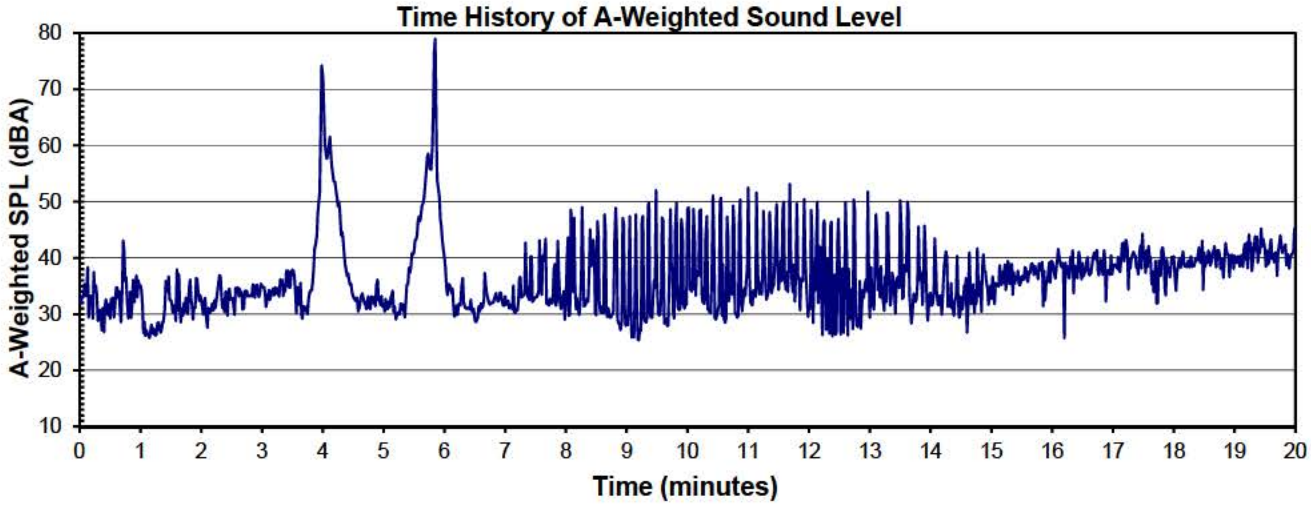
Location 15 - Summer - Day

Measured Monday, July 21, 2014, Between 10:39 AM & 10:59 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**52.4**
L_{max}:	81.3
L_{01}:	59.0
L_{10}:	44.3
L_{50}:	33.7
L_{90}:	**28.6**
L_{99}:	25.8
L_{min}:	24.2





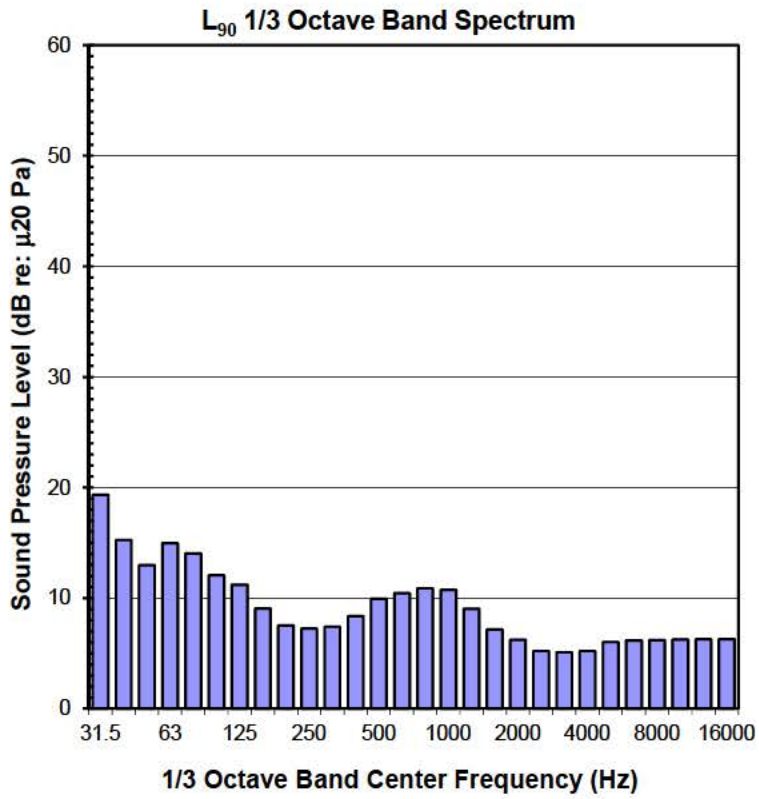
Run001

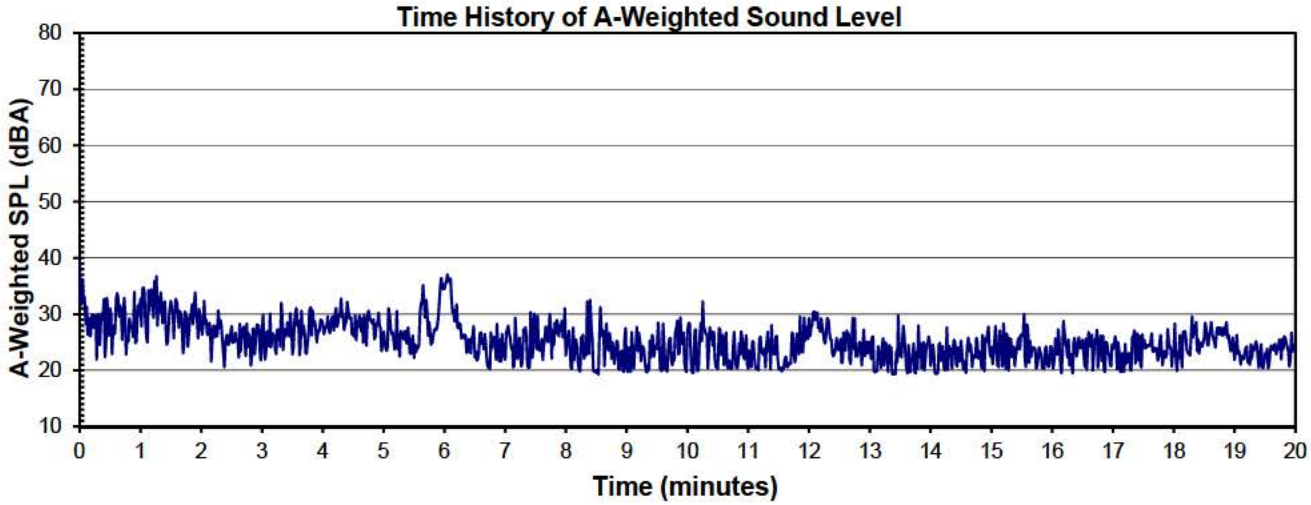
Location 15 - Summer - Night

Measured Monday, July 21, 2014, Between 10:30 PM & 10:50 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**26.9**
L_{max}:	43.8
L_{01}:	35.6
L_{10}:	29.8
L_{50}:	24.7
L_{90}:	**20.3**
L_{99}:	19.4
L_{min}:	19.0





Run006

Annex D

Continuous Monitoring
Winter

Location 2 - Continuous Monitoring - Winter

Northern Pass
Monday, March 24, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00								
01:00								
02:00								
03:00								
04:00								
05:00								
06:00								
07:00								
08:00	41.4	30.6	32.2	33.8	36.1	41.7	49.4	76.0
09:00	39.7	30.5	31.7	32.9	36.3	42.8	49.5	57.0
10:00	43.9	31.6	33.3	36.6	40.7	46.1	52.6	68.4
11:00	44.8	33.3	35.0	36.9	41.4	48.0	53.5	67.7
12:00	42.8	32.4	34.3	36.5	41.0	45.5	51.1	62.2
13:00	45.3	32.8	34.9	37.2	42.1	47.7	55.4	65.0
14:00	45.7	33.6	36.1	38.8	42.2	48.0	55.1	69.4
15:00	44.1	33.7	35.5	37.4	41.7	47.2	52.7	59.0
16:00	43.4	32.6	34.5	36.4	40.0	46.1	53.3	62.5
17:00	40.6	29.6	31.7	33.8	37.6	43.8	48.9	59.7
18:00	45.7	28.1	30.2	32.2	35.9	43.2	54.1	74.3
19:00	39.6	28.4	30.1	31.9	35.1	42.6	49.9	58.0
20:00	37.1	29.0	30.5	31.6	33.7	40.3	46.4	56.1
21:00	36.0	28.4	29.7	30.7	32.7	37.2	46.5	55.5
22:00	32.7	26.3	28.0	29.2	31.4	34.4	41.3	44.9
23:00	34.5	28.0	30.5	31.7	33.3	35.8	41.5	55.7

Overall L_{eq}: **42.6**

L_{eq} (day*): **43.1**
L_{eq} (night):** **33.7**

Lowest L_{90} (day): **30.7**
Lowest L_{90} (night): **29.2**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Location 2 - Continuous Monitoring - Winter

Northern Pass
Tuesday, March 25, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	34.6	30.0	31.1	32.1	33.9	36.2	40.5	46.5
01:00	35.0	29.5	31.3	32.6	34.4	36.5	40.3	45.4
02:00	35.1	27.3	29.2	30.8	34.5	37.3	39.9	49.8
03:00	31.7	27.0	28.3	29.4	31.0	33.3	37.2	46.0
04:00	33.1	27.9	29.3	30.4	32.1	34.3	39.6	48.0
05:00	37.0	30.6	31.8	32.8	35.3	39.0	45.2	54.2
06:00	41.3	32.8	34.2	35.8	39.6	44.1	48.2	58.1
07:00	46.3	37.3	38.9	41.2	44.5	49.2	53.1	63.9
08:00	44.0	37.4	38.6	39.5	41.2	46.8	53.1	63.9
09:00	45.9	36.7	38.3	39.4	41.2	46.3	55.1	67.7
10:00	49.6	30.1	32.0	34.5	38.1	45.4	65.2	71.3
11:00	47.0	30.7	32.3	34.4	38.5	45.6	58.9	70.9
12:00	41.1	32.8	34.6	35.9	38.8	44.2	49.6	55.8
13:00	42.5	30.7	32.8	34.6	38.7	45.2	52.6	62.8
14:00	40.7	31.6	33.1	34.8	37.9	43.9	48.8	58.2
15:00	42.1	30.1	31.8	33.6	36.9	44.7	52.6	66.7
16:00	41.0	28.3	30.0	31.6	35.7	44.6	50.8	63.9
17:00	39.9	26.4	28.6	30.3	36.0	43.8	49.3	58.7
18:00	38.2	25.5	26.8	28.1	31.1	41.6	47.0	64.1
19:00	38.8	19.1	20.3	22.4	27.1	40.4	48.9	61.0
20:00	34.9	17.8	19.0	20.6	27.7	39.6	45.2	52.6
21:00	33.5	23.8	25.2	26.2	28.0	34.9	45.0	55.4
22:00	30.7	23.2	24.3	25.5	27.7	31.5	41.8	47.6
23:00	31.1	23.5	25.2	26.6	29.3	32.5	40.2	47.6

Overall L_{eq}: **42.0**

L_{eq} (day*): **43.7**
L_{eq} (night):** **35.7**

Lowest L_{90} (day): **20.6**
Lowest L_{90} (night): **25.5**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Location 2 - Continuous Monitoring - Winter

Northern Pass
Wednesday, March 26, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	27.7	19.5	20.5	21.8	24.3	28.5	39.7	44.6
01:00	26.1	18.8	19.4	20.6	22.9	27.9	36.3	43.8
02:00	25.8	18.8	19.7	20.7	22.8	26.8	36.4	44.8
03:00	25.8	19.8	20.7	21.8	23.7	27.2	35.2	43.1
04:00	27.9	21.0	22.2	23.5	25.8	29.4	37.4	46.4
05:00	32.2	24.8	26.8	28.0	29.9	34.2	41.5	47.3
06:00	38.6	30.1	31.4	32.8	35.9	41.0	46.7	57.8
07:00	41.0	33.4	34.5	36.4	38.7	43.8	49.3	59.3
08:00	41.4	34.7	36.0	37.4	39.7	44.0	49.3	57.1
09:00	45.9	35.7	37.4	38.9	41.7	48.1	57.5	63.4
10:00	47.9	35.2	36.5	37.7	41.0	47.7	58.2	74.4
11:00	55.3	39.3	42.6	45.2	49.7	55.3	63.3	82.5
12:00	59.5	45.3	47.4	49.8	55.1	62.5	69.4	83.1
13:00	56.4	45.3	47.2	49.7	53.7	58.9	65.9	76.5
14:00	58.8	43.9	45.9	50.2	55.2	61.3	69.0	82.3
15:00	57.5	42.7	44.7	47.7	53.0	60.2	68.1	80.0
16:00	58.3	46.8	48.6	50.7	55.2	61.0	67.7	80.7
17:00	58.4	45.6	48.1	51.4	55.5	61.0	68.2	78.3
18:00	56.7	43.6	45.9	48.7	52.9	58.9	67.2	80.1
19:00	55.8	40.7	43.4	46.7	51.8	58.1	65.7	81.1
20:00	54.9	41.0	42.6	45.7	51.7	57.9	64.9	72.6
21:00	51.9	40.9	42.8	46.1	50.0	54.7	60.1	67.8
22:00	49.6	37.9	39.2	41.5	46.4	52.3	59.1	67.7
23:00	50.1	35.1	37.1	39.0	44.1	53.2	59.6	76.3

Overall L_{eq}: **54.0**

L_{eq} (day*): **55.9**
L_{eq} (night):** **43.6**

Lowest L_{90} (day): **36.4**
Lowest L_{90} (night): **20.6**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Location 2 - Continuous Monitoring - Winter

Northern Pass
Thursday, March 27, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	52.0	40.0	41.8	43.9	49.0	54.6	61.6	75.1
01:00	48.6	34.6	37.0	39.8	44.7	51.7	57.7	70.3
02:00	45.9	34.8	37.9	40.1	43.1	48.4	55.4	64.8
03:00	46.9	36.5	38.3	40.5	43.8	49.7	56.1	67.9
04:00	42.2	31.7	33.6	35.8	39.2	44.9	51.6	64.4
05:00	38.2	30.8	32.1	33.5	36.4	40.9	45.8	53.5
06:00	42.0	32.4	33.7	35.1	38.3	44.9	52.2	63.0
07:00	45.2	33.9	35.1	36.2	38.8	45.1	54.4	71.6
08:00	45.1	33.3	35.5	37.1	40.3	48.0	56.0	67.0
09:00	44.5	33.4	35.0	36.5	40.3	47.3	54.5	63.3
10:00	41.8	29.1	31.4	34.0	37.8	43.8	52.7	64.7
11:00	43.9	30.8	32.5	34.9	39.9	47.2	54.0	60.2
12:00								
13:00								
14:00								
15:00								
16:00								
17:00								
18:00								
19:00								
20:00								
21:00								
22:00								
23:00								

Overall L_{eq}: **46.1**

L_{eq} (day*): **44.3**
L_{eq} (night):** **47.1**

Lowest L_{90} (day): **34.0**
Lowest L_{90} (night): **33.5**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Location 9 - Continuous Monitoring - Winter

Northern Pass
Monday, March 24, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00								
01:00								
02:00								
03:00								
04:00								
05:00								
06:00								
07:00								
08:00								
09:00	59.9	35.1	38.6	41.7	46.0	53.2	72.3	90.5
10:00	49.5	36.9	39.5	42.1	47.1	52.5	58.0	73.4
11:00	49.8	38.6	40.3	42.6	46.9	53.1	58.6	69.9
12:00	54.8	36.6	39.3	41.6	45.8	52.6	68.0	79.0
13:00	47.9	35.6	38.6	41.8	45.6	50.9	56.8	69.1
14:00	48.1	36.7	39.3	41.9	45.4	50.4	56.1	71.4
15:00	50.3	39.1	41.5	43.9	47.3	52.7	58.2	73.4
16:00	48.4	37.3	40.0	42.6	46.5	51.4	55.6	66.4
17:00	47.0	35.4	38.1	41.5	45.2	49.8	54.9	65.6
18:00	42.8	30.8	33.6	36.3	40.4	45.6	51.7	61.6
19:00	43.2	29.2	31.5	33.9	38.0	44.2	54.7	68.8
20:00	43.9	28.9	31.7	34.9	39.5	45.8	54.9	66.1
21:00	42.1	25.8	28.7	32.2	37.4	43.9	53.2	63.9
22:00	40.1	23.5	25.9	30.0	35.5	41.3	52.1	62.9
23:00	37.0	23.4	25.2	27.9	32.3	38.5	45.3	64.3

Overall L_{eq}: **51.1**

L_{eq} (day*): **51.6**
L_{eq} (night):** **38.8**

Lowest L_{90} (day): **32.2**
Lowest L_{90} (night): **27.9**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Location 9 - Continuous Monitoring - Winter

Northern Pass
Tuesday, March 25, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	36.9	23.4	24.7	27.0	30.4	36.8	47.6	64.8
01:00	31.8	22.1	23.8	25.9	28.8	34.4	41.3	50.1
02:00	34.3	22.9	23.8	25.0	29.0	36.5	45.7	55.8
03:00	35.0	23.1	24.3	25.9	29.3	36.6	45.1	58.0
04:00	35.2	23.7	25.0	27.1	31.0	37.6	44.5	56.1
05:00	40.5	27.8	29.1	31.7	36.0	41.0	48.0	68.2
06:00	44.8	31.9	33.7	36.4	40.6	46.6	56.2	66.7
07:00	50.5	35.9	38.2	40.4	43.9	51.3	59.9	78.8
08:00	47.0	33.4	35.5	37.5	41.7	50.1	58.0	67.1
09:00	48.4	31.3	34.1	36.6	40.9	49.2	60.5	72.5
10:00	47.8	31.8	34.0	36.3	41.1	48.7	59.3	72.8
11:00	46.7	35.5	37.4	39.8	44.0	50.1	55.3	63.5
12:00	48.2	37.3	39.3	41.4	45.6	50.6	57.1	74.0
13:00	57.3	37.0	38.8	43.4	48.0	55.9	69.3	84.7
14:00	53.7	36.0	38.2	40.9	45.8	52.9	63.9	79.5
15:00	47.5	36.3	39.2	41.6	44.8	49.3	57.1	70.0
16:00	44.0	34.3	36.5	38.6	42.2	46.4	52.1	68.7
17:00	43.2	30.9	33.3	36.4	40.5	45.8	52.6	62.5
18:00	39.8	27.4	29.3	32.2	36.7	42.4	49.5	58.7
19:00	42.1	27.3	30.5	34.0	38.5	43.3	53.3	64.5
20:00	42.8	28.2	30.8	35.2	39.8	45.8	52.2	63.1
21:00	41.4	24.7	28.5	33.2	37.3	42.7	51.4	66.0
22:00	43.3	25.5	28.1	30.5	35.4	44.8	56.5	65.3
23:00	35.5	20.9	22.8	26.4	31.1	36.8	46.4	62.7

Overall L_{eq}: **47.7**

L_{eq} (day*): **49.5**
L_{eq} (night):** **39.6**

Lowest L_{90} (day): **32.2**
Lowest L_{90} (night): **25.0**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Location 9 - Continuous Monitoring - Winter

Northern Pass
Wednesday, March 26, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	30.5	19.9	21.3	23.2	28.3	33.3	39.9	47.4
01:00	35.0	19.8	20.4	22.0	27.4	32.6	41.9	62.4
02:00	30.1	20.3	21.3	23.1	28.0	32.8	39.6	44.9
03:00	31.8	20.7	22.6	24.4	28.5	34.7	40.3	53.4
04:00	32.5	20.3	21.2	23.7	28.8	36.6	41.6	49.4
05:00	37.3	25.6	27.1	29.4	33.1	38.9	44.4	65.5
06:00	46.3	31.5	33.4	35.6	40.9	46.2	59.0	73.2
07:00	47.1	34.7	37.1	39.7	43.3	49.6	57.4	69.6
08:00	46.1	35.3	37.0	38.9	42.3	48.5	57.2	69.1
09:00	48.1	36.3	38.1	40.5	45.6	51.0	56.7	70.1
10:00	48.6	36.4	39.1	41.6	46.2	51.7	57.2	66.7
11:00	52.0	41.6	43.0	45.2	49.3	54.7	61.1	73.8
12:00	52.1	41.8	43.3	45.7	49.7	55.3	60.4	71.7
13:00	52.2	42.0	44.0	46.4	49.9	55.2	61.0	66.2
14:00	55.9	43.8	45.4	47.5	51.6	58.4	65.3	80.0
15:00	55.2	44.9	46.7	48.5	52.0	58.2	64.6	73.2
16:00	55.4	44.8	46.8	48.7	52.3	58.5	64.9	70.0
17:00	54.0	43.3	44.8	47.0	51.0	57.1	63.7	69.4
18:00	50.9	40.7	42.3	44.4	48.5	53.7	60.1	67.0
19:00	50.9	39.6	41.6	43.5	47.5	54.0	60.2	70.8
20:00	50.5	38.1	39.9	42.6	47.1	53.4	61.0	66.0
21:00	50.2	35.2	37.3	40.7	45.7	53.3	61.0	66.4
22:00	50.5	37.8	39.9	42.0	47.1	53.8	59.7	65.1
23:00	47.1	31.7	33.2	36.4	42.4	50.2	58.5	61.7

Overall L_{eq}: **50.6**

L_{eq} (day*): **52.2**
L_{eq} (night):** **43.9**

Lowest L_{90} (day): **38.9**
Lowest L_{90} (night): **22.0**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Location 9 - Continuous Monitoring - Winter

Northern Pass
Thursday, March 27, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	48.2	26.2	28.1	31.6	36.8	48.9	60.3	70.9
01:00	44.1	26.8	28.5	30.7	36.7	47.1	56.0	61.9
02:00	43.9	25.5	26.6	31.0	37.2	46.9	54.9	63.3
03:00	39.5	25.0	26.8	28.6	34.3	42.9	50.6	56.1
04:00	38.6	24.6	26.0	28.1	33.6	40.3	50.2	58.7
05:00	44.3	28.4	30.4	33.3	39.4	47.4	55.5	63.9
06:00	50.8	33.4	36.4	40.5	47.5	54.3	60.5	65.6
07:00	52.3	42.0	44.4	46.6	50.0	55.1	61.1	66.4
08:00	51.7	36.0	39.3	42.2	47.4	54.3	62.1	78.7
09:00	48.9	33.9	36.4	39.6	44.4	50.5	60.0	73.4
10:00	50.0	35.6	38.5	41.0	45.3	51.7	59.8	78.8
11:00	46.9	32.9	35.4	38.0	42.7	49.5	57.1	67.8
12:00	46.5	35.6	37.4	41.1	44.5	49.1	54.5	71.7
13:00	45.6	31.7	34.6	37.7	42.3	48.6	54.2	67.6
14:00	45.8	31.6	35.3	38.1	42.2	47.1	53.9	73.7
15:00	44.6	31.4	34.2	37.3	42.7	47.6	52.0	63.3
16:00	47.6	36.8	39.1	42.0	45.3	49.8	56.1	69.0
17:00	43.7	31.2	33.6	37.1	41.9	46.5	51.7	61.9
18:00	41.9	29.8	31.4	33.8	39.0	45.1	51.3	58.7
19:00	42.5	32.9	34.5	36.5	40.0	44.8	52.4	61.8
20:00	41.6	30.2	32.2	34.5	38.6	44.9	50.8	58.4
21:00	39.1	26.6	29.1	32.0	36.3	41.9	48.5	57.2
22:00								
23:00								

Overall L_{eq}: **47.0**

L_{eq} (day*): **47.4**
L_{eq} (night):** **46.0**

Lowest L_{90} (day): **32.0**
Lowest L_{90} (night): **28.1**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Annex E

Continuous Monitoring
Summer

cta

Location 2 - Continuous Monitoring - Summer

Northern Pass
Monday, July 21, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00								
01:00								
02:00								
03:00								
04:00								
05:00								
06:00								
07:00								
08:00								
09:00	42.0	30.2	31.8	33.6	37.9	44.3	52.4	63.3
10:00	39.8	29.3	30.5	32.0	35.8	42.4	50.3	60.5
11:00	41.8	27.4	28.7	30.9	35.8	43.6	52.8	63.2
12:00	46.2	28.0	30.9	33.5	38.3	47.9	58.4	70.0
13:00	42.1	28.0	29.8	31.6	36.5	43.0	55.0	62.7
14:00	39.3	28.0	29.4	31.3	35.7	42.8	48.7	58.3
15:00	75.9	28.5	29.9	36.8	58.8	76.5	90.3	95.0
16:00	58.4	27.0	28.7	31.3	37.2	61.4	71.5	76.0
17:00	41.5	25.6	27.5	29.5	36.4	44.4	52.1	65.3
18:00	42.2	26.2	27.9	33.5	38.7	44.5	52.4	70.5
19:00	42.7	30.1	31.7	33.7	38.7	45.3	53.0	71.1
20:00	41.3	32.3	33.8	35.0	37.3	43.8	51.6	67.8
21:00	38.6	31.8	32.9	33.9	35.9	40.1	48.1	60.0
22:00	37.3	31.4	33.3	34.1	35.7	38.7	46.1	52.5
23:00	36.3	31.8	33.2	34.3	35.8	37.8	41.7	47.7

Overall L_{eq}: **64.3**

L_{eq} (day*): **64.9**
L_{eq} (night):** **36.9**

Lowest L_{90} (day): **29.5**
Lowest L_{90} (night): **34.1**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Location 2 - Continuous Monitoring - Summer

Northern Pass
Tuesday, July 22, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	35.7	31.6	32.6	33.5	35.0	37.2	42.0	47.8
01:00	35.0	31.0	32.2	33.2	34.5	35.9	38.6	50.6
02:00	35.6	31.4	32.6	33.4	34.8	36.2	41.7	51.8
03:00	35.5	30.5	32.2	33.5	35.1	36.9	39.6	45.5
04:00	53.2	32.0	33.4	34.3	36.5	56.3	66.0	73.3
05:00	49.7	33.7	35.7	37.1	40.3	48.7	63.5	72.5
06:00	43.2	37.0	38.4	39.6	41.3	45.0	50.6	67.0
07:00	46.9	38.1	39.8	40.7	42.8	46.8	54.9	82.8
08:00	44.2	38.2	39.3	40.2	42.3	46.7	52.3	59.1
09:00	42.3	34.1	36.0	37.0	40.0	44.7	50.9	63.2
10:00	41.9	31.2	32.6	33.9	37.9	44.8	52.1	63.5
11:00	42.6	30.7	32.3	34.1	37.8	43.6	51.8	69.4
12:00	42.6	29.9	31.1	32.5	37.8	45.6	53.7	62.6
13:00	43.8	31.2	32.7	35.0	40.1	46.6	53.9	65.5
14:00	40.8	30.9	32.9	34.7	38.0	43.7	48.7	62.4
15:00	43.1	30.4	32.6	34.3	38.4	44.7	54.2	68.2
16:00	43.4	31.6	33.6	35.7	39.3	46.4	53.6	61.0
17:00	47.4	34.7	36.2	38.5	43.9	50.6	57.1	67.2
18:00	44.9	34.5	36.2	38.1	41.8	47.6	54.5	62.5
19:00	44.6	34.1	35.6	37.2	40.4	46.6	54.2	71.6
20:00	46.4	33.9	35.6	37.1	40.3	46.2	56.8	70.7
21:00	39.3	34.1	35.1	36.1	38.1	41.7	45.7	55.3
22:00	38.4	32.8	33.8	34.9	36.7	40.3	45.5	55.5
23:00	37.2	31.8	33.3	34.2	35.6	39.4	44.6	53.5

Overall L_{eq}: **44.9**

L_{eq} (day*): **44.2**
L_{eq} (night):** **45.9**

Lowest L_{90} (day): **32.5**
Lowest L_{90} (night): **33.2**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Location 2 - Continuous Monitoring - Summer

Northern Pass
Wednesday, July 23, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	38.8	32.1	33.2	34.3	36.9	42.1	46.4	51.7
01:00	40.1	33.5	34.5	35.9	38.4	43.1	47.4	49.9
02:00	36.3	31.5	33.0	33.8	35.2	37.6	44.5	49.3
03:00	35.8	32.2	33.4	34.2	35.4	37.1	40.3	45.0
04:00	45.2	32.0	33.7	34.8	37.5	48.2	55.0	75.3
05:00	46.1	34.2	36.4	38.1	40.3	46.4	54.4	76.3
06:00	44.1	37.6	39.0	40.1	41.9	46.0	52.6	66.3
07:00	44.8	38.7	39.9	41.3	43.3	46.8	51.9	63.6
08:00	44.7	36.6	38.3	39.7	42.0	45.5	54.1	71.7
09:00	49.0	34.6	35.8	37.0	40.5	45.0	52.2	80.6
10:00	47.3	34.9	36.4	38.2	42.1	47.2	58.6	70.0
11:00	47.8	35.1	36.7	39.2	42.7	48.1	58.4	72.0
12:00	48.3	36.3	37.7	40.7	44.6	49.3	58.5	71.7
13:00	48.7	38.4	39.6	41.5	45.6	50.3	57.0	71.6
14:00	47.0	36.7	39.0	40.7	45.0	49.3	54.6	69.0
15:00	48.1	38.5	39.8	41.8	45.7	50.5	56.7	69.0
16:00	45.3	37.7	39.3	40.7	43.9	48.1	51.5	57.1
17:00	45.2	34.6	37.1	39.7	43.3	47.7	53.8	64.1
18:00	43.8	35.3	37.0	38.4	41.3	45.7	50.9	72.3
19:00	52.8	36.3	37.8	39.3	47.3	53.7	59.0	88.0
20:00	58.7	41.5	43.0	46.1	52.6	60.7	68.5	88.6
21:00	57.0	33.3	35.3	37.9	51.1	59.4	67.7	81.5
22:00	48.5	34.5	35.8	37.7	42.1	49.4	58.9	79.4
23:00	55.0	24.0	40.4	41.8	45.8	56.6	66.8	84.9

Overall L_{eq}: **50.3**

L_{eq} (day*): **51.3**
L_{eq} (night):** **47.6**

Lowest L_{90} (day): **37.0**
Lowest L_{90} (night): **33.8**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Location 2 - Continuous Monitoring - Summer

Northern Pass
Thursday, July 24, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	41.2	34.4	35.2	36.8	39.7	42.7	48.8	65.3
01:00	38.1	34.3	35.1	36.2	37.8	39.7	41.3	58.4
02:00	38.2	31.5	33.0	34.7	37.1	39.5	44.9	63.3
03:00	39.7	31.3	32.7	34.9	37.6	41.5	47.8	67.6
04:00	44.1	35.1	36.0	36.7	38.5	42.6	57.5	63.7
05:00	51.8	32.9	35.1	36.4	38.8	49.6	63.9	84.6
06:00	45.4	34.6	35.7	36.7	38.9	43.7	56.9	69.5
07:00	45.1	28.5	36.5	37.8	41.3	47.4	53.9	72.5
08:00	41.9	34.8	36.2	37.3	39.8	44.6	50.0	59.8
09:00	44.5	34.5	36.0	37.7	41.0	46.3	53.1	68.1
10:00	43.5	34.3	36.7	38.4	41.1	45.1	51.5	63.1
11:00	40.3	31.4	33.0	35.0	37.9	42.9	49.5	56.8
12:00	41.5	30.3	32.0	33.8	37.9	43.1	51.4	65.6
13:00	40.7	29.5	31.0	34.3	39.0	43.3	49.1	57.6
14:00	43.6	34.0	35.5	37.3	41.1	46.4	52.3	65.0
15:00	45.6	35.1	36.8	39.2	43.4	48.3	53.9	67.4
16:00	48.0	38.4	39.5	41.4	45.3	49.5	59.1	66.1
17:00	45.4	35.9	37.6	40.1	43.7	47.9	51.9	66.0
18:00	44.0	34.7	36.2	38.2	42.0	46.8	51.6	68.7
19:00	46.4	33.1	34.4	36.0	40.7	47.2	58.7	68.5
20:00	40.5	32.2	33.5	34.7	37.4	43.7	49.4	62.5
21:00	38.0	32.4	34.1	35.4	36.9	39.5	44.8	51.4
22:00	39.6	30.9	32.3	33.2	35.5	43.3	49.1	55.9
23:00	34.8	29.7	30.7	31.5	33.1	36.4	43.5	51.0

Overall L_{eq}: **44.2**

L_{eq} (day*): **44.0**
L_{eq} (night):** **44.6**

Lowest L_{90} (day): **33.8**
Lowest L_{90} (night): **31.5**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Location 9 - Continuous Monitoring - Summer

Northern Pass
Monday, July 21, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00								
01:00								
02:00								
03:00								
04:00								
05:00								
06:00								
07:00								
08:00								
09:00								
10:00								
11:00	46.6	38.8	40.3	42.1	44.6	48.8	55.2	62.9
12:00	44.8	36.8	38.9	40.7	43.2	46.8	52.8	67.3
13:00	45.4	36.7	38.8	40.6	43.5	47.7	53.7	64.7
14:00	45.6	37.8	39.2	41.0	44.3	48.2	52.5	61.6
15:00	46.4	37.5	38.7	40.5	44.4	49.7	53.7	65.2
16:00	46.7	38.4	39.6	41.1	44.0	48.5	55.8	71.1
17:00	49.5	39.2	40.4	42.7	45.4	50.5	60.5	72.4
18:00	47.6	37.7	39.8	41.4	43.9	48.4	58.9	69.9
19:00	45.8	36.9	38.3	40.3	43.0	48.0	55.9	65.1
20:00	46.5	36.4	37.9	40.1	43.0	48.4	56.5	67.9
21:00	41.7	34.4	35.5	37.0	39.6	44.5	50.0	58.6
22:00	39.2	32.8	33.7	34.5	36.8	41.1	48.7	55.9
23:00	39.8	31.5	32.2	32.9	34.6	39.8	49.4	62.3

Overall L_{eq}: **45.8**

L_{eq} (day*): **46.4**
L_{eq} (night):** **39.5**

Lowest L_{90} (day): **37.0**
Lowest L_{90} (night): **32.9**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Location 9 - Continuous Monitoring - Summer

Northern Pass
Tuesday, July 22, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	35.8	31.1	32.0	32.4	33.6	37.7	43.4	58.8
01:00	35.3	30.8	31.7	32.1	33.0	36.8	43.6	53.9
02:00	34.4	30.8	31.3	31.6	32.2	35.4	42.3	56.8
03:00	34.6	30.6	31.4	31.9	32.8	37.6	41.1	46.6
04:00	37.2	30.9	31.7	32.2	34.6	39.2	44.1	58.4
05:00	41.1	33.2	34.3	35.4	39.0	42.8	50.5	59.3
06:00	47.2	35.5	37.2	39.4	43.3	49.4	56.2	72.0
07:00	46.1	36.9	38.5	40.9	43.7	48.9	54.8	60.7
08:00	46.3	35.8	37.6	40.0	42.9	50.3	55.2	67.7
09:00	47.1	37.2	38.7	40.2	43.3	51.1	56.0	64.2
10:00	47.4	35.8	38.0	39.2	41.8	46.8	53.8	73.9
11:00	48.1	37.8	39.6	42.5	46.0	50.0	55.6	73.9
12:00	48.7	40.6	42.3	44.1	46.9	50.9	56.4	68.2
13:00	50.9	39.1	41.6	44.5	48.1	52.5	57.8	74.7
14:00	47.9	40.1	42.0	43.8	46.5	50.4	54.4	63.0
15:00	55.6	40.5	42.5	45.2	49.4	58.5	66.9	73.1
16:00	49.7	41.7	43.3	45.2	48.0	51.9	57.4	66.9
17:00	49.5	40.8	42.4	44.7	47.1	50.6	56.3	74.6
18:00	50.5	38.4	40.7	42.6	45.7	50.1	59.7	74.5
19:00	51.9	37.2	38.9	41.3	45.3	50.5	64.1	81.3
20:00	43.6	35.2	36.9	39.0	41.8	46.1	51.5	61.0
21:00	41.0	33.3	34.6	36.3	38.8	43.8	49.4	59.5
22:00	39.4	32.4	33.2	34.2	36.8	41.3	49.5	57.9
23:00	36.2	31.7	32.5	33.2	34.7	38.3	42.8	51.3

Overall L_{eq}: **47.8**

L_{eq} (day*): **49.6**
L_{eq} (night):** **40.3**

Lowest L_{90} (day): **36.3**
Lowest L_{90} (night): **31.6**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Location 9 - Continuous Monitoring - Summer

Northern Pass
Wednesday, July 23, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	34.7	31.2	31.9	32.3	33.2	36.1	41.6	53.1
01:00	34.9	30.9	31.5	31.9	32.8	36.6	44.3	56.9
02:00	37.1	30.5	31.2	31.6	32.7	38.2	48.4	56.4
03:00	36.4	30.9	31.8	32.4	33.5	38.7	45.1	55.4
04:00	38.6	31.6	32.5	33.6	36.7	40.8	45.8	59.4
05:00	44.4	34.4	35.8	38.1	43.0	46.5	52.5	61.2
06:00	43.6	33.9	37.0	39.3	42.1	46.0	51.3	57.4
07:00	46.1	38.1	40.0	41.6	44.3	48.2	54.7	63.5
08:00	48.4	37.5	39.1	41.1	44.6	50.9	57.2	68.0
09:00	50.1	38.2	39.9	41.5	44.9	52.6	61.6	70.9
10:00	48.2	37.1	39.5	42.5	46.5	51.0	55.9	67.3
11:00	48.8	39.1	41.8	44.0	47.4	51.5	55.4	63.6
12:00	49.7	41.1	43.2	45.0	47.9	52.3	57.9	66.8
13:00	50.4	43.1	44.5	46.0	48.8	53.0	57.8	71.1
14:00	50.9	40.7	42.7	45.0	48.4	53.4	60.0	73.5
15:00	49.4	41.0	43.3	45.6	48.0	51.7	56.8	64.5
16:00	49.9	42.2	44.1	45.8	48.3	52.1	57.7	64.3
17:00	59.4	41.8	43.3	45.7	50.5	65.7	68.2	79.0
18:00	64.2	48.8	50.5	54.6	60.7	67.6	69.6	90.5
19:00	58.2	48.0	50.1	52.8	55.9	59.8	66.9	81.8
20:00	49.3	39.7	41.4	43.4	46.8	53.3	56.7	63.6
21:00	46.4	39.5	41.3	42.8	45.0	48.9	53.1	62.7
22:00	55.7	48.7	50.3	52.3	54.8	58.1	60.3	71.1
23:00	56.5	40.7	42.6	45.2	52.3	60.3	66.7	69.9

Overall L_{eq}: **54.0**

L_{eq} (day*): **55.3**
L_{eq} (night):** **50.0**

Lowest L_{90} (day): **41.1**
Lowest L_{90} (night): **31.6**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Location 9 - Continuous Monitoring - Summer

Northern Pass
Thursday, July 24, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	46.0	36.5	38.2	39.8	44.1	49.6	52.4	63.7
01:00	45.6	37.4	39.1	40.8	43.6	49.0	51.9	61.9
02:00	44.5	34.8	35.7	37.3	40.5	46.5	56.3	63.2
03:00	56.5	33.7	34.7	35.2	38.5	58.6	69.7	78.7
04:00	39.6	34.2	34.8	35.4	37.5	42.5	47.5	54.9
05:00	42.6	34.8	35.9	36.9	39.9	45.1	51.9	60.7
06:00	44.4	35.1	36.1	38.4	42.4	47.2	52.5	61.9
07:00								
08:00								
09:00								
10:00								
11:00								
12:00								
13:00								
14:00								
15:00								
16:00								
17:00								
18:00								
19:00								
20:00								
21:00								
22:00								
23:00								

Overall L_{eq}: **49.4**

L_{eq} (day*):
L_{eq} (night):** **49.4**

Lowest L_{90} (day):
Lowest L_{90} (night): **35.2**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

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Northern Pass Project – Sound Report 2

Franklin Converter Terminal

Sound Impact Assessment

Introduction

As part of the Northern Pass Project, Northern Pass Transmission LLC is proposing to construct a converter terminal in Franklin, New Hampshire. Cavanaugh Tocci Associates, Inc. has been asked to provide sound impact assessment of this facility. In that this evaluation precedes the actual design of the facility, this sound impact assessment is based on acoustic design requirements that will be incorporated into the Project contracts. To assist in defining appropriate acoustic design goals for this facility, we have conducted an extensive sound monitoring program. This report presents the results of the sound monitoring program, a review of applicable noise regulations, a statement of the acoustic design goals for the project, and an assessment of Project sound impact.

Baseline Sound Survey

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, defining appropriate acoustic design goals for the proposed Converter Terminal that are based on an understanding of the existing acoustic environment will render Project related noise consistent with the level and character of other sounds in the environment, and will minimize acoustic impact at sensitive receptors.

An environmental sound survey was conducted to characterize the existing acoustic environment in the vicinity of the proposed converter terminal. In order to document the time-varying characteristics of ambient environmental sounds in the study area, the sound monitoring program implemented unattended continuous measurements for two 7-day periods, and observed short-term (15-minute) intermittent measurements. The measurements were conducted during a cold weather season (January 30, 2014 – February 6, 2014) with leaves off the trees, and a warm weather season with foliage and insect sounds present (June 16, 2014 – June 23, 2014). The results of the survey allow both quantitative and qualitative analyses of the acoustical environment surrounding the Project. Annex A of this report is a glossary of acoustical terminology.

Sound Measurement Locations

A review of the existing land use in the vicinity of the converter terminal site was conducted to identify the closest and most representative receptor locations. On the basis of this review, three sound monitoring locations were selected, as shown in Figure 1. The sound monitoring locations may be described as follows:

- **IM-N**: Intermittent monitoring location North: Lat: 43.3958 Long: -71.6462
- **IM-E**: Intermittent monitoring location East: Lat: 43.3925 Long: -71.6462
- **IM-S**: Intermittent monitoring location South: Lat: 43.3884 Long: -71.6486
- **CM-1**: Continuous monitoring location 1 (IM-E): Lat: 43.3925 Long: -71.6462

Continuous Sound Monitoring

To identify typical patterns in existing ambient environmental sound levels, and to quantify time-varying ambient sound levels in the community, continuous sound monitoring was performed at one location adjacent to the nearest residence southeast of the Project area, as shown in Figure 1 (CM-1). For both the cold and warm weather seasons, data was gathered for a 7-day (168-hour) period. The measurement periods were:

- January 30, 2014, 12:00 noon to February 6, 2014, 12:00 noon
- June 16, 2014, 1:00 p.m. to June 23, 2014, 1:00 p.m.

For these continuous measurements, sound levels were monitored using Larson Davis 831 sound level meters outfitted with ½ inch electret microphones and windscreens. The microphones were mounted on tree branches that were approximately 1.5 meters above the ground. The instruments were calibrated before and after the measurement periods using a Larson Davis CAL200 acoustical calibrator. These instruments are compliant with international standards for class 1 instrumentation (IEC 61672-1:2002, and IEC 60942-1:2003), and have current calibration certificates traceable to National Institute of Standards and Technology (NIST).

For this study, the sound monitors were programmed to report the following A-weighted environmental noise descriptors on an hourly basis:

- Maximum and minimum sound levels (L_{max}, L_{min})
- Percentile sound levels (L_{99}, L_{90}, L_{50}, L_{10}, L_{01})
- Equivalent sound level (L_{eq})

A complete listing of all of the hourly metrics that were recorded can be found in Annex B.

Intermittent Sound Monitoring

Intermittent sound measurements were performed for 15-minute intervals at three representative receptor locations (identified in Figure 1 as IM-N, IM-E, and IM-S). The measurements were performed during both daytime and nighttime periods on January 30-31, 2014, and June 16-17, 2014. These measurements were conducted with a Bruel and Kjaer Instruments Type 2250 sound level analyzer outfitted with a ½ inch electret microphone and windscreen. During all measurements, the meter was mounted on a tripod with the microphone situated approximately 1.5 meters above the ground. The instrument was calibrated before and after use with a Bruel and Kjaer Instruments Type 4231 acoustical calibrator. These instruments are compliant with international standards for class 1 instrumentation (IEC 61672-1:2002, and IEC 60942-1:2003), and have current calibration certificates traceable to National Institute of Standards and Technology (NIST).

The results of the measurements are presented in Annex C. The data presentation format has three primary elements:

- The first is a listing of A-weighted descriptors on the upper left hand side of the figures. Note that the statistical descriptors (L_n) are presented in order of decreasing value. Logically, the L_{max} is the highest sound level reached during the 15-minute interval; the L_{01} is the next highest since it is exceeded only 1 percent of the time interval, and so forth. The L_{eq} and L_{90} are shown shaded, as they are the key descriptors used in evaluating background sound levels.
- The second element in these figures is a 1/3 octave band spectrum of the L_{90} sound pressure level. This spectrum is used to identify the presence of distinct tonal characteristics and to quantify the frequency content associated with the background sounds. Note that nighttime data during the warm weather monitoring period (June 17, 2014) indicates significant tonal sound in the 4,000, and 5,000 Hz frequency bands. These high frequency sounds are associated with insect noise.

- The third element at the bottom of the figures is a graphic level record, or time-history, of the A-weighted sound level in 1-second increments recorded over the 15-minute interval. The peaks in these figures are associated with transient sounds mainly produced by passing vehicles on South Main Street (US-3). Note that due to a data storage error, the time history data for the nighttime winter samples is not available.

Survey Results

Figures 2 and 3 present selected results from the continuous sound monitoring that occurred during the winter and summer surveys. The sound level data included in the plots are the hourly L_{01} (nominal maximum level), the hourly L_{eq} (energy average level), and the hourly L_{90} (background level). In addition, we have included a dashed line to indicate the average of the lowest daily $L_{90(1\text{-hour})}$ sound levels measured for each week. This value represents a very conservative estimate of the lowest background sound levels that occur during the quietest periods of the entire survey. For the winter survey this value was 21 dBA, and for the summer survey this value was 27 dBA. It should be noted that these nominally lowest background sound levels only occur for brief periods of time (less than 6 minutes of an hour) and only during the early morning hours when there are significant gaps in traffic on South Main Street (US-3).

Table 1 below provides a summary of the intermittent measurement results:

Table 1: Summary of Intermittent Sound Measurements

	Cold Season (January 30-31, 2014)				Warm Season (June 16-17, 2014)			
	Daytime		Nighttime		Daytime		Nighttime	
Location	L_{eq}	L_{90}	L_{eq}	L_{90}	L_{eq}	L_{90}	L_{eq}	L_{90}
IM-N	53.5	26.9	50.9	25.0	51.7	31.6	41.4	26.4
IM-E	64.2	29.4	53.1	24.8	63.5	32.4	52.6	28.7
IM-S	57.0	28.6	58.2	20.9	56.5	31.1	45.3	24.2

For the most part sound in the community surrounding the converter terminal is dominated by traffic on South Main Street (US-3). In addition, low background sound levels associated with steady traffic on I-93 (approximately 2 miles east of the Project) contribute to the acoustic environment. As indicated in Figures 2 and 3, sound levels typically follow a diurnal pattern with the lowest levels occurring in the early morning hours when traffic is at a minimum. Finally, noises produced by birds, insects, and wind blowing through foliage are sources of background sound at all locations in the project area. These indigenous sounds depend on many factors including weather and time of year.

Sound Regulations

There are no Federal, or state noise regulations that define limits for environmental sound produced by the proposed project. However, the Code of the City of Franklin contains a noise ordinance. Selected text from this ordinance is presented below:

> ***Section 215-2. Prohibited Conduct***
>
> *It shall be unlawful for any person, firm or corporation to make, continue or cause to be made or continued or to allow to be continued any loud, unnecessary, unreasonable or unusual noises or any noise which either annoys, disturbs or endangers the comfort, repose, health, peace, safety, convenience, welfare and prosperity of others within the limits of the City of Franklin.*

The City Noise ordinance is a nuisance type prohibiting the production of sound that is an annoyance in the community. As a nuisance type ordinance, specific, measureable sound level limits are not provided. Engineering noise control requires that specific noise limits be defined. The following acoustic design goal will facilitate engineering analysis, and will avoid the nuisance condition prohibited in the "City" noise ordinance.

Facility Acoustic Design Goal

The acoustic design goal for this project has been based on limiting facility related sound to less than 10 dBA above the nominally lowest sound levels that were measured during the baseline sound surveys. For this project, the following acoustic design goal will be specified in the contract documents:

- The maximum sound level for continuous sound produced by the operation of all equipment located at the facility shall not exceed 30 dBA at any existing occupied residential receptor property when measured within the boundaries of the receptor property.

Noise mitigation options include, but are not limited to equipment selection, equipment placement, sound barrier walls, and sound enclosures. Prior to the purchase of equipment, the contractor will be required to demonstrate that the design will meet the acoustic requirements. The acoustic modeling for this anysis will use algorithms and procedures described in International Standard ISO 9613-2:1996 "Acoustics - Attenuation of sound during propagation outdoors – Part 2: General method of calculation." At the conclusion of construction, the contractor will demonstrate through field measurements that the Project complies with the acoustic specifications.

Sound Impact Assessment

The above acoustic design goal defines very stringent limits for sound produced by the proposed converter terminal that apply at all existing residential receptors. It is my professional opinion that if sound produced by the proposed Project meets the above stated acoustic design goals; it will not have an unreasonable adverse effect at all surrounding properties.

Aerial Photograph Indicating Project Site and Sound Monitoring Locations

Figure 1

cta

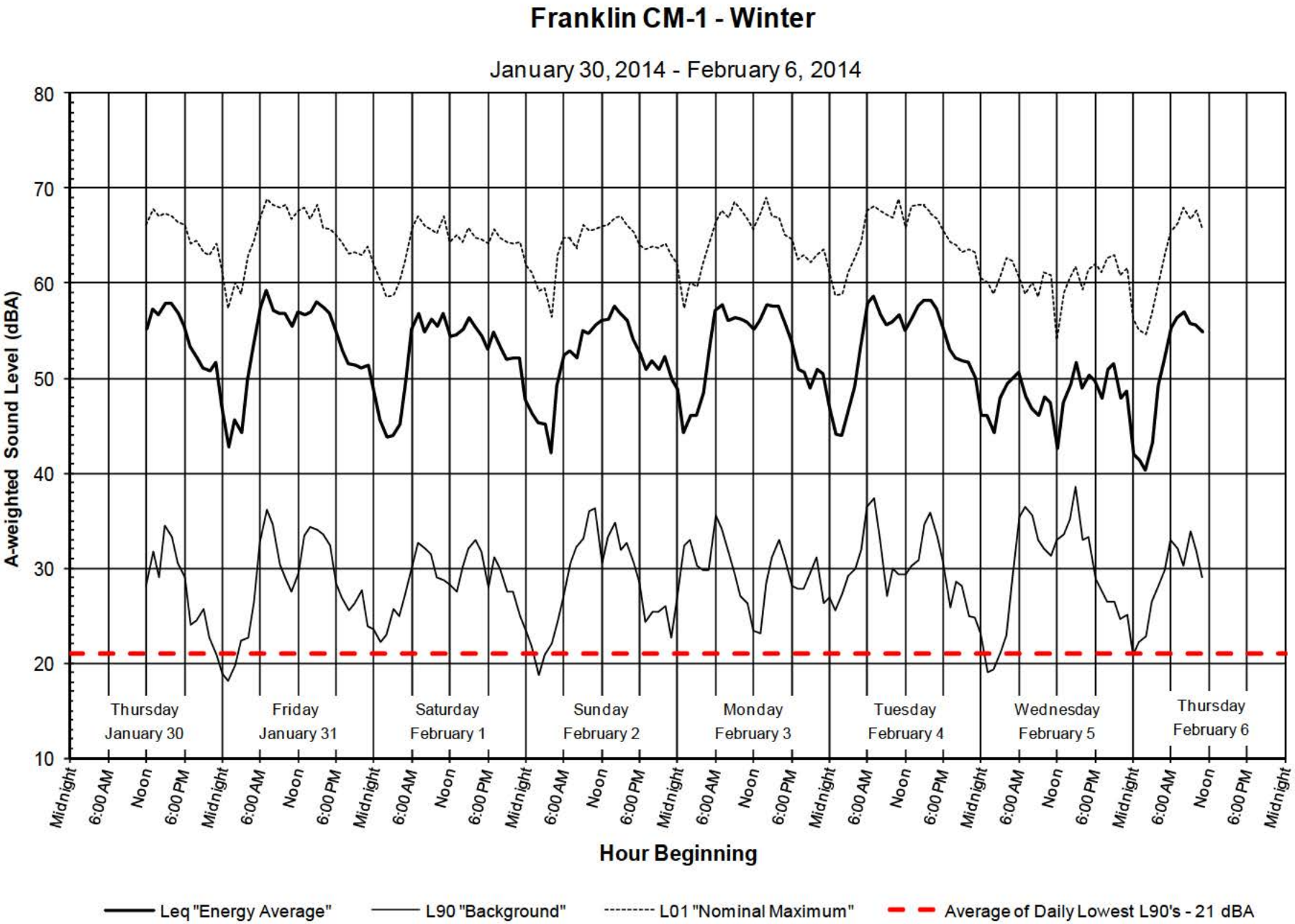

Franklin CM-1 - Winter
January 30, 2014 - February 6, 2014
A-weighted Sound Level (dBA)
80
70
60
50
40
30
20
10
Thursday January 30
Friday January 31
Saturday February 1
Sunday February 2
Monday February 3
Tuesday February 4
Wednesday February 5
Thursday February 6
Midnight
6:00 AM
Noon
6:00 PM
Hour Beginning
Leq "Energy Average"
L90 "Background"
L01 "Nominal Maximum"
Average of Daily Lowest L90's - 21 dBA

Figure 2

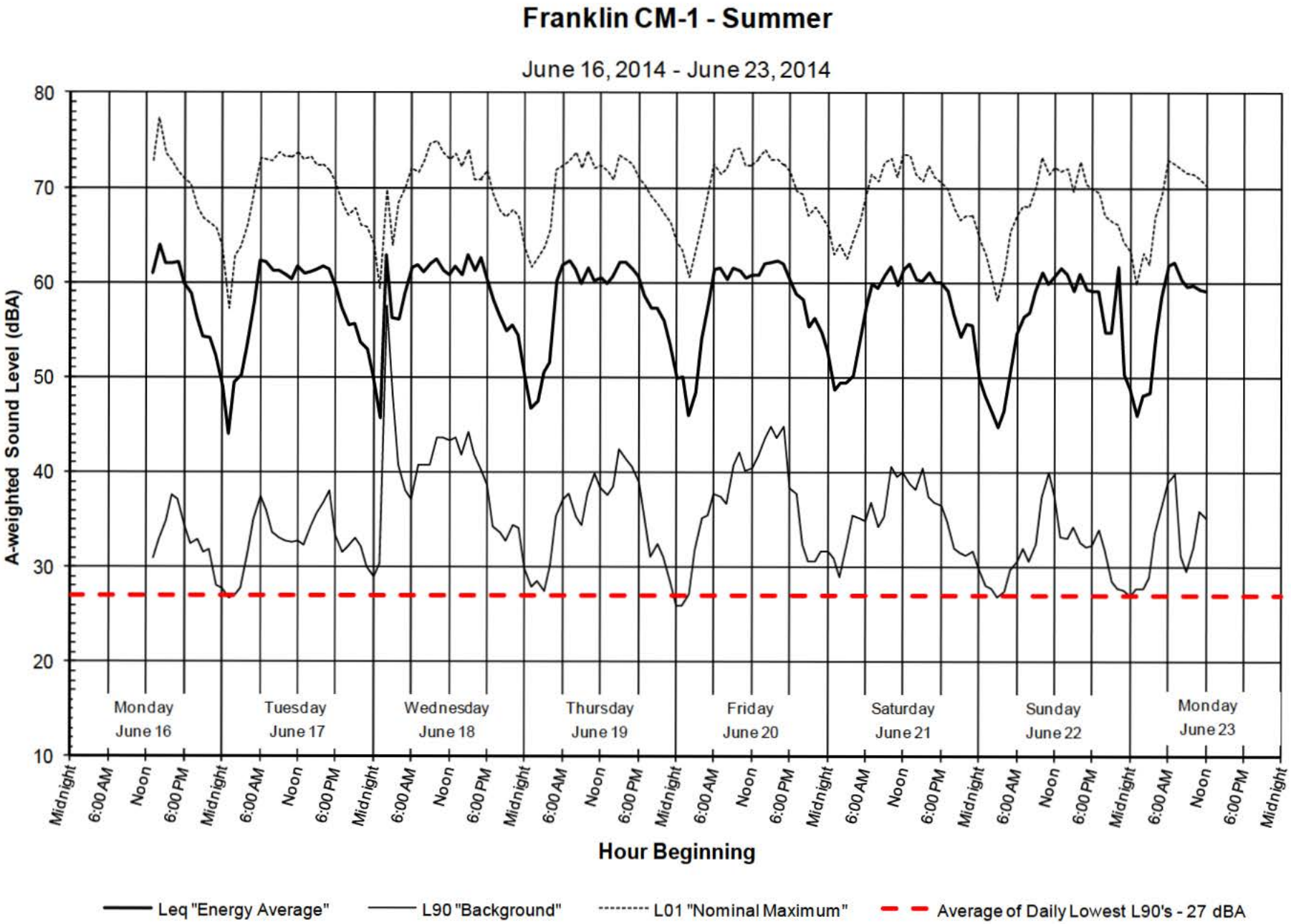

Franklin CM-1 - Summer
June 16, 2014 - June 23, 2014
A-weighted Sound Level (dBA)
80
70
60
50
40
30
20
10
Monday June 16
Tuesday June 17
Wednesday June 18
Thursday June 19
Friday June 20
Saturday June 21
Sunday June 22
Monday June 23
Midnight
6:00 AM
Noon
6:00 PM
Hour Beginning
Leq "Energy Average"
L90 "Background"
L01 "Nominal Maximum"
Average of Daily Lowest L90's - 27 dBA

Figure 3

Annex A

Sound Measurement Terminology

cta

SOUND MEASUREMENT TERMINOLOGY

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.

Spectral Characteristics – 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.

- L_{90} is the sound level in dBA exceeded 90 percent of the time during the measurement period. 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.

- L_{50} is the median sound level: the sound level in dBA exceeded 50 percent of the time during the measurement period.

- L_{10} is the sound level exceeded only 10 percent of the time. It is close to the maximum level observed during the measurement period. The L_{10} is sometimes called the *intrusive* sound level because it is caused by occasional louder noises like those from passing motor vehicles or aircraft.

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.

When a steady continuous sound is measured, the L_{10}, L_{50}, L_{90} and L_{eq} are all equal. For a constant sound level, such as from a power plant operating continuously for a 24-hour period, the L_{dn} is approximately 6 dBA higher than the directly measured sound level.

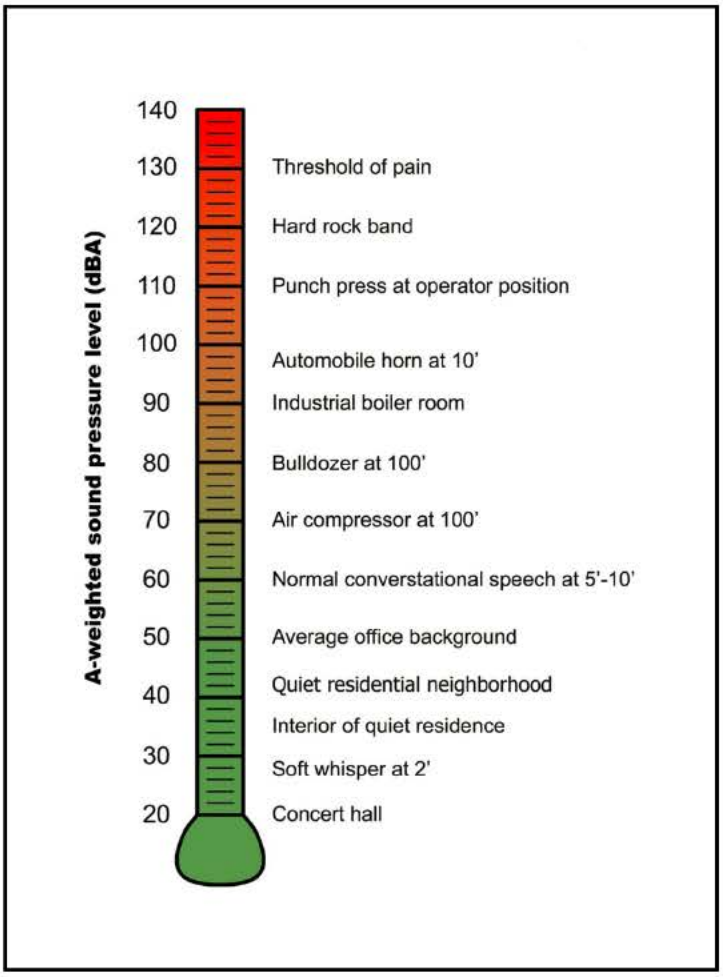


Figure A-1

Typical Sound Levels for Common Interior and Environmental Sources

Annex B

Continuous Sound Monitoring Data

cta

Franklin CM-1 - Winter

Northern Pass - Franklin Converter Station
Thursday, January 30, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00								
01:00								
02:00								
03:00								
04:00								
05:00								
06:00								
07:00								
08:00								
09:00								
10:00								
11:00								
12:00	55.1	20.8	23.3	28.1	42.8	59.7	66.2	73.8
13:00	57.2	21.4	24.0	31.7	45.4	60.4	67.8	81.7
14:00	56.6	20.0	22.6	29.0	46.3	61.6	67.1	73.6
15:00	57.9	26.2	29.1	34.5	52.2	62.4	67.3	74.7
16:00	57.9	25.0	27.2	33.3	51.8	62.6	67.0	73.0
17:00	56.8	22.1	24.1	30.6	48.9	61.7	66.4	72.9
18:00	55.5	21.2	24.0	29.1	44.0	60.2	66.2	73.5
19:00	53.3	19.0	20.5	24.0	36.9	58.2	64.2	71.2
20:00	52.1	20.6	22.1	24.5	32.5	56.1	64.4	70.1
21:00	51.0	22.2	23.5	25.7	32.7	54.9	63.3	71.8
22:00	50.8	18.0	19.8	22.7	32.0	54.8	63.0	69.5
23:00	51.7	17.4	18.6	20.9	28.3	54.9	64.1	73.1

Overall L_{eq}: **55.4**

L_{eq} (day*): **55.9**
L_{eq} (night):** **51.3**

Lowest L_{90} (day): **24.0**
Lowest L_{90} (night): **20.9**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Winter

Northern Pass - Franklin Converter Station
Friday, January 31, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	47.2	16.7	17.6	18.9	24.2	45.6	61.1	71.3
01:00	42.8	16.5	17.5	18.1	20.7	30.5	57.4	65.7
02:00	45.6	17.0	17.8	19.8	24.4	37.6	60.0	70.9
03:00	44.2	19.0	20.3	22.4	26.1	35.7	58.8	67.0
04:00	49.8	19.4	20.9	22.6	27.5	51.2	62.9	72.0
05:00	53.4	21.3	22.8	26.4	35.2	58.1	64.5	72.3
06:00	57.4	27.4	29.4	32.7	48.1	61.7	66.7	79.2
07:00	59.2	28.1	31.1	36.2	51.5	62.9	68.8	82.2
08:00	57.1	30.1	32.2	34.6	44.3	61.0	68.3	82.7
09:00	56.8	25.8	27.8	30.4	43.0	60.6	68.0	80.7
10:00	56.9	23.8	25.6	28.9	43.5	60.2	68.2	80.3
11:00	55.5	23.0	24.9	27.5	41.6	59.8	66.7	75.3
12:00	56.9	23.3	25.6	29.5	43.6	60.0	67.6	82.7
13:00	56.7	26.6	29.4	33.4	45.7	60.8	68.0	77.6
14:00	57.0	29.3	31.0	34.4	49.4	61.7	66.8	74.7
15:00	58.1	26.2	28.1	34.0	51.5	62.4	68.3	74.9
16:00	57.4	25.8	27.5	33.5	51.5	62.2	65.9	72.6
17:00	56.8	22.6	25.4	32.3	49.9	61.5	65.7	75.3
18:00	54.7	23.5	25.2	28.5	42.9	59.8	65.0	72.2
19:00	52.9	20.9	23.7	26.9	35.6	57.2	64.3	73.6
20:00	51.5	21.0	22.5	25.5	34.7	55.9	63.1	69.3
21:00	51.3	22.2	23.9	26.3	32.7	55.0	63.3	71.4
22:00	51.0	23.4	25.9	27.6	32.5	55.4	63.0	67.6
23:00	51.4	20.6	21.8	23.9	33.1	54.8	63.8	70.5

Overall L_{eq}: **55.1**

L_{eq} (day*): **56.4**
L_{eq} (night):** **51.4**

Lowest L_{90} (day): **25.5**
Lowest L_{90} (night): **18.1**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Winter

Northern Pass - Franklin Converter Station
Saturday, February 1, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	48.5	18.8	20.5	23.6	27.8	49.8	62.1	68.8
01:00	45.7	18.8	19.9	22.2	25.5	38.5	60.2	69.0
02:00	43.8	19.6	21.4	22.9	27.0	34.5	58.5	67.5
03:00	43.9	20.6	22.3	25.7	29.5	35.6	58.7	64.9
04:00	45.2	22.5	23.8	25.0	27.6	38.8	60.0	66.2
05:00	49.7	23.6	25.2	27.2	31.3	52.4	62.3	67.8
06:00	55.2	26.0	28.2	30.3	37.3	57.9	65.9	79.8
07:00	56.9	28.1	30.1	32.6	40.0	59.3	67.1	83.6
08:00	54.8	26.6	29.7	32.1	38.5	58.5	66.0	77.2
09:00	56.2	27.7	28.9	31.5	40.3	59.1	65.6	84.1
10:00	55.5	20.7	22.4	29.1	43.7	59.7	65.2	80.6
11:00	56.8	18.9	21.9	28.8	46.1	60.4	67.1	82.0
12:00	54.4	21.3	24.0	28.2	44.9	59.4	64.3	71.3
13:00	54.6	21.2	22.9	27.5	43.8	59.2	65.1	74.5
14:00	55.1	24.2	25.9	30.1	47.5	60.1	64.3	72.2
15:00	56.3	26.9	28.4	32.0	49.2	61.1	65.9	72.9
16:00	55.4	26.7	29.9	32.9	47.5	60.5	64.7	70.7
17:00	54.4	23.1	25.0	31.8	46.2	59.4	64.6	68.5
18:00	53.1	23.0	24.4	28.0	39.3	57.9	64.2	68.8
19:00	54.8	27.1	29.1	31.1	40.0	59.8	65.7	71.1
20:00	53.2	26.1	27.4	29.9	37.2	57.9	64.7	71.7
21:00	51.9	24.3	25.6	27.5	32.5	55.5	64.3	69.2
22:00	52.2	24.7	26.0	27.5	32.9	56.4	64.2	69.3
23:00	52.1	19.6	21.3	25.0	31.4	54.9	64.3	74.5

Overall L_{eq}: **53.8**

L_{eq} (day*): **55.1**
L_{eq} (night):** **50.2**

Lowest L_{90} (day): **27.5**
Lowest L_{90} (night): **22.2**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Winter

Northern Pass - Franklin Converter Station
Sunday, February 2, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	47.7	20.3	21.5	23.5	27.0	45.2	61.9	69.3
01:00	46.2	19.1	20.4	21.7	24.0	35.6	61.1	70.7
02:00	45.3	16.8	17.4	18.8	21.5	30.5	59.1	71.1
03:00	45.1	17.9	19.2	20.9	23.6	32.7	59.5	70.4
04:00	42.1	19.5	20.4	22.1	26.8	31.7	56.5	68.0
05:00	49.3	22.1	23.1	24.3	27.8	50.6	63.0	68.7
06:00	52.4	23.5	24.7	26.9	32.4	56.1	64.7	73.0
07:00	52.9	27.3	28.9	30.5	35.2	57.4	64.7	68.6
08:00	52.1	29.2	30.3	32.2	36.2	56.4	63.7	69.3
09:00	55.0	30.3	31.5	33.1	41.3	59.5	66.1	74.1
10:00	54.8	31.2	33.2	36.0	41.5	59.6	65.5	73.3
11:00	55.6	30.0	33.3	36.3	44.0	60.6	65.6	73.1
12:00	56.1	25.4	27.2	30.5	44.8	61.1	66.0	74.6
13:00	56.2	28.2	30.2	33.3	45.7	61.4	66.1	70.9
14:00	57.6	27.7	29.9	34.8	50.4	62.6	66.9	71.8
15:00	56.9	26.0	27.8	31.9	45.8	62.0	67.0	74.3
16:00	56.0	25.9	27.4	32.7	44.2	61.3	66.2	71.4
17:00	54.1	25.5	27.6	30.6	38.5	59.1	65.4	70.8
18:00	52.6	24.0	25.9	28.4	35.7	57.3	64.0	68.1
19:00	51.0	20.6	22.0	24.4	32.8	54.0	63.5	70.7
20:00	51.8	21.7	23.6	25.4	31.8	54.4	63.9	75.1
21:00	50.9	22.8	24.0	25.4	29.5	53.4	63.7	70.3
22:00	52.3	22.6	23.8	26.0	33.5	56.5	64.2	70.9
23:00	49.9	18.8	19.8	22.6	27.9	52.2	62.9	70.5

Overall L_{eq}: **53.3**

L_{eq} (day*): **54.7**
L_{eq} (night):** **49.0**

Lowest L_{90} (day): **24.4**
Lowest L_{90} (night): **18.8**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Winter

Northern Pass - Franklin Converter Station
Monday, February 3, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	48.8	22.6	24.6	26.7	34.0	46.8	62.1	71.9
01:00	44.2	28.1	29.8	32.4	38.0	44.5	57.3	65.7
02:00	46.0	28.4	29.9	32.9	37.2	43.7	60.1	68.1
03:00	46.1	26.0	28.2	30.3	34.3	43.2	59.6	71.7
04:00	48.4	26.2	27.9	29.8	35.2	47.1	62.0	69.6
05:00	53.1	24.0	25.7	29.8	37.8	57.9	64.0	72.3
06:00	57.1	27.5	29.8	35.5	49.8	61.7	66.5	73.7
07:00	57.8	26.9	30.2	34.2	51.1	62.0	67.6	74.9
08:00	56.1	24.0	26.1	31.6	44.4	60.5	66.9	74.4
09:00	56.3	24.8	26.6	29.5	41.7	60.2	68.5	76.3
10:00	56.2	21.9	23.9	27.0	39.7	60.1	67.8	79.3
11:00	55.9	19.9	21.5	26.3	42.8	60.2	66.8	75.5
12:00	55.1	18.8	20.1	23.4	43.4	59.9	65.6	74.0
13:00	56.0	18.7	19.7	23.2	42.7	60.3	67.3	75.2
14:00	57.8	20.2	23.1	28.4	49.1	61.9	69.0	75.5
15:00	57.6	22.0	24.1	31.1	51.0	62.3	67.1	73.9
16:00	57.6	24.4	27.2	33.0	51.3	62.2	66.9	73.3
17:00	55.6	24.5	26.9	31.0	46.7	60.6	65.0	71.7
18:00	54.0	22.2	24.0	28.1	39.4	59.1	64.6	70.5
19:00	51.0	23.4	25.5	27.8	35.0	55.6	62.5	68.1
20:00	50.6	22.7	24.5	27.8	33.4	54.5	63.0	67.8
21:00	48.9	25.4	27.3	29.6	33.1	51.2	62.2	66.0
22:00	51.0	25.2	27.8	31.1	35.5	55.2	62.9	69.7
23:00	50.5	21.5	23.3	26.3	32.4	51.5	63.5	74.1

Overall L_{eq}: **54.6**

L_{eq} (day*): **55.7**
L_{eq} (night):** **51.3**

Lowest L_{90} (day): **23.2**
Lowest L_{90} (night): **26.3**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Winter

Northern Pass - Franklin Converter Station
Tuesday, February 4, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	47.3	23.5	24.9	26.9	30.2	39.3	61.2	71.1
01:00	44.2	21.9	23.2	25.5	30.7	35.7	58.7	66.8
02:00	43.9	22.9	24.6	27.3	29.8	34.6	58.9	66.3
03:00	46.8	25.7	27.6	29.2	31.8	42.6	61.1	68.8
04:00	49.1	25.9	28.1	29.9	34.5	49.0	62.8	69.3
05:00	53.2	27.7	29.7	31.9	36.8	58.2	64.3	70.4
06:00	57.9	31.4	33.1	36.4	50.2	62.5	67.6	73.8
07:00	58.6	31.9	34.1	37.4	51.9	63.0	68.1	76.0
08:00	56.7	26.1	28.1	33.1	44.7	61.3	67.6	74.9
09:00	55.7	21.9	23.4	27.0	39.3	59.8	67.2	76.0
10:00	55.9	24.0	26.9	29.9	43.8	60.1	66.9	75.2
11:00	56.6	23.7	25.9	29.4	41.7	60.0	68.8	80.2
12:00	54.9	23.3	25.1	29.3	42.4	59.5	65.8	72.8
13:00	56.4	24.4	26.1	30.2	44.5	60.5	68.1	75.0
14:00	57.6	22.6	25.1	30.8	49.5	61.6	68.3	76.9
15:00	58.2	25.2	28.5	34.6	50.3	62.4	68.2	77.6
16:00	58.2	24.1	28.1	35.9	51.7	62.6	67.4	79.4
17:00	57.3	26.8	28.5	33.3	49.2	62.1	66.8	74.3
18:00	55.0	25.8	27.9	30.6	43.5	59.9	65.5	74.2
19:00	53.0	21.5	23.3	25.9	34.1	57.9	64.3	71.4
20:00	52.1	24.1	26.1	28.6	34.7	56.0	64.0	70.6
21:00	51.9	23.4	25.6	28.1	33.3	55.9	63.2	73.6
22:00	51.7	21.6	23.0	25.0	31.1	55.6	63.6	70.5
23:00	49.9	20.7	22.6	24.8	29.8	51.5	63.2	72.4

Overall L_{eq}: **55.1**

L_{eq} (day*): **56.3**
L_{eq} (night):** **51.6**

Lowest L_{90} (day): **25.9**
Lowest L_{90} (night): **24.8**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Winter

Northern Pass - Franklin Converter Station
Wednesday, February 5, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	46.0	20.2	21.5	23.2	27.2	42.0	60.6	67.8
01:00	46.0	16.9	17.7	19.1	26.0	40.7	60.1	71.6
02:00	44.2	17.0	18.2	19.3	23.6	33.0	58.9	69.2
03:00	47.9	18.7	19.8	21.2	23.7	41.0	60.9	72.3
04:00	49.4	20.3	21.5	22.9	27.7	51.5	62.6	68.8
05:00	50.1	23.8	26.3	28.7	35.9	53.8	62.4	68.8
06:00	50.6	32.4	33.6	35.4	41.9	54.9	60.6	72.6
07:00	48.0	32.5	35.1	36.4	40.0	51.5	58.8	68.4
08:00	46.8	31.6	33.8	35.6	38.8	46.9	60.0	69.3
09:00	46.1	29.9	31.4	32.9	36.3	46.6	58.5	70.7
10:00	48.1	29.4	30.6	32.1	34.7	47.8	61.2	74.3
11:00	47.4	27.3	28.9	31.3	35.9	46.2	60.9	68.9
12:00	42.6	29.6	31.3	33.0	36.7	44.9	54.0	62.6
13:00	47.4	29.0	30.7	33.6	38.6	48.4	59.0	73.3
14:00	49.2	31.3	32.8	35.1	40.2	52.5	60.6	69.9
15:00	51.7	34.8	36.3	38.6	44.0	55.8	61.8	73.5
16:00	49.0	29.6	30.9	32.9	39.5	53.8	59.3	70.8
17:00	50.3	29.0	31.1	33.2	37.9	54.3	61.4	73.0
18:00	49.7	24.4	26.5	28.9	33.5	52.4	62.1	69.8
19:00	47.9	24.8	26.3	27.6	30.5	49.2	61.1	70.0
20:00	50.9	23.9	25.2	26.4	29.7	47.7	62.6	79.7
21:00	51.5	23.2	25.0	26.5	30.0	49.4	63.0	81.1
22:00	47.9	21.7	23.4	24.6	28.4	49.4	60.8	71.6
23:00	48.6	21.5	23.1	25.1	29.3	50.8	61.6	70.0

Overall L_{eq}: **48.7**

L_{eq} (day*): **49.0**
L_{eq} (night):** **48.3**

Lowest L_{90} (day): **26.4**
Lowest L_{90} (night): **19.1**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Winter

Northern Pass - Franklin Converter Station
Thursday, February 6, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	41.9	18.3	19.6	20.8	24.1	36.3	56.3	65.5
01:00	41.3	18.5	20.1	22.2	26.5	32.4	55.0	66.6
02:00	40.3	19.5	21.3	22.8	25.8	32.5	54.6	65.2
03:00	43.1	23.2	24.3	26.4	29.5	38.8	56.7	67.3
04:00	49.2	24.5	26.3	28.2	31.9	46.7	60.2	78.5
05:00	51.8	25.7	27.4	29.8	36.4	54.9	62.9	76.2
06:00	55.2	26.2	28.5	32.9	46.7	59.8	65.3	71.7
07:00	56.4	25.4	28.2	32.1	48.7	60.7	66.3	74.8
08:00	56.9	24.0	26.2	30.3	44.1	60.3	67.9	81.0
09:00	55.8	27.8	30.2	33.8	44.0	60.2	66.7	74.9
10:00	55.6	26.5	28.5	31.8	41.3	59.5	67.6	76.3
11:00	54.8	21.6	24.0	29.0	39.5	59.2	65.8	75.7
12:00								
13:00								
14:00								
15:00								
16:00								
17:00								
18:00								
19:00								
20:00								
21:00								
22:00								
23:00								

Overall L_{eq}: **53.4**

L_{eq} (day*): **56.0**
L_{eq} (night):** **49.5**

Lowest L_{90} (day): **29.0**
Lowest L_{90} (night): **20.8**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Summer

Northern Pass - Franklin Converter Station
Monday, June 16, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00								
01:00								
02:00								
03:00								
04:00								
05:00								
06:00								
07:00								
08:00								
09:00								
10:00								
11:00								
12:00								
13:00	61.0	25.0	27.6	31.0	44.9	63.9	72.8	84.6
14:00	63.9	25.5	27.9	32.9	49.7	65.3	77.3	85.3
15:00	62.0	28.2	30.8	34.9	51.3	65.8	73.5	82.5
16:00	62.0	29.1	32.6	37.6	53.4	66.2	72.8	80.5
17:00	62.1	28.7	31.6	37.1	50.7	65.5	71.7	90.6
18:00	59.9	28.2	31.5	34.2	46.8	64.5	70.8	79.1
19:00	58.8	26.6	29.3	32.4	43.5	62.8	70.4	79.7
20:00	56.2	29.3	30.9	32.9	39.5	58.8	67.9	79.9
21:00	54.3	27.3	29.7	31.6	35.8	56.2	66.7	78.6
22:00	54.2	26.6	29.3	31.8	35.3	54.7	66.3	82.0
23:00	52.3	23.6	25.5	28.1	33.4	51.0	65.7	74.4

Overall L_{eq}: **60.1**

L_{eq} (day*): **60.8**
L_{eq} (night):** **53.3**

Lowest L_{90} (day): **31.0**
Lowest L_{90} (night): **28.1**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Summer

Northern Pass - Franklin Converter Station
Tuesday, June 17, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	49.0	23.9	25.6	27.7	30.9	44.2	63.9	70.8
01:00	44.0	22.9	24.8	26.7	29.7	34.2	57.2	70.9
02:00	49.5	23.7	25.5	27.0	29.8	38.1	62.9	79.0
03:00	50.2	23.7	25.6	27.7	31.2	40.3	63.7	77.3
04:00	53.4	27.6	29.2	31.5	38.4	53.1	66.2	78.2
05:00	57.9	30.5	32.7	35.0	41.9	61.8	69.3	82.1
06:00	62.3	31.0	33.9	37.4	50.5	65.8	73.1	85.9
07:00	62.2	30.1	32.1	36.0	52.8	66.0	73.0	82.1
08:00	61.2	26.6	30.1	33.7	46.3	63.8	72.8	87.6
09:00	61.3	25.6	28.0	33.0	47.1	64.0	73.7	83.8
10:00	60.8	26.8	29.1	32.7	44.8	63.1	73.3	84.6
11:00	60.3	25.5	28.6	32.6	44.7	63.4	73.2	82.5
12:00	61.7	26.5	29.0	32.7	47.1	64.0	73.7	85.6
13:00	60.9	26.6	28.7	32.3	46.4	63.9	73.0	84.2
14:00	61.1	27.5	29.5	34.2	49.3	64.6	73.2	82.0
15:00	61.4	27.9	29.9	35.6	52.0	65.6	72.3	80.7
16:00	61.7	27.0	33.0	36.9	52.4	66.0	72.4	80.7
17:00	61.3	30.3	34.4	38.0	52.4	65.9	71.8	78.3
18:00	59.4	27.0	29.8	33.3	46.8	63.7	70.5	81.2
19:00	57.3	26.0	28.8	31.6	42.1	62.3	68.3	77.6
20:00	55.5	27.2	29.2	32.1	39.6	59.8	67.1	77.6
21:00	55.7	28.5	30.6	33.0	36.9	57.8	67.8	78.6
22:00	53.7	27.8	29.7	32.1	36.4	54.3	66.0	77.9
23:00	52.9	26.8	28.5	30.1	34.0	50.7	65.8	81.2

Overall L_{eq}: **59.3**

L_{eq} (day*): **60.5**
L_{eq} (night):** **55.6**

Lowest L_{90} (day): **31.6**
Lowest L_{90} (night): **26.7**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Summer

Northern Pass - Franklin Converter Station
Wednesday, June 18, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	50.1	26.4	27.6	28.9	31.5	44.4	64.1	73.1
01:00	45.7	26.4	28.3	30.3	33.0	40.1	59.4	69.6
02:00	63.0	40.1	44.6	57.5	60.7	65.4	69.8	90.6
03:00	56.2	44.0	45.8	48.3	55.7	58.2	63.9	73.0
04:00	56.1	36.2	38.9	40.8	44.0	55.2	68.4	82.0
05:00	58.9	32.1	35.6	38.1	44.2	63.1	70.1	79.7
06:00	61.5	31.4	33.4	37.2	50.2	65.5	72.0	82.5
07:00	61.8	31.0	35.5	40.7	52.9	65.7	71.6	83.9
08:00	61.1	34.4	37.1	40.7	49.8	64.3	72.8	83.3
09:00	62.1	35.5	37.8	40.7	48.7	64.5	74.6	85.5
10:00	62.5	38.4	40.7	43.6	50.6	64.9	74.9	85.8
11:00	61.2	37.3	40.4	43.6	50.6	64.0	73.8	81.2
12:00	60.8	38.5	40.4	43.4	50.7	64.0	73.0	83.7
13:00	61.7	38.6	40.5	43.7	51.2	65.0	73.6	84.6
14:00	60.8	33.8	37.0	41.9	51.4	64.9	72.2	78.9
15:00	62.9	39.6	41.4	44.2	55.1	66.4	74.1	82.9
16:00	61.2	36.0	38.3	41.9	52.2	65.9	70.8	81.2
17:00	62.6	33.6	36.8	40.1	50.8	65.2	70.9	92.6
18:00	60.5	33.1	35.9	38.7	48.1	64.5	71.7	83.3
19:00	58.0	27.5	31.0	34.3	43.8	62.2	69.4	78.2
20:00	56.6	27.2	31.1	33.7	41.8	60.9	67.6	77.7
21:00	54.9	28.7	30.7	32.8	38.0	57.6	66.9	77.2
22:00	55.6	29.5	32.4	34.4	38.9	57.7	67.7	78.9
23:00	54.5	27.4	31.6	34.1	37.6	54.3	66.9	79.4

Overall L_{eq}: **60.1**

L_{eq} (day*): **61.0**
L_{eq} (night):** **58.1**

Lowest L_{90} (day): **32.8**
Lowest L_{90} (night): **28.9**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Summer

Northern Pass - Franklin Converter Station
Thursday, June 19, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	49.8	25.9	28.3	29.9	33.5	43.1	63.8	75.0
01:00	46.7	24.9	26.3	27.9	31.5	37.7	61.6	71.1
02:00	47.5	25.2	26.9	28.5	31.7	38.9	62.5	70.9
03:00	50.5	24.3	25.9	27.4	30.5	41.9	63.7	81.1
04:00	51.6	25.9	28.0	30.2	37.7	50.3	65.5	72.5
05:00	60.2	30.9	33.3	35.3	41.3	62.4	71.9	87.2
06:00	61.9	29.6	32.7	37.2	50.9	65.7	72.3	84.4
07:00	62.3	31.4	33.4	37.7	53.4	66.1	72.8	84.0
08:00	61.3	26.7	28.4	35.3	48.3	64.3	73.7	82.9
09:00	60.0	27.0	29.7	34.4	44.7	63.3	72.0	84.3
10:00	61.5	30.6	33.3	37.7	47.1	64.2	73.9	83.5
11:00	60.2	33.0	35.1	39.8	47.8	64.0	72.1	81.3
12:00	60.5	31.2	34.3	38.4	47.9	63.9	72.3	83.7
13:00	59.8	30.8	32.7	37.6	47.9	63.8	71.8	83.4
14:00	60.6	31.1	34.7	38.5	49.6	64.8	70.8	84.5
15:00	62.1	37.1	38.9	42.4	53.0	66.2	73.4	80.6
16:00	62.2	34.9	36.5	41.3	53.2	65.9	72.9	82.9
17:00	61.4	32.7	36.4	40.6	51.3	65.3	72.5	82.6
18:00	60.6	34.1	35.8	39.0	48.8	64.3	71.0	86.8
19:00	58.6	29.9	31.9	35.0	44.4	62.1	70.2	81.2
20:00	57.4	26.6	28.3	31.1	41.1	60.5	69.2	80.1
21:00	57.3	26.4	28.5	32.5	39.9	59.5	68.3	82.5
22:00	56.0	25.4	28.0	31.1	37.3	58.5	67.4	81.0
23:00	53.5	24.7	26.5	28.3	33.4	55.0	66.3	74.8

Overall L_{eq}: **59.4**

L_{eq} (day*): **60.6**
L_{eq} (night):** **56.1**

Lowest L_{90} (day): **31.1**
Lowest L_{90} (night): **27.4**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Summer

Northern Pass - Franklin Converter Station
Friday, June 20, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	49.9	23.5	24.7	26.0	29.2	46.8	64.3	72.8
01:00	50.0	23.0	24.6	25.9	28.8	40.0	63.4	75.8
02:00	46.0	23.3	24.9	27.1	31.7	39.0	60.5	69.6
03:00	48.4	28.2	30.1	31.9	35.2	42.5	63.2	71.6
04:00	54.0	29.0	31.8	35.2	39.3	52.5	66.5	80.4
05:00	57.9	31.2	33.3	35.4	41.0	61.9	69.5	78.3
06:00	61.4	33.2	35.6	37.8	50.5	65.5	72.5	80.7
07:00	61.5	30.4	32.9	37.4	52.4	66.0	71.5	80.1
08:00	60.4	30.7	32.3	36.7	47.9	64.3	72.0	81.5
09:00	61.6	33.9	36.4	40.8	49.6	64.6	74.1	83.6
10:00	61.3	36.7	37.7	42.1	49.3	64.3	74.2	81.5
11:00	60.4	34.4	36.4	40.1	48.4	64.3	72.4	82.3
12:00	60.8	35.0	36.9	40.4	49.1	64.6	72.4	84.1
13:00	60.8	34.6	36.6	41.6	50.1	64.5	73.1	80.3
14:00	62.1	37.7	39.7	43.7	52.3	65.3	74.1	83.8
15:00	62.2	39.3	41.5	44.8	53.7	66.0	73.0	81.5
16:00	62.4	36.0	38.5	43.7	53.6	66.2	73.0	84.4
17:00	62.0	38.4	41.0	44.8	53.4	66.0	72.5	83.4
18:00	60.3	31.6	33.2	38.4	48.8	64.5	71.8	78.9
19:00	58.8	31.5	33.3	37.8	47.3	63.5	69.7	78.7
20:00	58.2	27.9	30.0	32.5	41.8	61.0	69.3	81.4
21:00	55.3	25.9	28.3	30.7	37.9	59.7	67.0	76.1
22:00	56.3	26.6	28.1	30.7	36.7	58.6	68.0	82.7
23:00	54.8	28.3	29.9	31.7	37.6	55.9	67.0	78.4

Overall L_{eq}: **59.5**

L_{eq} (day*): **60.8**
L_{eq} (night):** **55.6**

Lowest L_{90} (day): **30.7**
Lowest L_{90} (night): **25.9**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Summer

Northern Pass - Franklin Converter Station
Saturday, June 21, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	52.7	26.6	29.3	31.7	35.7	51.1	65.8	79.1
01:00	48.8	27.3	29.1	30.9	34.1	42.2	63.0	77.1
02:00	49.5	25.2	27.1	29.0	33.2	42.0	64.0	76.1
03:00	49.5	27.2	30.1	32.4	36.2	42.7	62.5	79.9
04:00	50.3	30.1	33.1	35.5	39.3	45.9	64.3	73.5
05:00	53.4	30.6	32.8	35.1	39.2	51.5	66.5	77.7
06:00	57.5	30.3	32.3	34.8	40.7	60.0	69.1	81.2
07:00	59.9	30.6	33.5	36.8	45.3	63.9	71.5	80.0
08:00	59.4	28.1	31.0	34.2	45.3	63.2	70.7	81.4
09:00	60.8	28.9	31.9	35.3	47.6	64.1	72.7	87.0
10:00	61.7	34.6	36.5	40.6	51.9	65.3	73.1	86.5
11:00	59.8	33.2	36.1	39.6	48.5	63.8	71.1	84.3
12:00	61.5	33.6	35.8	40.0	49.8	64.9	73.5	85.6
13:00	62.0	32.1	35.2	38.8	49.6	64.8	73.4	86.8
14:00	60.4	31.3	34.6	38.2	49.2	64.5	71.4	81.1
15:00	60.2	35.5	37.2	40.5	49.6	64.5	70.7	82.0
16:00	61.2	31.5	33.3	37.4	49.5	64.7	72.3	82.9
17:00	60.1	31.3	33.5	36.9	48.3	64.1	71.2	83.6
18:00	60.0	29.5	32.1	36.5	46.6	62.9	70.5	86.0
19:00	59.1	26.0	30.0	34.8	46.6	63.0	70.0	81.3
20:00	56.6	27.5	29.5	32.0	40.7	60.9	67.8	78.9
21:00	54.4	27.4	29.2	31.5	37.4	57.4	66.6	76.5
22:00	55.6	27.4	29.1	31.2	36.6	58.1	67.1	79.4
23:00	55.4	27.2	30.0	31.7	36.3	55.5	67.1	84.1

Overall L_{eq}: **58.6**

L_{eq} (day*): **60.1**
L_{eq} (night):** **53.6**

Lowest L_{90} (day): **31.5**
Lowest L_{90} (night): **29.0**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Summer

Northern Pass - Franklin Converter Station
Sunday, June 22, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	49.9	26.3	28.2	29.9	34.9	44.1	64.8	72.0
01:00	48.0	25.4	26.6	28.0	30.7	39.0	63.0	72.4
02:00	46.3	24.6	26.0	27.7	30.0	36.6	60.6	72.8
03:00	44.8	24.3	25.7	26.8	28.6	34.3	58.2	69.7
04:00	46.4	23.4	25.9	27.5	32.3	40.7	61.3	70.0
05:00	51.0	25.6	28.0	29.8	33.3	47.3	65.4	74.6
06:00	54.6	24.9	27.7	30.6	37.1	56.6	67.2	74.3
07:00	56.5	26.5	29.4	32.0	39.7	60.3	68.2	75.9
08:00	56.9	25.9	27.5	30.6	39.7	60.3	68.0	80.0
09:00	59.2	27.1	29.2	32.5	44.2	62.7	70.3	85.6
10:00	61.1	31.9	34.2	37.4	47.4	64.0	73.2	85.7
11:00	59.9	31.4	35.6	40.0	48.3	63.7	71.5	80.7
12:00	60.9	30.4	32.5	37.5	49.1	64.7	72.2	80.4
13:00	61.5	26.6	28.4	33.2	47.6	63.9	71.7	87.0
14:00	60.9	25.5	28.4	33.1	48.9	64.6	72.0	86.0
15:00	59.2	27.3	29.1	34.3	48.6	64.0	69.7	78.0
16:00	61.0	25.9	28.1	32.6	48.3	64.4	72.8	82.1
17:00	59.3	25.4	28.3	32.1	47.9	64.0	70.4	78.0
18:00	59.1	26.0	29.3	32.3	47.4	63.9	69.9	80.1
19:00	59.1	27.3	29.9	34.0	46.3	63.2	69.5	83.2
20:00	54.8	27.1	29.3	31.8	37.4	58.3	67.0	73.9
21:00	54.8	24.8	26.4	28.5	34.7	56.1	66.5	83.2
22:00	61.7	24.4	25.9	27.7	32.0	51.4	66.1	95.6
23:00	50.4	24.5	26.3	27.6	30.6	47.5	64.4	74.7

Overall L_{eq}: **58.1**

L_{eq} (day*): **59.4**
L_{eq} (night):** **54.0**

Lowest L_{90} (day): **28.5**
Lowest L_{90} (night): **26.8**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Franklin CM-1 - Summer

Northern Pass - Franklin Converter Station
Monday, June 23, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	48.9	24.0	25.9	27.0	29.7	40.8	63.3	74.6
01:00	45.9	24.7	26.3	27.7	30.1	35.8	59.8	71.9
02:00	48.1	25.0	26.4	27.8	30.4	39.0	63.1	70.9
03:00	48.4	26.1	27.4	28.9	32.4	38.9	61.9	77.0
04:00	54.3	30.0	31.3	33.6	37.8	52.5	66.9	80.4
05:00	58.6	31.8	34.3	36.5	41.7	62.0	69.5	83.9
06:00	61.9	35.4	36.7	38.9	51.2	66.0	73.0	82.0
07:00	62.2	31.5	34.9	39.8	53.8	66.2	72.5	84.2
08:00	60.3	24.1	26.5	31.3	47.1	64.2	72.0	81.3
09:00	59.5	24.5	26.2	29.6	45.1	63.1	71.6	81.7
10:00	59.8	25.5	27.5	32.1	45.4	63.4	71.5	81.8
11:00	59.4	27.7	29.5	35.9	45.1	62.9	71.0	81.0
12:00	59.1	28.3	31.3	35.2	45.3	63.0	70.3	81.6
13:00								
14:00								
15:00								
16:00								
17:00								
18:00								
19:00								
20:00								
21:00								
22:00								
23:00								

Overall L_{eq}: **58.4**

L_{eq} (day*): **60.2**
L_{eq} (night):** **56.0**

Lowest L_{90} (day): **29.6**
Lowest L_{90} (night): **27.0**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Annex C

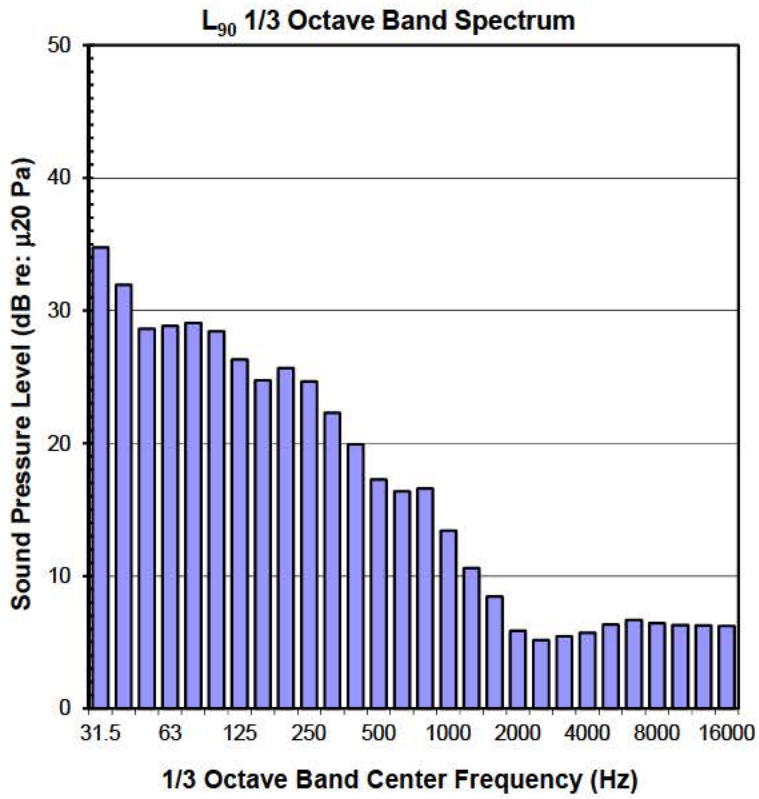
Intermittent Sound Measurement Data

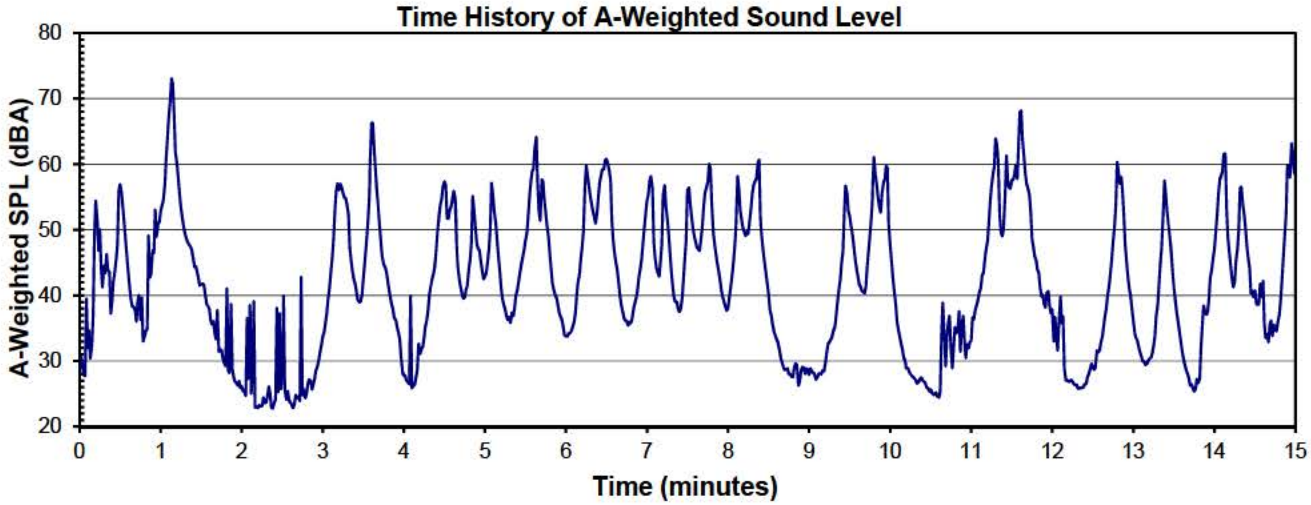
Franklin IM-N - Winter - Day

Measured Thursday, January 30, 2014, Between 8:59 AM & 9:14 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**53.5**
L_{max}:	74.5
L_{01}:	65.2
L_{10}:	56.9
L_{50}:	40.9
L_{90}:	**26.9**
L_{99}:	23.2
L_{min}:	22.1





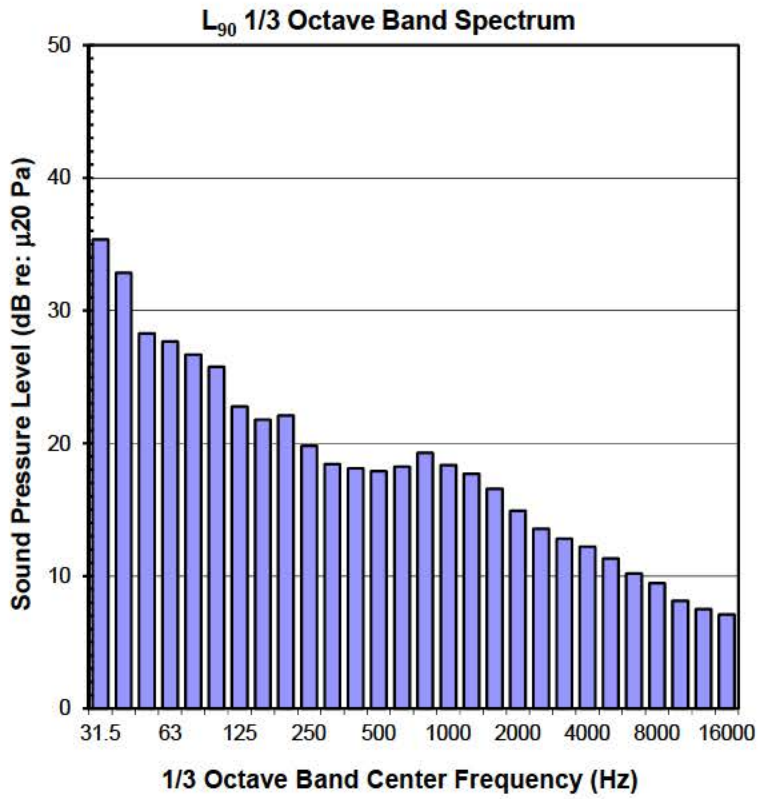
Run001

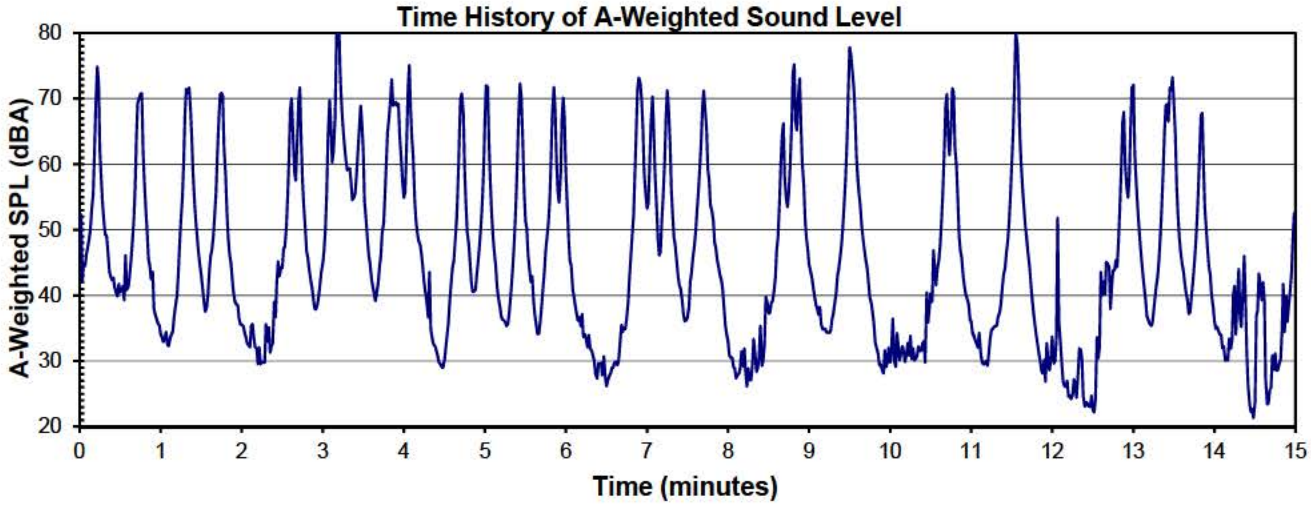
Franklin IM-E - Winter - Day

Measured Thursday, January 30, 2014, Between 9:18 AM & 9:33 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**64.2**
L_{max}:	90.2
L_{01}:	75.0
L_{10}:	66.8
L_{50}:	42.5
L_{90}:	**29.4**
L_{99}:	23.0
L_{min}:	21.0





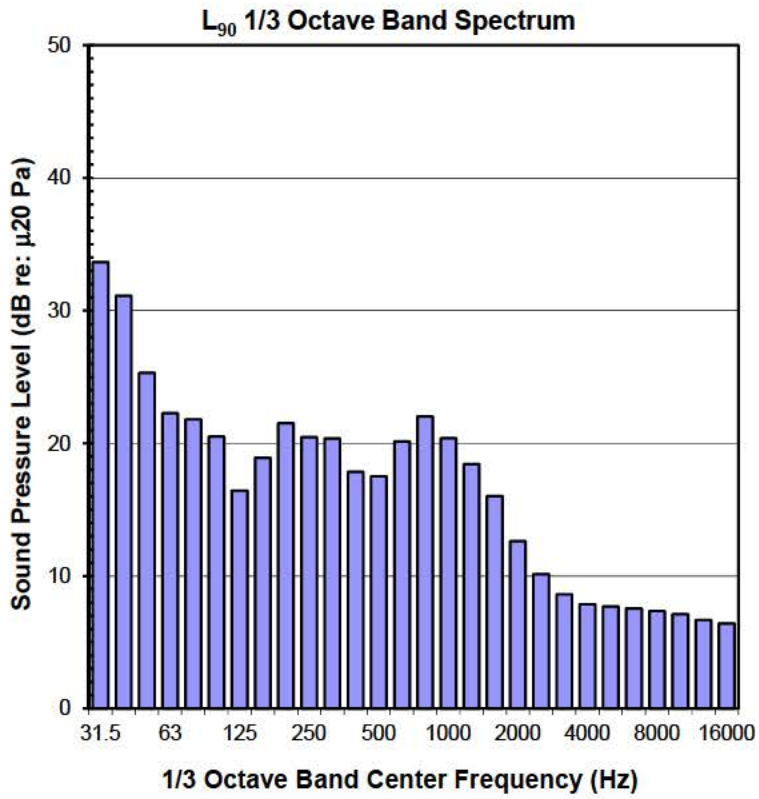
Run002

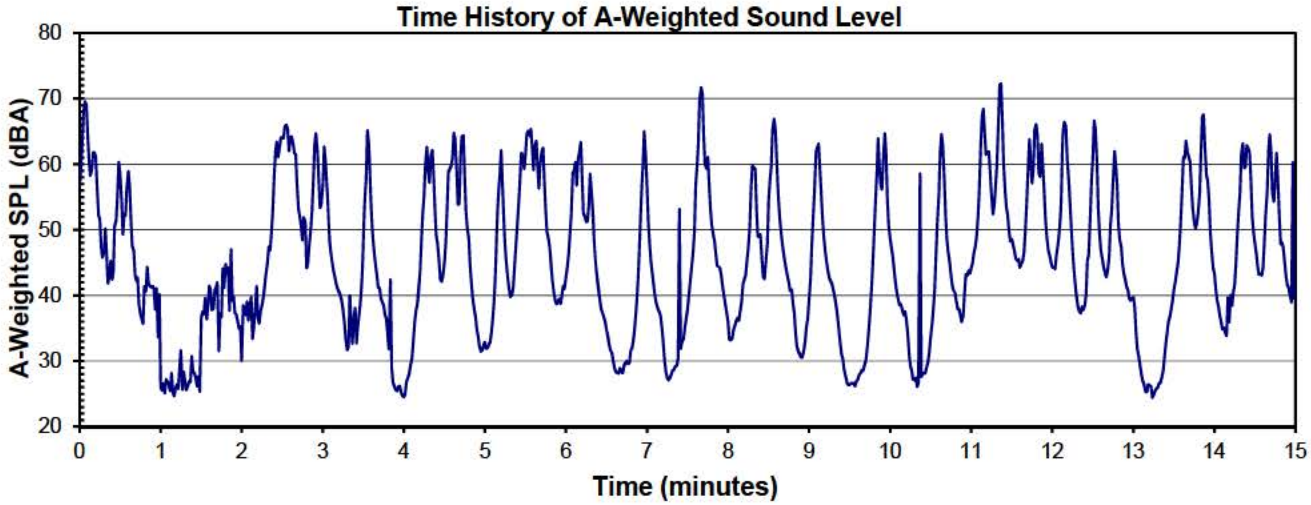
Franklin IM-S - Winter - Day

Measured Thursday, January 30, 2014, Between 9:38 AM & 9:53 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**57.0**
L_{max}:	74.4
L_{01}:	68.1
L_{10}:	61.6
L_{50}:	44.0
L_{90}:	**28.6**
L_{99}:	24.9
L_{min}:	23.8





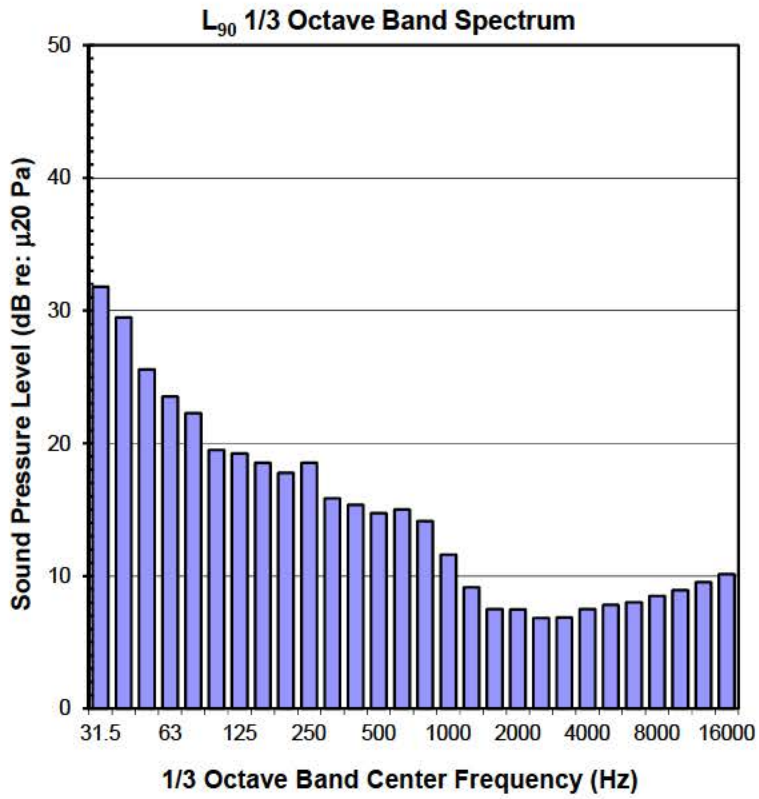
Run003

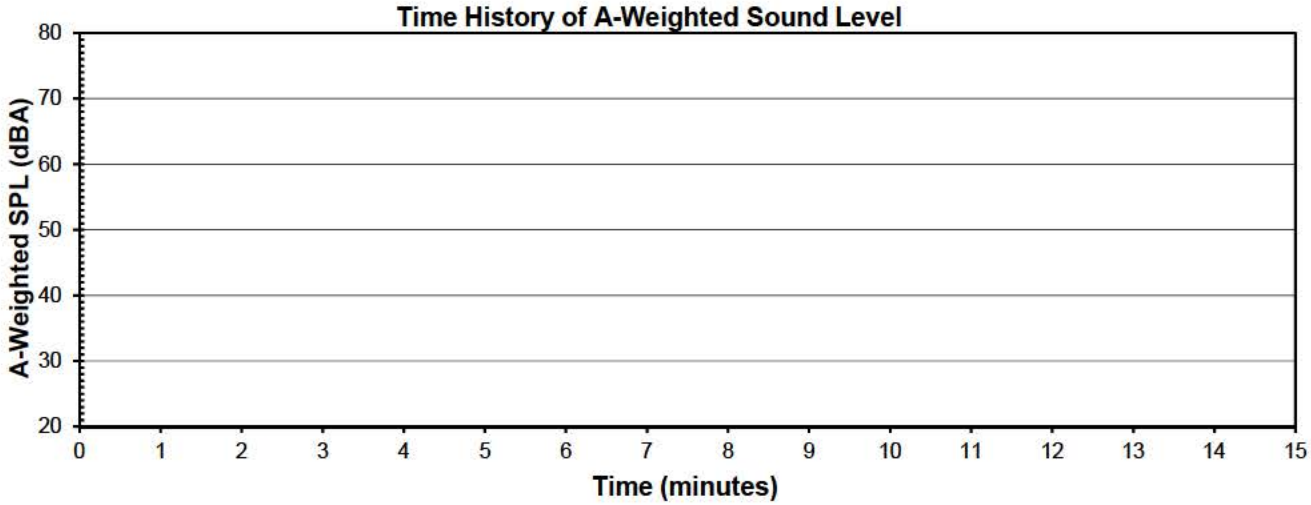
Franklin IM-N - Winter - Night

Measured Friday, January 31, 2014, Between 12:00 AM & 12:15 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**50.9**
L_{max}:	72.2
L_{01}:	62.8
L_{10}:	54.0
L_{50}:	45.6
L_{90}:	**25.0**
L_{99}:	21.0
L_{min}:	20.0





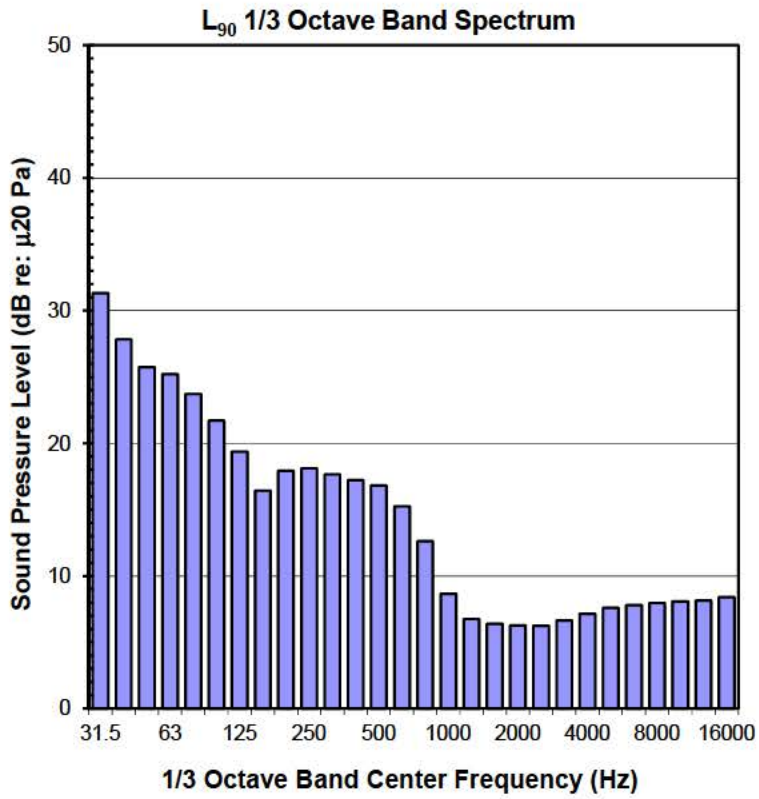
Run009

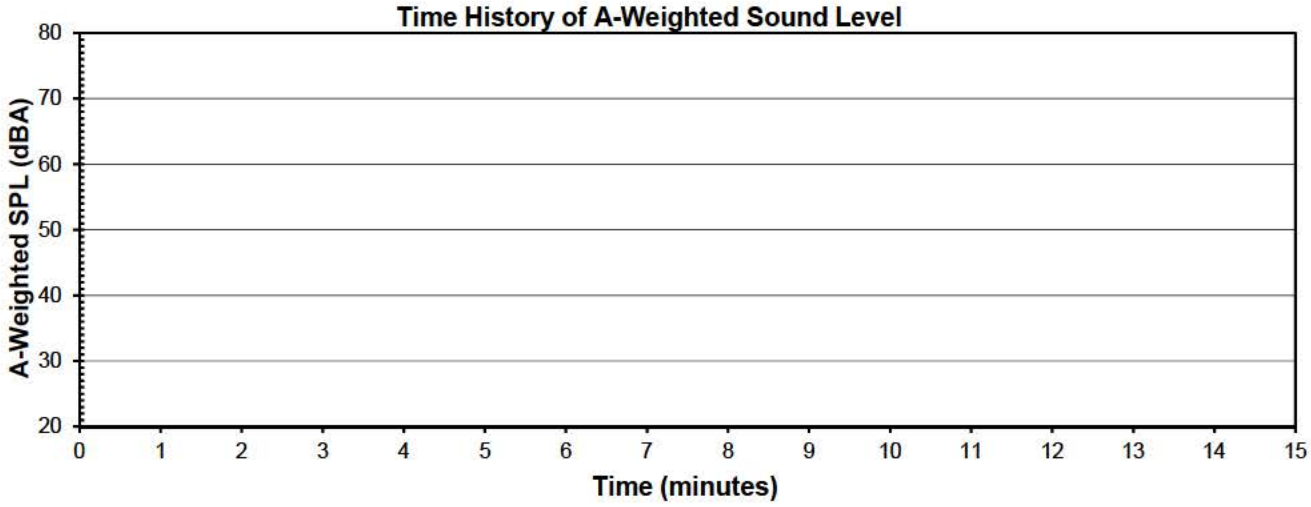
Franklin IM-E - Winter - Night

Measured Friday, January 31, 2014, Between 12:22 AM & 12:37 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**53.1**
L_{max}:	74.2
L_{01}:	66.2
L_{10}:	53.0
L_{50}:	47.8
L_{90}:	**24.6**
L_{99}:	20.4
L_{min}:	19.4





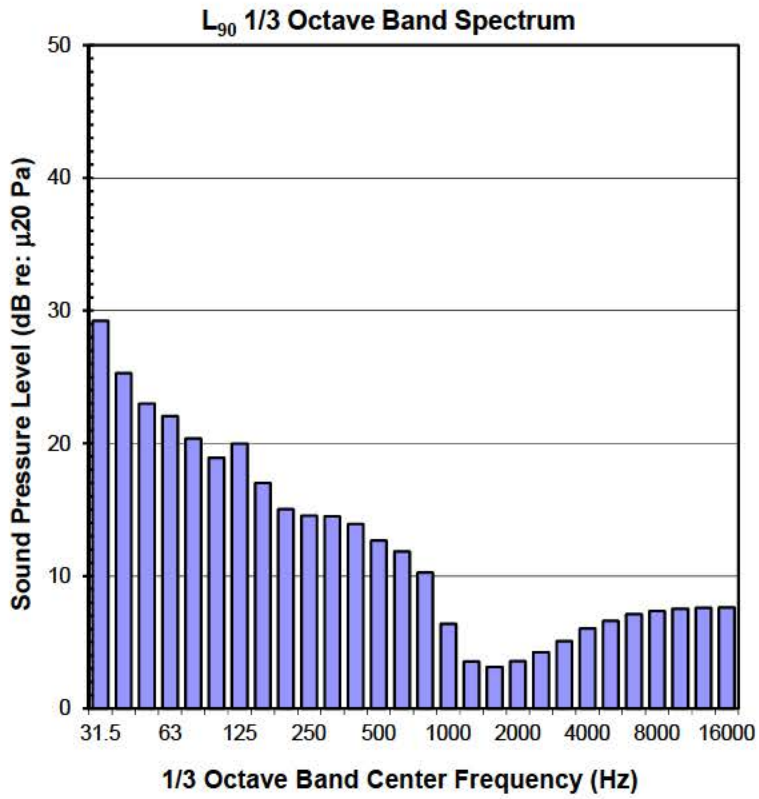
Run010

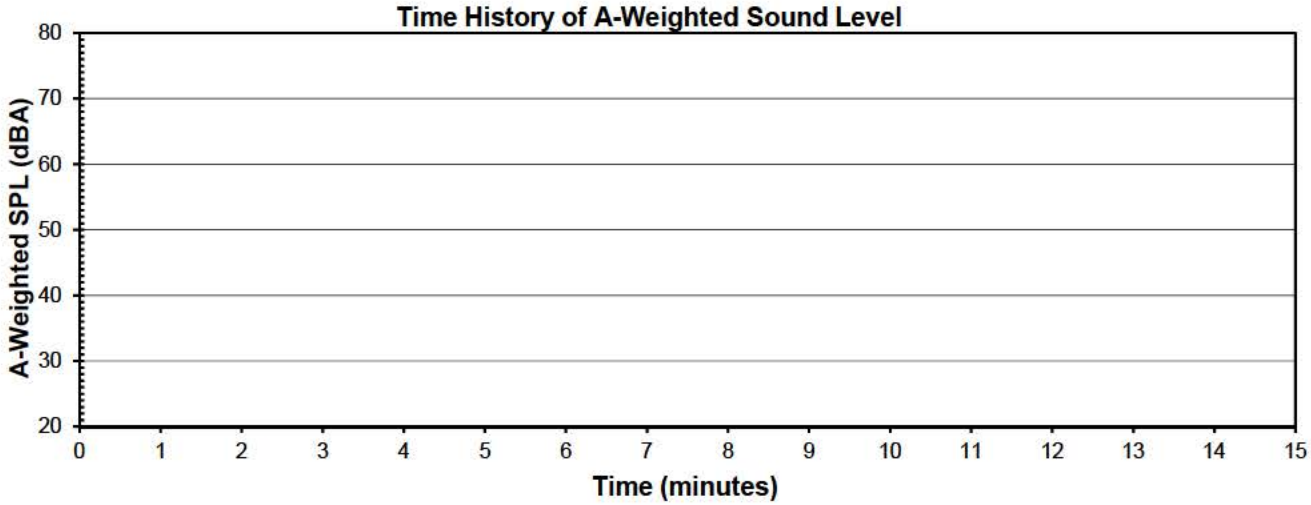
Franklin IM-S - Winter - Night

Measured Friday, January 31, 2014, Between 12:42 AM & 12:57 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**58.2**
L_{max}:	85.4
L_{01}:	71.4
L_{10}:	52.4
L_{50}:	28.8
L_{90}:	**20.9**
L_{99}:	19.8
L_{min}:	18.8





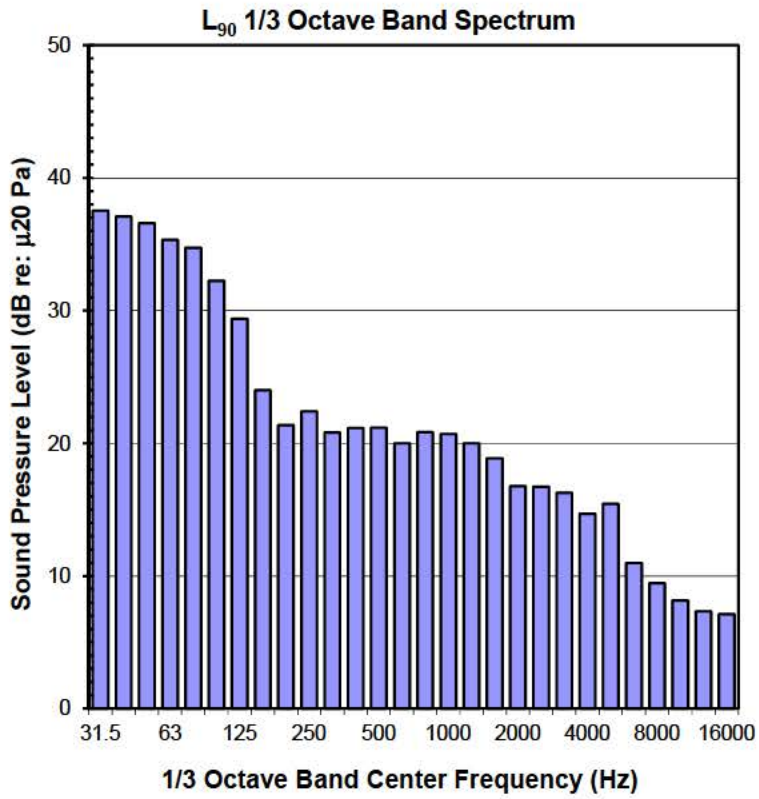
Run011

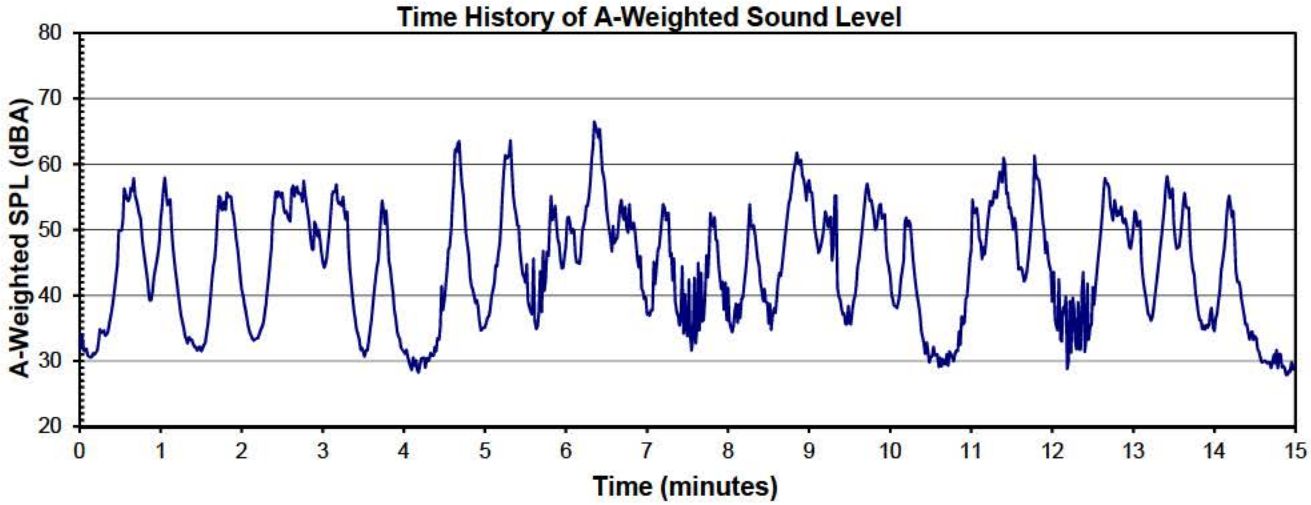
Franklin IM-N - Summer - Day

Measured Monday, June 16, 2014, Between 11:43 AM & 11:58 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**51.7**
L_{max}:	68.1
L_{01}:	62.6
L_{10}:	55.5
L_{50}:	44.4
L_{90}:	**31.6**
L_{99}:	28.6
L_{min}:	27.4





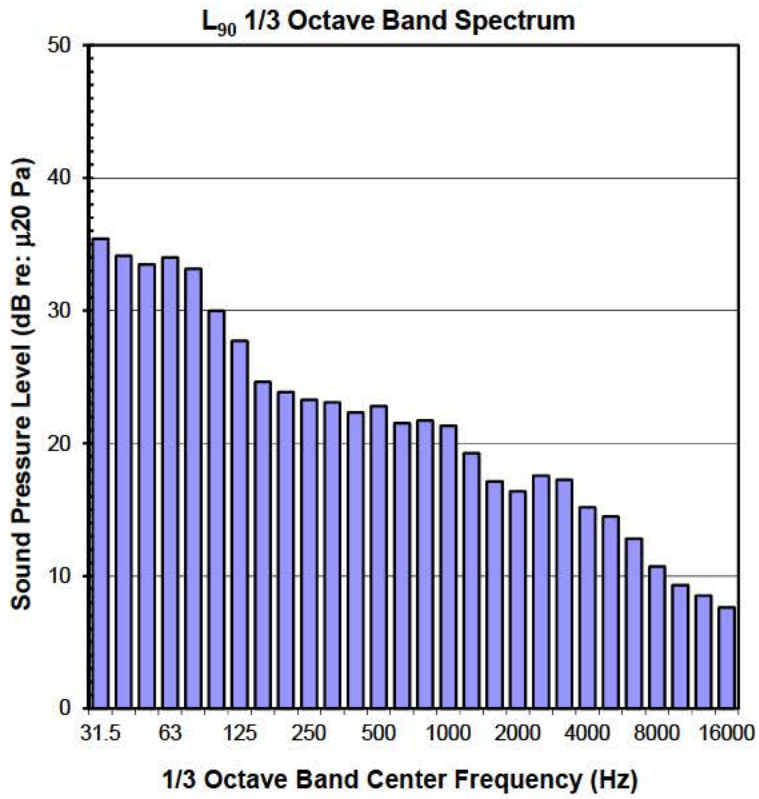
Run001

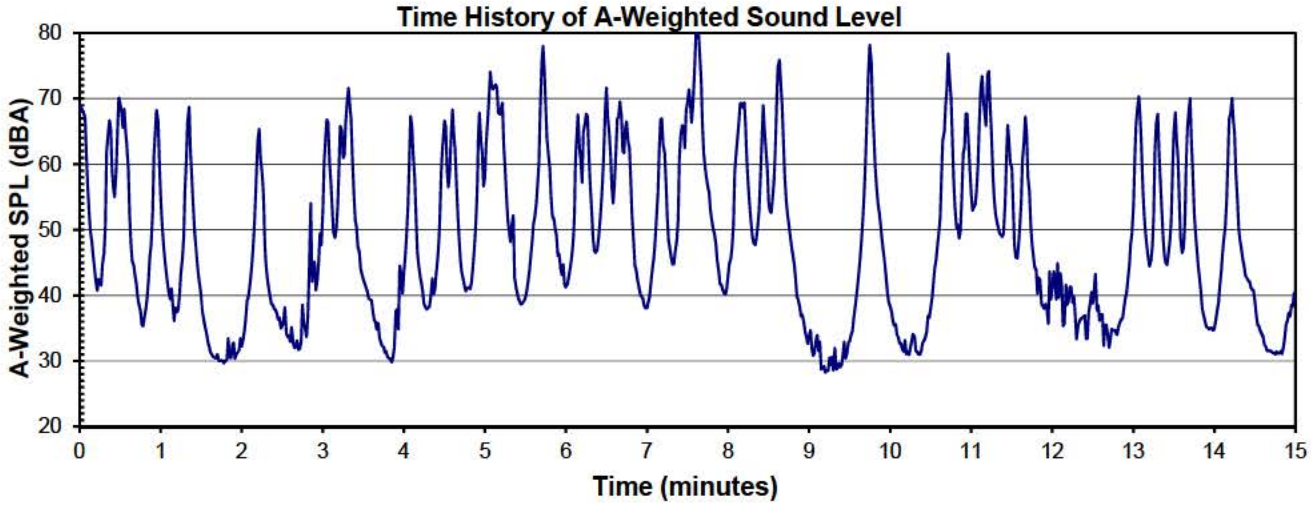
Franklin IM-E - Summer - Day

Measured Monday, June 16, 2014, Between 12:02 PM & 12:17 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**63.5**
L_{max}:	85.7
L_{01}:	75.9
L_{10}:	67.2
L_{50}:	46.0
L_{90}:	**32.4**
L_{99}:	29.0
L_{min}:	27.8





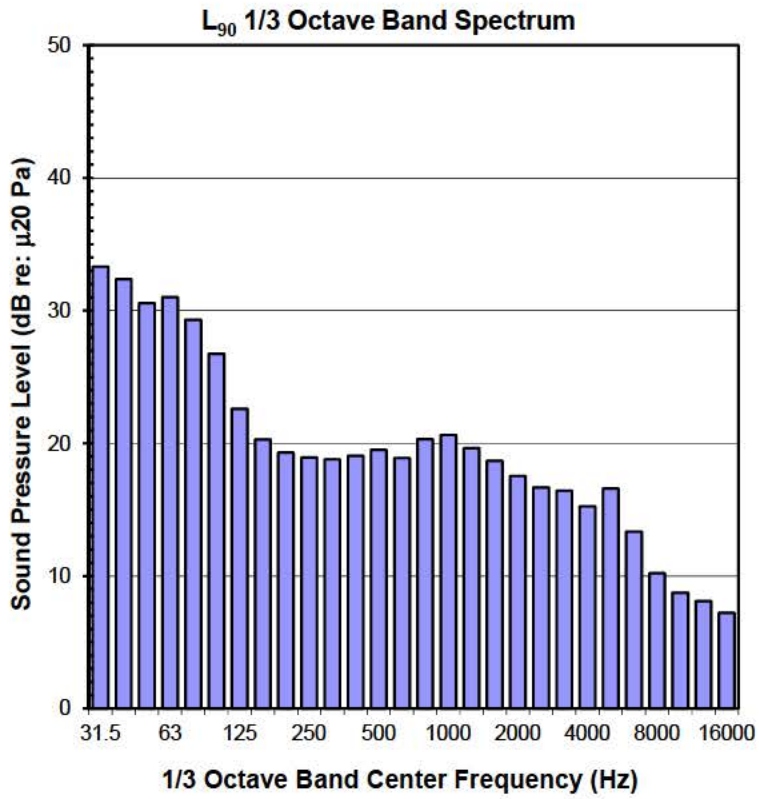
Run002

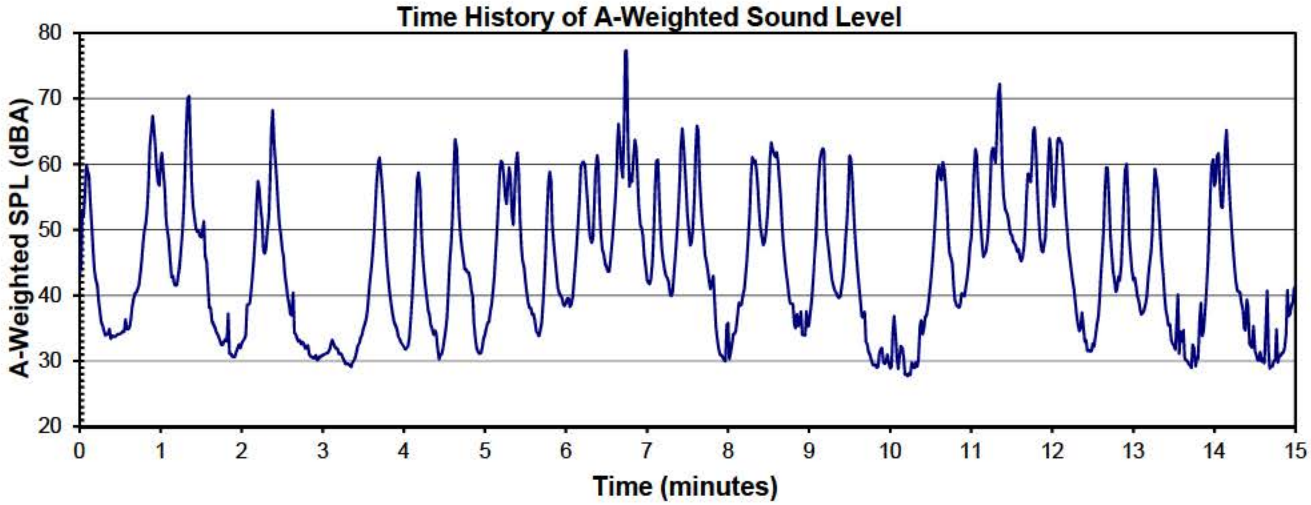
Franklin IM-S - Summer - Day

Measured Monday, June 16, 2014, Between 12:22 PM & 12:37 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**56.5**
L_{max}:	81.6
L_{01}:	66.9
L_{10}:	59.8
L_{50}:	42.5
L_{90}:	**31.1**
L_{99}:	28.7
L_{min}:	27.3





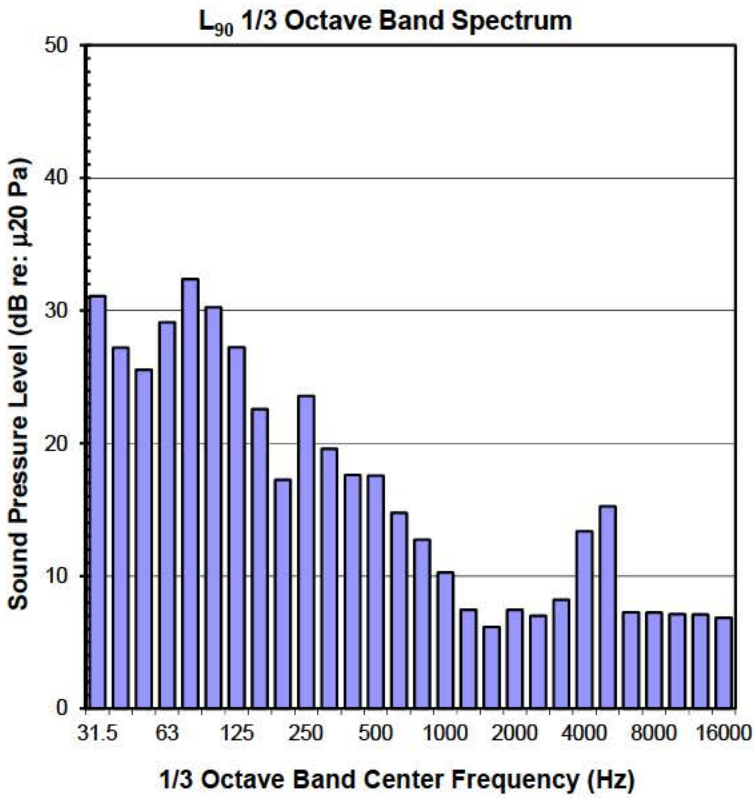
Run003

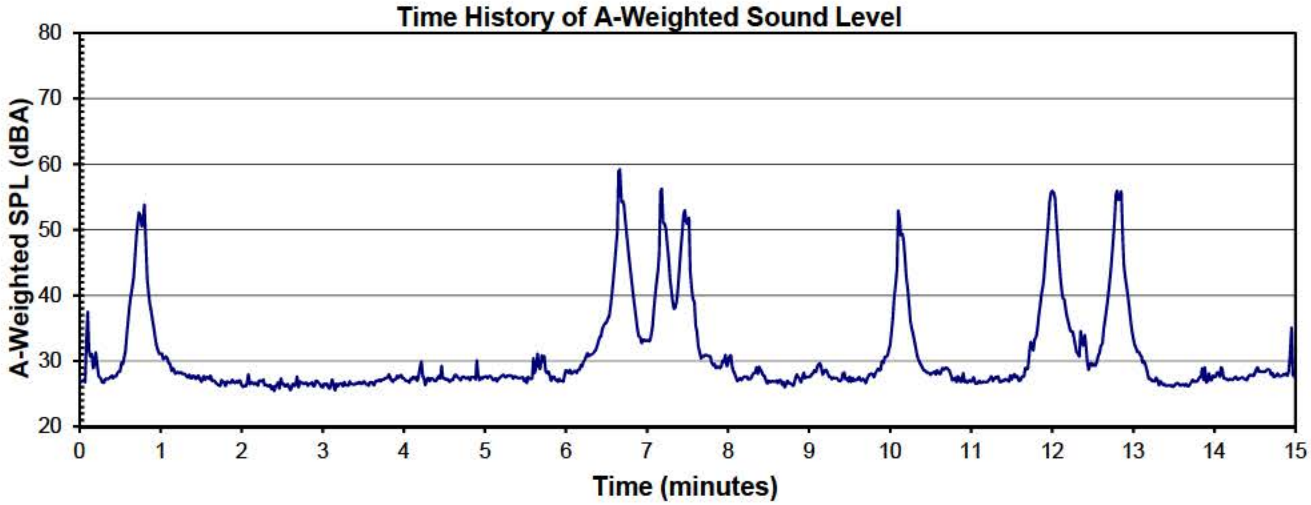
Franklin IM-N - Summer - Night

Measured Tuesday, June 17, 2014, Between 12:11 AM & 12:26 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**41.4**
L_{max}:	62.6
L_{01}:	55.1
L_{10}:	40.3
L_{50}:	27.8
L_{90}:	**26.4**
L_{99}:	25.6
L_{min}:	24.4





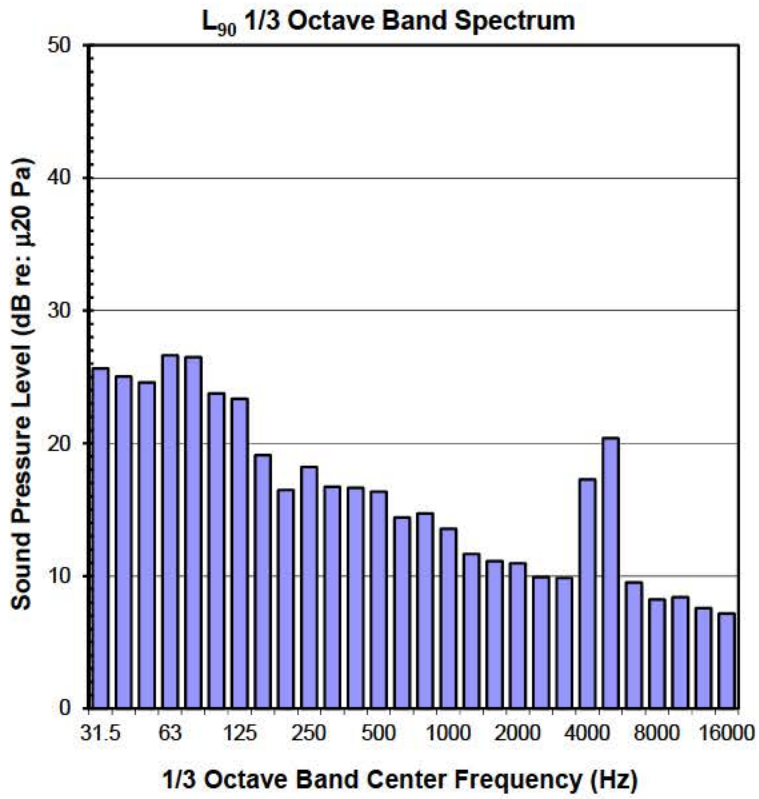
Run009

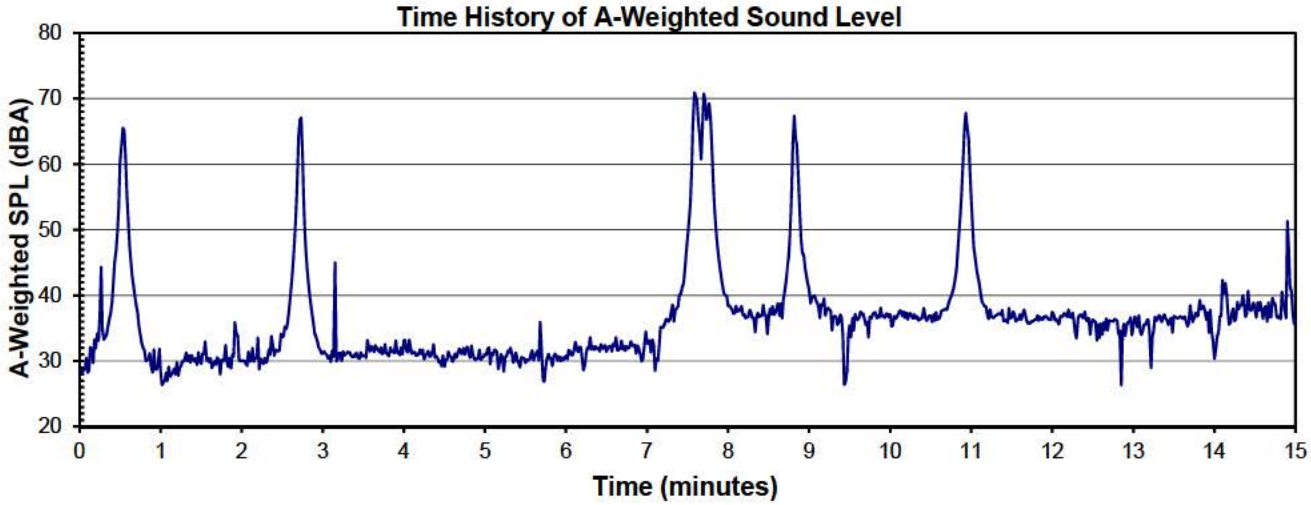
Franklin IM-E - Summer - Night

Measured Tuesday, June 17, 2014, Between 12:28 AM & 12:43 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**52.6**
L_{max}:	72.0
L_{01}:	67.4
L_{10}:	42.5
L_{50}:	33.8
L_{90}:	**28.7**
L_{99}:	26.3
L_{min}:	24.4





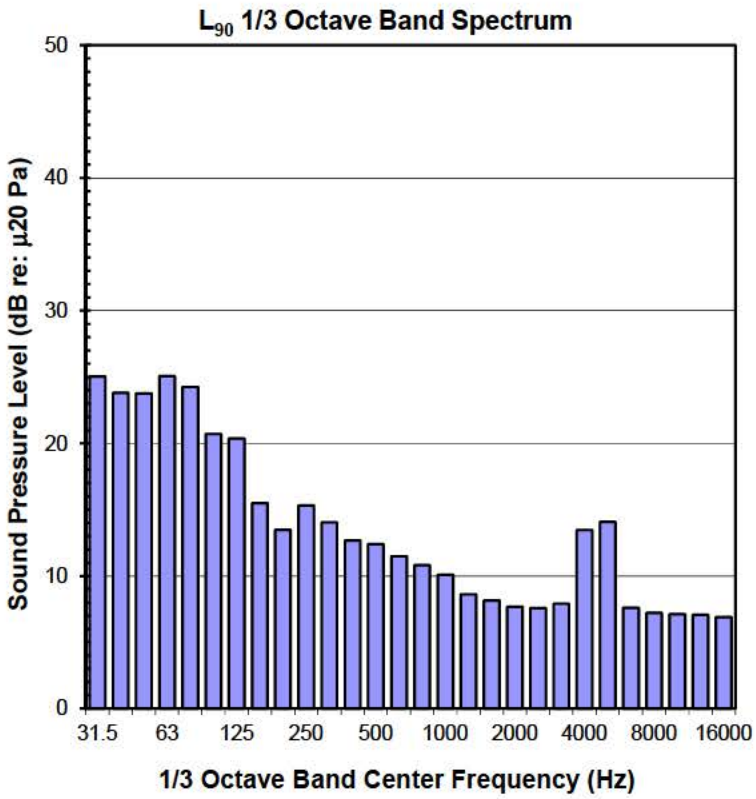
Run010

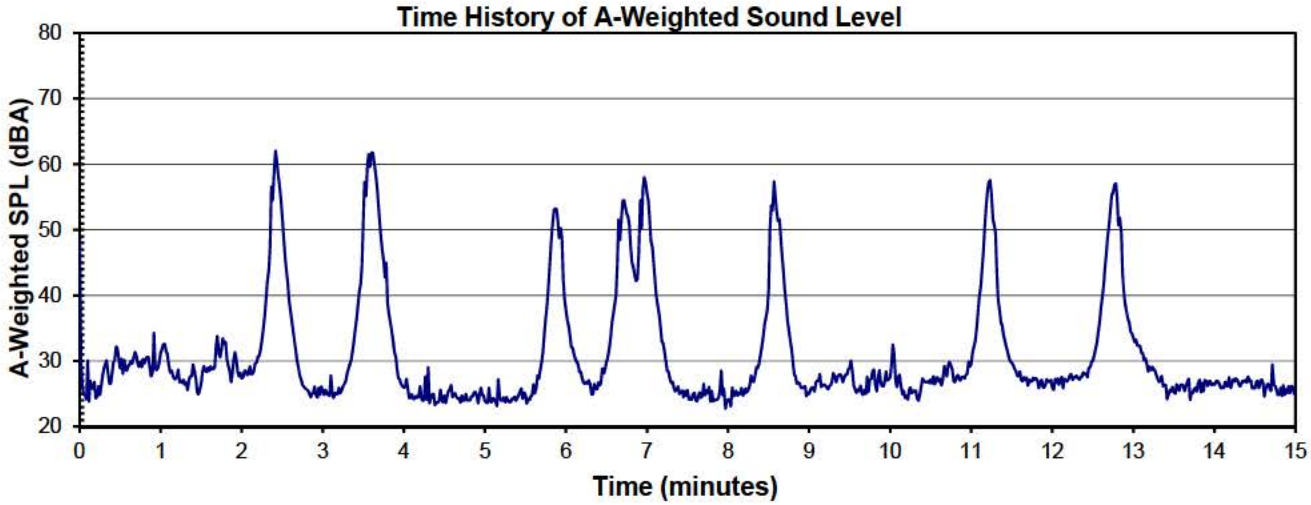
Franklin IM-S - Summer - Night

Measured Tuesday, June 17, 2014, Between 12:46 AM & 1:01 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**45.3**
L_{max}:	62.8
L_{01}:	58.9
L_{10}:	45.3
L_{50}:	27.5
L_{90}:	**24.2**
L_{99}:	23.0
L_{min}:	21.9





Run011

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Northern Pass Project – Sound Report 3

Deerfield Substation Expansion

Sound Impact Assessment

Introduction

As part of the Northern Pass Project, Northern Pass Transmission LLC is proposing to expand the Deerfield Substation in Deerfield, New Hampshire. Cavanaugh Tocci Associates, Inc. has been asked to provide sound impact assessment of this Project. In that this evaluation precedes the actual design of the Project, this sound impact assessment is based on acoustic design requirements that will be incorporated into the Project contracts. To assist in defining appropriate acoustic design goals for this facility, we have conducted an extensive sound monitoring program. This report presents the results of the sound monitoring program, a review of applicable noise regulations, a statement of the acoustic design goals for the project, and an assessment of Project sound impact.

Baseline Sound Survey

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, defining appropriate acoustic design goals for the proposed substation expansion that are based on an understanding of the existing acoustic environment will render Project related noise consistent with the level and character of other sounds in the environment, and will minimize acoustic impact at sensitive receptors.

An environmental sound survey was conducted to characterize the existing acoustic environment in the vicinity of the proposed Project. In order to document the time-varying characteristics of ambient environmental sounds in the study area, the sound monitoring program implemented unattended continuous measurements for two 7-day periods, and observed short-term (15-minute) intermittent measurements. The measurements were conducted during a cold weather season (January 30, 2014 – February 6, 2014) with leaves off the trees, and a warm weather season with foliage and insect sounds present (June 16, 2014 – June 23, 2014). The results of the survey allow both quantitative and qualitative analyses of the acoustical environment surrounding the Project. Annex A of this report is a glossary of acoustical terminology.

Sound Measurement Locations

A review of the existing land use in the vicinity of the Project site was conducted to identify the closest and most representative receptor locations. On the basis of this review, four sound monitoring locations were selected, as shown in Figure 1. The sound monitoring locations may be described as follows:

- **IM-N**: Intermittent monitoring location North: Lat: 43.1476 Long: -71.1802
- **IM-W**: Intermittent monitoring location West: Lat: 43.1422 Long: -71.1901
- **IM-S**: Intermittent monitoring location South: Lat: 43.1386 Long: -71.1909
- **CM-1**: Continuous monitoring location 1: Lat: 43.1411 Long: -71.1893

Continuous Sound Monitoring

To identify typical patterns in existing ambient environmental sound levels, and to quantify time-varying ambient sound levels in the community, continuous sound monitoring was performed at one location adjacent to the nearest residence west of the Project area, as shown in Figure 1 (CM-1). For both the cold and warm weather seasons, data was gathered for a 7-day (168-hour) period. The measurement periods were:

- January 30, 2014, 12:00 noon to February 6, 2014, 12:00 noon
- June 16, 2014, 3:00 p.m. to June 23, 2014, 3:00 p.m.

For these continuous measurements, sound levels were monitored using Larson Davis 831 sound levels meters outfitted with ½ inch electret microphones and windscreens. The microphones were mounted on tree branches that were approximately 1.5 meters above the ground. The instruments were calibrated before and after the measurement periods using a Larson Davis CAL200 acoustical calibrator. These instruments are compliant with international standards for class 1 instrumentation (IEC 61672-1:2002, and IEC 60942-1:2003), and have current calibration certificates traceable to National Institute of Standards and Technology (NIST).

For this study, the sound monitors were programmed to report the following A-weighted environmental noise descriptors on an hourly basis:

- Maximum and minimum sound levels (L_{max}, L_{min})
- Percentile sound levels (L_{99}, L_{90}, L_{50}, L_{10}, L_{01})
- Equivalent sound level (L_{eq})

A complete listing of all of the hourly metrics that were recorded can be found in Annex B.

Intermittent Sound Monitoring

Intermittent sound measurements were performed for 15-minute intervals at three representative receptor locations (identified in Figure 1 as IM-N, IM-W, and IM-S). The measurements were performed during both daytime and nighttime periods on January 30-31, 2014, and June 16-17, 2014. These measurements were conducted with a Bruel and Kjaer Instruments Type 2250 sound level analyzer outfitted with a ½ inch electret microphone and windscreen. During all measurements, the meter was mounted on a tripod with the microphone situated approximately 1.5 meters above the ground. The instrument was calibrated before and after use with a Bruel and Kjaer Instruments Type 4231 acoustical calibrator. These instruments are compliant with international standards for class 1 instrumentation (IEC 61672-1:2002, and IEC 60942-1:2003), and have current calibration certificates traceable to National Institute of Standards and Technology (NIST).

The results of the measurements are presented in Annex C. The data presentation format has three primary elements:

- The first is a listing of A-weighted descriptors on the upper left hand side of the figures. Note that the statistical descriptors (L_n) are presented in order of decreasing value. Logically, the L_{max} is the highest sound level reached during the 15-minute interval; the L_{01} is the next highest since it is exceeded only 1 percent of the time interval, and so forth. The L_{eq} and L_{90} are shown shaded, as they are the key descriptors used in evaluating background sound levels.
- The second element in these figures is a 1/3 octave band spectrum of the L_{90} sound pressure level. This spectrum is used to identify the presence of distinct tonal characteristics and to quantify the frequency content associated with the background sounds. Note that nighttime data during the warm weather monitoring period (June 17, 2014) indicates significant tonal sound in the 4,000, and 5,000 Hz frequency bands. These high frequency sounds are associated with insect noise.

- The third element at the bottom of the figures is a graphic level record, or time-history, of the A-weighted sound level in 1-second increments recorded over the 15-minute interval. The peaks in these figures are associated with transient sounds mainly produced by passing vehicles on local roads, dogs barking, aircraft flying overhead. Note that due to a data storage error, the time history data for the nighttime winter sample at IM-N is not available.

Survey Results

Figures 2 and 3 present selected results from the continuous sound monitoring that occurred during the winter and summer surveys. The sound level data included in the plots are the hourly L_{01} (nominal maximum level), the hourly L_{eq} (energy average level), and the hourly L_{90} (background level). In addition, we have included a dashed line to indicate the average of the lowest daily $L_{90(1\text{-hour})}$ sound levels measured for each week. This value represents a very conservative estimate of the lowest background sound levels that occur during the quietest periods of the entire survey. For the winter survey this value was 24 dBA, and for the summer survey this value was 27 dBA.

Table 1 below provides a summary of the intermittent measurement results:

Table 1: Summary of Intermittent Sound Measurements

	Cold Season (January 30-31, 2014)				Warm Season (June 16-17, 2014)			
	Daytime		Nighttime		Daytime		Nighttime	
Location	L_{eq}	L_{90}	L_{eq}	L_{90}	L_{eq}	L_{90}	L_{eq}	L_{90}
IM-N	44.9	27.0	47.0	26.8	43.3	28.2	43.7	24.9
IM-W	37.7	26.3	38.6	24.6	38.3	30.4	30.8	28.5
IM-S	46.3	24.4	35.2	22.8	53.8	30.3	31.5	26.3

For the most part, background sound levels in the community surrounding the Project are currently controlled by sound produced by the existing substation. Currently, sound levels produced by the substation at the nearest residence west of the project range between 24 and 30 dBA. Traffic on local roads is an occasional source transient sound. Finally, noises produced by birds, insects, and wind blowing through foliage are sources of background sound at all locations in the project area. These indigenous sounds depend on many factors including weather and time of year.

Sound Regulations

There are no Federal, or state noise regulations that define limits for environmental sound produced by the proposed project. However, the Zoning Ordinance of the Town of Deerfield defines noise limits for use in evaluating projects that would potentially be zoned in a commercial/industrial flexible overlay district. Although it is not likely that these limits are directly applicable to the proposed expansion of the substation, they do provide appropriate context for evaluating project acoustic design goals that are discussed below. Selected text from the zoning ordinance follows:

> ***Section 212.4 D (21) NOISE***
>
> *Can the proposed land uses and activities be conducted so that noise generated shall not exceed the maximum noise dB level allowed and that excessive noise at unreasonable hours is avoided? If not, have detailed plans been approved for the elimination of objectionable noise levels? Sound pressure levels shall be measured on a sound level meter at all major lot lines of the site, at a height if at least 4 feet above the ground surface. Noise shall be measured with a sound level meter meeting the standards of the American National Standards Institute "American Standard Specification for General Purpose Sound Level Meters" and be set to the A-weighted response scale and slow response. Acceptable levels for primarily residential areas is 55 dB(A) from 7 a.m. – 10 p.m. and 45 dB(A) from 10 p.m. – 7 a.m. Areas that are primarily commercial with no residential uses should be 65 dB(A) from 7 a.m. – 10 p.m. and 55 dB(A) from 10 p.m. – 7 a.m. Industrial districts should be 75 dB (A} from 7 a.m. – 10 p.m. and 65 dB(A) from 10 p.m.– 7 a.m. In areas of mixed use, the limits governing the stricter zone shall apply to any noise entering the area.*

Since the use of land in this area is primarily residential, this ordinance permits property line sound levels of 55 dBA during daytime hours, and 45 dBA during nighttime hours.

Facility Acoustic Design Goal

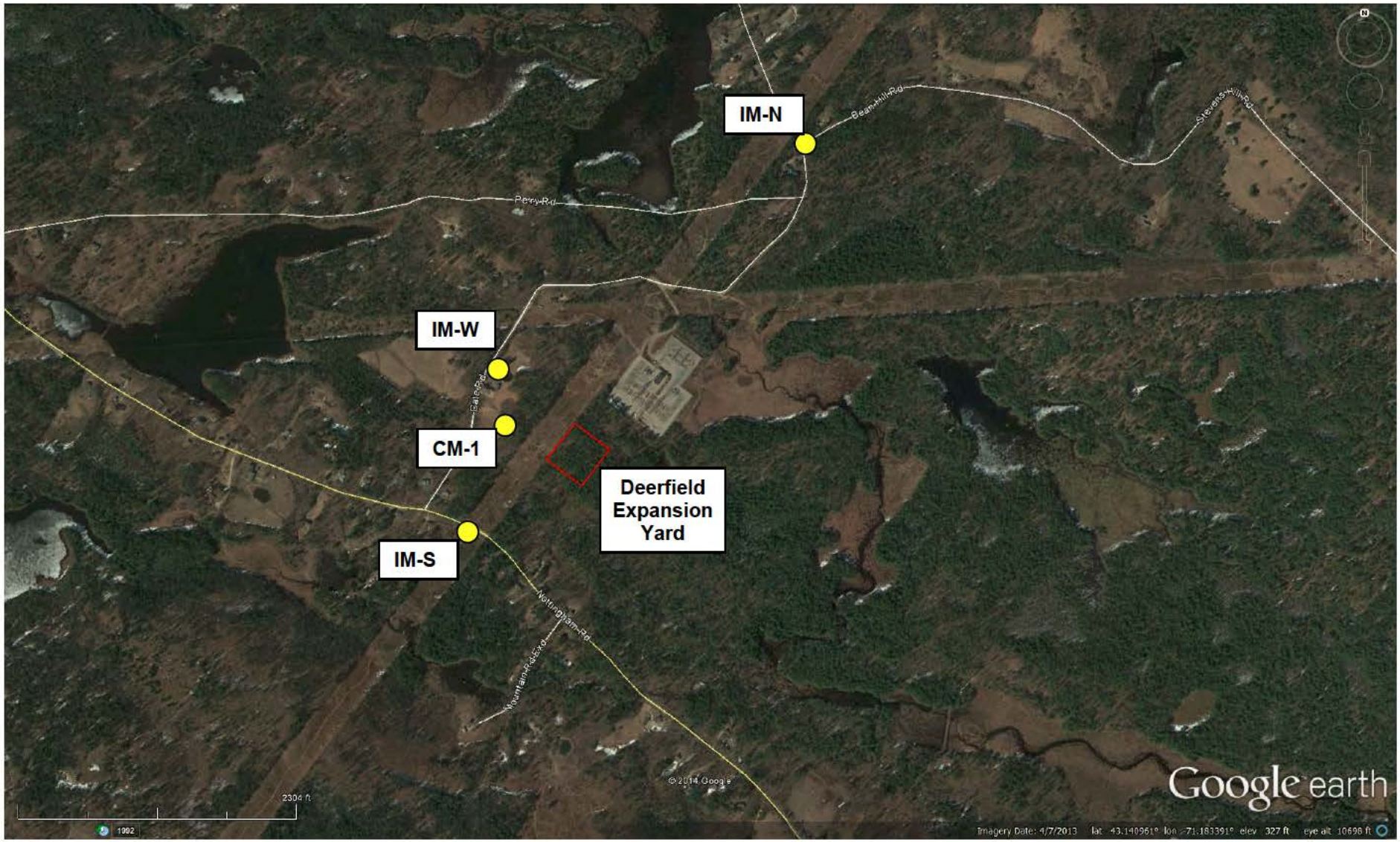
The acoustic design goal for this expansion project has been based on limiting Project related sound to less than 5 dBA above the nominally lowest sound levels that were measured during the baseline sound surveys. For this project, the following acoustic design goal will be specified in the contract documents:

- The maximum sound level for continuous sound produced by the operation of all equipment located at the facility shall not exceed 29 dBA at any existing occupied residential receptor property when measured within the boundaries of the receptor property.

Noise mitigation options include, but are not limited to equipment selection, equipment placement, sound barrier walls, and sound enclosures. Prior to the purchase of equipment, the contractor will be required to demonstrate that the design will meet the acoustic requirements. The acoustic modeling for this anysis will use algorithms and procedures described in International Standard ISO 9613-2:1996 "Acoustics - Attenuation of sound during propagation outdoors – Part 2: General method of calculation." At the conclusion of construction, the contractor will demonstrate through field measurements that the Project complies with the acoustic specifications.

Sound Impact Assessment

The above acoustic design goal defines very stringent limits for sound produced by the proposed expansion of the substation that apply at all existing residential receptors. It should be noted that with the expansion, background sound levels at the nearest residences are expected to be below 30 dBA, which is 15 dBA lower than the most stringent limit of the Town of Deerfield zoning ordinance. It is my professional opinion that if sound produced by the proposed Project meets the above stated acoustic design goals; it will not produce a noticeable impact on the acoustic environment, and will not have an unreasonable adverse effect at all surrounding properties.



Aerial Photograph Indicating Project Site and Sound Monitoring Locations

Figure 1

cta

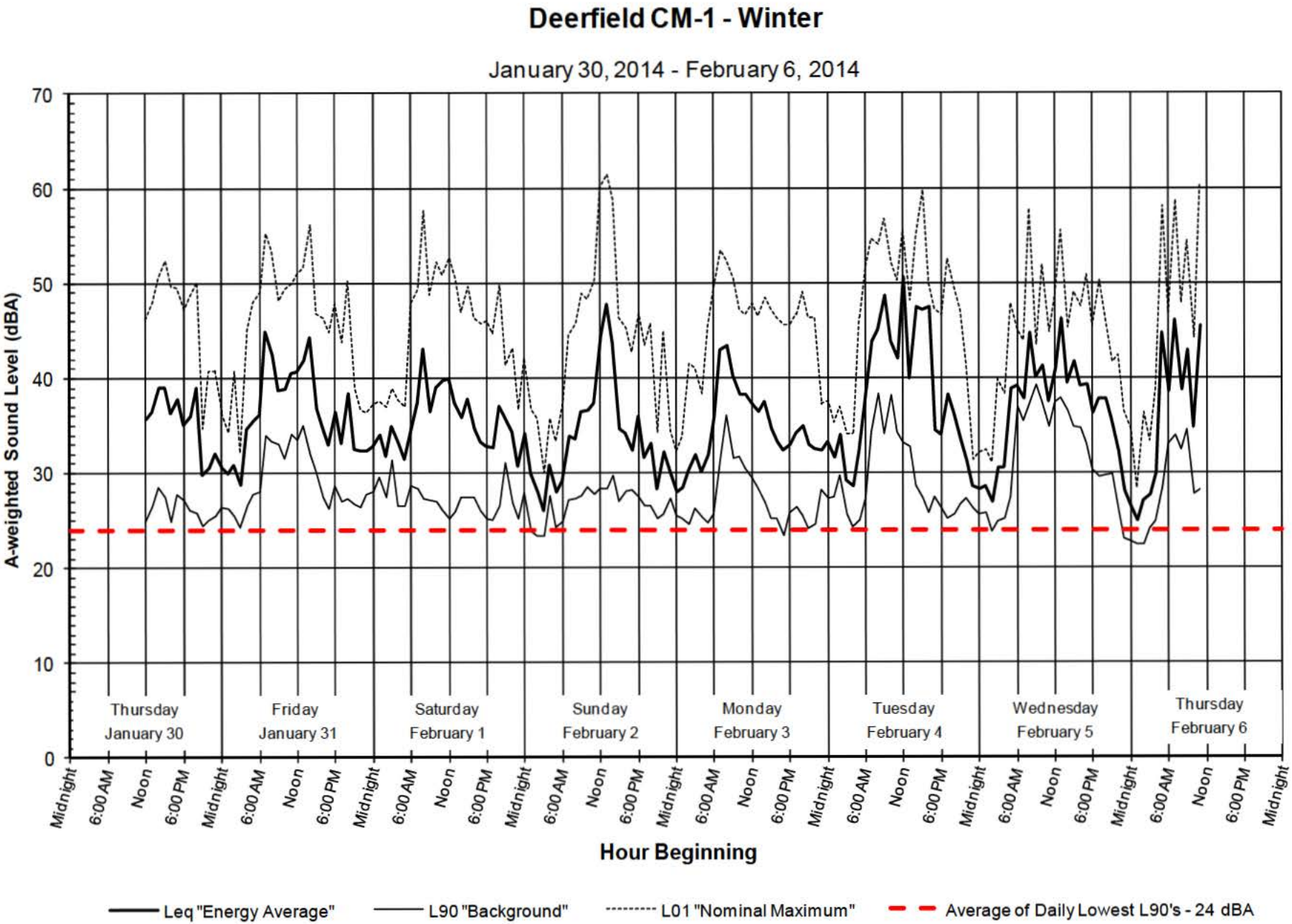

Deerfield CM-1 - Winter
January 30, 2014 - February 6, 2014
A-weighted Sound Level (dBA)
70
60
50
40
30
20
10
0
Thursday January 30
Friday January 31
Saturday February 1
Sunday February 2
Monday February 3
Tuesday February 4
Wednesday February 5
Thursday February 6
Midnight
6:00 AM
Noon
6:00 PM
Hour Beginning
Leq "Energy Average"
L90 "Background"
L01 "Nominal Maximum"
Average of Daily Lowest L90's - 24 dBA

Figure 2

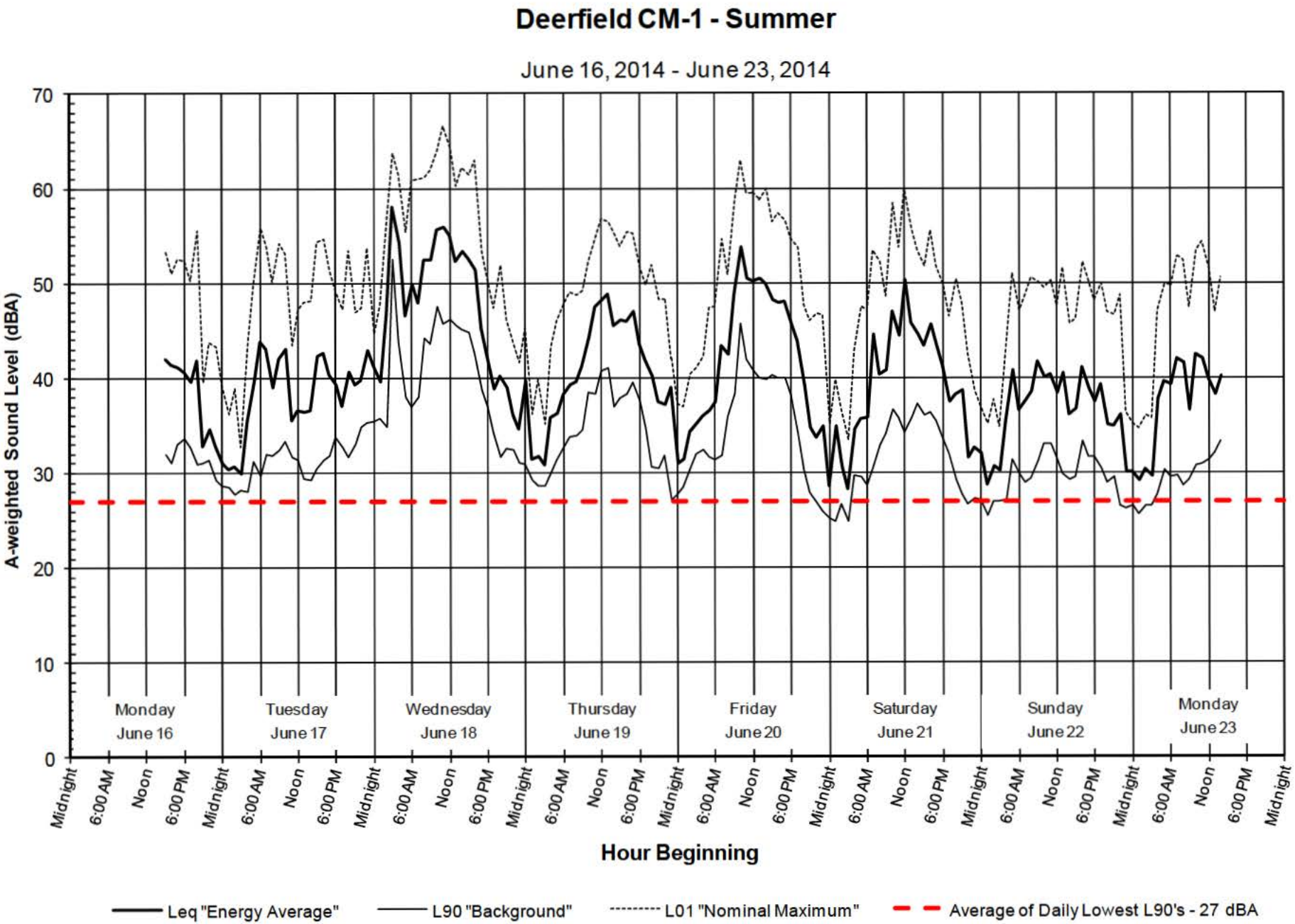

Deerfield CM-1 - Summer
June 16, 2014 - June 23, 2014
A-weighted Sound Level (dBA)
70
60
50
40
30
20
10
0
Monday June 16
Tuesday June 17
Wednesday June 18
Thursday June 19
Friday June 20
Saturday June 21
Sunday June 22
Monday June 23
Midnight
6:00 AM
Noon
6:00 PM
Hour Beginning
Leq "Energy Average"
L90 "Background"
L01 "Nominal Maximum"
Average of Daily Lowest L90's - 27 dBA

Figure 3

Annex A

Sound Measurement Terminology

cta

SOUND MEASUREMENT TERMINOLOGY

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.

Spectral Characteristics – 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.

- L_{90} is the sound level in dBA exceeded 90 percent of the time during the measurement period. 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.

- L_{50} is the median sound level: the sound level in dBA exceeded 50 percent of the time during the measurement period.

- L_{10} is the sound level exceeded only 10 percent of the time. It is close to the maximum level observed during the measurement period. The L_{10} is sometimes called the *intrusive* sound level because it is caused by occasional louder noises like those from passing motor vehicles or aircraft.

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.

When a steady continuous sound is measured, the L_{10}, L_{50}, L_{90} and L_{eq} are all equal. For a constant sound level, such as from a power plant operating continuously for a 24-hour period, the L_{dn} is approximately 6 dBA higher than the directly measured sound level.

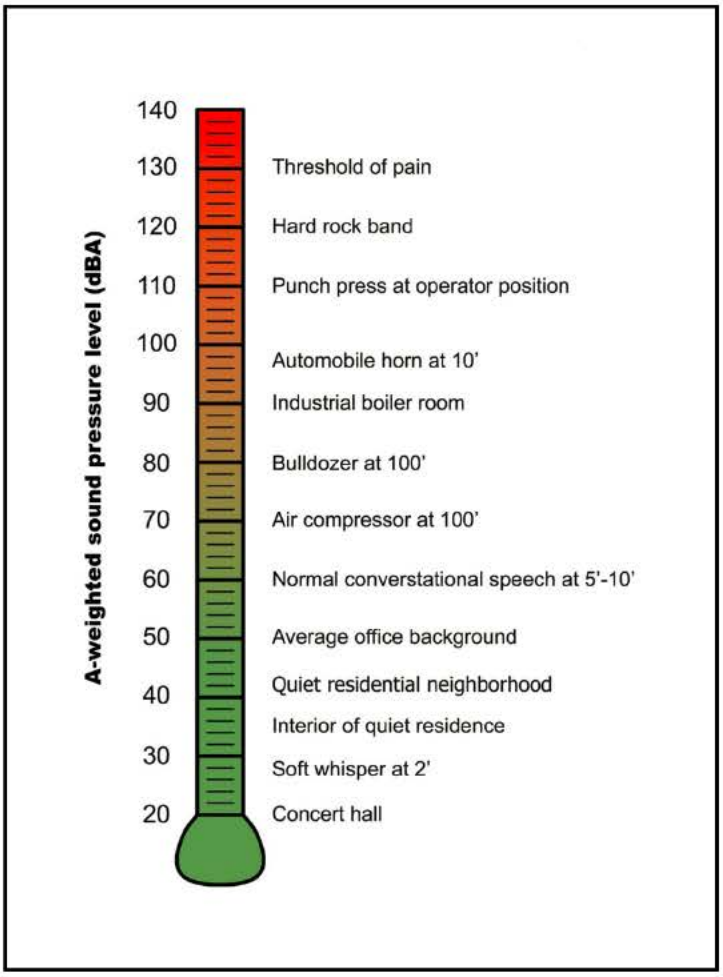


Figure A-1

Typical Sound Levels for Common Interior and Environmental Sources

Annex B

Continuous Sound Monitoring Data

cta

Deerfield CM-1 - Winter

Northern Pass - Deerfield Substation
Thursday, January 30, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00								
01:00								
02:00								
03:00								
04:00								
05:00								
06:00								
07:00								
08:00								
09:00								
10:00								
11:00								
12:00	35.7	22.0	23.4	24.9	27.8	33.0	46.2	72.5
13:00	36.4	22.6	24.3	26.6	30.2	36.7	48.0	57.7
14:00	39.0	25.4	26.6	28.5	32.5	39.1	50.6	61.1
15:00	39.0	23.5	25.2	27.5	31.0	39.5	52.4	60.8
16:00	36.2	21.8	23.2	24.9	28.5	37.5	49.7	56.0
17:00	37.8	21.6	23.7	27.7	33.7	39.6	49.5	53.1
18:00	35.1	22.0	24.1	27.1	31.0	36.3	47.3	54.5
19:00	36.0	21.0	23.9	26.1	29.2	33.5	48.6	60.6
20:00	39.0	21.5	23.6	25.8	28.8	36.0	50.1	63.3
21:00	29.7	21.5	22.8	24.4	27.0	30.2	34.7	52.1
22:00	30.6	21.5	23.3	25.0	27.4	30.7	40.7	52.6
23:00	32.0	21.3	23.2	25.5	28.6	32.0	40.8	54.5

Overall L_{eq}: **36.5**

L_{eq} (day*): **37.0**
L_{eq} (night):** **31.3**

Lowest L_{90} (day): **24.4**
Lowest L_{90} (night): **25.0**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Winter

Northern Pass - Deerfield Substation
Friday, January 31, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	30.5	23.3	24.5	26.4	29.7	32.9	36.4	39.3
01:00	29.9	23.0	24.9	26.2	29.0	31.5	34.3	46.8
02:00	30.8	20.7	22.6	25.5	28.8	31.9	40.8	49.4
03:00	28.7	21.5	22.5	24.2	28.6	30.7	32.2	35.3
04:00	34.6	23.6	24.9	26.6	28.9	32.1	45.2	59.1
05:00	35.5	24.8	26.1	27.7	30.7	34.8	48.0	55.2
06:00	36.1	24.1	26.3	28.0	30.7	35.2	49.0	54.9
07:00	44.9	28.7	30.6	33.9	39.4	48.1	55.3	62.9
08:00	42.5	29.8	31.5	33.3	38.0	44.1	53.5	64.2
09:00	38.8	28.5	30.2	33.1	36.4	41.3	48.1	55.8
10:00	38.8	28.8	30.0	31.5	34.6	40.5	49.3	58.8
11:00	40.5	31.4	32.6	34.1	37.8	42.9	50.0	58.2
12:00	40.7	31.3	32.4	33.5	37.2	42.8	51.0	59.2
13:00	41.9	31.5	33.1	35.0	38.7	44.4	51.7	60.0
14:00	44.3	26.6	29.0	32.0	39.0	46.3	56.1	65.8
15:00	36.7	25.4	28.0	30.2	33.9	39.3	46.8	53.1
16:00	34.8	24.0	25.2	27.5	30.7	36.1	46.4	52.0
17:00	32.9	23.0	24.4	26.3	29.5	33.8	44.9	50.0
18:00	36.4	24.2	26.2	28.7	32.6	37.7	47.9	53.9
19:00	33.1	23.3	25.1	27.0	30.5	34.5	43.7	52.5
20:00	38.4	24.0	25.0	27.3	31.0	36.4	50.3	63.2
21:00	32.5	22.4	23.8	26.7	30.8	34.1	39.0	52.1
22:00	32.3	22.3	24.1	26.4	31.7	35.1	36.7	51.4
23:00	32.4	24.2	25.5	27.7	31.8	35.1	36.4	41.2

Overall L_{eq}: **38.5**

L_{eq} (day*): **40.1**
L_{eq} (night):** **33.0**

Lowest L_{90} (day): **26.3**
Lowest L_{90} (night): **24.2**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Winter

Northern Pass - Deerfield Substation
Saturday, February 1, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	32.8	23.2	25.6	28.1	32.2	35.4	37.2	41.0
01:00	34.0	26.6	28.2	29.5	32.9	35.2	37.6	54.6
02:00	31.8	24.0	25.9	27.5	30.3	35.1	37.0	37.9
03:00	35.0	27.3	29.9	31.3	34.1	36.8	39.0	52.1
04:00	33.2	22.7	24.3	26.5	30.6	35.4	37.7	54.6
05:00	31.4	22.6	24.5	26.5	29.1	33.7	37.0	52.8
06:00	34.8	24.9	26.5	28.7	31.5	34.7	47.9	53.7
07:00	37.4	24.2	25.9	28.4	32.4	38.0	49.4	61.1
08:00	43.0	24.4	25.9	27.3	31.4	41.4	57.7	64.8
09:00	36.4	24.1	25.5	27.1	30.5	38.0	48.8	54.8
10:00	39.0	23.3	25.0	27.0	30.2	41.1	52.2	57.3
11:00	39.8	22.4	24.0	26.1	30.9	42.3	50.9	63.7
12:00	39.9	22.4	23.7	25.2	28.6	43.1	52.7	61.0
13:00	37.4	22.1	24.1	26.0	29.2	37.2	50.6	57.6
14:00	35.9	23.1	25.4	27.4	30.7	38.1	47.0	55.7
15:00	37.8	23.9	25.8	27.5	31.2	40.4	49.7	55.5
16:00	34.6	24.5	25.8	27.5	30.1	35.9	46.3	62.5
17:00	33.2	23.6	24.9	26.0	28.0	33.8	45.8	57.5
18:00	32.7	23.1	24.2	25.2	26.8	30.2	46.0	54.6
19:00	32.7	22.4	23.9	25.0	27.0	32.9	44.7	53.5
20:00	37.1	23.2	24.8	26.6	31.5	37.3	49.8	60.6
21:00	35.6	27.3	29.1	31.0	34.2	38.5	41.4	49.6
22:00	34.4	22.0	24.6	26.9	31.3	38.2	43.2	50.6
23:00	30.6	22.6	23.8	25.2	27.4	31.3	36.7	54.4

Overall L_{eq}: **36.6**

L_{eq} (day*): **37.8**
L_{eq} (night):** **33.4**

Lowest L_{90} (day): **25.0**
Lowest L_{90} (night): **25.2**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Winter

Northern Pass - Deerfield Substation
Sunday, February 2, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	34.1	24.7	26.3	27.9	31.2	37.3	42.1	49.8
01:00	29.9	20.4	22.4	23.8	26.2	30.6	36.6	53.3
02:00	28.0	20.5	21.8	23.3	25.3	28.0	35.7	49.7
03:00	26.0	20.2	21.9	23.3	25.6	28.1	30.0	32.2
04:00	30.9	24.0	25.4	27.6	30.0	32.4	35.8	48.3
05:00	28.0	21.7	22.9	24.3	27.2	30.5	33.4	35.2
06:00	29.2	22.2	23.7	24.9	27.2	30.7	37.4	47.5
07:00	33.9	23.9	25.3	27.2	29.6	32.9	44.6	57.3
08:00	33.6	24.1	25.9	27.3	29.8	34.2	45.7	53.5
09:00	36.5	24.9	26.3	27.6	30.3	36.2	48.9	57.8
10:00	36.6	26.4	27.3	28.5	30.7	38.2	48.3	55.8
11:00	37.4	25.1	26.5	27.7	30.1	38.6	50.2	56.9
12:00	44.5	25.7	26.7	28.3	31.7	38.6	60.1	64.7
13:00	47.7	25.8	26.9	28.4	32.6	45.5	61.5	66.9
14:00	43.7	26.4	28.2	29.7	34.4	40.8	58.7	66.0
15:00	34.6	24.9	25.8	27.0	29.6	36.7	46.3	55.2
16:00	34.1	26.0	27.0	28.1	30.1	35.6	45.3	53.9
17:00	32.4	26.4	27.3	28.2	29.7	33.3	42.7	51.3
18:00	36.0	25.1	26.3	27.4	29.3	34.1	46.8	60.5
19:00	31.5	24.1	25.2	26.5	28.5	31.9	43.4	55.9
20:00	33.1	24.2	25.4	26.5	28.7	33.0	45.8	55.1
21:00	28.2	23.0	24.0	25.1	27.2	30.4	34.2	42.9
22:00	32.2	23.2	24.2	25.7	28.0	31.6	45.0	51.3
23:00	30.2	24.0	25.5	27.3	29.8	32.1	34.4	37.9

Overall L_{eq}: **38.1**

L_{eq} (day*): **39.9**
L_{eq} (night):** **30.4**

Lowest L_{90} (day): **25.1**
Lowest L_{90} (night): **23.3**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Winter

Northern Pass - Deerfield Substation
Monday, February 3, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	28.0	23.0	24.1	25.5	27.5	29.8	32.3	39.8
01:00	28.4	22.2	24.1	25.2	27.4	31.0	33.8	39.3
02:00	30.3	21.7	23.2	24.6	27.1	32.3	41.5	46.6
03:00	31.9	22.9	24.4	26.2	29.7	34.0	41.1	49.9
04:00	30.2	22.1	23.4	25.3	27.9	31.8	38.3	48.5
05:00	31.9	21.9	23.5	24.7	27.0	30.9	45.4	51.8
06:00	35.8	23.1	24.4	25.6	27.6	33.2	49.3	56.2
07:00	42.9	27.0	28.7	31.7	36.5	46.3	53.4	62.5
08:00	43.4	29.9	32.3	36.1	40.2	46.8	52.4	58.8
09:00	40.2	28.5	30.1	31.5	36.2	43.5	50.4	54.9
10:00	38.3	28.0	29.5	31.6	35.3	41.8	47.3	51.2
11:00	38.2	27.5	28.7	30.5	33.5	39.0	46.7	61.6
12:00	37.3	26.5	28.3	29.4	32.4	40.1	47.8	56.4
13:00	36.4	26.1	27.2	28.3	31.9	39.4	46.5	53.1
14:00	37.5	24.2	25.4	26.8	31.1	41.4	48.4	52.3
15:00	34.6	22.3	23.8	25.2	27.7	35.0	47.3	53.6
16:00	33.3	21.7	23.3	25.2	27.9	33.7	46.3	50.1
17:00	32.4	21.6	22.4	23.3	26.3	32.8	45.6	48.4
18:00	32.9	22.1	23.4	25.8	28.3	32.2	45.6	50.8
19:00	34.2	24.3	24.9	26.4	28.3	31.5	46.7	55.9
20:00	35.0	22.6	24.0	25.5	27.6	33.7	49.0	54.3
21:00	33.0	21.6	22.8	24.1	25.9	32.7	46.3	55.3
22:00	32.4	22.7	23.7	24.6	27.1	32.3	46.3	53.2
23:00	32.4	22.2	24.3	28.2	30.9	34.0	37.2	51.0

Overall L_{eq}: **36.6**

L_{eq} (day*): **38.1**
L_{eq} (night):** **31.9**

Lowest L_{90} (day): **23.3**
Lowest L_{90} (night): **24.6**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Winter

Northern Pass - Deerfield Substation
Tuesday, February 4, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	33.3	22.0	23.8	27.3	32.5	35.7	37.6	49.5
01:00	31.6	22.4	25.0	27.5	31.3	33.9	35.3	36.5
02:00	34.0	24.5	26.8	29.7	33.8	35.4	37.0	48.6
03:00	29.1	23.2	24.1	25.6	28.3	31.8	34.1	36.6
04:00	28.6	21.6	22.9	24.3	26.3	29.3	34.1	50.8
05:00	32.3	22.2	23.7	25.0	27.5	31.2	46.3	51.9
06:00	38.7	24.0	25.4	27.3	30.6	39.5	51.6	55.5
07:00	43.9	28.3	30.4	34.2	38.7	48.0	54.6	59.2
08:00	45.1	30.3	34.8	38.4	42.6	48.1	54.1	59.8
09:00	48.7	27.1	28.9	34.1	39.7	46.0	56.8	74.2
10:00	43.9	31.4	34.0	38.2	42.2	46.5	52.1	58.4
11:00	42.0	27.5	29.2	34.3	40.1	44.8	50.3	58.1
12:00	50.6	28.3	30.4	33.2	38.7	44.2	55.5	77.7
13:00	40.0	28.9	30.6	32.7	37.5	43.5	48.2	53.6
14:00	47.4	24.9	26.7	28.7	33.9	43.3	54.8	74.4
15:00	47.2	23.1	24.7	27.3	29.9	42.2	59.8	74.4
16:00	47.4	22.3	23.6	25.8	29.4	37.1	50.0	75.8
17:00	34.4	24.2	25.5	27.5	29.9	34.0	47.3	50.9
18:00	34.0	22.8	24.3	26.2	28.3	34.3	46.6	56.8
19:00	38.3	22.3	24.1	25.1	27.2	31.6	52.6	61.5
20:00	36.2	22.1	24.0	25.6	27.9	32.5	49.3	57.6
21:00	33.5	24.6	25.7	26.7	28.3	31.7	47.1	53.8
22:00	31.4	25.5	26.5	27.3	29.0	31.3	41.5	51.1
23:00	28.5	23.8	25.2	26.3	28.2	30.1	31.4	42.3

Overall L_{eq}: **43.2**

L_{eq} (day*): **45.0**
L_{eq} (night):** **33.2**

Lowest L_{90} (day): **25.1**
Lowest L_{90} (night): **24.3**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Winter

Northern Pass - Deerfield Substation
Wednesday, February 5, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	28.3	21.0	22.7	25.6	27.8	30.5	32.2	33.1
01:00	28.6	22.4	24.1	25.8	28.2	30.6	32.4	33.0
02:00	26.9	21.2	22.4	23.8	26.1	29.5	31.1	31.7
03:00	30.5	20.8	22.5	24.8	27.6	30.1	39.9	50.9
04:00	30.6	22.1	23.7	25.2	27.7	30.8	38.3	52.6
05:00	38.9	23.7	25.1	27.4	35.7	40.5	47.9	59.3
06:00	39.2	35.4	36.1	36.9	38.2	39.0	45.0	59.7
07:00	37.8	34.1	34.9	35.5	36.8	39.3	43.9	57.5
08:00	44.7	35.4	36.1	37.1	38.9	45.1	57.8	65.7
09:00	40.1	38.0	38.8	39.2	39.8	41.0	43.4	51.3
10:00	41.2	35.9	36.7	37.4	38.8	41.9	52.0	60.2
11:00	37.5	33.0	33.9	34.9	36.6	39.1	44.8	48.4
12:00	40.9	34.7	36.0	37.4	39.0	42.0	48.8	60.2
13:00	46.2	35.3	36.4	37.9	42.7	49.4	55.5	63.0
14:00	39.4	34.2	35.2	36.5	38.5	41.7	45.3	52.9
15:00	41.7	32.5	33.7	34.9	37.0	41.3	49.0	68.2
16:00	39.1	32.4	33.7	34.7	35.9	39.8	47.6	62.2
17:00	39.3	30.2	31.8	33.1	35.2	40.3	50.8	61.3
18:00	36.3	27.0	28.3	30.3	33.6	38.7	45.5	53.0
19:00	37.8	26.6	27.9	29.5	32.4	38.0	50.3	61.8
20:00	37.8	26.3	27.7	29.7	34.6	36.1	46.3	64.1
21:00	35.5	25.7	27.2	29.9	34.6	37.2	41.7	56.9
22:00	32.2	22.7	24.5	26.4	30.1	34.2	42.4	51.9
23:00	28.2	19.4	21.5	23.1	26.4	30.5	36.5	45.0

Overall L_{eq}: **39.3**

L_{eq} (day*): **40.8**
L_{eq} (night):** **34.0**

Lowest L_{90} (day): **29.5**
Lowest L_{90} (night): **23.1**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Winter

Northern Pass - Deerfield Substation
Thursday, February 6, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	26.6	19.4	21.1	22.7	25.4	27.1	34.5	47.7
01:00	25.0	20.6	21.5	22.5	24.8	26.5	28.3	28.9
02:00	27.0	18.9	20.0	22.4	25.4	28.6	36.4	42.8
03:00	27.7	21.4	22.8	24.1	26.4	30.4	33.3	42.1
04:00	29.9	22.0	23.5	24.9	27.3	32.6	38.8	46.1
05:00	44.7	24.1	25.6	28.5	33.9	41.1	58.1	67.4
06:00	38.5	29.2	30.6	33.0	36.5	41.4	46.8	53.6
07:00	46.1	29.4	31.4	34.0	37.0	45.4	58.7	68.0
08:00	38.7	29.2	30.7	32.5	36.0	41.7	47.9	55.2
09:00	42.9	31.1	32.5	34.6	38.1	44.0	54.5	63.3
10:00	34.7	23.2	25.6	27.7	32.3	37.1	44.2	51.9
11:00	45.5	23.5	25.8	28.2	32.3	43.0	60.2	67.7
12:00								
13:00								
14:00								
15:00								
16:00								
17:00								
18:00								
19:00								
20:00								
21:00								
22:00								
23:00								

Overall L_{eq}: **40.8**

L_{eq} (day*): **43.3**
L_{eq} (night):** **37.5**

Lowest L_{90} (day): **27.7**
Lowest L_{90} (night): **22.4**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Summer

Northern Pass - Deerfield Substation
Monday, June 16, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00								
01:00								
02:00								
03:00								
04:00								
05:00								
06:00								
07:00								
08:00								
09:00								
10:00								
11:00								
12:00								
13:00								
14:00								
15:00	42.0	26.7	30.0	32.0	35.8	43.0	53.3	65.8
16:00	41.4	27.1	29.1	31.1	34.9	40.9	51.1	67.0
17:00	41.2	29.5	31.6	33.1	36.3	42.6	52.6	63.4
18:00	40.7	30.7	32.0	33.6	35.5	41.6	52.4	63.7
19:00	39.6	29.2	31.6	32.8	35.1	40.4	50.3	63.6
20:00	41.8	27.9	29.9	30.9	32.5	39.5	55.5	62.8
21:00	32.9	29.3	30.4	31.1	32.1	33.4	39.5	54.8
22:00	34.6	29.3	30.5	31.3	32.4	34.6	43.7	65.2
23:00	32.9	26.4	28.3	29.3	30.6	33.8	43.3	53.2

Overall L_{eq}: **39.8**

L_{eq} (day*): **40.6**
L_{eq} (night):** **33.8**

Lowest L_{90} (day): **30.9**
Lowest L_{90} (night): **29.3**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Summer

Northern Pass - Deerfield Substation
Tuesday, June 17, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	31.0	26.4	27.7	28.7	30.0	31.2	39.3	51.3
01:00	30.4	26.3	27.6	28.5	29.6	30.7	36.2	47.1
02:00	30.6	25.4	26.7	27.8	29.4	31.2	38.9	47.1
03:00	29.9	25.8	27.2	28.2	29.7	31.3	32.7	42.9
04:00	35.4	25.8	26.8	28.0	31.8	39.4	43.6	50.1
05:00	39.7	26.7	28.6	31.2	35.6	42.8	49.9	59.6
06:00	43.9	26.4	27.9	29.7	34.5	44.7	55.8	70.0
07:00	43.1	28.1	29.9	32.0	36.8	46.1	53.9	66.0
08:00	39.0	29.6	30.9	31.9	34.0	41.8	50.1	59.5
09:00	42.0	29.9	31.4	32.5	35.3	43.4	54.2	69.1
10:00	43.1	30.3	32.1	33.4	35.9	43.0	53.2	67.1
11:00	35.5	29.3	30.6	31.7	33.9	37.7	43.4	59.5
12:00	36.6	27.7	29.8	31.3	34.0	38.0	47.2	52.6
13:00	36.5	25.9	27.7	29.4	32.1	37.8	48.0	61.4
14:00	36.6	25.7	27.7	29.2	32.3	37.7	48.1	58.6
15:00	42.3	25.5	28.2	30.5	34.4	43.8	54.4	67.5
16:00	42.6	27.0	29.4	31.4	35.6	45.3	54.6	66.0
17:00	40.4	28.4	30.4	31.9	35.0	43.0	51.4	64.4
18:00	39.3	29.7	32.2	33.8	36.3	42.0	49.2	53.6
19:00	37.0	30.5	31.8	32.8	34.4	38.2	47.3	58.3
20:00	40.6	29.3	30.6	31.7	33.5	39.5	53.5	62.8
21:00	39.3	30.9	32.1	33.1	36.0	43.1	47.0	53.2
22:00	39.7	32.1	33.9	34.8	37.4	42.6	47.4	54.0
23:00	43.0	32.9	34.2	35.3	37.7	42.0	53.8	66.6

Overall L_{eq}: **39.9**

L_{eq} (day*): **40.3**
L_{eq} (night):** **39.0**

Lowest L_{90} (day): **29.2**
Lowest L_{90} (night): **27.8**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Summer

Northern Pass - Deerfield Substation
Wednesday, June 18, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	41.2	33.1	34.4	35.5	37.0	40.6	44.7	69.1
01:00	39.7	32.3	34.1	35.7	37.6	42.4	47.7	52.9
02:00	46.8	31.9	33.2	34.8	38.5	51.1	57.0	62.1
03:00	58.1	44.2	47.7	52.6	57.5	60.7	63.8	67.7
04:00	54.3	37.7	40.5	43.7	52.7	57.8	61.5	65.9
05:00	46.6	33.5	35.8	38.0	42.6	50.6	55.4	65.2
06:00	49.9	32.2	34.3	36.9	43.6	53.7	60.9	66.0
07:00	47.9	33.7	35.4	38.0	42.6	48.9	61.0	67.1
08:00	52.5	40.1	42.0	44.2	49.2	55.9	61.1	68.3
09:00	52.5	36.8	39.4	43.6	49.2	56.0	61.9	66.7
10:00	55.7	43.5	44.7	47.6	52.9	59.0	64.1	71.1
11:00	56.0	41.3	43.2	45.7	51.7	58.9	66.6	73.3
12:00	55.1	41.5	43.2	46.2	51.4	58.8	64.4	68.8
13:00	52.4	38.8	42.2	45.6	49.5	55.8	60.2	66.3
14:00	53.4	40.3	42.2	45.2	50.6	56.5	62.2	70.0
15:00	52.6	41.2	42.5	44.8	49.9	56.0	61.4	66.8
16:00	51.4	37.8	39.2	42.6	47.9	53.9	63.0	66.9
17:00	45.2	35.0	36.6	38.8	43.3	48.2	53.3	57.5
18:00	42.4	33.9	35.5	36.9	40.1	45.7	50.2	55.5
19:00	38.8	31.8	32.8	34.2	36.4	41.7	47.4	52.4
20:00	40.3	28.9	30.5	31.7	34.1	42.3	52.0	60.8
21:00	39.1	30.1	31.4	32.6	36.1	43.1	46.2	53.1
22:00	36.1	30.3	31.4	32.5	34.1	39.2	43.6	53.3
23:00	34.6	25.1	29.7	31.1	33.5	36.6	41.6	51.6

Overall L_{eq}: **51.5**

L_{eq} (day*): **51.8**
L_{eq} (night):** **51.0**

Lowest L_{90} (day): **31.7**
Lowest L_{90} (night): **31.1**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Summer

Northern Pass - Deerfield Substation
Thursday, June 19, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	39.8	27.5	29.5	30.9	35.6	40.1	45.3	67.6
01:00	31.5	26.8	28.1	29.2	30.8	33.6	36.2	48.4
02:00	31.7	26.0	27.6	28.6	30.3	32.4	39.9	55.2
03:00	30.9	26.7	27.8	28.7	30.4	32.6	35.1	40.8
04:00	35.8	26.0	28.0	30.0	33.8	39.1	43.3	49.6
05:00	36.2	28.1	29.8	31.4	34.1	38.2	46.0	52.4
06:00	38.3	29.2	31.0	32.7	35.0	40.9	47.8	57.6
07:00	39.3	30.6	32.2	33.8	36.8	41.4	49.0	54.7
08:00	39.6	30.5	32.6	33.9	37.1	42.2	48.8	56.5
09:00	41.3	30.9	32.8	34.6	38.7	44.6	49.2	61.3
10:00	44.3	34.4	35.8	38.5	42.3	47.5	52.2	56.6
11:00	47.4	33.4	35.4	38.4	44.7	51.0	54.8	72.0
12:00	48.2	36.0	38.2	40.7	45.9	51.4	56.8	61.9
13:00	48.8	36.2	38.0	41.1	46.1	52.6	56.4	69.1
14:00	45.5	33.4	34.8	37.0	41.6	48.0	55.2	67.2
15:00	46.1	31.3	33.0	37.9	44.0	49.3	53.9	65.1
16:00	46.0	35.5	36.7	38.3	42.5	49.2	55.4	61.4
17:00	47.0	33.5	36.1	39.6	44.4	50.1	55.3	63.1
18:00	43.6	34.2	35.8	37.5	41.5	46.7	51.7	57.2
19:00	41.9	30.7	32.3	34.7	39.9	45.0	49.8	59.8
20:00	40.2	27.8	29.1	30.6	33.7	41.8	51.9	64.2
21:00	37.4	27.4	29.1	30.4	34.0	39.0	48.3	57.9
22:00	37.2	28.9	30.4	31.8	34.3	38.2	48.3	53.3
23:00	39.0	23.5	25.5	27.2	30.3	33.5	42.1	67.6

Overall L_{eq}: **43.3**

L_{eq} (day*): **45.0**
L_{eq} (night):** **36.6**

Lowest L_{90} (day): **30.4**
Lowest L_{90} (night): **27.2**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Summer

Northern Pass - Deerfield Substation
Friday, June 20, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	31.0	24.9	26.3	27.8	30.0	32.7	37.3	48.3
01:00	31.4	25.6	27.0	28.5	30.8	33.1	37.0	44.0
02:00	34.3	25.3	28.4	30.5	33.1	36.4	40.4	59.4
03:00	35.2	28.8	30.5	32.0	34.2	37.4	41.1	49.1
04:00	36.0	29.1	31.0	32.4	34.8	38.4	42.2	48.5
05:00	36.6	27.7	29.9	31.7	34.0	38.1	47.4	58.5
06:00	37.5	26.9	29.3	31.3	34.3	40.0	47.5	56.9
07:00	43.3	28.4	30.1	31.9	36.6	46.0	54.7	69.1
08:00	42.4	31.3	33.2	35.9	40.0	45.9	50.9	63.2
09:00	48.9	34.0	35.6	38.3	43.8	49.9	58.7	78.3
10:00	53.8	39.8	42.1	45.8	50.8	56.9	62.9	76.8
11:00	50.5	36.8	38.4	41.9	47.5	54.2	59.5	66.7
12:00	50.1	37.6	38.8	40.7	46.3	54.5	59.5	66.4
13:00	50.4	33.7	36.3	40.0	47.5	54.1	58.8	69.8
14:00	49.9	34.4	36.9	39.9	46.6	53.1	59.9	66.2
15:00	48.2	35.4	36.8	40.3	45.0	51.1	56.5	70.5
16:00	47.9	35.7	36.9	40.0	44.8	51.5	57.4	60.9
17:00	48.1	35.1	36.6	40.0	45.3	51.8	56.6	60.9
18:00	45.7	33.8	35.2	38.1	42.2	48.7	54.6	68.6
19:00	43.8	29.5	31.6	34.1	40.0	46.8	53.8	64.4
20:00	39.4	27.3	28.8	30.3	33.6	39.4	47.7	67.5
21:00	34.7	24.4	26.6	27.9	30.1	35.3	46.0	59.9
22:00	33.8	24.9	25.9	26.9	28.8	32.9	46.8	54.3
23:00	34.9	21.8	23.6	26.0	30.0	33.2	46.6	58.4

Overall L_{eq}: **46.5**

L_{eq} (day*): **48.4**
L_{eq} (night):** **35.0**

Lowest L_{90} (day): **27.9**
Lowest L_{90} (night): **26.0**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Summer

Northern Pass - Deerfield Substation
Saturday, June 21, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	28.6	21.8	23.6	25.1	27.5	31.2	35.1	42.0
01:00	34.9	21.8	23.6	24.8	27.1	30.7	39.9	61.5
02:00	30.7	22.7	24.3	26.7	29.2	32.6	36.7	48.0
03:00	28.3	22.3	23.6	24.9	27.4	30.9	33.5	41.2
04:00	34.6	23.8	27.0	29.7	32.7	37.2	42.8	49.7
05:00	35.7	25.8	28.1	29.6	32.4	36.8	47.5	53.3
06:00	35.8	25.3	26.7	28.7	31.8	37.9	47.1	54.3
07:00	44.6	26.8	28.7	30.5	33.7	43.8	53.4	76.8
08:00	40.4	28.5	30.1	32.9	35.9	41.0	52.2	63.2
09:00	40.8	30.3	31.9	34.1	38.1	44.4	48.6	55.8
10:00	46.9	32.5	33.8	36.6	42.2	48.5	58.4	71.4
11:00	44.5	31.6	33.4	35.7	40.7	48.4	53.7	59.1
12:00	50.4	30.8	32.5	34.3	40.9	55.9	59.9	66.8
13:00	45.8	31.9	33.6	35.8	42.5	49.1	55.7	66.0
14:00	44.6	33.8	34.8	37.2	42.1	47.8	53.5	62.4
15:00	43.3	31.0	33.0	36.1	41.2	46.5	51.8	57.2
16:00	45.6	31.5	33.2	36.3	42.1	48.9	55.5	61.4
17:00	43.4	32.0	33.3	35.5	40.3	45.8	51.8	67.2
18:00	41.3	30.0	31.4	33.5	38.0	44.5	49.8	63.1
19:00	37.4	28.5	30.5	32.0	34.2	40.2	46.5	56.6
20:00	38.3	26.1	27.8	29.3	31.6	40.6	50.4	57.0
21:00	38.7	24.1	26.2	27.7	31.6	37.1	47.8	64.9
22:00	31.5	22.8	25.0	26.7	28.8	31.7	42.5	52.5
23:00	32.7	24.7	25.8	27.3	31.2	35.2	38.7	48.8

Overall L_{eq}: **42.6**

L_{eq} (day*): **44.5**
L_{eq} (night):** **33.3**

Lowest L_{90} (day): **27.7**
Lowest L_{90} (night): **24.8**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Summer

Northern Pass - Deerfield Substation
Sunday, June 22, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	32.1	23.4	24.9	27.2	30.9	34.5	37.0	48.8
01:00	28.7	21.8	24.0	25.5	27.8	30.9	35.1	39.4
02:00	30.6	24.2	25.6	27.0	29.4	33.2	37.7	43.4
03:00	30.3	24.0	25.2	27.0	29.6	32.6	34.8	44.1
04:00	35.5	23.3	25.2	27.2	33.0	39.1	43.9	53.8
05:00	40.8	25.0	29.1	31.3	34.4	42.0	51.1	66.2
06:00	36.6	25.8	27.9	29.9	33.0	37.4	47.1	55.4
07:00	37.7	25.1	27.0	29.0	32.4	39.0	48.7	62.7
08:00	38.6	25.3	27.4	29.4	32.6	40.6	50.5	59.4
09:00	41.8	27.4	29.2	31.2	34.8	40.9	50.1	68.7
10:00	40.0	29.2	31.5	33.0	36.1	43.5	49.5	59.9
11:00	40.3	29.5	31.1	33.1	36.2	42.5	50.2	64.5
12:00	38.5	27.0	29.2	31.5	35.2	42.0	47.5	55.7
13:00	40.4	26.8	28.1	29.9	34.7	42.9	51.7	62.7
14:00	36.1	26.7	27.9	29.2	32.1	39.5	45.7	52.6
15:00	36.7	25.1	27.5	29.6	32.7	38.3	46.2	64.1
16:00	41.1	29.9	31.5	33.4	36.4	43.9	52.2	59.4
17:00	38.9	28.8	30.2	31.6	34.1	41.3	50.3	59.4
18:00	37.4	28.4	30.6	31.7	33.7	40.0	48.2	55.0
19:00	39.4	27.3	29.1	30.5	33.7	42.6	50.0	61.4
20:00	35.1	26.0	27.6	29.0	31.4	35.9	46.9	53.7
21:00	34.9	25.2	28.2	29.5	31.3	35.0	46.6	57.5
22:00	36.1	23.6	25.1	26.6	30.3	34.2	48.8	56.0
23:00	30.0	23.2	24.7	26.3	28.8	31.6	36.3	51.7

Overall L_{eq}: **37.9**

L_{eq} (day*): **38.9**
L_{eq} (night):** **35.2**

Lowest L_{90} (day): **29.0**
Lowest L_{90} (night): **25.5**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Deerfield CM-1 - Summer

Northern Pass - Deerfield Substation
Monday, June 23, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	30.1	23.5	24.9	26.6	29.7	31.9	35.1	42.9
01:00	29.2	22.3	24.0	25.6	28.2	31.9	34.7	50.1
02:00	30.3	23.9	25.2	26.5	28.8	31.8	36.0	49.0
03:00	29.7	23.8	25.3	26.5	28.6	31.9	35.8	45.4
04:00	37.7	24.1	25.7	27.7	33.8	41.7	47.1	55.8
05:00	39.6	25.4	27.7	30.3	34.3	42.6	49.8	64.6
06:00	39.4	24.1	26.2	29.5	33.4	43.6	49.8	55.5
07:00	42.0	25.8	27.6	29.7	33.6	44.0	52.8	65.1
08:00	41.6	24.8	26.9	28.7	31.5	40.3	52.4	68.8
09:00	36.5	25.3	27.5	29.3	32.1	38.3	47.4	58.7
10:00	42.4	26.9	28.9	30.7	34.2	43.9	53.5	67.6
11:00	42.0	27.8	29.2	30.9	34.3	43.9	54.4	63.2
12:00	39.9	27.6	29.9	31.4	35.0	42.4	51.5	57.6
13:00	38.3	28.1	30.2	32.1	35.5	40.9	46.9	56.7
14:00	40.2	28.3	30.8	33.3	36.9	42.3	50.6	59.2
15:00								
16:00								
17:00								
18:00								
19:00								
20:00								
21:00								
22:00								
23:00								

Overall L_{eq}: **39.1**

L_{eq} (day*): **40.8**
L_{eq} (night):** **36.0**

Lowest L_{90} (day): **28.7**
Lowest L_{90} (night): **25.6**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Annex C

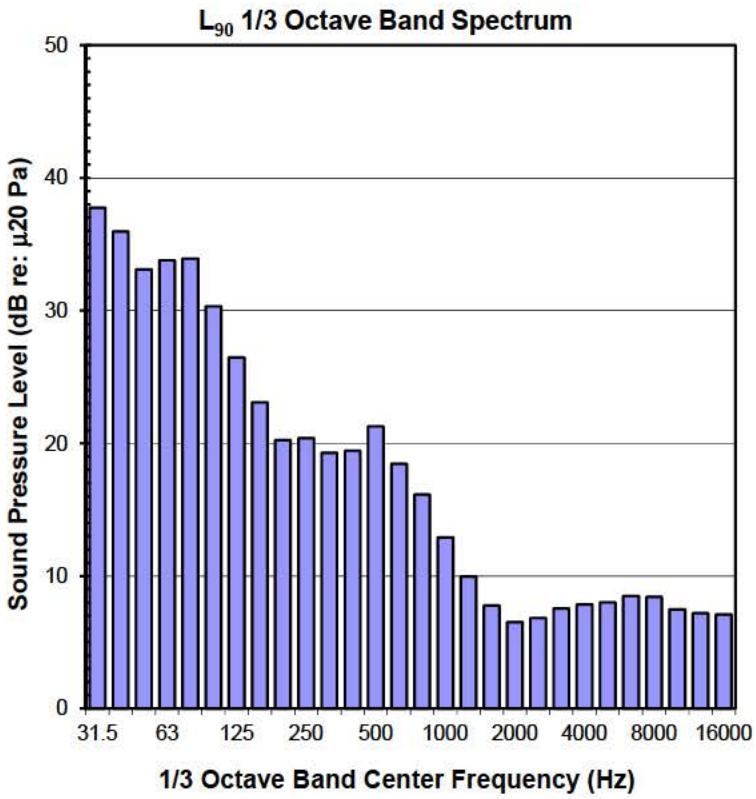
Intermittent Sound Measurement Data

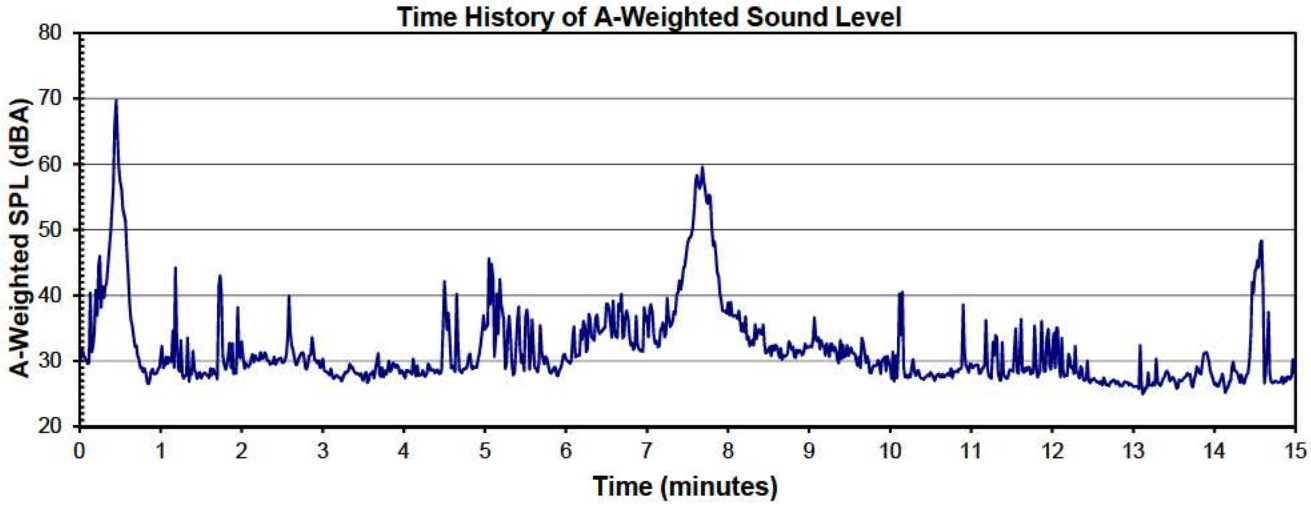
Deerfield IM-N - Winter - Day

Measured Thursday, January 30, 2014, Between 11:01 AM & 11:16 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**44.9**
L_{max}:	70.5
L_{01}:	57.3
L_{10}:	38.4
L_{50}:	29.5
L_{90}:	**27.0**
L_{99}:	25.8
L_{min}:	24.3





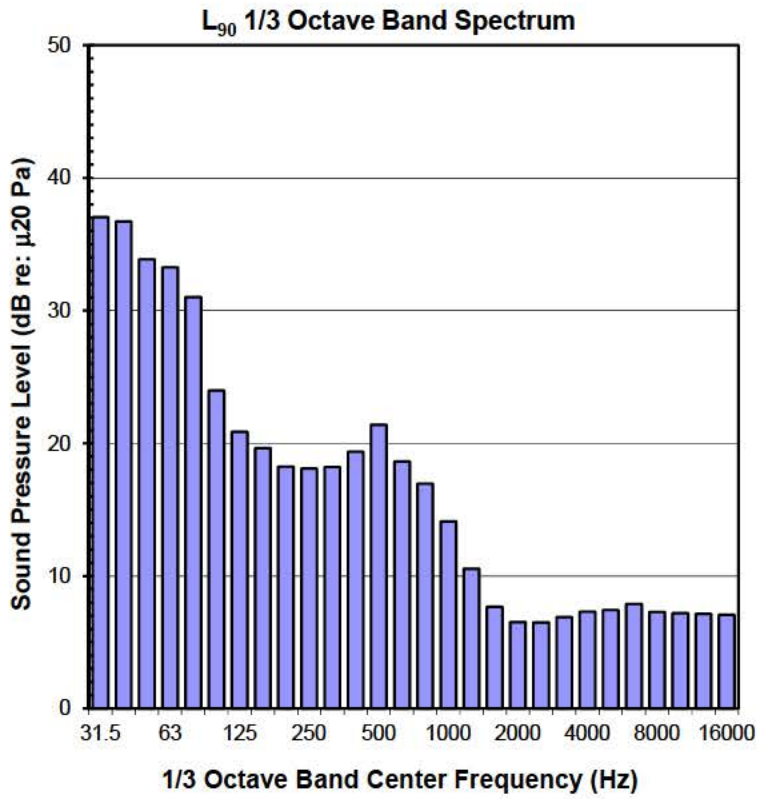
Run004

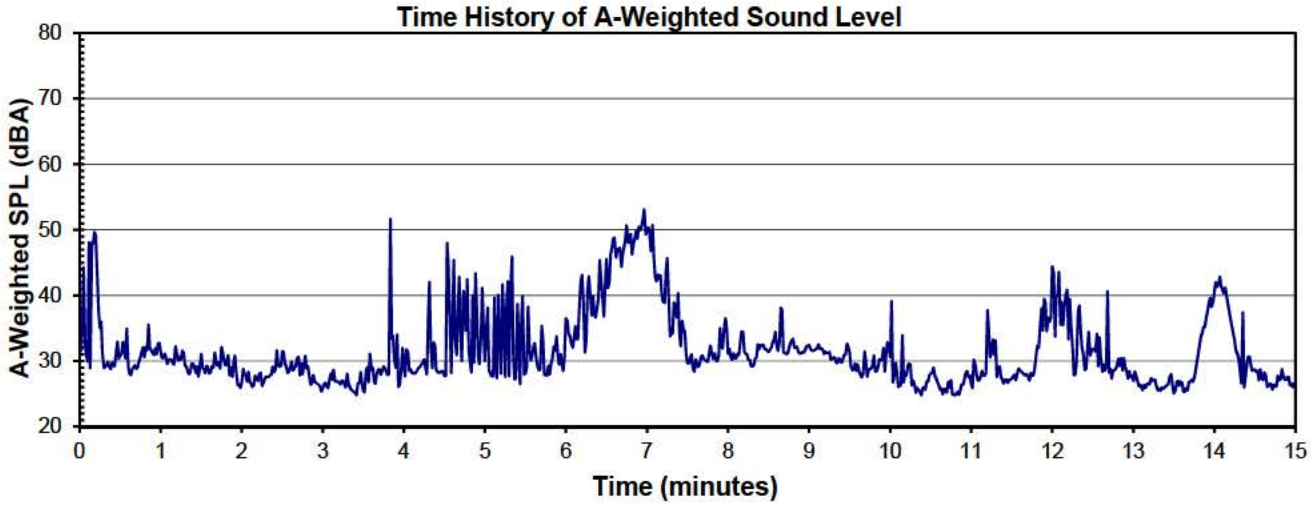
Deerfield IM-W - Winter - Day

Measured Thursday, January 30, 2014, Between 11:26 AM & 11:41 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**37.7**
L_{max}:	60.6
L_{01}:	50.2
L_{10}:	40.0
L_{50}:	29.5
L_{90}:	**26.3**
L_{99}:	25.0
L_{min}:	23.8





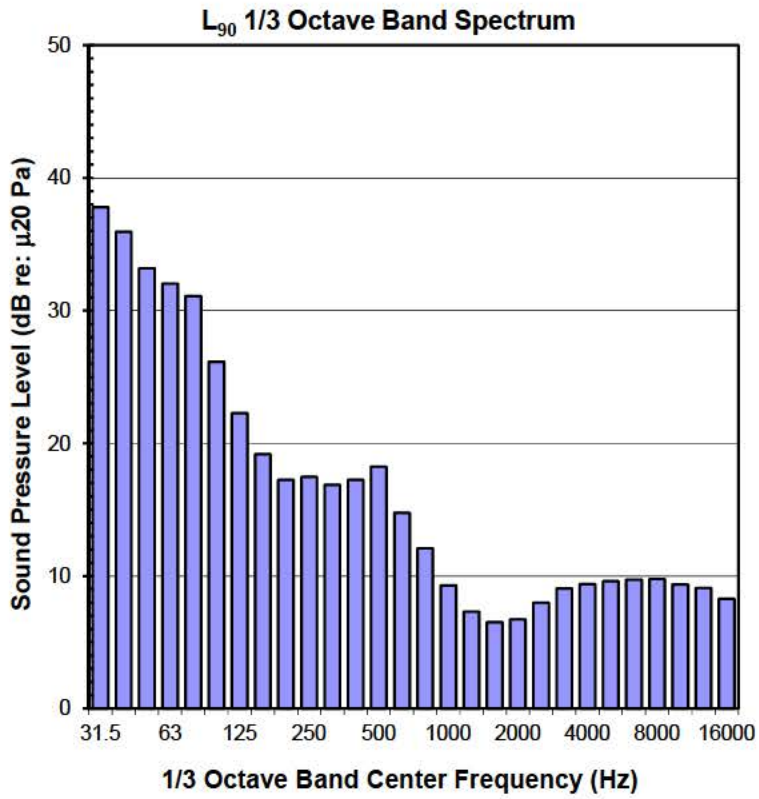
Run005

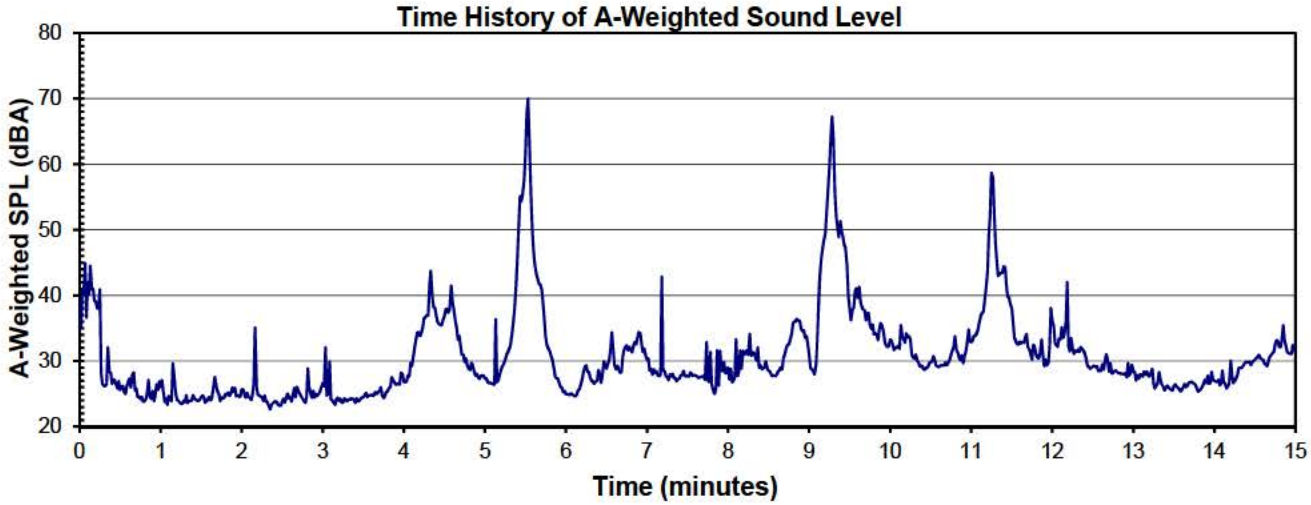
Deerfield IM-S - Winter - Day

Measured Thursday, January 30, 2014, Between 12:04 PM & 12:19 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**46.3**
L_{max}:	71.0
L_{01}:	58.6
L_{10}:	38.2
L_{50}:	28.7
L_{90}:	**24.4**
L_{99}:	23.4
L_{min}:	22.1





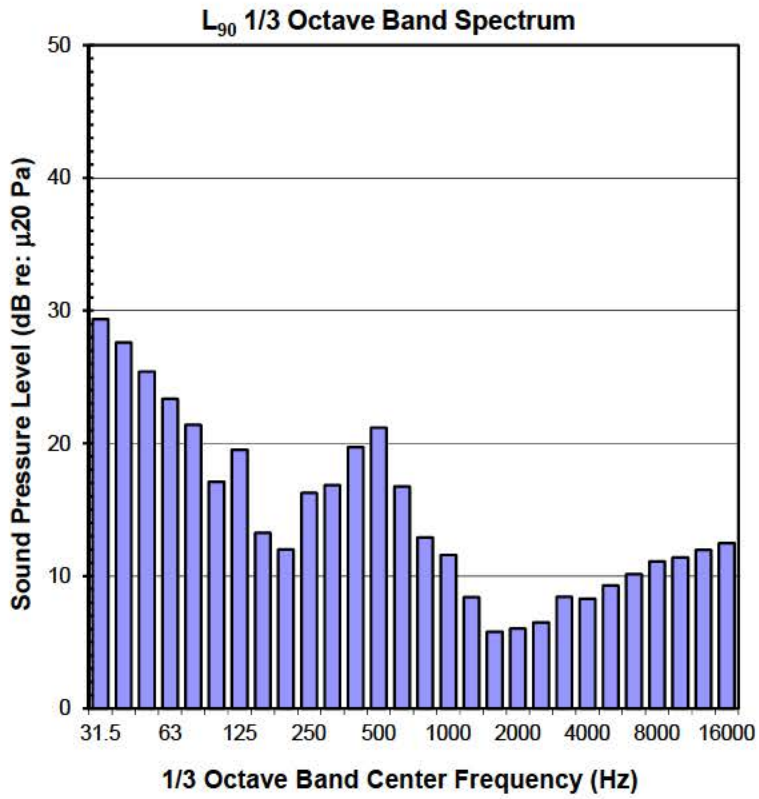
Run006

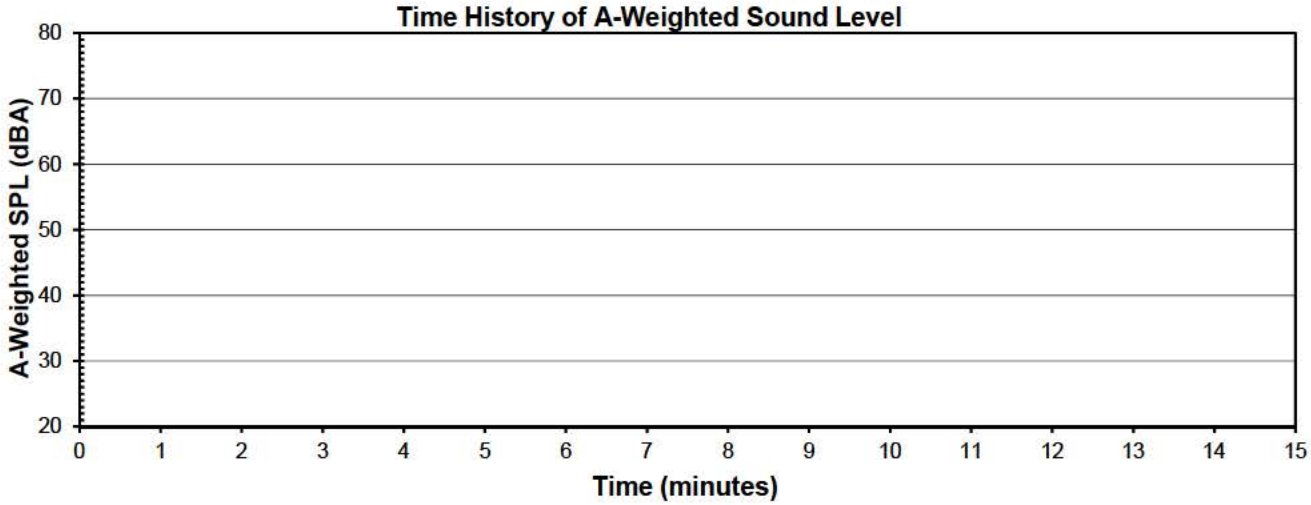
Deerfield IM-N - Winter - Night

Measured Friday, January 31, 2014, Between 1:51 AM & 2:06 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**47.0**
L_{max}:	70.0
L_{01}:	56.9
L_{10}:	51.5
L_{50}:	31.3
L_{90}:	**26.8**
L_{99}:	25.0
L_{min}:	23.6





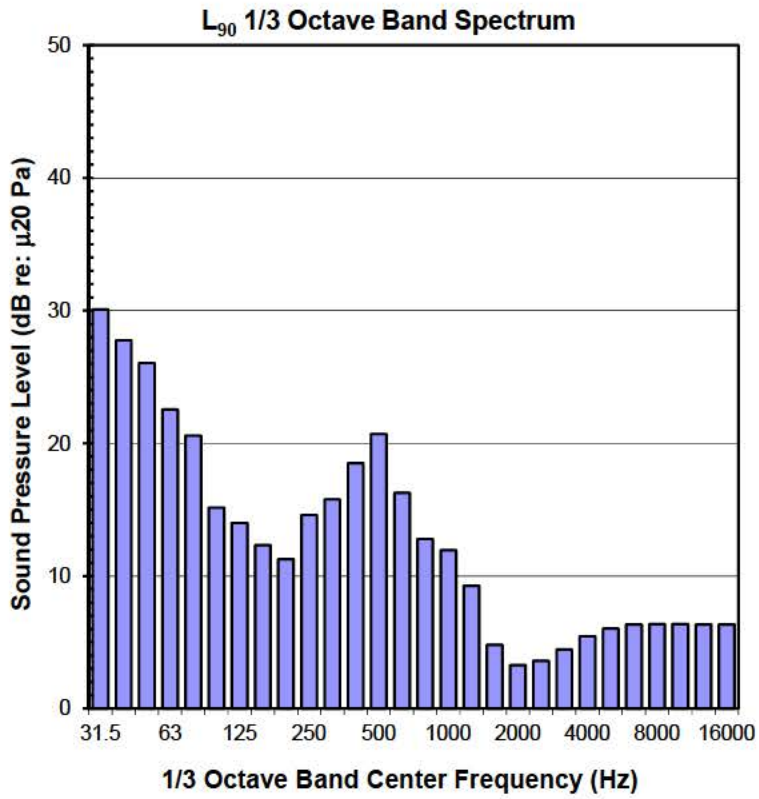
Run012

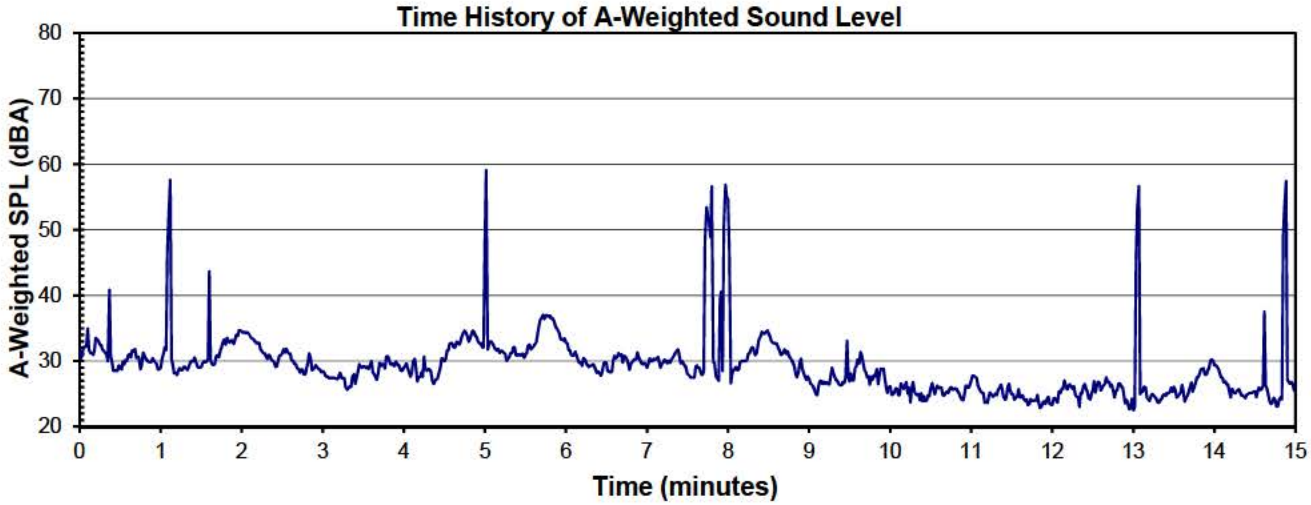
Deerfield IM-W - Winter - Night

Measured Friday, January 31, 2014, Between 2:12 AM & 2:27 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**38.6**
L_{max}:	66.5
L_{01}:	51.6
L_{10}:	33.1
L_{50}:	28.8
L_{90}:	**24.6**
L_{99}:	23.1
L_{min}:	21.7





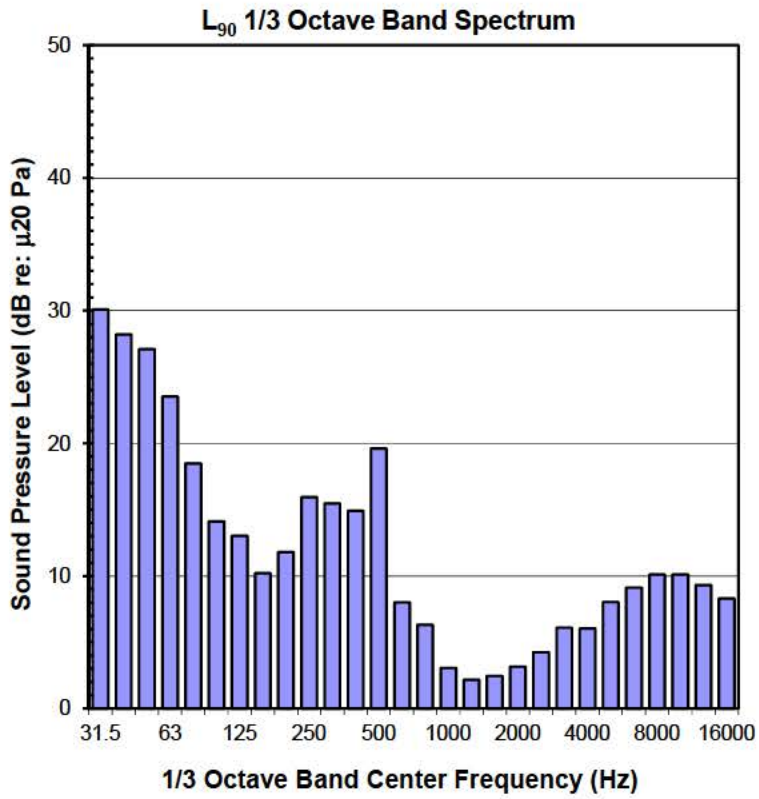
Run013

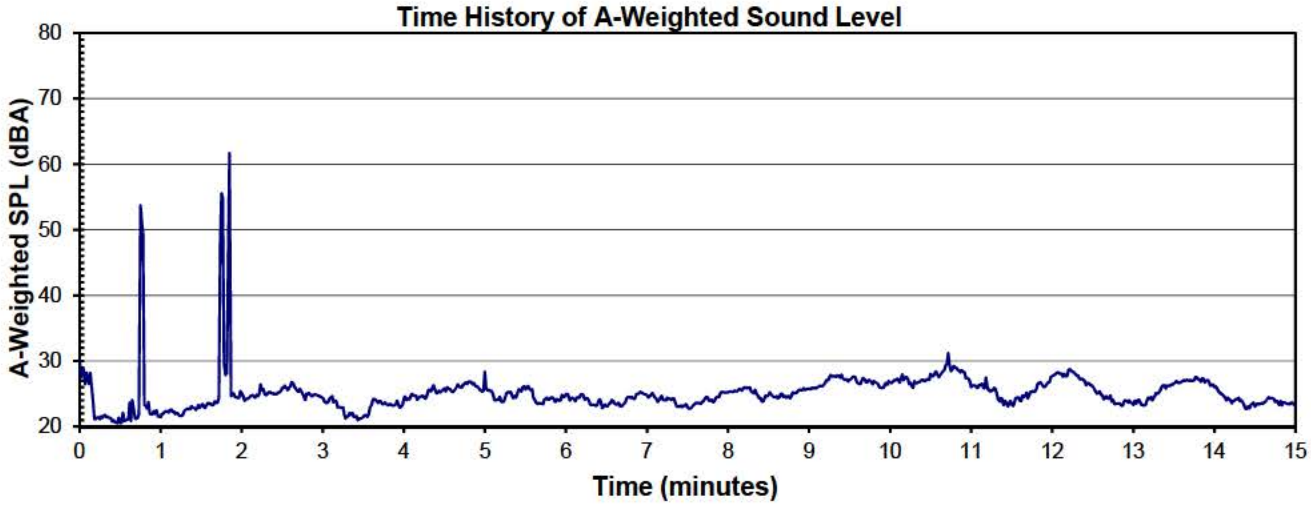
Deerfield IM-S - Winter - Night

Measured Friday, January 31, 2014, Between 2:31 AM & 2:46 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**35.2**
L_{max}:	68.2
L_{01}:	31.0
L_{10}:	27.3
L_{50}:	24.7
L_{90}:	**22.8**
L_{99}:	20.8
L_{min}:	20.1





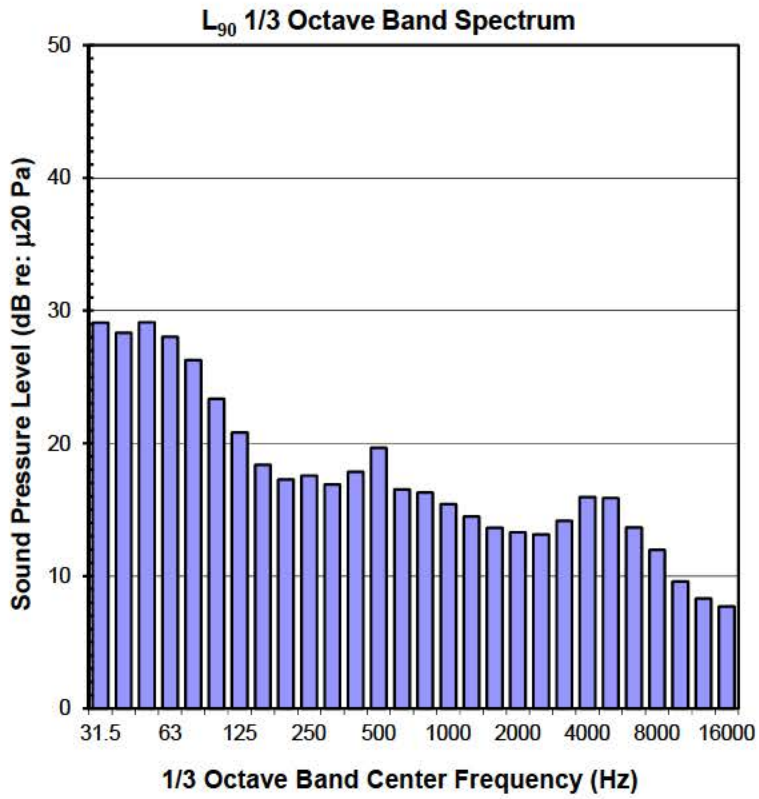
Run014

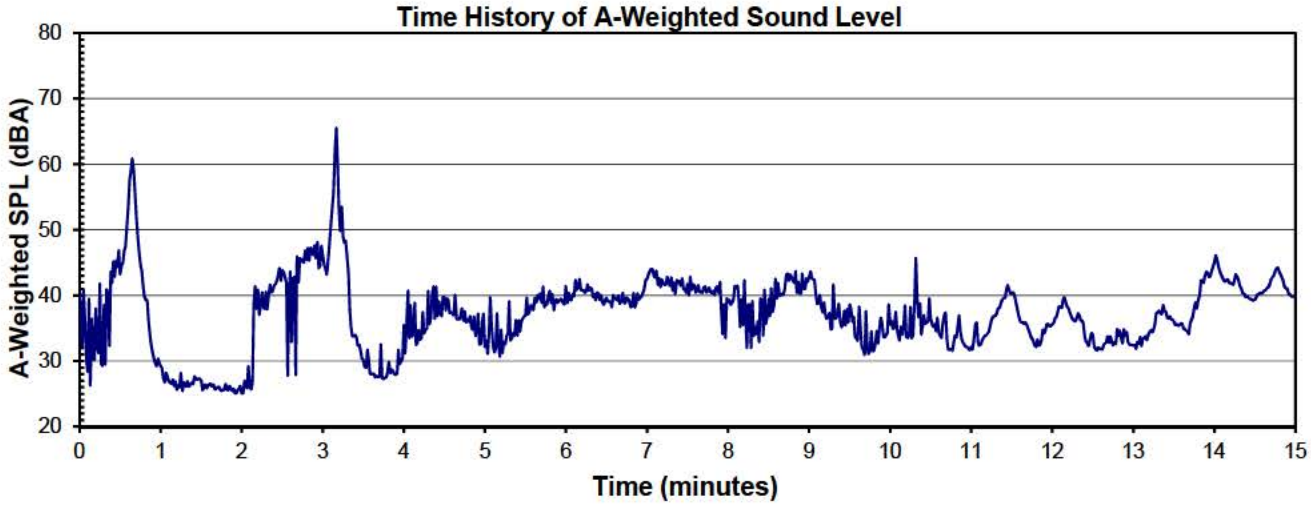
Deerfield IM-N Summer - Day

Measured Monday, June 16, 2014, Between 1:54 PM & 2:09 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**43.3**
L_{max}:	66.6
L_{01}:	54.8
L_{10}:	43.2
L_{50}:	36.7
L_{90}:	**28.2**
L_{99}:	25.4
L_{min}:	24.4





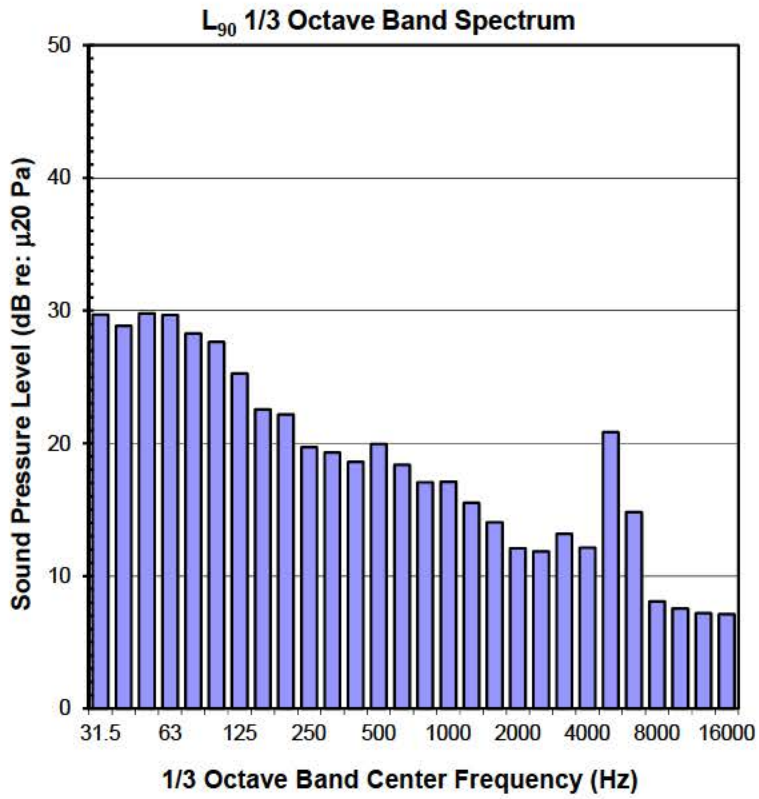
Run005

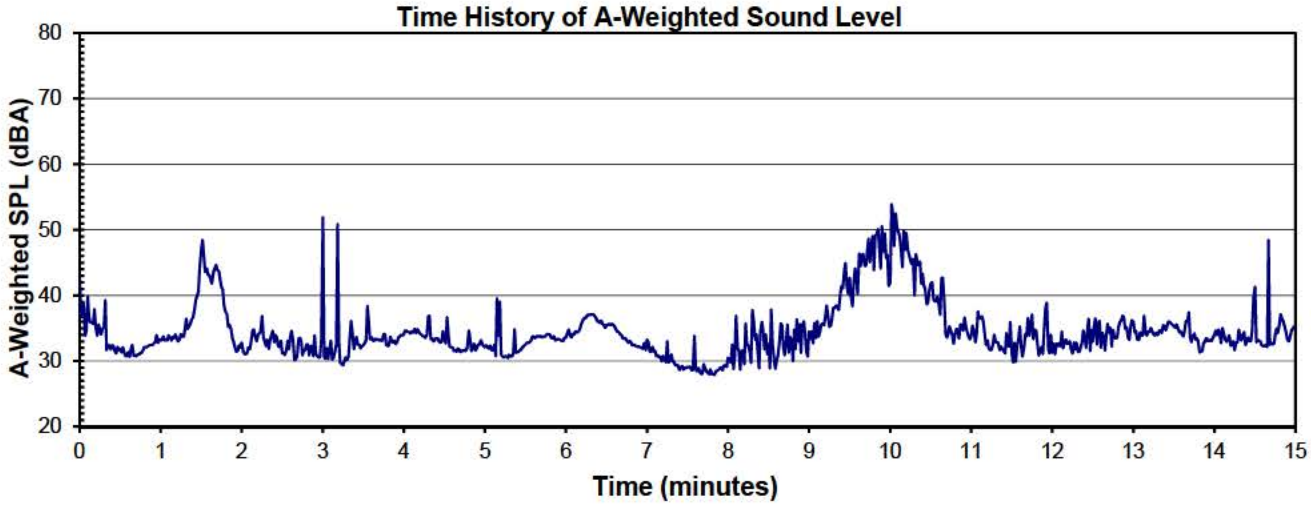
Deerfield IM-W Summer - Day

Measured Monday, June 16, 2014, Between 1:28 PM & 1:43 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**38.3**
L_{max}:	60.7
L_{01}:	49.8
L_{10}:	40.1
L_{50}:	33.3
L_{90}:	**30.4**
L_{99}:	28.1
L_{min}:	26.8





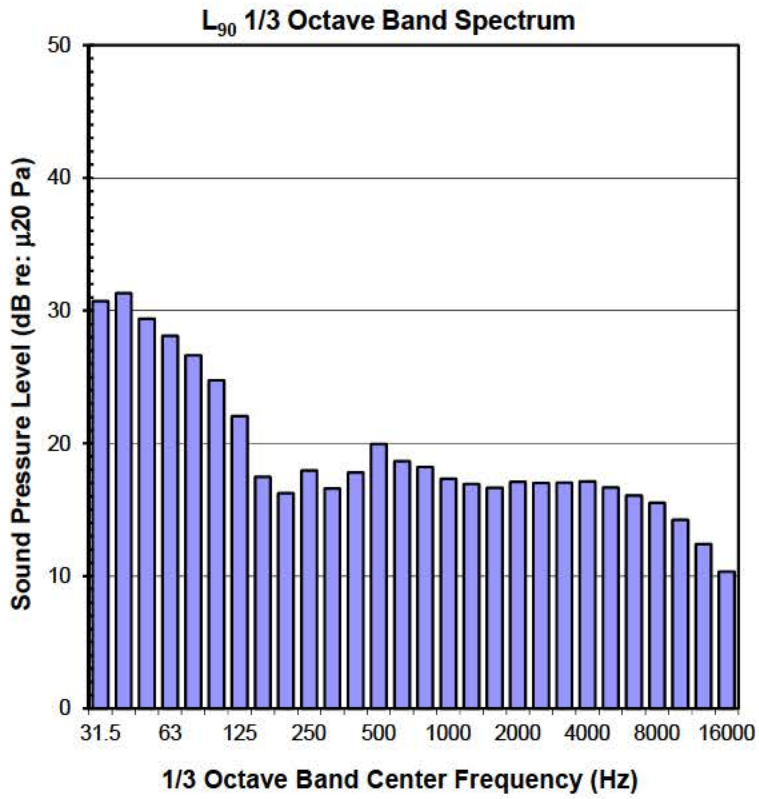
Run004

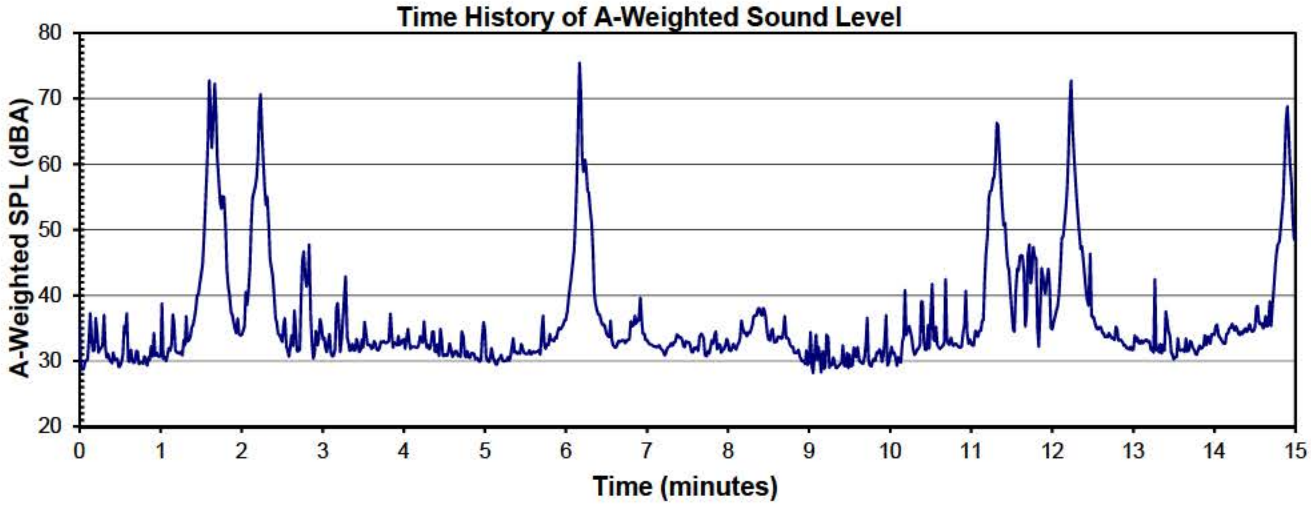
Deerfield IM-S Summer - Day

Measured Monday, June 16, 2014, Between 2:13 PM & 2:28 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**53.8**
L_{max}:	78.6
L_{01}:	68.0
L_{10}:	47.4
L_{50}:	33.0
L_{90}:	**30.3**
L_{99}:	28.7
L_{min}:	27.3





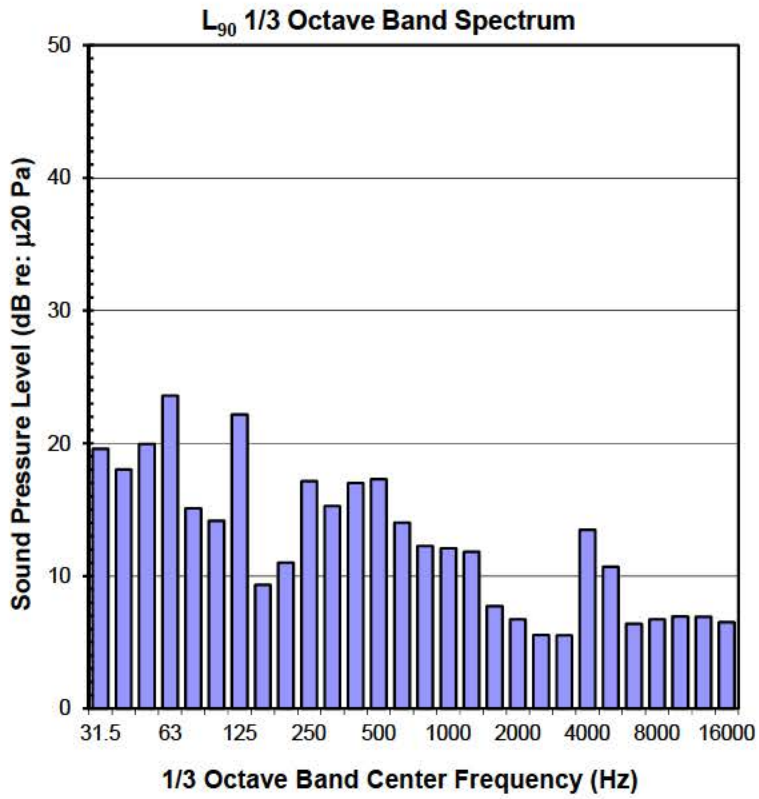
Run006

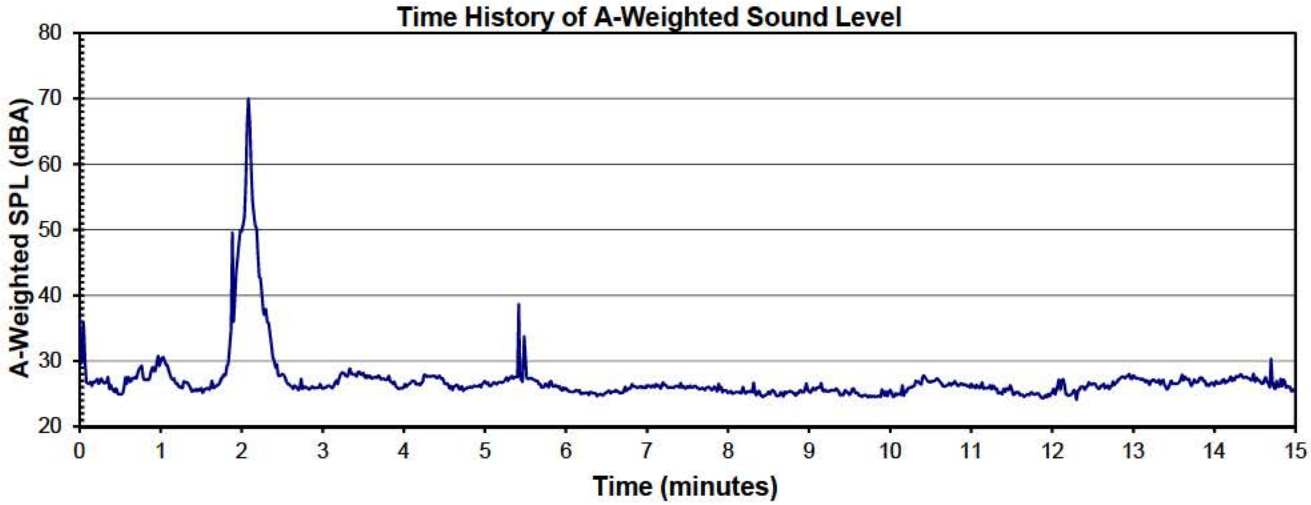
Deerfield IM-N Summer - Night

Measured Tuesday, June 17, 2014, Between 2:09 AM & 2:24 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**43.7**
L_{max}:	70.9
L_{01}:	50.9
L_{10}:	28.0
L_{50}:	26.2
L_{90}:	**24.9**
L_{99}:	24.1
L_{min}:	23.4





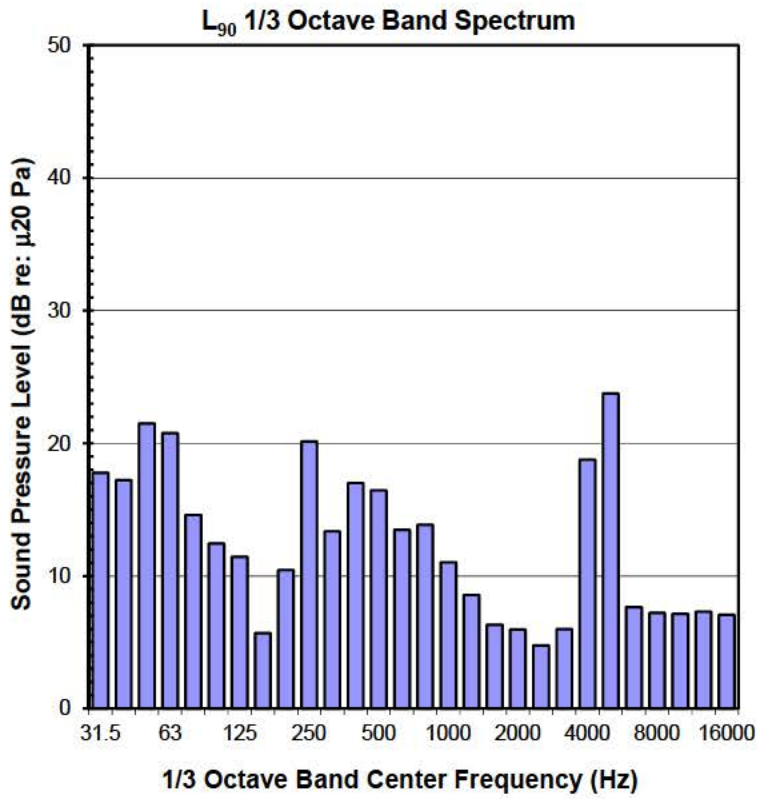
Run013

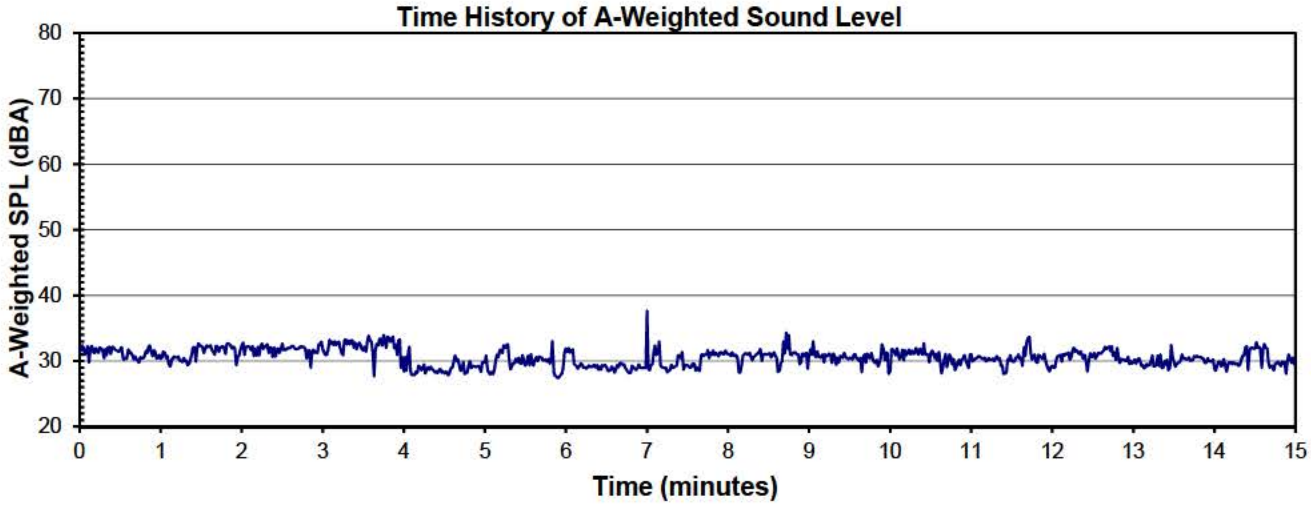
Deerfield IM-W Summer - Night

Measured Tuesday, June 17, 2014, Between 1:50 AM & 2:05 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**30.8**
L_{max}:	45.2
L_{01}:	34.3
L_{10}:	32.6
L_{50}:	30.3
L_{90}:	**28.5**
L_{99}:	27.5
L_{min}:	26.2





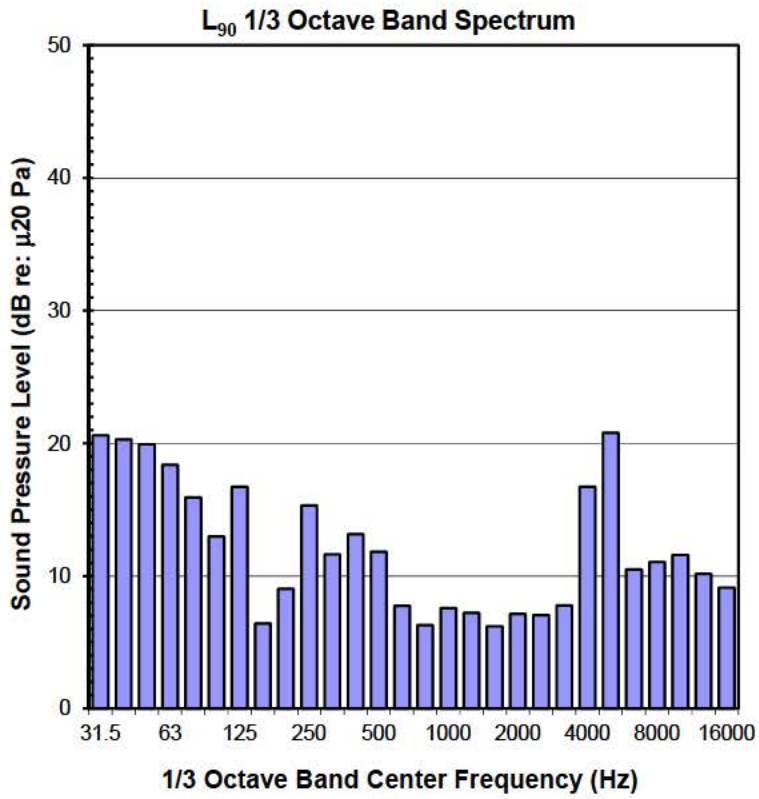
Run012

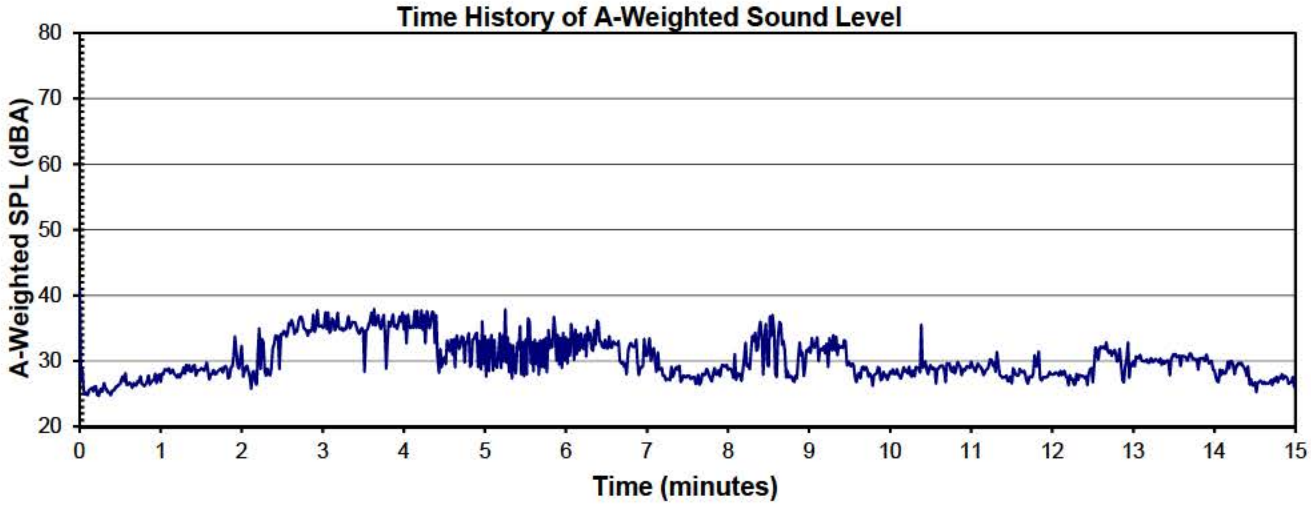
Deerfield IM-S Summer - Night

Measured Tuesday, June 17, 2014, Between 2:28 AM & 2:43 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**31.5**
L_{max}:	46.9
L_{01}:	39.9
L_{10}:	34.9
L_{50}:	29.0
L_{90}:	**26.3**
L_{99}:	24.6
L_{min}:	23.1





Run014

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Northern Pass Project

Scobie Pond Substation Expansion – Sound Report 4

Sound Impact Assessment

Introduction

As part of the Northern Pass Project, Northern Pass Transmission LLC is proposing to expand the Scobie Pond Substation in Londonderry, New Hampshire. Cavanaugh Tocci Associates, Inc. has been asked to provide sound impact assessment of this Project. In that this evaluation precedes the actual design of the Project, this sound impact assessment is based on acoustic design requirements that will be incorporated into the Project contracts. To assist in defining appropriate acoustic design goals for this facility, we have conducted an extensive sound monitoring program. This report presents the results of the sound monitoring program, a review of applicable noise regulations, a statement of the acoustic design goals for the project, and an assessment of Project sound impact.

Baseline Sound Survey

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, defining appropriate acoustic design goals for the proposed substation expansion that are based on an understanding of the existing acoustic environment will render Project related noise consistent with the level and character of other sounds in the environment, and will minimize acoustic impact at sensitive receptors.

An environmental sound survey was conducted to characterize the existing acoustic environment in the vicinity of the proposed Project. In order to document the time-varying characteristics of ambient environmental sounds in the study area, the sound monitoring program implemented unattended continuous measurements for two 7-day periods, and observed short-term (15-minute) intermittent measurements. The measurements were conducted during a cold weather season (January 30, 2014 – February 6, 2014) with leaves off the trees, and a warm weather season with foliage and insect sounds present (June 16, 2014 – June 23, 2014). The results of the survey allow both quantitative and qualitative analyses of the acoustical environment surrounding the Project. Annex A of this report is a glossary of acoustical terminology.

Sound Measurement Locations

A review of the existing land use in the vicinity of the Project site was conducted to identify the closest and most representative receptor locations. On the basis of this review, two sound monitoring locations were selected, as shown in Figure 1. The sound monitoring locations may be described as follows:

- **CM-N / IM-N**: Continuous / Intermittent monitoring location North
  Lat: 42.9064 Long: -71.3415
- **CM-S / IM-S**: Continuous / Intermittent monitoring location South
  Lat: 43.9045 Long: -71.3400

Continuous Sound Monitoring

To identify typical patterns in existing ambient environmental sound levels, and to quantify time-varying ambient sound levels in the community, continuous sound monitoring was performed at one location adjacent to the nearest residence west of the Project area, as shown in Figure 1 (CM-1). For both the cold and warm weather seasons, data was gathered for a 7-day (168-hour) period. The measurement periods were:

- January 30, 2014, 2:00 p.m. to February 6, 2014, 2:00 p.m.
- June 16, 2014, 4:00 p.m. to June 23, 2014, 4:00 p.m.

For these continuous measurements, sound levels were monitored using Larson Davis 831 sound levels meters outfitted with ½ inch electret microphones and windscreens. The microphones were mounted on tree branches that were approximately 1.5 meters above the ground. The instruments were calibrated before and after the measurement periods using a Larson Davis CAL200 acoustical calibrator. These instruments are compliant with international standards for class 1 instrumentation (IEC 61672-1:2002, and IEC 60942-1:2003), and have current calibration certificates traceable to National Institute of Standards and Technology (NIST).

For this study, the sound monitors were programmed to report the following A-weighted environmental noise descriptors on an hourly basis:

- Maximum and minimum sound levels (L_{max}, L_{min})
- Percentile sound levels (L_{99}, L_{90}, L_{50}, L_{10}, L_{01})
- Equivalent sound level (L_{eq})

A complete listing of all of the hourly metrics that were recorded can be found in Annex B.

Intermittent Sound Monitoring

Intermittent sound measurements were performed for 15-minute intervals at two representative receptor locations (identified in Figure 1 as IM-N, and IM-S). The measurements were performed during both daytime and nighttime periods on January 30-31, 2014, and June 16-17, 2014. These measurements were conducted with a Bruel and Kjaer Instruments Type 2250 sound level analyzer outfitted with a ½ inch electret microphone and windscreen. During all measurements, the meter was mounted on a tripod with the microphone situated approximately 1.5 meters above the ground. The instrument was calibrated before and after use with a Bruel and Kjaer Instruments Type 4231 acoustical calibrator. These instruments are compliant with international standards for class 1 instrumentation (IEC 61672-1:2002, and IEC 60942-1:2003), and have current calibration certificates traceable to National Institute of Standards and Technology (NIST).

The results of the measurements are presented in Annex C. The data presentation format has three primary elements:

- The first is a listing of A-weighted descriptors on the upper left hand side of the figures. Note that the statistical descriptors (L_n) are presented in order of decreasing value. Logically, the L_{max} is the highest sound level reached during the 15-minute interval; the L_{01} is the next highest since it is exceeded only 1 percent of the time interval, and so forth. The L_{eq} and L_{90} are shown shaded, as they are the key descriptors used in evaluating background sound levels.
- The second element in these figures is a 1/3 octave band spectrum of the L_{90} sound pressure level. This spectrum is used to identify the presence of distinct tonal characteristics and to quantify the frequency content associated with the background sounds. Note these data indicate occasional tonal components in the 125 Hz band (winter and summer data), and in the upper frequency bands 4,000 to 6,300 Hz frequency bands (summer data). Tones in the 125 Hz band are produced by the existing transformers at the substation. The high frequency tones are associated with insect noise.

- The third element at the bottom of the figures is a graphic level record, or time-history, of the A-weighted sound level in 1-second increments recorded over the 15-minute interval. The peaks in these figures are associated with transient sounds mainly produced by passing vehicles on local roads, dogs barking, aircraft flying overhead. Note that due to a data storage error, the time history data for the nighttime winter sample at IM-N is not available.

Survey Results

Figures 2 through 5 present selected results from the continuous sound monitoring that occurred during the winter and summer surveys. The sound level data included in the plots are the hourly L_{01} (nominal maximum level), the hourly L_{eq} (energy average level), and the hourly L_{90} (background level). In addition, we have included a dashed line to indicate the average of the lowest daily $L_{90(1\text{-hour})}$ sound levels measured for each week. This value represents a very conservative estimate of the lowest background sound levels that occur during the quietest periods of the entire survey. For the winter survey the values were 30 and 31 dBA, and for the summer survey the values were 34 and 36 dBA.

Table 1 below provides a summary of the intermittent measurement results:

Table 1: Summary of Intermittent Sound Measurements

	Cold Season (January 30-31, 2014)				Warm Season (June 16-17, 2014)			
	Daytime		Nighttime		Daytime		Nighttime	
Location	L_{eq}	L_{90}	L_{eq}	L_{90}	L_{eq}	L_{90}	L_{eq}	L_{90}
IM-N	41.6	33.9	44.0	37.6	37.1	33.4	38.9	36.5
IM-S	42.9	37.7	46.8	38.4	46.9	39.4	43.8	39.9

For the most part, background sound levels in the community surrounding the Project are currently controlled by traffic on I-93 (approximately 1 mile west of the substation), traffic on Route 28 (approximately 2000 feet south), and sound produced by the existing substation. In addition there is a wood recycling facility (1000 feet southeast of the substation) that regularly operates front end loaders, excavators, stacker-reclaimers, and wood chippers. Finally, noises produced by birds, insects, and wind blowing through foliage are sources of background sound at all locations in the project area. These indigenous sounds depend on many factors including weather and time of year.

Sound Regulations

There are no Federal, or state noise regulations that define limits for environmental sound produced by the proposed project. In addition, there are no local regulations that are applicable to sound produced by the substation. However, the Zoning Ordinance of the Town of Londonderry, New Hampshire defines a noise limit as a performance standard for Projects in commercial and industrial districts. Since the substation is not located in either of these districts, this limit is not directly applicable to the proposed expansion of the substation. However, this limit can provide appropriate context for evaluating project acoustic design goals that are discussed below. Selected text from the zoning ordinance follows:

> ***Section 3.2.3 NOISE***
>
> *All noise, except that generated by normal automobile, truck or railroad service shall be muffled so as not to be objectionable due to intermittence, beat frequency or shrillness. At property lines, noise may not exceed a maximum level of 75 decibels.*

It is assumed that the above limit of 75 decibels at property lines is A-weighted (dBA) as is customary when evaluating environmental sound.

Facility Acoustic Design Goal

The acoustic design goal for this expansion project has been based on limiting Project related sound to less than 5 dBA above the nominally lowest sound levels that were measured during the baseline sound surveys. For this project, the following acoustic design goal will be specified in the contract documents:

- The maximum sound level for continuous sound produced by the operation of all Project related equipment located at the facility shall not exceed 35 dBA at any existing occupied residential receptor property when measured within the boundaries of the receptor property.

Noise mitigation options include, but are not limited to equipment selection, equipment placement, sound barrier walls, and sound enclosures. Prior to the purchase of equipment, the contractor will be required to demonstrate that the design will meet the acoustic requirements. The acoustic modeling for this anysis will use algorithms and procedures described in International Standard ISO 9613-2:1996 "Acoustics - Attenuation of sound during propagation outdoors – Part 2: General method of calculation." At the conclusion of construction, the contractor will demonstrate through field measurements that the Project complies with the acoustic specifications.

Sound Impact Assessment

The above acoustic design goal defines very stringent limits for sound produced by the proposed expansion of the substation that apply at all existing residential receptors. It is my professional opinion that if sound produced by the proposed Project meets the above stated acoustic design goals; it will not have an unreasonable adverse effect at all surrounding properties.

Aerial Photograph Indicating Project Site and Sound Monitoring Locations

Figure 1

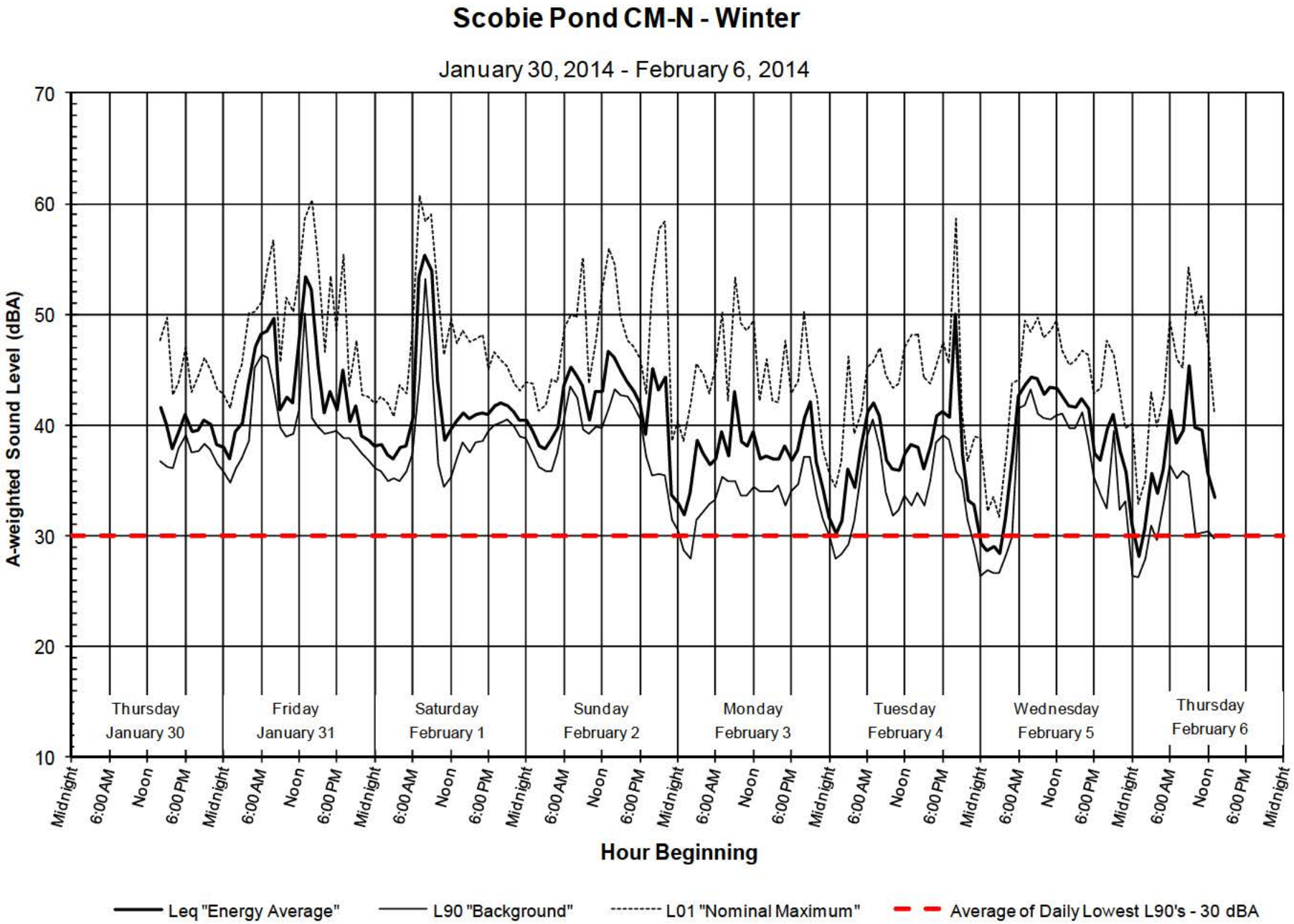
Scobie Pond CM-N - Winter
January 30, 2014 - February 6, 2014
A-weighted Sound Level (dBA)
70
60
50
40
30
20
10
Thursday January 30
Friday January 31
Saturday February 1
Sunday February 2
Monday February 3
Tuesday February 4
Wednesday February 5
Thursday February 6
Midnight
6:00 AM
Noon
6:00 PM
Hour Beginning
Leq "Energy Average"
L90 "Background"
L01 "Nominal Maximum"
Average of Daily Lowest L90's - 30 dBA

Figure 2

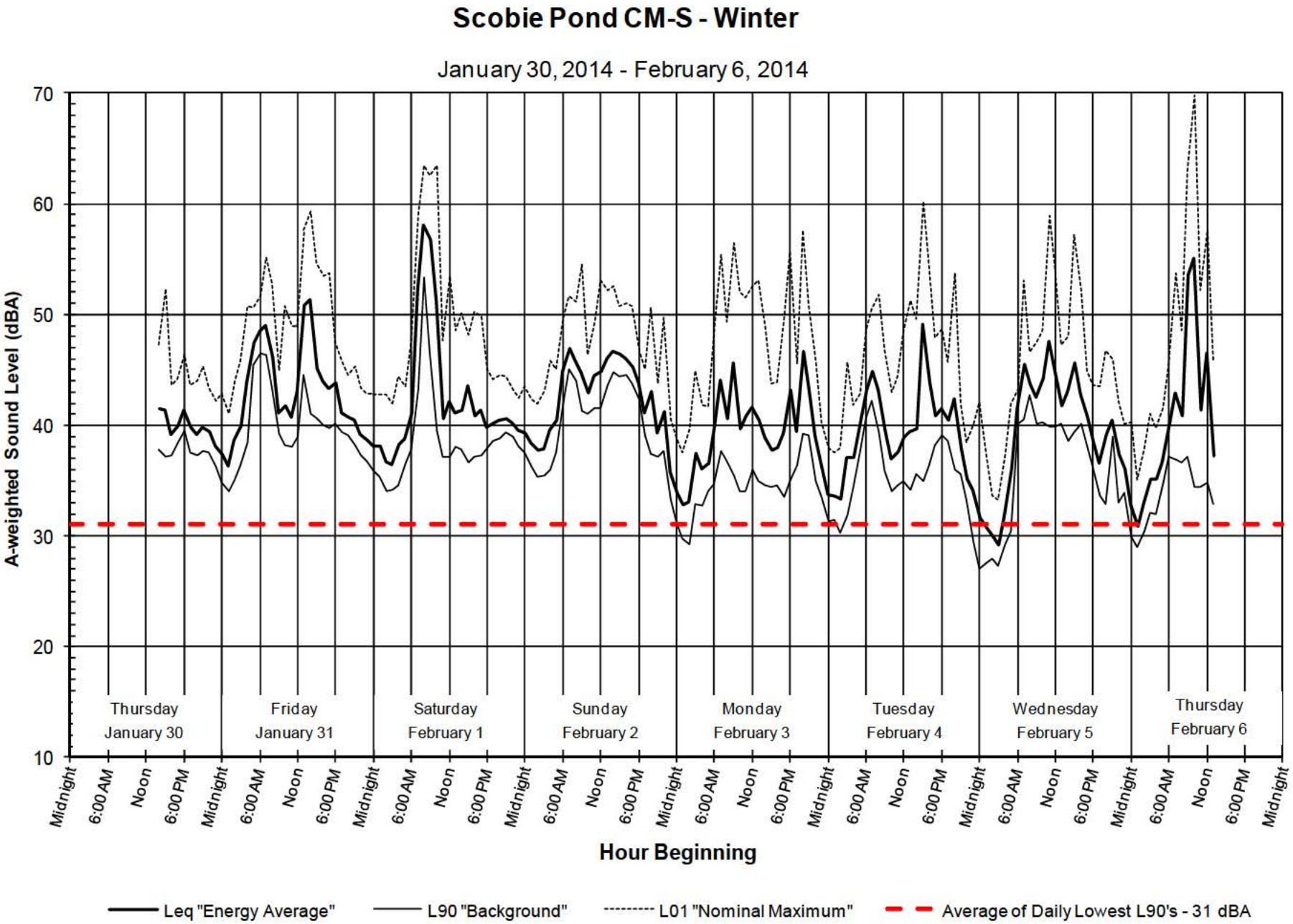
Scobie Pond CM-S - Winter
January 30, 2014 - February 6, 2014
A-weighted Sound Level (dBA)
70
60
50
40
30
20
10
Thursday January 30
Friday January 31
Saturday February 1
Sunday February 2
Monday February 3
Tuesday February 4
Wednesday February 5
Thursday February 6
Midnight
6:00 AM
Noon
6:00 PM
Hour Beginning
Leq "Energy Average"
L90 "Background"
L01 "Nominal Maximum"
Average of Daily Lowest L90's - 31 dBA

Figure 3

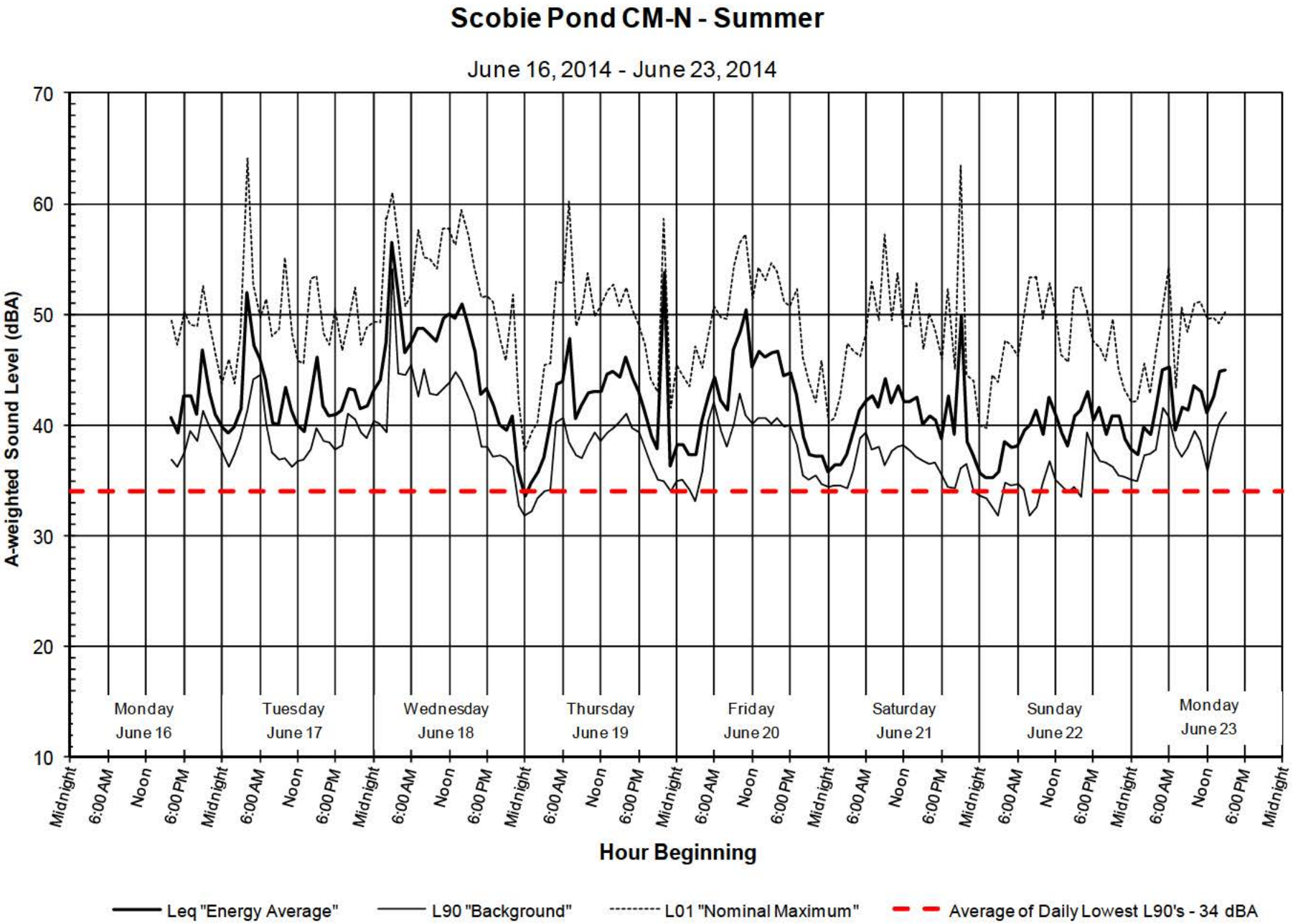
Scobie Pond CM-N - Summer
June 16, 2014 - June 23, 2014
A-weighted Sound Level (dBA)
70
60
50
40
30
20
10
Monday June 16
Tuesday June 17
Wednesday June 18
Thursday June 19
Friday June 20
Saturday June 21
Sunday June 22
Monday June 23
Midnight
6:00 AM
Noon
6:00 PM
Hour Beginning
Leq "Energy Average"
L90 "Background"
L01 "Nominal Maximum"
Average of Daily Lowest L90's - 34 dBA

Figure 4

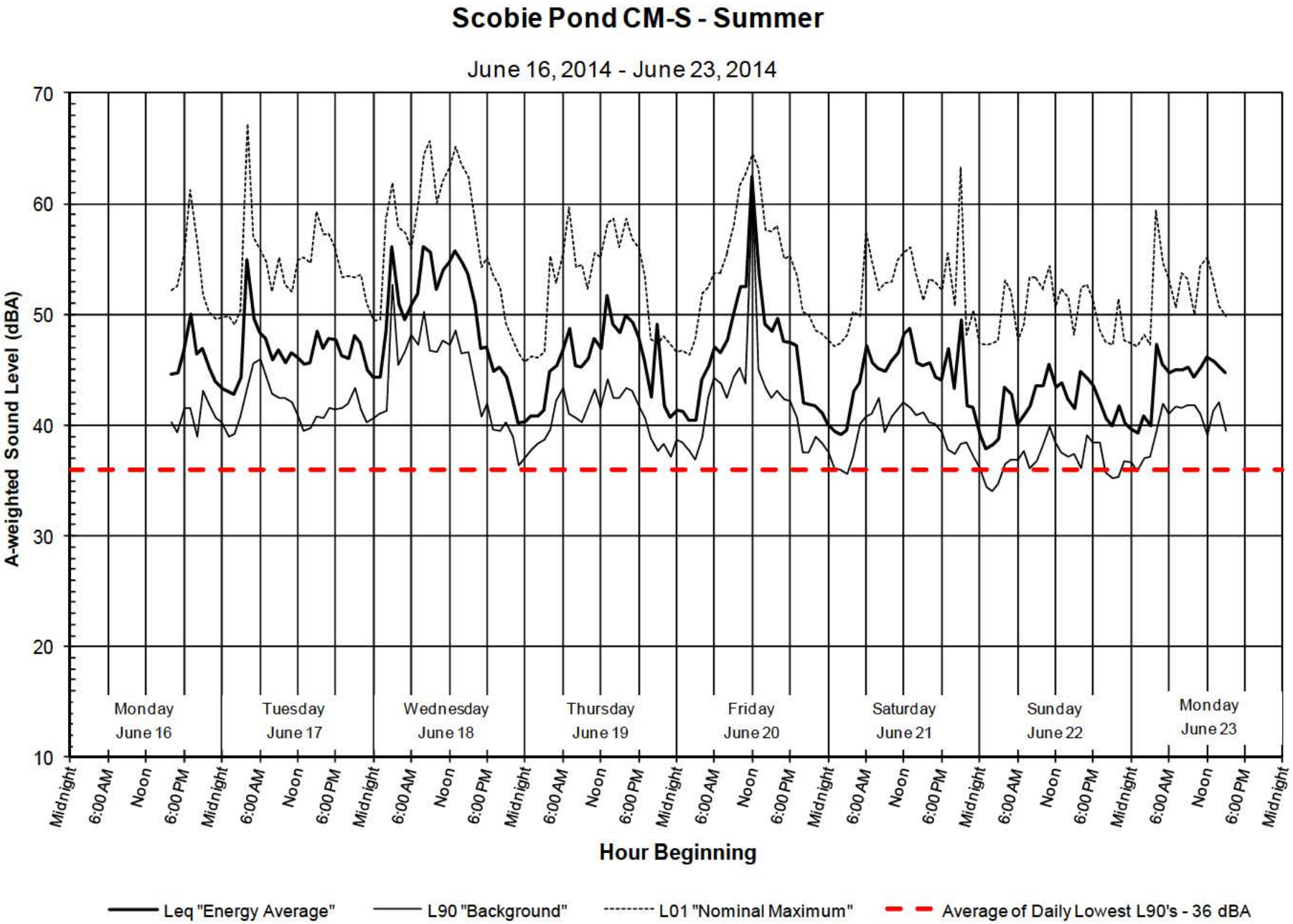
Scobie Pond CM-S - Summer
June 16, 2014 - June 23, 2014
A-weighted Sound Level (dBA)
70
60
50
40
30
20
10
Monday June 16
Tuesday June 17
Wednesday June 18
Thursday June 19
Friday June 20
Saturday June 21
Sunday June 22
Monday June 23
Midnight
6:00 AM
Noon
6:00 PM
Hour Beginning
Leq "Energy Average"
L90 "Background"
L01 "Nominal Maximum"
Average of Daily Lowest L90's - 36 dBA

Figure 5

Annex A

Sound Measurement Terminology

cta

SOUND MEASUREMENT TERMINOLOGY

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.

Spectral Characteristics – 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.

- L_{90} is the sound level in dBA exceeded 90 percent of the time during the measurement period. 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.

- L_{50} is the median sound level: the sound level in dBA exceeded 50 percent of the time during the measurement period.

- L_{10} is the sound level exceeded only 10 percent of the time. It is close to the maximum level observed during the measurement period. The L_{10} is sometimes called the *intrusive* sound level because it is caused by occasional louder noises like those from passing motor vehicles or aircraft.

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.

When a steady continuous sound is measured, the L_{10}, L_{50}, L_{90} and L_{eq} are all equal. For a constant sound level, such as from a power plant operating continuously for a 24-hour period, the L_{dn} is approximately 6 dBA higher than the directly measured sound level.

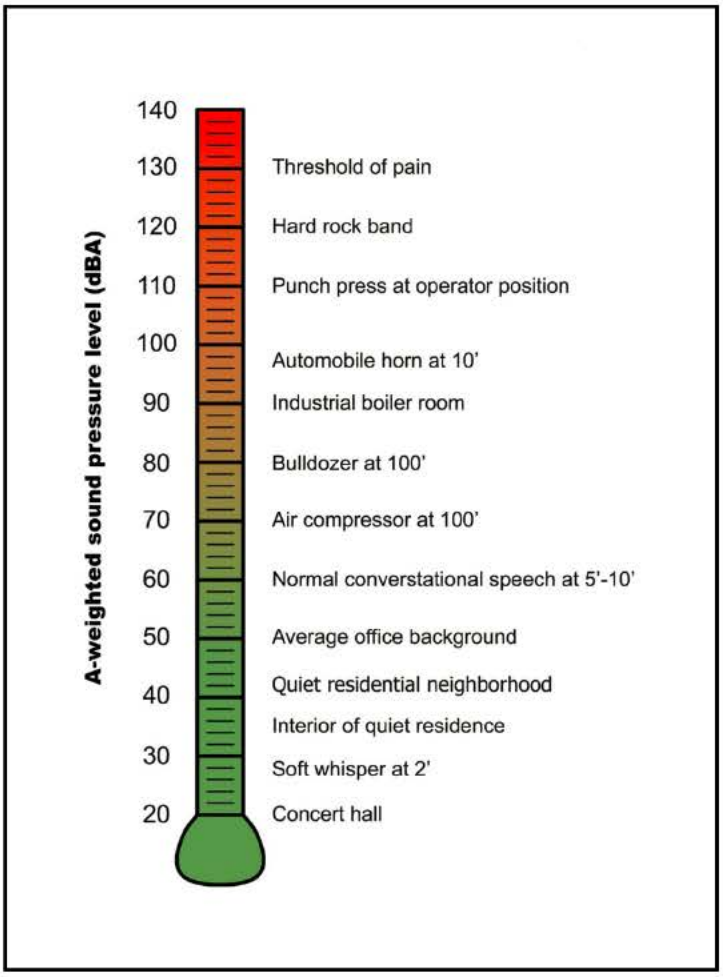

Figure A-1

Typical Sound Levels for Common Interior and Environmental Sources

Annex B

Continuous Sound Monitoring Data

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Scobie Pond CM-N - Winter

Northern Pass - Scobie Pond Substation
Thursday, January 30, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00								
01:00								
02:00								
03:00								
04:00								
05:00								
06:00								
07:00								
08:00								
09:00								
10:00								
11:00								
12:00								
13:00								
14:00	41.6	34.0	35.6	36.8	38.7	42.3	47.7	78.3
15:00	40.1	33.5	34.8	36.2	38.1	41.3	49.7	59.2
16:00	37.9	34.4	35.4	36.1	37.3	39.2	42.7	50.3
17:00	39.5	35.2	37.0	37.9	39.2	40.7	43.9	52.0
18:00	41.0	37.0	38.3	39.1	40.4	42.1	47.0	53.1
19:00	39.4	35.1	36.5	37.5	39.1	40.9	43.0	50.3
20:00	39.6	35.2	36.6	37.7	39.1	40.7	44.5	53.1
21:00	40.4	36.4	37.5	38.3	39.5	41.5	46.1	59.3
22:00	40.0	35.4	36.8	37.8	39.0	40.9	45.1	61.3
23:00	38.3	34.4	35.7	36.5	37.8	39.6	43.2	57.1

Overall L_{eq}: **39.9**

L_{eq} (day*): **40.1**
L_{eq} (night):** **39.2**

Lowest L_{90} (day): **36.1**
Lowest L_{90} (night): **36.5**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Winter

Northern Pass - Scobie Pond Substation
Friday, January 31, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	38.0	33.2	34.5	35.8	37.6	39.3	42.9	51.0
01:00	36.9	32.6	33.9	34.8	36.3	38.8	41.6	46.6
02:00	39.4	33.3	34.7	36.1	39.0	41.4	44.0	50.8
03:00	40.2	32.5	34.8	37.0	39.3	42.2	45.5	53.4
04:00	43.6	35.8	37.2	38.6	42.9	45.7	50.1	59.0
05:00	47.0	42.5	44.2	45.2	46.9	48.4	50.3	54.4
06:00	48.2	43.7	45.1	46.4	48.1	49.5	51.1	58.4
07:00	48.5	43.7	45.0	46.1	48.1	49.8	54.2	62.7
08:00	49.6	39.5	41.2	43.6	47.3	53.5	56.7	63.4
09:00	41.4	37.8	38.8	39.7	40.9	43.1	45.7	55.2
10:00	42.5	37.0	38.2	38.9	40.1	42.0	51.5	63.9
11:00	42.0	37.3	38.4	39.2	40.6	42.7	50.3	62.0
12:00	47.0	38.1	39.6	41.4	45.2	49.9	53.9	65.9
13:00	53.4	42.7	44.6	50.1	52.6	55.6	58.7	68.2
14:00	52.3	38.4	39.6	40.7	45.9	57.3	60.4	68.2
15:00	45.1	37.9	38.8	39.9	41.9	47.9	55.3	65.3
16:00	41.1	37.2	38.5	39.2	40.4	42.0	46.6	58.7
17:00	43.0	37.1	38.4	39.3	40.5	43.8	53.5	63.9
18:00	41.4	37.6	38.7	39.5	40.7	42.3	48.5	54.1
19:00	45.0	36.9	38.1	38.8	40.0	41.5	55.4	78.1
20:00	40.3	36.3	37.7	38.8	40.0	41.4	43.5	50.0
21:00	41.8	35.6	37.0	38.0	39.2	41.0	47.7	67.0
22:00	39.0	35.5	36.6	37.4	38.6	40.2	42.7	57.7
23:00	38.6	34.8	35.9	36.9	38.2	40.1	42.6	47.9

Overall L_{eq}: **46.1**

L_{eq} (day*): **47.2**
L_{eq} (night):** **43.1**

Lowest L_{90} (day): **38.0**
Lowest L_{90} (night): **34.8**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Winter

Northern Pass - Scobie Pond Substation
Saturday, February 1, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	38.1	33.2	34.6	36.1	37.8	39.6	42.0	50.7
01:00	38.2	33.4	34.8	35.9	37.5	39.8	42.6	54.7
02:00	37.4	32.5	33.9	35.0	37.0	39.0	41.9	46.2
03:00	36.9	33.3	34.2	35.2	36.5	38.4	40.8	46.1
04:00	38.0	31.7	33.6	35.0	37.3	39.9	43.6	49.5
05:00	38.1	33.6	34.8	35.9	37.6	39.6	42.9	53.8
06:00	40.7	34.9	36.2	37.4	39.1	42.3	48.5	57.6
07:00	53.4	42.8	43.5	44.3	48.1	57.2	60.7	69.5
08:00	55.3	50.5	52.0	53.2	55.0	56.7	58.4	78.6
09:00	53.9	39.3	40.4	46.5	53.7	56.8	59.1	64.9
10:00	43.9	34.1	35.2	36.5	40.1	47.5	51.7	58.4
11:00	38.7	31.9	33.1	34.4	36.8	41.5	46.4	52.5
12:00	39.6	33.0	34.2	35.3	37.1	41.1	49.6	57.9
13:00	40.3	34.6	35.7	37.0	39.1	42.0	47.4	56.6
14:00	41.1	35.8	37.3	38.5	40.1	42.4	48.6	56.5
15:00	40.6	35.0	36.3	37.5	39.4	42.6	47.5	61.1
16:00	41.0	35.6	37.5	38.5	40.1	42.5	47.8	56.5
17:00	41.1	36.3	37.7	38.6	40.1	42.4	48.1	57.0
18:00	41.0	37.7	38.7	39.5	40.7	42.1	45.0	49.2
19:00	41.7	37.9	39.1	40.0	41.2	42.7	46.6	56.7
20:00	42.0	38.3	39.5	40.2	41.5	43.5	45.8	52.7
21:00	41.8	38.8	39.8	40.5	41.5	43.0	45.3	51.0
22:00	41.2	38.1	39.1	39.9	41.1	42.2	43.7	50.9
23:00	40.5	36.8	37.8	38.9	40.2	41.7	43.1	51.2

Overall L_{eq}: **46.3**

L_{eq} (day*): **48.1**
L_{eq} (night):** **39.1**

Lowest L_{90} (day): **34.4**
Lowest L_{90} (night): **35.0**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Winter

Northern Pass - Scobie Pond Substation
Sunday, February 2, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	40.4	36.3	37.8	38.8	40.1	41.6	43.9	51.0
01:00	39.5	34.5	35.9	37.4	39.0	41.1	43.7	49.2
02:00	38.1	33.8	35.0	36.2	37.8	39.5	41.3	45.6
03:00	37.8	33.7	34.9	35.9	37.4	39.3	41.8	48.8
04:00	38.6	33.4	34.5	35.9	37.9	40.4	44.2	55.0
05:00	39.8	34.5	35.8	37.5	39.5	41.6	43.9	46.9
06:00	43.5	37.8	39.1	40.8	43.0	44.9	48.8	57.6
07:00	45.2	41.4	42.5	43.5	44.8	46.3	49.8	57.9
08:00	44.5	40.2	41.2	42.5	43.9	46.2	49.8	57.0
09:00	43.5	37.9	38.9	39.6	41.1	43.2	55.0	66.1
10:00	40.5	37.3	38.5	39.2	40.3	41.6	43.7	53.9
11:00	43.1	37.9	38.9	39.9	42.5	45.2	47.7	50.7
12:00	43.0	37.7	38.9	39.7	41.4	44.5	52.0	61.4
13:00	46.7	39.8	40.8	41.6	43.3	50.1	55.9	59.9
14:00	46.1	41.5	42.6	43.3	44.2	47.7	54.5	61.6
15:00	44.8	40.9	41.8	42.7	44.4	46.0	49.9	57.2
16:00	44.0	40.6	41.8	42.6	43.7	44.9	47.6	57.0
17:00	43.1	40.1	41.1	41.8	42.8	44.3	47.1	53.0
18:00	42.0	38.6	39.6	40.5	41.7	43.0	46.0	51.9
19:00	39.1	34.6	36.3	37.1	38.4	40.9	42.9	51.8
20:00	45.1	33.6	34.7	35.4	36.7	38.8	52.3	78.1
21:00	43.2	33.5	34.6	35.6	37.1	39.1	57.7	66.3
22:00	44.3	32.1	34.0	35.5	37.9	40.1	58.4	73.9
23:00	33.7	29.2	30.5	31.4	33.1	35.7	38.6	44.6

Overall L_{eq}: **43.0**

L_{eq} (day*): **44.0**
L_{eq} (night):** **40.5**

Lowest L_{90} (day): **35.4**
Lowest L_{90} (night): **31.4**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Winter

Northern Pass - Scobie Pond Substation
Monday, February 3, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	33.0	28.7	29.7	30.5	31.9	34.3	40.4	49.5
01:00	31.9	25.6	27.2	28.7	30.9	34.3	38.6	42.2
02:00	33.9	25.0	26.2	27.9	31.1	37.2	42.0	46.2
03:00	38.6	27.8	29.5	31.5	36.6	42.2	45.6	47.8
04:00	37.5	28.7	30.4	32.2	35.4	40.9	44.5	49.6
05:00	36.5	29.8	31.5	32.9	34.9	39.4	42.9	45.8
06:00	37.0	30.7	32.5	33.2	34.7	37.1	45.1	59.7
07:00	39.4	33.2	34.2	35.3	36.7	39.6	50.3	58.2
08:00	37.2	32.2	33.5	34.9	36.7	38.7	42.2	51.0
09:00	43.0	32.5	33.5	35.0	37.3	47.5	53.3	58.5
10:00	38.5	30.7	32.5	33.6	35.8	38.0	49.2	60.6
11:00	38.1	31.2	32.5	33.6	35.7	39.1	48.5	57.2
12:00	39.4	31.6	33.1	34.4	36.2	40.7	49.5	60.9
13:00	36.9	32.3	33.2	34.1	36.2	38.4	42.2	57.1
14:00	37.2	31.4	32.7	34.1	35.9	38.1	45.9	54.7
15:00	36.9	31.9	32.9	34.0	36.2	38.5	42.2	55.3
16:00	37.0	31.6	33.2	34.5	36.5	38.7	42.1	47.8
17:00	38.1	29.9	31.1	32.8	35.4	41.0	47.6	52.9
18:00	36.8	32.0	33.2	34.1	35.5	37.6	42.9	56.9
19:00	37.7	32.8	33.8	34.7	36.7	39.4	44.0	55.3
20:00	40.7	34.4	36.0	37.2	38.9	41.4	50.3	59.7
21:00	42.1	34.1	35.8	37.2	39.9	42.3	45.3	70.6
22:00	36.7	30.5	32.1	33.6	35.5	38.1	42.6	56.1
23:00	34.1	29.4	30.5	31.6	33.6	35.9	37.9	44.6

Overall L_{eq}: **38.2**

L_{eq} (day*): **39.1**
L_{eq} (night):** **36.0**

Lowest L_{90} (day): **32.8**
Lowest L_{90} (night): **27.9**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Winter

Northern Pass - Scobie Pond Substation
Tuesday, February 4, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	31.7	27.3	28.7	29.9	31.4	33.2	35.5	38.8
01:00	30.2	26.1	27.0	28.0	29.8	31.9	34.4	39.2
02:00	31.4	25.5	26.9	28.3	30.6	33.6	36.8	44.1
03:00	36.0	26.4	28.2	29.3	31.3	34.8	46.2	59.6
04:00	34.4	27.1	28.6	31.3	33.9	36.3	39.2	48.8
05:00	37.9	33.6	34.8	35.8	37.7	39.5	41.2	44.8
06:00	41.2	36.5	37.8	39.0	41.0	42.7	45.2	49.5
07:00	42.0	38.2	39.6	40.5	41.7	43.3	45.7	51.7
08:00	40.9	35.6	36.6	37.8	40.2	42.7	47.0	54.7
09:00	36.8	31.4	33.0	33.9	35.8	38.4	44.6	50.3
10:00	36.0	29.1	30.4	31.8	33.9	38.8	43.4	53.1
11:00	35.9	29.2	30.6	32.3	34.5	37.5	43.7	56.3
12:00	37.5	31.1	32.6	33.6	35.1	38.6	47.0	59.4
13:00	38.3	30.5	31.8	32.8	34.5	39.0	48.2	61.0
14:00	38.0	31.0	32.8	33.9	35.4	39.4	48.2	59.0
15:00	36.0	30.6	31.7	32.7	34.2	37.1	44.3	54.7
16:00	38.2	32.5	33.7	35.0	37.7	39.7	43.8	52.3
17:00	40.8	36.4	37.6	38.5	40.2	42.9	45.3	51.8
18:00	41.2	37.3	38.3	39.1	40.5	42.3	47.5	55.9
19:00	40.7	36.5	37.8	38.7	40.2	42.1	45.6	54.5
20:00	50.0	33.1	34.4	35.8	38.7	43.3	58.6	78.1
21:00	37.3	31.7	33.0	35.1	37.0	38.9	41.3	46.3
22:00	33.2	29.1	30.5	31.5	33.0	34.7	36.7	40.0
23:00	32.8	26.2	27.8	29.0	32.1	34.6	38.9	47.1

Overall L_{eq}: **40.1**

L_{eq} (day*): **41.5**
L_{eq} (night):** **35.8**

Lowest L_{90} (day): **31.8**
Lowest L_{90} (night): **28.0**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Winter

Northern Pass - Scobie Pond Substation
Wednesday, February 5, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	29.3	24.3	25.6	26.4	27.8	29.9	38.8	46.6
01:00	28.7	24.6	26.0	26.9	28.6	30.0	32.2	35.4
02:00	29.0	24.3	25.5	26.7	28.5	30.8	33.5	40.1
03:00	28.4	24.4	25.7	26.6	28.1	29.8	31.7	37.4
04:00	31.6	25.5	27.0	28.3	30.5	34.0	37.4	43.0
05:00	37.4	27.6	28.9	29.9	33.7	43.0	43.8	45.3
06:00	42.7	40.6	41.2	41.6	42.8	43.6	44.1	48.9
07:00	43.7	40.7	41.2	41.8	42.7	43.7	49.4	64.0
08:00	44.4	41.0	42.0	43.2	44.0	45.4	48.4	50.7
09:00	44.2	39.4	40.2	41.1	42.9	46.9	49.7	56.6
10:00	42.8	39.4	40.0	40.7	42.0	44.8	47.9	52.9
11:00	43.4	38.3	39.2	40.5	42.5	45.7	48.6	63.9
12:00	43.3	38.2	39.4	40.9	42.1	45.4	49.5	56.8
13:00	42.5	39.6	40.4	41.1	42.1	43.8	46.7	53.7
14:00	41.7	38.3	39.0	39.8	41.2	43.3	45.5	55.5
15:00	41.6	37.5	38.5	39.7	41.2	42.7	45.8	55.7
16:00	42.4	40.2	40.9	41.2	41.8	43.4	46.8	60.6
17:00	41.5	36.2	37.4	38.6	41.2	43.3	46.3	52.0
18:00	37.5	33.3	34.5	35.3	36.7	39.5	42.9	52.1
19:00	36.8	30.6	32.0	33.6	35.7	39.0	43.4	55.1
20:00	39.7	29.5	31.1	32.5	35.7	40.8	47.6	65.1
21:00	41.0	38.7	39.2	39.5	40.5	41.5	46.3	58.9
22:00	37.6	29.7	30.5	32.3	35.7	40.4	43.1	51.4
23:00	35.8	29.4	30.2	33.1	35.6	37.5	39.8	48.1

Overall L_{eq}: **40.8**

L_{eq} (day*): **42.2**
L_{eq} (night):** **36.3**

Lowest L_{90} (day): **32.5**
Lowest L_{90} (night): **26.4**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Winter

Northern Pass - Scobie Pond Substation
Thursday, February 6, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	31.1	24.7	25.7	26.4	29.9	33.0	40.1	49.3
01:00	28.1	24.2	25.4	26.3	27.4	30.0	32.9	38.6
02:00	30.6	25.1	26.7	28.0	30.1	32.5	35.1	45.5
03:00	35.6	26.5	29.1	30.9	33.9	38.6	43.0	50.2
04:00	33.9	27.1	28.3	29.6	32.9	36.3	39.9	44.7
05:00	36.0	30.5	31.9	33.1	34.9	37.7	42.7	51.3
06:00	41.3	33.3	34.7	36.4	39.7	44.1	49.4	56.4
07:00	38.4	33.3	34.4	35.2	36.9	40.4	46.0	55.4
08:00	39.5	32.2	34.3	35.8	38.4	42.2	45.2	49.3
09:00	45.4	30.3	31.7	35.4	41.0	49.3	54.2	64.7
10:00	39.8	27.0	28.5	30.1	33.7	44.0	49.9	60.1
11:00	39.5	27.8	29.0	30.3	33.0	41.7	51.7	60.5
12:00	35.7	28.1	29.2	30.4	32.1	35.8	47.0	58.7
13:00	33.4	26.4	28.3	29.7	31.7	35.4	41.2	50.3
14:00								
15:00								
16:00								
17:00								
18:00								
19:00								
20:00								
21:00								
22:00								
23:00								

Overall L_{eq}: **38.6**

L_{eq} (day*): **40.3**
L_{eq} (night):** **35.8**

Lowest L_{90} (day): **29.7**
Lowest L_{90} (night): **26.3**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Winter

Northern Pass - Scobie Pond Substation
Thursday, January 30, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00								
01:00								
02:00								
03:00								
04:00								
05:00								
06:00								
07:00								
08:00								
09:00								
10:00								
11:00								
12:00								
13:00								
14:00	41.5	35.6	36.8	37.8	39.7	43.0	47.2	72.7
15:00	41.4	34.9	36.1	37.2	38.8	41.3	52.3	60.8
16:00	39.2	35.3	36.4	37.3	38.8	40.7	43.6	51.2
17:00	39.9	36.4	37.5	38.3	39.5	41.0	44.1	55.6
18:00	41.3	37.4	38.5	39.5	40.7	42.2	46.3	55.4
19:00	39.8	35.1	36.5	37.6	39.7	41.3	43.6	50.5
20:00	39.2	34.8	36.4	37.3	38.7	40.5	44.0	51.2
21:00	39.8	35.9	37.0	37.7	39.0	41.1	45.3	55.3
22:00	39.4	35.3	36.5	37.5	39.0	40.9	43.4	49.4
23:00	38.1	33.9	35.1	36.2	37.8	39.6	42.2	50.9

Overall L_{eq}: **40.1**

L_{eq} (day*): **40.4**
L_{eq} (night):** **38.8**

Lowest L_{90} (day): **37.2**
Lowest L_{90} (night): **36.2**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Winter

Northern Pass - Scobie Pond Substation
Friday, January 31, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	37.4	32.6	33.7	34.8	36.8	38.8	42.9	56.5
01:00	36.3	31.3	33.0	34.0	35.7	38.1	41.1	50.4
02:00	38.7	32.5	33.8	35.1	38.1	40.8	43.9	52.0
03:00	39.9	33.1	34.6	36.4	39.0	42.1	45.8	55.2
04:00	43.9	35.5	37.0	38.4	42.9	46.3	50.7	57.9
05:00	47.4	43.0	44.2	45.4	47.2	48.9	50.6	53.7
06:00	48.5	43.6	45.1	46.5	48.3	49.9	51.7	59.5
07:00	49.0	43.9	45.4	46.3	48.2	49.9	55.2	67.1
08:00	46.2	39.8	41.3	43.4	45.1	48.2	52.8	61.7
09:00	41.1	37.0	38.3	39.2	40.6	42.5	44.9	51.5
10:00	41.7	35.7	37.2	38.2	39.9	42.0	50.7	62.1
11:00	40.7	36.1	37.2	38.0	39.2	41.3	49.0	65.5
12:00	43.1	36.5	37.9	39.0	41.8	45.1	48.9	65.2
13:00	50.8	41.0	42.7	44.6	49.0	54.1	57.6	64.5
14:00	51.4	38.6	39.6	41.0	45.1	55.7	59.3	65.5
15:00	45.1	37.8	39.1	40.6	42.5	46.8	54.7	64.1
16:00	43.9	37.9	39.1	40.0	41.2	45.4	53.5	67.0
17:00	43.3	37.5	38.9	39.8	41.1	43.8	53.8	60.2
18:00	43.8	38.0	39.3	40.1	41.3	42.8	47.5	76.0
19:00	41.1	36.6	38.1	39.3	40.5	42.1	45.7	57.9
20:00	40.7	36.3	37.9	39.1	40.4	41.9	44.5	53.5
21:00	40.4	35.3	37.0	38.2	39.7	41.5	45.3	60.8
22:00	39.2	35.1	36.4	37.3	38.8	40.5	43.4	53.7
23:00	38.6	34.4	35.7	36.7	38.2	40.1	42.8	48.8

Overall L_{eq}: **45.1**

L_{eq} (day*): **45.9**
L_{eq} (night):** **43.3**

Lowest L_{90} (day): **38.0**
Lowest L_{90} (night): **34.0**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Winter

Northern Pass - Scobie Pond Substation
Saturday, February 1, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	38.1	32.3	34.3	35.8	37.6	39.8	42.8	49.0
01:00	38.1	32.7	33.9	35.3	37.4	40.1	42.8	53.9
02:00	36.7	31.4	32.7	34.0	35.8	38.4	42.8	52.4
03:00	36.5	31.3	32.9	34.2	35.8	38.4	42.0	50.5
04:00	38.2	31.4	32.8	34.6	37.4	40.4	44.4	53.1
05:00	38.8	33.8	35.2	36.5	38.2	40.5	43.5	52.9
06:00	41.1	35.0	36.4	37.8	39.7	43.2	47.5	59.5
07:00	52.1	41.2	42.2	43.2	47.6	55.9	59.0	70.8
08:00	58.1	49.4	52.0	53.4	57.6	60.2	63.5	83.2
09:00	56.8	40.4	41.9	46.5	56.5	59.4	62.6	69.8
10:00	51.2	37.0	38.2	39.5	44.1	54.4	63.4	72.5
11:00	40.6	34.6	35.7	37.2	39.5	42.6	47.7	55.5
12:00	42.2	34.7	36.0	37.1	38.7	42.3	53.5	62.2
13:00	41.1	35.4	36.8	38.0	40.0	42.7	48.6	58.0
14:00	41.4	35.3	36.7	37.8	39.6	42.4	50.1	61.4
15:00	43.5	34.2	35.5	36.6	38.4	41.9	48.1	79.6
16:00	40.9	34.8	36.1	37.2	38.9	41.7	50.3	66.0
17:00	41.3	35.2	36.3	37.3	39.3	42.6	49.8	59.5
18:00	39.8	36.3	37.2	37.9	39.3	41.2	45.1	52.0
19:00	40.2	36.7	37.9	38.6	39.8	41.3	44.2	54.9
20:00	40.4	36.6	37.9	38.8	40.1	41.7	44.5	51.1
21:00	40.6	37.2	38.4	39.3	40.3	41.7	44.4	51.6
22:00	40.2	36.2	37.9	38.9	40.0	41.1	43.2	49.7
23:00	39.5	35.9	37.0	38.0	39.2	40.8	42.5	47.3

Overall L_{eq}: **48.3**

L_{eq} (day*): **50.2**
L_{eq} (night):** **38.8**

Lowest L_{90} (day): **36.6**
Lowest L_{90} (night): **34.0**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Winter

Northern Pass - Scobie Pond Substation
Sunday, February 2, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	39.3	35.4	36.4	37.5	39.0	40.6	43.5	53.6
01:00	38.4	33.8	34.8	36.2	38.0	40.1	42.3	49.6
02:00	37.7	32.5	34.1	35.3	37.3	39.3	41.9	48.3
03:00	37.8	33.4	34.5	35.5	37.2	39.7	43.1	51.3
04:00	39.5	32.9	34.3	36.0	38.5	41.7	45.8	54.8
05:00	40.5	35.4	36.3	37.5	39.9	42.7	45.1	49.1
06:00	44.9	38.6	39.9	42.0	44.4	46.4	49.7	63.2
07:00	46.9	42.5	43.8	45.0	46.5	48.1	51.6	61.0
08:00	45.8	41.8	43.0	44.0	45.2	47.3	51.2	60.0
09:00	44.7	39.5	40.4	41.3	43.1	45.1	54.5	64.4
10:00	42.9	39.3	40.3	41.1	42.4	43.7	46.3	66.7
11:00	44.5	39.5	40.5	41.5	43.9	46.7	49.3	54.1
12:00	44.8	39.5	40.7	41.6	43.3	46.8	53.1	57.6
13:00	46.0	41.5	42.6	43.6	45.2	47.2	52.2	60.5
14:00	46.7	42.9	44.0	44.8	45.8	48.0	52.6	63.7
15:00	46.4	42.4	43.5	44.4	46.1	47.7	50.8	58.7
16:00	46.0	42.6	43.7	44.5	45.7	46.9	51.0	56.2
17:00	45.2	41.9	43.0	43.7	44.8	46.2	50.8	55.5
18:00	43.8	40.3	41.5	42.3	43.6	44.8	46.7	54.0
19:00	41.1	36.5	38.0	39.1	40.5	42.9	45.1	53.9
20:00	43.1	35.5	36.5	37.4	38.8	40.7	50.6	74.6
21:00	39.3	34.7	35.9	37.1	39.0	40.7	43.7	50.8
22:00	41.2	34.5	36.2	37.7	39.9	42.2	49.7	63.4
23:00	35.8	30.9	32.1	33.2	35.1	37.9	40.5	43.8

Overall L_{eq}: **43.7**

L_{eq} (day*): **44.9**
L_{eq} (night):** **40.3**

Lowest L_{90} (day): **37.1**
Lowest L_{90} (night): **33.2**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Winter

Northern Pass - Scobie Pond Substation
Monday, February 3, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	33.9	28.5	30.0	31.2	33.2	35.8	38.8	51.3
01:00	32.8	27.4	28.6	29.8	32.0	35.0	37.5	43.2
02:00	33.1	26.9	28.2	29.3	31.8	35.5	39.6	46.0
03:00	37.5	30.2	31.3	32.9	35.8	40.4	44.9	48.7
04:00	36.0	30.1	31.2	32.8	35.2	38.1	41.8	46.1
05:00	36.6	31.6	32.9	34.1	35.9	38.7	41.7	45.1
06:00	39.9	32.6	33.7	34.7	36.2	38.2	48.2	66.7
07:00	44.1	35.3	36.6	37.7	39.2	41.5	55.4	67.6
08:00	40.6	33.9	35.5	36.7	38.4	40.2	49.3	63.3
09:00	45.6	32.9	34.3	35.5	38.0	50.3	56.4	62.3
10:00	39.7	31.6	33.0	34.1	35.7	39.8	52.1	60.0
11:00	40.9	31.7	32.8	34.0	36.4	40.0	51.5	64.3
12:00	41.6	32.8	34.0	36.0	38.0	43.4	52.6	60.9
13:00	40.4	32.7	33.6	34.9	36.9	39.7	53.1	61.1
14:00	38.9	31.9	33.1	34.5	37.0	39.9	48.7	58.2
15:00	37.7	32.5	33.5	34.4	36.9	39.6	43.8	57.8
16:00	38.0	31.1	32.6	34.5	37.1	39.9	43.9	59.4
17:00	39.3	30.0	31.6	33.5	36.6	41.6	49.7	56.5
18:00	43.2	31.5	33.4	34.9	36.8	39.1	55.7	73.0
19:00	39.4	33.3	34.9	36.4	38.6	41.0	45.6	53.9
20:00	46.7	36.0	37.9	39.2	41.1	45.8	57.6	71.2
21:00	43.1	35.3	37.7	39.1	41.5	43.7	50.9	65.4
22:00	39.0	32.3	33.6	34.9	37.7	41.1	45.8	57.0
23:00	36.1	30.9	32.3	33.5	35.7	37.9	40.2	46.5

Overall L_{eq}: **40.8**

L_{eq} (day*): **42.1**
L_{eq} (night):** **36.7**

Lowest L_{90} (day): **33.5**
Lowest L_{90} (night): **29.3**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Winter

Northern Pass - Scobie Pond Substation
Tuesday, February 4, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	33.7	28.9	30.3	31.3	33.5	35.3	37.9	42.3
01:00	33.6	29.4	30.5	31.4	33.3	35.2	37.5	44.6
02:00	33.3	27.1	28.5	30.3	32.8	35.4	37.9	44.3
03:00	37.1	28.5	30.0	31.9	33.9	36.8	45.7	60.5
04:00	37.1	31.9	33.0	34.3	36.5	39.0	41.8	50.5
05:00	39.8	35.0	36.5	37.7	39.5	41.4	42.9	47.9
06:00	43.2	37.6	39.2	40.7	42.7	44.5	48.6	60.0
07:00	44.8	39.5	40.9	42.2	43.5	45.2	50.5	65.9
08:00	43.2	36.8	38.2	39.4	41.7	44.1	51.8	64.1
09:00	39.4	33.6	34.9	35.9	37.6	40.8	46.7	61.4
10:00	37.0	30.6	32.3	34.0	36.0	39.0	43.0	52.3
11:00	37.6	31.2	33.0	34.5	36.7	39.0	44.4	54.6
12:00	38.9	32.1	33.7	35.0	36.9	39.9	48.4	59.2
13:00	39.4	31.6	33.0	34.2	36.1	39.6	51.3	61.3
14:00	39.7	33.1	34.4	35.6	37.4	40.9	49.6	58.5
15:00	49.1	32.5	33.8	34.9	36.5	50.3	60.2	77.2
16:00	43.8	33.5	35.0	36.4	38.3	47.0	54.3	67.4
17:00	40.9	35.8	37.3	38.2	39.8	42.0	47.9	59.8
18:00	41.5	37.1	38.3	39.1	40.5	42.7	48.7	54.0
19:00	40.5	34.9	37.1	38.6	40.1	41.8	45.7	57.6
20:00	42.4	33.1	34.5	36.0	38.7	42.6	53.8	65.0
21:00	37.8	32.3	34.3	35.6	37.2	39.5	42.0	49.3
22:00	35.1	30.4	31.6	33.2	34.8	36.5	38.5	47.9
23:00	34.1	26.2	27.4	29.4	33.1	35.5	40.1	51.3

Overall L_{eq}: **41.2**

L_{eq} (day*): **42.4**
L_{eq} (night):** **37.7**

Lowest L_{90} (day): **34.0**
Lowest L_{90} (night): **29.4**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Winter

Northern Pass - Scobie Pond Substation
Wednesday, February 5, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	31.7	25.8	26.4	27.1	28.4	31.4	42.1	52.7
01:00	30.9	26.4	27.1	27.6	29.1	31.6	37.1	56.5
02:00	29.9	26.2	27.1	27.9	29.2	31.6	33.6	39.3
03:00	29.2	26.0	26.7	27.3	28.5	31.4	33.2	42.8
04:00	31.9	26.8	28.1	29.3	31.2	33.7	37.3	49.7
05:00	36.1	28.2	29.3	30.4	32.9	41.3	41.9	43.3
06:00	41.6	39.1	39.6	40.1	41.5	42.6	43.2	52.4
07:00	45.5	39.0	39.7	40.5	41.5	42.8	53.1	72.1
08:00	43.7	41.2	42.0	42.7	43.5	44.8	46.6	51.5
09:00	42.5	38.5	39.2	40.1	41.9	44.3	47.5	55.4
10:00	44.2	38.4	39.4	40.2	41.8	47.7	48.5	62.1
11:00	47.6	37.7	38.7	39.9	42.4	49.0	58.9	68.4
12:00	44.4	37.5	38.7	39.9	41.4	44.8	53.8	72.3
13:00	41.8	39.0	39.5	40.1	41.4	42.9	47.2	54.6
14:00	43.0	36.9	37.8	38.6	41.0	47.2	48.0	56.2
15:00	45.6	37.7	38.6	39.4	40.8	46.8	57.2	73.6
16:00	42.8	38.9	39.6	40.1	40.7	42.3	52.2	67.2
17:00	40.7	36.0	36.9	38.2	40.4	42.4	44.9	52.5
18:00	38.5	34.0	35.3	36.3	38.0	40.1	43.6	51.5
19:00	36.6	30.8	32.6	33.7	35.5	38.9	43.5	48.8
20:00	39.2	30.0	31.3	32.9	36.6	41.2	46.7	63.3
21:00	40.5	37.9	38.5	39.0	40.0	41.0	46.0	59.7
22:00	37.4	30.6	31.3	33.0	36.1	40.0	42.2	49.8
23:00	36.0	30.3	31.0	33.9	35.8	37.3	40.1	51.9

Overall L_{eq}: **41.7**

L_{eq} (day*): **43.3**
L_{eq} (night):** **35.8**

Lowest L_{90} (day): **32.9**
Lowest L_{90} (night): **27.1**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Winter

Northern Pass - Scobie Pond Substation
Thursday, February 6, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	32.8	28.0	29.0	29.9	32.1	34.0	40.2	49.4
01:00	30.9	26.9	28.2	29.0	30.0	32.9	35.1	40.5
02:00	33.0	27.2	29.1	30.4	32.3	35.0	37.9	52.5
03:00	35.1	28.4	30.2	32.1	34.2	37.2	41.0	46.1
04:00	35.2	28.5	30.3	32.0	34.6	37.3	39.8	43.8
05:00	36.7	32.1	33.6	34.7	36.2	38.0	41.5	50.6
06:00	40.1	34.7	36.0	37.2	39.0	42.2	45.6	51.3
07:00	42.9	35.0	36.0	36.9	38.4	44.4	53.8	64.0
08:00	40.8	34.6	35.8	36.6	38.4	42.2	48.5	66.3
09:00	53.5	33.0	34.9	37.1	42.5	58.7	63.0	69.5
10:00	55.1	31.6	32.9	34.4	39.5	56.9	69.8	77.1
11:00	41.4	31.3	32.8	34.4	37.2	44.0	52.2	61.8
12:00	46.6	32.7	33.6	34.8	37.1	51.5	57.6	65.2
13:00	37.2	29.5	31.2	32.9	35.2	39.3	45.8	56.3
14:00								
15:00								
16:00								
17:00								
18:00								
19:00								
20:00								
21:00								
22:00								
23:00								

Overall L_{eq}: **46.8**

L_{eq} (day*): **49.6**
L_{eq} (night):** **35.8**

Lowest L_{90} (day): **32.9**
Lowest L_{90} (night): **29.0**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Summer

Northern Pass - Scobie Pond Substation
Monday, June 16, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00								
01:00								
02:00								
03:00								
04:00								
05:00								
06:00								
07:00								
08:00								
09:00								
10:00								
11:00								
12:00								
13:00								
14:00								
15:00								
16:00	40.7	34.5	35.4	36.9	38.8	42.2	49.4	67.0
17:00	39.3	34.3	35.2	36.3	38.1	40.7	47.2	56.8
18:00	42.7	34.7	36.0	37.6	41.4	45.0	50.3	56.4
19:00	42.7	37.0	38.2	39.5	41.4	44.2	49.1	65.2
20:00	41.0	35.9	37.3	38.6	39.9	42.1	48.9	58.8
21:00	46.8	38.4	39.6	41.3	43.8	46.4	52.6	78.0
22:00	42.9	37.9	39.0	40.0	41.6	45.1	49.4	55.4
23:00	41.0	37.0	37.9	38.7	40.2	42.6	46.2	55.1

Overall L_{eq}: **42.7**

L_{eq} (day*): **42.9**
L_{eq} (night):** **42.1**

Lowest L_{90} (day): **36.3**
Lowest L_{90} (night): **38.7**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Summer

Northern Pass - Scobie Pond Substation
Tuesday, June 17, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	39.8	35.7	36.8	37.7	39.3	41.6	43.8	48.6
01:00	39.3	34.5	35.5	36.3	38.3	41.1	46.0	52.1
02:00	39.8	35.3	36.3	37.4	39.4	41.7	43.8	48.0
03:00	41.5	36.3	37.7	38.8	40.4	43.0	48.1	56.5
04:00	52.0	35.7	37.4	41.4	46.0	55.0	64.1	65.8
05:00	47.2	41.8	43.2	44.1	46.6	49.0	52.7	60.6
06:00	46.0	42.8	43.7	44.5	45.6	47.0	49.7	57.0
07:00	44.1	37.2	38.2	40.1	43.1	45.9	51.4	56.0
08:00	40.2	35.6	36.8	37.6	38.8	41.2	48.0	59.5
09:00	40.1	35.2	36.2	36.9	38.2	41.6	48.7	65.7
10:00	43.4	34.8	36.0	37.0	38.3	45.0	55.2	66.7
11:00	41.4	33.9	35.0	36.3	38.9	41.2	48.3	76.1
12:00	40.0	34.0	35.2	36.7	38.6	41.0	45.8	71.9
13:00	39.4	35.0	36.0	36.9	38.6	40.6	45.6	62.9
14:00	42.3	35.1	36.2	37.8	40.0	42.9	53.2	61.8
15:00	46.2	36.8	38.1	39.7	42.3	46.1	53.5	71.6
16:00	41.7	36.6	37.7	38.6	40.9	43.4	48.3	62.6
17:00	40.8	36.2	37.7	38.4	39.9	42.5	47.2	53.8
18:00	41.0	35.9	36.9	37.8	39.3	41.8	50.5	62.0
19:00	41.4	36.0	37.2	38.2	40.5	43.4	46.7	65.5
20:00	43.3	38.8	40.1	41.0	42.4	45.0	49.2	58.3
21:00	43.2	38.5	39.6	40.5	41.9	44.2	52.5	60.7
22:00	41.5	37.6	38.6	39.3	40.6	42.4	47.3	64.0
23:00	41.7	36.9	38.0	38.8	40.3	42.6	48.8	60.2

Overall L_{eq}: **43.8**

L_{eq} (day*): **42.3**
L_{eq} (night):** **45.5**

Lowest L_{90} (day): **36.3**
Lowest L_{90} (night): **36.3**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Summer

Northern Pass - Scobie Pond Substation
Wednesday, June 18, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	43.0	38.1	39.1	40.4	42.0	45.1	49.3	56.2
01:00	44.1	38.0	39.0	40.1	42.6	45.8	49.3	74.0
02:00	47.5	36.5	37.8	39.4	42.2	51.2	58.7	62.8
03:00	56.5	50.3	51.7	54.1	56.1	58.2	61.0	69.0
04:00	51.3	41.8	43.3	44.7	49.2	54.5	56.7	65.5
05:00	46.5	41.6	43.4	44.6	46.0	48.2	50.8	63.2
06:00	47.6	43.4	44.6	45.5	47.1	49.5	51.8	58.0
07:00	48.8	40.4	41.6	42.6	45.5	48.8	57.6	75.2
08:00	48.7	42.8	43.9	45.0	47.5	51.3	55.2	60.4
09:00	48.1	38.1	39.7	42.9	46.7	51.1	55.0	59.4
10:00	47.6	39.6	41.0	42.7	46.3	50.6	54.1	65.0
11:00	49.7	40.1	41.4	43.3	47.5	53.0	57.8	62.8
12:00	50.0	40.8	41.9	43.9	48.3	53.0	57.7	61.6
13:00	49.7	40.3	43.0	44.8	48.2	52.8	56.3	64.6
14:00	50.9	39.8	41.2	44.0	48.2	54.6	59.4	69.3
15:00	49.1	39.0	40.5	42.5	47.0	52.3	57.1	64.5
16:00	46.7	38.4	39.5	41.2	44.6	50.0	54.3	59.9
17:00	42.8	36.2	37.0	38.1	40.3	45.0	51.5	73.2
18:00	43.3	35.6	37.0	38.1	41.0	45.6	51.6	73.3
19:00	41.8	34.0	35.8	37.1	39.1	43.5	51.2	69.1
20:00	40.1	35.4	36.4	37.3	38.8	41.6	47.8	62.0
21:00	39.6	35.1	36.1	37.0	38.7	41.2	45.8	55.2
22:00	40.9	34.1	35.2	36.2	37.9	41.3	51.8	62.6
23:00	35.9	30.2	31.4	32.8	34.9	38.0	42.1	49.7

Overall L_{eq}: **48.5**

L_{eq} (day*): **47.7**
L_{eq} (night):** **49.5**

Lowest L_{90} (day): **37.0**
Lowest L_{90} (night): **32.8**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Summer

Northern Pass - Scobie Pond Substation
Thursday, June 19, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	33.6	30.2	31.1	31.8	33.1	35.1	37.7	50.8
01:00	34.7	30.1	31.3	32.2	33.9	36.7	39.4	49.7
02:00	35.8	31.1	32.1	33.4	35.2	37.5	40.3	50.0
03:00	37.1	31.2	32.6	34.1	35.8	38.3	45.4	51.7
04:00	39.8	31.7	32.9	34.2	38.8	42.7	45.6	58.4
05:00	43.7	37.4	39.0	40.2	41.9	44.4	52.9	63.0
06:00	43.9	38.5	39.6	40.6	42.4	44.8	52.8	62.3
07:00	47.8	35.9	37.3	38.5	41.0	47.1	60.2	70.3
08:00	40.6	35.2	36.4	37.3	39.1	42.4	48.9	56.2
09:00	41.8	34.9	36.0	37.0	39.1	42.2	50.4	73.7
10:00	42.9	34.9	36.5	38.2	40.2	44.0	53.8	67.0
11:00	43.0	36.3	38.0	39.3	41.6	45.4	49.8	61.6
12:00	43.1	35.8	37.0	38.6	41.5	45.4	50.7	60.4
13:00	44.6	36.9	38.1	39.4	42.0	46.8	52.2	65.7
14:00	44.9	37.0	38.0	39.8	43.0	47.8	52.7	65.9
15:00	44.3	37.5	38.7	40.2	43.0	46.9	50.8	66.8
16:00	46.1	36.8	38.3	41.0	44.6	49.2	52.5	56.8
17:00	44.2	37.8	38.7	39.7	42.4	47.4	50.5	66.9
18:00	43.0	36.2	37.4	39.4	41.8	45.6	48.9	57.1
19:00	41.3	35.7	36.7	37.9	40.1	43.7	47.3	56.1
20:00	39.0	33.9	35.2	36.5	38.4	40.8	44.2	49.9
21:00	37.8	32.5	33.9	35.1	37.0	39.3	43.0	55.9
22:00	53.8	32.5	33.7	34.9	37.6	41.1	58.7	86.5
23:00	36.3	31.9	33.1	34.0	35.5	37.9	41.6	51.8

Overall L_{eq}: **44.4**

L_{eq} (day*): **43.7**
L_{eq} (night):** **45.5**

Lowest L_{90} (day): **35.1**
Lowest L_{90} (night): **31.8**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Summer

Northern Pass - Scobie Pond Substation
Friday, June 20, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	38.2	32.1	33.5	35.0	36.9	40.2	45.5	51.8
01:00	38.2	32.1	33.7	35.1	37.3	40.1	44.5	55.5
02:00	37.4	31.9	33.1	34.2	36.5	39.7	43.5	48.9
03:00	37.4	30.3	31.5	33.1	35.7	39.2	47.1	52.8
04:00	40.3	32.3	34.0	35.8	39.5	42.8	45.2	53.1
05:00	42.8	37.4	39.0	40.4	42.2	44.4	48.0	56.5
06:00	44.4	40.4	41.4	42.1	43.5	46.1	50.8	58.8
07:00	42.3	37.3	38.5	39.5	41.2	44.1	49.7	59.0
08:00	41.3	36.4	37.3	38.0	39.4	43.5	49.6	58.9
09:00	46.8	37.2	38.8	40.1	43.3	49.2	54.4	71.0
10:00	48.5	39.7	41.1	42.8	46.7	51.8	56.5	59.5
11:00	50.4	37.9	39.3	40.9	44.0	49.4	57.3	79.0
12:00	45.2	37.6	38.8	40.1	43.5	48.1	51.4	70.5
13:00	46.7	37.1	38.7	40.7	44.5	49.9	54.2	71.4
14:00	46.1	37.5	39.1	40.7	44.0	49.0	53.1	77.3
15:00	46.5	37.1	38.3	40.1	43.6	49.8	54.7	67.4
16:00	46.7	37.5	39.0	40.6	44.6	50.0	53.9	62.0
17:00	44.5	37.1	38.4	39.9	42.9	47.5	51.1	60.1
18:00	44.7	36.1	38.1	40.0	43.6	47.7	50.7	57.0
19:00	42.8	35.6	37.0	38.2	40.5	45.3	52.3	59.1
20:00	38.9	33.3	34.4	35.4	37.6	41.0	46.1	59.3
21:00	37.4	33.4	34.3	35.1	36.4	39.0	44.0	51.3
22:00	37.2	33.7	34.8	35.5	36.5	38.4	42.1	53.5
23:00	37.2	33.3	34.2	34.7	35.7	37.6	45.8	54.8

Overall L_{eq}: **44.3**

L_{eq} (day*): **45.7**
L_{eq} (night):** **40.1**

Lowest L_{90} (day): **35.1**
Lowest L_{90} (night): **33.1**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Summer

Northern Pass - Scobie Pond Substation
Saturday, June 21, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	35.8	32.7	33.7	34.4	35.4	36.8	40.3	49.7
01:00	36.4	33.0	33.9	34.6	35.9	37.8	40.6	49.6
02:00	36.4	32.8	33.8	34.6	35.5	37.7	42.6	51.5
03:00	37.4	32.9	33.7	34.3	35.5	38.0	47.4	55.7
04:00	39.6	33.5	34.5	35.8	38.5	41.8	46.7	53.5
05:00	41.4	35.4	37.1	38.8	40.5	43.3	46.2	57.5
06:00	42.3	36.7	38.1	39.3	41.3	44.4	48.3	55.7
07:00	42.6	34.5	36.3	37.8	40.1	44.4	53.0	58.9
08:00	41.6	35.8	37.0	38.0	40.0	43.5	49.5	60.1
09:00	44.2	33.9	34.9	36.4	39.1	43.9	57.3	64.9
10:00	42.0	34.9	36.4	37.7	40.7	44.2	49.5	62.5
11:00	43.6	35.4	36.8	38.0	40.6	45.4	53.7	67.4
12:00	42.1	35.4	37.0	38.2	41.0	44.0	48.9	68.8
13:00	42.1	34.4	36.0	37.7	40.2	44.9	49.0	68.1
14:00	42.5	35.0	36.3	37.2	38.8	42.3	52.8	67.1
15:00	40.1	33.8	35.4	36.8	39.0	42.4	46.9	54.4
16:00	40.8	34.3	35.5	36.5	38.4	42.7	50.1	60.1
17:00	40.5	33.4	35.3	36.6	38.6	42.2	48.7	64.0
18:00	38.8	33.2	34.4	35.4	37.6	41.1	46.0	51.1
19:00	42.7	31.8	33.3	34.4	36.1	39.2	52.3	72.7
20:00	39.1	32.1	33.3	34.3	36.2	39.9	45.1	67.6
21:00	49.9	33.2	35.2	36.1	37.9	44.5	63.4	75.8
22:00	38.5	34.7	35.9	36.5	37.7	39.6	44.5	57.0
23:00	37.4	32.3	33.4	34.1	36.0	39.6	44.0	55.5

Overall L_{eq}: **42.0**

L_{eq} (day*): **43.2**
L_{eq} (night):** **38.9**

Lowest L_{90} (day): **34.3**
Lowest L_{90} (night): **34.1**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Summer

Northern Pass - Scobie Pond Substation
Sunday, June 22, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	35.7	31.5	32.6	33.6	35.2	37.4	40.0	47.3
01:00	35.3	31.2	32.3	33.4	34.9	36.8	39.7	45.2
02:00	35.3	31.3	32.0	32.6	33.6	36.3	44.5	52.7
03:00	35.8	30.2	31.1	31.9	33.9	37.6	43.9	59.2
04:00	38.5	32.2	33.5	34.8	36.8	40.4	47.7	52.7
05:00	38.0	31.9	33.3	34.5	36.1	39.2	47.3	63.8
06:00	38.1	32.2	33.5	34.7	36.4	39.9	46.2	57.1
07:00	39.6	31.4	33.0	34.2	36.4	42.0	49.8	57.4
08:00	40.1	29.7	31.0	31.9	33.7	41.4	53.3	57.5
09:00	41.3	30.1	31.3	32.6	35.0	40.4	53.4	62.0
10:00	39.1	32.1	33.3	34.7	36.4	40.1	49.6	57.9
11:00	42.5	34.1	35.4	36.7	39.6	44.4	52.8	61.2
12:00	40.9	32.6	33.6	35.1	37.9	43.8	50.4	63.2
13:00	39.3	31.3	33.2	34.6	37.2	41.9	46.3	62.8
14:00	38.1	31.2	32.8	33.9	36.4	40.2	45.7	66.9
15:00	40.9	31.2	32.2	34.4	36.5	41.8	52.4	61.9
16:00	41.4	31.1	32.2	33.5	35.8	44.1	52.4	69.2
17:00	43.1	37.1	38.2	39.3	41.5	45.8	50.2	59.5
18:00	40.5	35.6	36.9	37.9	39.5	42.0	47.7	53.3
19:00	41.6	34.3	35.7	36.8	38.5	41.4	47.0	65.9
20:00	39.2	34.3	35.6	36.6	38.1	41.1	45.8	52.2
21:00	40.8	34.3	35.3	36.2	37.8	40.4	49.6	68.5
22:00	40.9	33.8	34.7	35.4	36.6	39.0	45.0	69.4
23:00	38.8	33.2	34.2	35.3	37.3	39.5	43.2	66.2

Overall L_{eq}: **39.9**

L_{eq} (day*): **40.8**
L_{eq} (night):** **37.8**

Lowest L_{90} (day): **31.9**
Lowest L_{90} (night): **31.9**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-N - Summer

Northern Pass - Scobie Pond Substation
Monday, June 23, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	37.8	32.8	34.0	35.1	37.3	39.8	42.1	51.0
01:00	37.4	32.6	33.6	34.9	36.8	39.3	42.2	52.3
02:00	39.8	34.6	36.5	37.3	39.1	41.7	45.6	53.9
03:00	39.2	35.4	36.6	37.4	38.9	40.8	42.8	48.3
04:00	41.9	34.2	35.7	37.8	41.4	44.4	46.5	52.0
05:00	45.0	39.0	40.1	41.5	44.5	46.5	50.7	66.4
06:00	45.3	37.9	39.2	40.8	42.8	45.7	54.3	67.7
07:00	39.6	36.6	37.4	38.0	39.1	41.0	43.4	51.7
08:00	41.6	35.4	36.4	37.1	38.6	44.2	50.6	61.4
09:00	41.3	35.6	36.6	37.9	40.2	43.3	48.4	57.3
10:00	43.5	37.5	38.5	39.5	42.3	45.3	51.0	63.1
11:00	43.0	33.4	35.6	38.6	41.5	44.6	51.2	60.3
12:00	41.1	33.2	34.3	35.9	38.4	43.1	49.6	71.9
13:00	42.6	34.4	35.9	38.2	41.2	44.7	49.7	68.9
14:00	44.8	36.7	38.5	40.1	44.0	47.3	49.2	65.0
15:00	45.0	38.7	39.9	41.2	44.3	47.2	50.4	58.1
16:00								
17:00								
18:00								
19:00								
20:00								
21:00								
22:00								
23:00								

Overall L_{eq}: **42.5**

L_{eq} (day*): **42.8**
L_{eq} (night):** **42.0**

Lowest L_{90} (day): **35.9**
Lowest L_{90} (night): **34.9**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Summer

Northern Pass - Scobie Pond Substation
Monday, June 16, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00								
01:00								
02:00								
03:00								
04:00								
05:00								
06:00								
07:00								
08:00								
09:00								
10:00								
11:00								
12:00								
13:00								
14:00								
15:00								
16:00	44.6	37.5	39.3	40.3	41.9	48.3	52.2	62.0
17:00	44.7	37.0	38.2	39.4	41.5	48.3	52.6	59.5
18:00	46.7	37.9	40.0	41.5	44.2	49.3	55.6	65.6
19:00	50.1	38.2	39.8	41.5	44.0	49.3	61.2	74.4
20:00	46.4	36.8	37.8	38.9	41.9	49.3	56.4	66.8
21:00	46.9	39.5	41.4	43.1	46.1	49.4	51.8	58.8
22:00	45.1	39.8	41.0	42.0	44.1	48.2	50.2	56.0
23:00	43.9	38.6	39.7	40.7	42.3	46.3	49.6	59.3

Overall L_{eq}: **46.5**

L_{eq} (day*): **47.0**
L_{eq} (night):** **44.5**

Lowest L_{90} (day): **38.9**
Lowest L_{90} (night): **40.7**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Summer

Northern Pass - Scobie Pond Substation
Tuesday, June 17, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	43.3	37.5	39.2	40.3	42.0	45.5	49.7	51.8
01:00	43.0	36.2	37.7	38.9	41.3	45.8	49.8	54.3
02:00	42.8	36.6	38.0	39.2	41.6	45.0	49.1	54.9
03:00	44.4	37.8	39.4	40.8	43.0	46.8	50.4	60.6
04:00	55.0	37.5	39.2	43.5	47.2	57.0	67.2	70.3
05:00	49.6	42.9	44.5	45.6	48.5	51.0	57.0	77.3
06:00	48.4	44.2	45.2	46.0	47.2	50.1	55.8	66.4
07:00	47.8	41.4	43.1	44.4	46.2	49.5	54.8	65.5
08:00	45.9	40.5	41.8	42.8	44.2	48.8	52.0	57.7
09:00	46.8	40.0	41.4	42.5	44.3	49.4	55.1	65.2
10:00	45.7	40.3	41.5	42.5	44.2	48.6	52.7	60.8
11:00	46.5	36.5	39.0	42.1	45.2	49.4	52.0	59.3
12:00	46.2	37.0	39.4	40.9	43.6	49.0	54.9	67.2
13:00	45.5	36.6	38.2	39.5	42.0	48.4	55.2	64.6
14:00	45.7	37.3	38.5	39.8	42.6	48.7	54.6	71.0
15:00	48.5	38.6	39.8	40.8	43.4	49.5	59.3	72.9
16:00	46.9	38.2	39.4	40.6	43.0	49.3	57.3	65.0
17:00	47.9	39.4	40.6	41.6	43.8	48.9	57.3	71.5
18:00	47.7	39.0	40.4	41.4	44.6	51.1	55.9	62.1
19:00	46.3	39.4	40.6	41.6	43.7	48.9	53.4	68.3
20:00	46.0	40.1	41.0	41.9	44.2	48.6	53.5	60.6
21:00	48.1	39.5	41.0	43.4	47.3	50.9	53.3	58.6
22:00	47.4	38.0	39.7	41.4	45.8	50.6	53.6	61.5
23:00	45.0	37.6	39.1	40.2	42.7	48.5	51.0	61.4

Overall L_{eq}: **47.6**

L_{eq} (day*): **46.9**
L_{eq} (night):** **48.6**

Lowest L_{90} (day): **39.5**
Lowest L_{90} (night): **38.9**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Summer

Northern Pass - Scobie Pond Substation
Wednesday, June 18, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	44.3	38.1	39.8	40.7	42.4	48.5	49.4	56.0
01:00	44.3	38.7	40.2	41.0	42.6	48.1	49.5	68.3
02:00	48.5	38.8	40.0	41.3	43.5	51.8	58.9	62.0
03:00	56.1	49.7	51.3	52.7	55.5	58.1	61.9	69.4
04:00	50.9	42.8	44.1	45.4	49.4	53.5	57.9	66.7
05:00	49.5	44.6	45.9	46.7	48.2	50.9	57.4	66.2
06:00	50.9	45.3	47.1	48.2	50.1	52.5	56.0	74.2
07:00	51.8	42.8	45.2	47.3	50.0	53.9	60.0	76.0
08:00	56.1	47.4	48.6	50.3	53.8	59.3	64.5	67.8
09:00	55.6	42.4	44.0	46.8	52.3	59.1	65.6	69.3
10:00	52.3	42.3	44.4	46.6	50.4	55.6	60.1	63.6
11:00	54.1	43.2	44.8	47.6	52.4	57.2	62.0	68.9
12:00	54.7	43.4	45.1	47.3	51.9	58.0	63.3	71.8
13:00	55.7	44.2	46.3	48.6	52.4	58.9	65.2	70.5
14:00	54.7	42.8	44.1	46.5	51.6	57.6	63.6	72.6
15:00	53.7	42.0	44.2	46.6	51.1	56.7	62.4	68.4
16:00	50.9	40.3	41.8	44.0	48.2	54.4	58.9	77.2
17:00	46.9	38.4	39.5	40.8	43.5	48.3	54.2	72.8
18:00	47.0	39.0	40.6	42.0	45.1	49.6	55.2	59.0
19:00	44.8	37.4	38.5	39.6	41.7	46.6	53.6	69.7
20:00	45.3	37.0	38.3	39.5	41.6	46.2	52.5	74.1
21:00	44.3	37.9	39.1	40.2	43.3	46.9	49.2	55.6
22:00	42.4	37.1	38.1	38.9	40.9	45.6	47.6	57.0
23:00	40.2	34.6	35.6	36.4	37.8	44.7	46.5	61.5

Overall L_{eq}: **51.9**

L_{eq} (day*): **52.8**
L_{eq} (night):** **50.0**

Lowest L_{90} (day): **39.5**
Lowest L_{90} (night): **36.4**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Summer

Northern Pass - Scobie Pond Substation
Thursday, June 19, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	40.3	34.7	36.0	37.0	38.6	44.9	45.7	61.5
01:00	40.8	34.6	36.2	37.8	39.7	43.6	46.2	48.0
02:00	40.8	35.4	37.2	38.3	39.8	42.8	46.1	49.8
03:00	41.3	35.5	37.7	38.7	40.2	44.2	46.6	52.9
04:00	44.8	36.6	38.5	39.6	42.2	46.5	55.3	62.6
05:00	45.4	39.0	40.7	42.2	44.2	47.4	52.8	62.2
06:00	46.7	41.0	42.3	43.4	45.1	47.6	55.5	67.6
07:00	48.8	38.5	39.9	41.0	43.8	50.2	59.7	72.5
08:00	45.4	38.4	39.7	40.7	42.9	47.1	54.2	66.4
09:00	45.3	37.6	39.2	40.3	43.2	47.6	54.5	60.4
10:00	46.0	38.5	39.8	41.6	45.0	48.5	52.3	60.3
11:00	47.9	39.5	41.1	43.2	46.1	50.5	55.5	66.9
12:00	46.9	38.2	39.3	41.5	45.0	49.1	55.2	68.8
13:00	51.7	40.1	41.8	44.2	50.6	54.9	58.3	66.9
14:00	49.1	38.7	40.2	42.4	46.4	51.6	58.6	71.2
15:00	48.3	39.6	41.1	42.5	45.8	50.9	56.1	68.5
16:00	49.9	39.0	40.5	43.4	47.2	53.2	58.6	61.6
17:00	49.3	39.5	41.3	43.1	47.2	52.6	56.9	62.9
18:00	48.0	38.4	39.9	41.7	46.0	51.2	56.0	61.9
19:00	45.9	37.7	39.4	40.6	43.5	49.1	53.4	65.5
20:00	42.5	36.0	37.3	38.8	41.2	45.7	47.8	60.7
21:00	49.1	36.0	37.1	37.7	39.0	44.7	47.4	84.2
22:00	41.7	35.7	37.0	38.3	40.3	45.1	48.0	56.5
23:00	40.7	35.3	36.4	37.2	38.8	42.7	47.3	58.6

Overall L_{eq}: **46.8**

L_{eq} (day*): **48.1**
L_{eq} (night):** **43.2**

Lowest L_{90} (day): **37.7**
Lowest L_{90} (night): **37.0**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Summer

Northern Pass - Scobie Pond Substation
Friday, June 20, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	41.4	36.2	37.6	38.7	40.4	43.6	46.6	52.2
01:00	41.2	35.8	37.5	38.5	40.0	43.5	46.8	52.4
02:00	40.5	35.2	36.6	37.7	39.4	42.8	46.4	52.6
03:00	40.4	34.7	36.0	36.9	38.7	43.0	47.8	53.6
04:00	44.1	35.9	37.4	39.0	42.2	46.1	51.9	65.5
05:00	45.4	39.8	41.2	42.4	44.3	47.2	52.5	61.8
06:00	47.0	42.1	43.3	44.3	45.9	47.8	53.7	67.2
07:00	46.5	41.3	42.8	43.7	45.3	47.8	53.8	64.6
08:00	47.7	40.3	41.6	42.5	44.1	47.5	55.6	72.8
09:00	49.9	41.4	42.8	44.4	47.6	52.8	58.1	70.2
10:00	52.5	40.8	42.3	45.2	49.6	55.6	61.7	67.3
11:00	52.5	40.6	42.0	43.8	47.9	53.7	62.7	76.3
12:00	62.5	44.9	46.9	61.2	62.6	63.2	64.5	78.7
13:00	53.7	40.3	41.8	45.1	49.0	55.6	63.2	70.9
14:00	49.1	40.5	41.9	43.4	46.9	52.2	57.6	67.4
15:00	48.5	38.9	40.4	42.4	46.5	51.1	57.5	61.2
16:00	49.6	39.1	40.3	43.1	47.1	52.5	58.0	66.2
17:00	47.6	39.5	41.0	42.3	45.8	50.7	55.0	61.6
18:00	47.5	38.6	40.0	42.2	45.6	50.4	55.3	65.0
19:00	47.2	38.6	39.6	40.7	43.9	48.8	53.5	75.3
20:00	42.0	35.6	36.7	37.6	39.6	45.4	50.3	62.5
21:00	41.9	35.8	36.9	37.6	38.8	44.8	50.0	60.6
22:00	41.7	37.4	38.2	38.9	39.9	43.7	48.5	59.3
23:00	41.1	36.9	37.8	38.4	39.5	42.7	48.3	55.8

Overall L_{eq}: **51.2**

L_{eq} (day*): **53.0**
L_{eq} (night):** **43.2**

Lowest L_{90} (day): **37.6**
Lowest L_{90} (night): **36.9**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Summer

Northern Pass - Scobie Pond Substation
Saturday, June 21, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	40.0	35.7	36.8	37.6	38.7	41.5	47.6	49.8
01:00	39.4	34.1	34.9	36.1	37.9	41.5	47.1	51.3
02:00	39.1	34.4	35.3	36.0	37.2	41.2	47.4	49.6
03:00	39.5	34.3	35.0	35.6	37.1	41.7	48.2	54.0
04:00	43.0	35.0	36.0	37.2	40.9	45.8	50.2	63.9
05:00	43.8	36.2	38.4	40.1	42.3	46.0	49.8	64.7
06:00	47.2	37.9	39.5	40.8	43.2	47.5	57.5	74.0
07:00	45.6	38.1	39.5	41.0	42.9	47.3	54.9	70.4
08:00	45.1	40.4	41.4	42.4	44.0	47.0	52.2	63.8
09:00	44.8	36.7	38.1	39.3	43.4	47.3	52.8	63.5
10:00	45.8	37.2	38.8	40.8	44.2	49.0	52.9	58.1
11:00	46.6	38.2	40.2	41.4	44.1	49.4	54.9	64.9
12:00	48.2	39.2	40.8	42.1	46.1	51.4	55.5	65.2
13:00	48.8	38.9	40.2	41.5	45.0	50.8	56.1	74.8
14:00	45.7	38.1	39.7	40.9	43.3	47.9	53.6	67.0
15:00	45.4	38.0	39.5	41.2	44.0	47.9	51.3	63.2
16:00	45.7	37.7	39.0	40.3	42.9	48.2	53.2	68.4
17:00	44.4	37.8	39.0	40.1	42.1	47.3	52.9	58.9
18:00	44.1	36.8	38.3	39.3	41.1	46.9	52.2	65.5
19:00	46.9	35.3	36.7	37.8	39.6	46.3	55.6	79.9
20:00	43.3	35.0	36.5	37.4	39.1	44.8	50.8	72.8
21:00	49.5	36.4	37.4	38.3	40.0	47.3	63.3	74.3
22:00	41.7	36.8	37.8	38.5	39.7	42.9	48.1	67.9
23:00	41.6	35.3	36.3	37.1	38.9	43.4	50.4	64.7

Overall L_{eq}: **45.3**

L_{eq} (day*): **46.3**
L_{eq} (night):** **42.5**

Lowest L_{90} (day): **37.4**
Lowest L_{90} (night): **35.6**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Summer

Northern Pass - Scobie Pond Substation
Sunday, June 22, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	39.2	33.4	35.0	36.2	37.6	41.0	47.4	49.7
01:00	37.8	32.6	33.6	34.4	35.7	39.6	47.2	49.2
02:00	38.2	32.0	33.1	34.0	35.4	41.1	47.4	51.2
03:00	38.8	32.7	33.8	34.7	36.2	41.3	47.7	57.6
04:00	43.4	33.7	34.7	36.5	40.0	46.5	53.1	65.6
05:00	42.8	34.4	35.7	36.9	39.1	44.5	52.1	70.2
06:00	40.0	34.3	35.8	36.9	38.5	41.9	47.7	57.8
07:00	41.0	35.2	36.8	37.7	39.0	43.1	49.1	55.8
08:00	41.8	33.9	35.1	36.1	37.9	43.8	53.3	60.1
09:00	43.6	33.5	35.5	36.8	39.1	46.2	53.3	70.0
10:00	43.6	34.3	36.7	38.0	40.3	46.9	52.3	65.6
11:00	45.5	36.3	37.8	39.9	43.2	48.1	54.4	61.0
12:00	43.4	35.7	37.1	38.4	41.3	46.2	50.6	74.0
13:00	43.8	34.4	36.1	37.5	41.5	46.9	52.3	58.1
14:00	42.4	33.6	35.6	37.1	39.5	45.8	51.5	63.8
15:00	41.5	33.6	35.9	37.4	39.1	45.2	48.2	58.6
16:00	44.8	33.1	34.7	36.1	41.8	48.1	52.4	62.5
17:00	44.2	36.3	37.6	39.1	42.0	46.6	52.7	60.7
18:00	43.5	36.2	37.4	38.5	40.3	46.3	51.4	68.1
19:00	42.3	35.5	37.3	38.5	40.1	45.9	48.5	57.6
20:00	40.6	33.2	34.6	35.7	37.9	45.6	47.5	55.5
21:00	39.9	32.6	34.4	35.2	36.5	45.1	47.2	55.5
22:00	41.8	33.1	34.3	35.3	37.1	43.9	51.4	68.8
23:00	40.2	34.8	35.9	36.7	38.3	42.7	47.6	54.9

Overall L_{eq}: **42.3**

L_{eq} (day*): **43.1**
L_{eq} (night):** **40.7**

Lowest L_{90} (day): **35.2**
Lowest L_{90} (night): **34.0**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Scobie Pond CM-S - Summer

Northern Pass - Scobie Pond Substation
Monday, June 23, 2014

Time	L_{eq}	L_{min}	L_{99}	L_{90}	L_{50}	L_{10}	L_{01}	L_{max}
00:00	39.7	34.8	35.9	36.6	37.9	41.8	47.4	49.2
01:00	39.3	34.3	35.1	35.9	37.5	41.6	47.1	49.0
02:00	40.9	35.2	36.1	37.0	39.2	43.6	48.1	52.6
03:00	39.9	35.2	36.3	37.1	38.6	41.7	47.3	49.6
04:00	47.3	36.2	37.5	39.2	42.5	48.0	59.5	64.2
05:00	45.5	39.5	40.8	42.0	44.0	47.1	54.6	60.4
06:00	44.7	38.7	40.0	41.1	42.9	46.4	53.2	62.0
07:00	45.0	39.4	40.5	41.7	43.1	46.6	50.6	68.7
08:00	45.0	39.7	40.8	41.5	42.7	47.5	53.8	63.6
09:00	45.2	39.9	41.0	41.8	43.2	47.3	53.2	65.9
10:00	44.3	39.2	40.8	41.8	43.2	46.6	50.0	61.7
11:00	45.2	36.8	38.3	41.1	43.3	47.6	54.4	60.9
12:00	46.1	35.8	37.8	39.1	41.5	47.4	55.1	74.8
13:00	45.8	37.5	39.4	41.3	44.0	48.2	53.1	65.6
14:00	45.3	39.5	40.7	42.1	44.5	47.7	50.8	61.7
15:00	44.7	36.6	37.6	39.5	44.1	47.2	49.8	58.9
16:00								
17:00								
18:00								
19:00								
20:00								
21:00								
22:00								
23:00								

Overall L_{eq}: **44.6**

L_{eq} (day*): **45.2**
L_{eq} (night):** **43.6**

Lowest L_{90} (day): **39.1**
Lowest L_{90} (night): **35.9**

* 7:00 a.m. to 10:00 p.m.
** 10:00 p.m. to 7:00 a.m.

Annex C

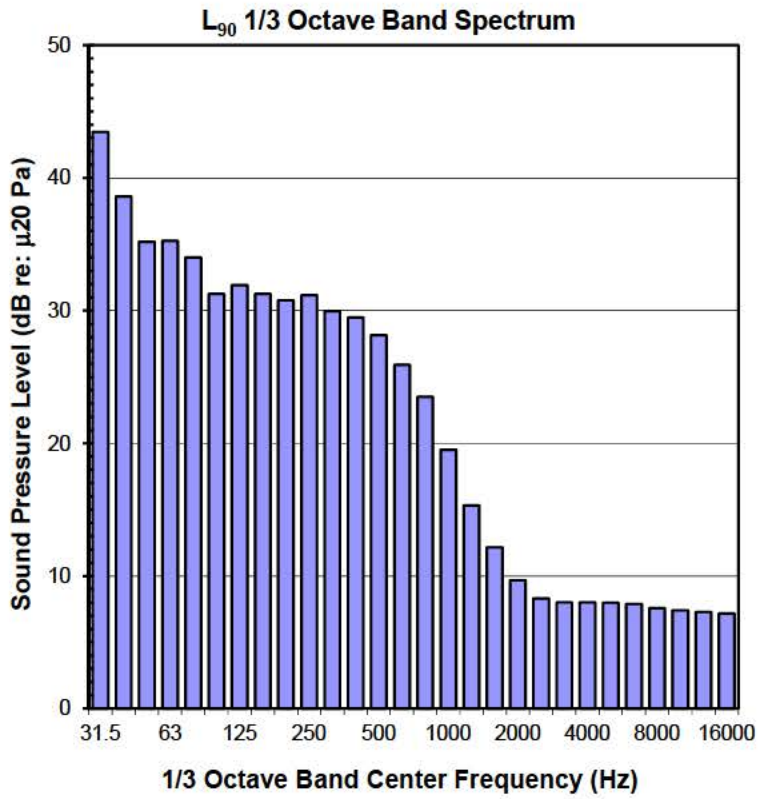
Intermittent Sound Measurement Data

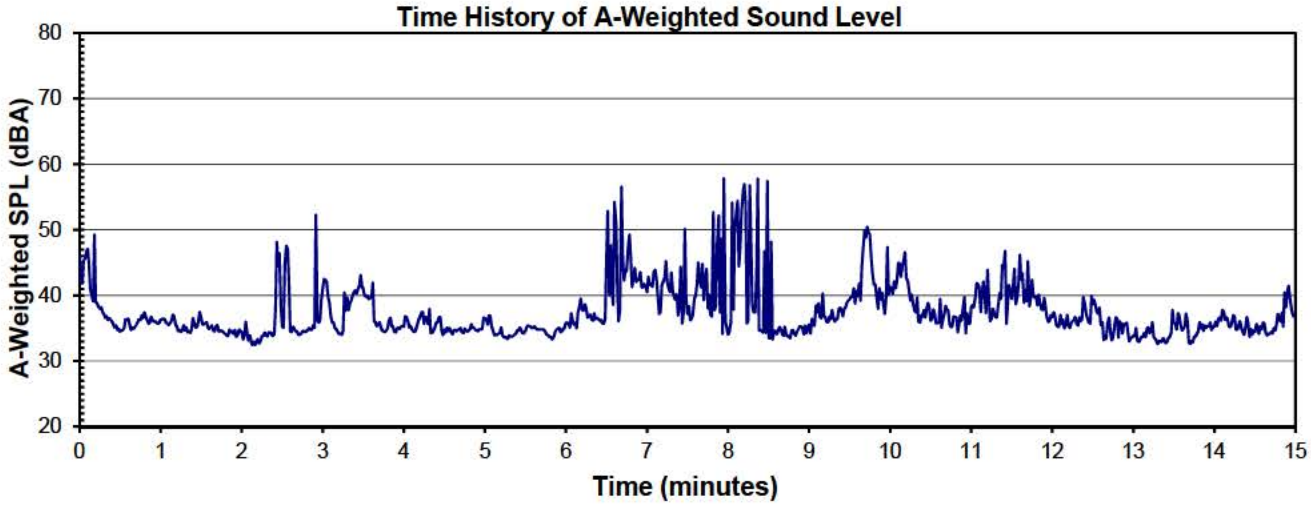
Scobie Pond IM-N - Winter - Day

Measured Thursday, January 30, 2014, Between 1:18 PM & 1:33 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**41.6**
L_{max}:	66.7
L_{01}:	51.9
L_{10}:	42.0
L_{50}:	35.9
L_{90}:	**33.9**
L_{99}:	32.7
L_{min}:	31.5





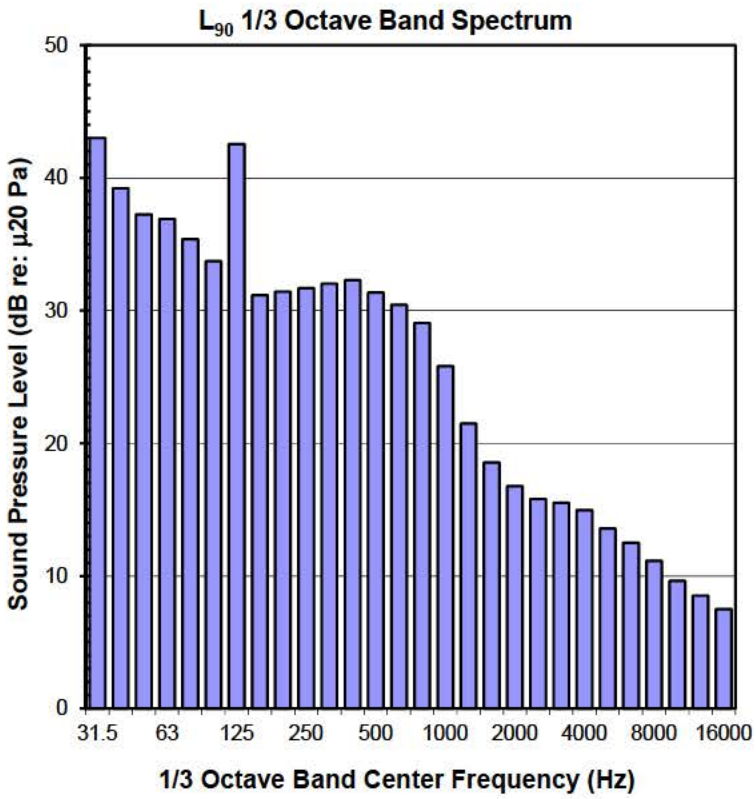
Run007

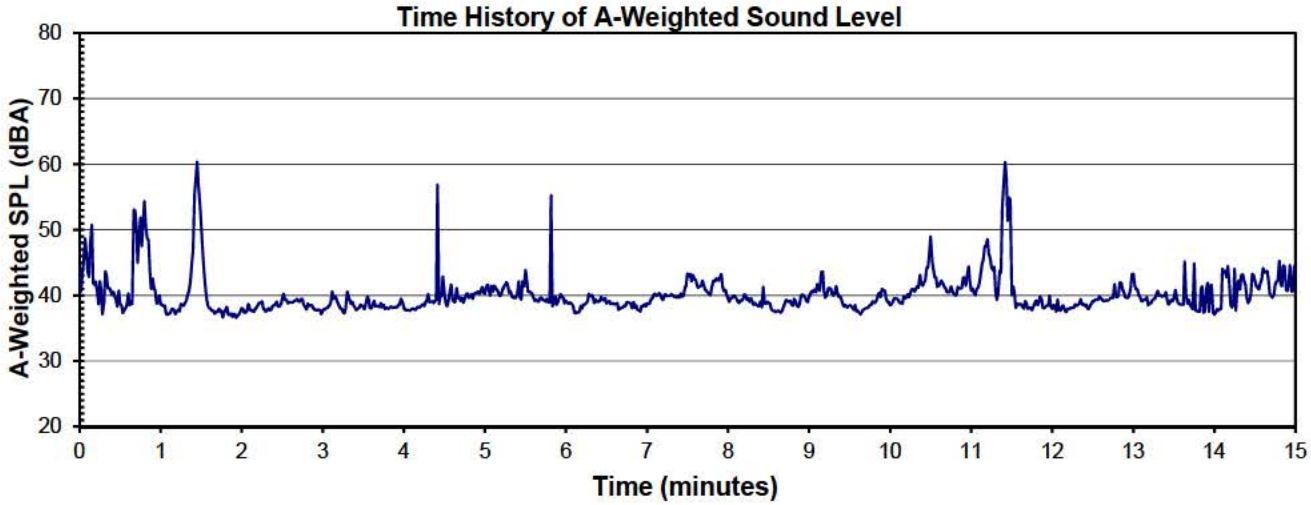
Scobie Pond IM-S - Winter - Day

Measured Thursday, January 30, 2014, Between 1:37 PM & 1:52 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**42.9**
L_{max}:	65.6
L_{01}:	54.5
L_{10}:	42.9
L_{50}:	39.3
L_{90}:	**37.7**
L_{99}:	36.9
L_{min}:	36.0





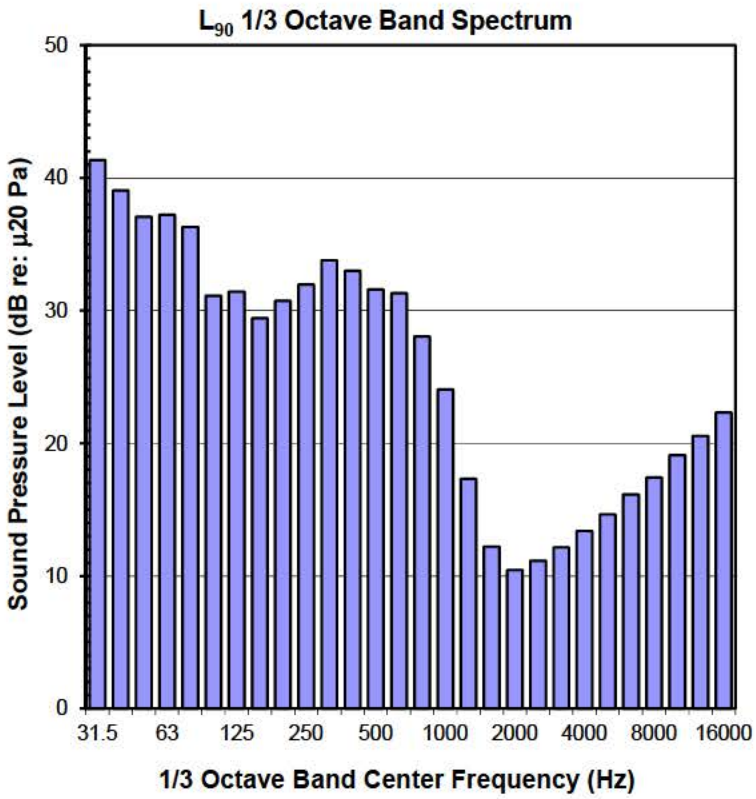
Run008

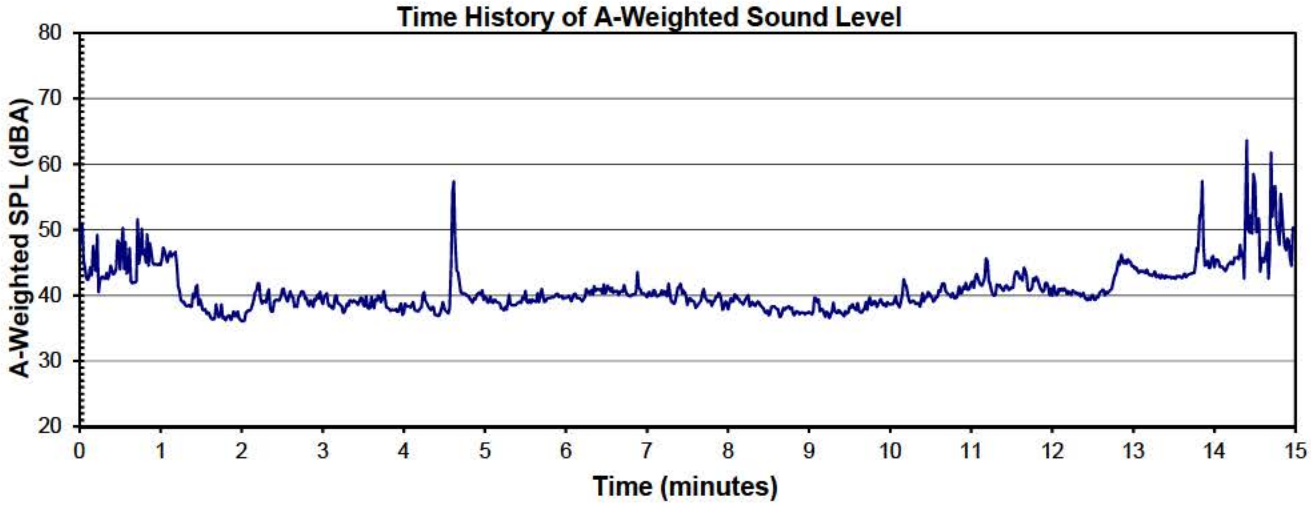
Scobie Pond IM-N - Winter - Night

Measured Friday, January 31, 2014, Between 3:26 AM & 3:41 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**44.0**
L_{max}:	71.1
L_{01}:	54.1
L_{10}:	44.9
L_{50}:	40.0
L_{90}:	**37.6**
L_{99}:	36.4
L_{min}:	35.4





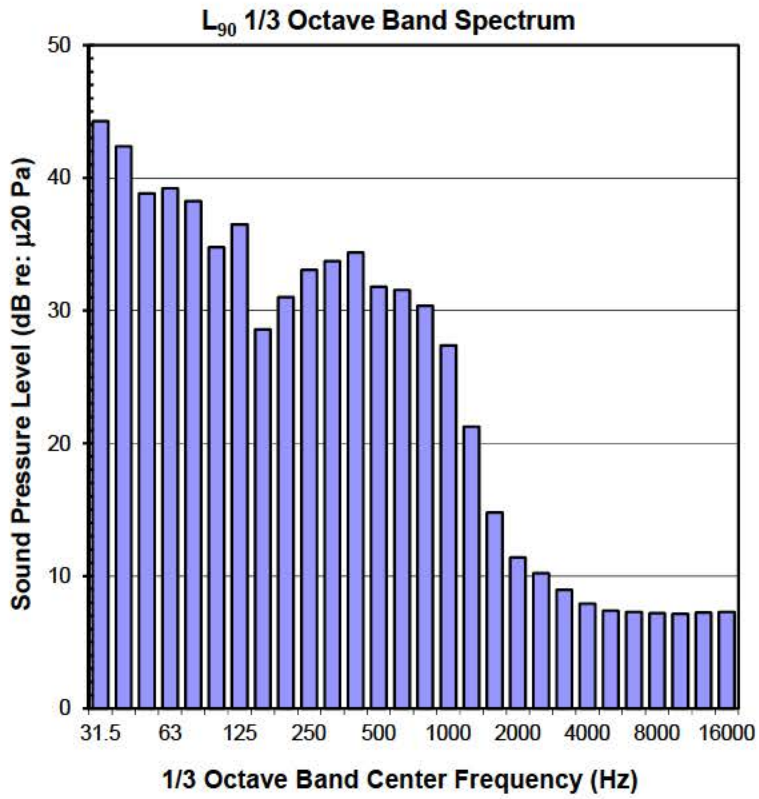
Run015

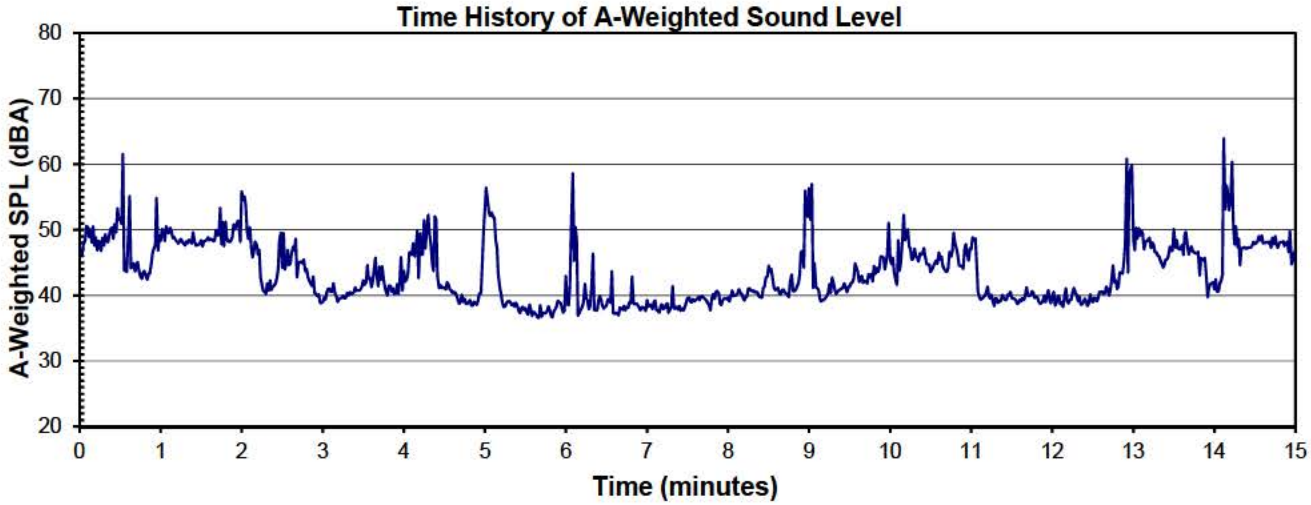
Scobie Pond IM-S - Winter - Night

Measured Friday, January 31, 2014, Between 3:43 AM & 3:58 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**46.8**
L_{max}:	70.7
L_{01}:	56.7
L_{10}:	48.9
L_{50}:	42.1
L_{90}:	**38.4**
L_{99}:	36.9
L_{min}:	35.9





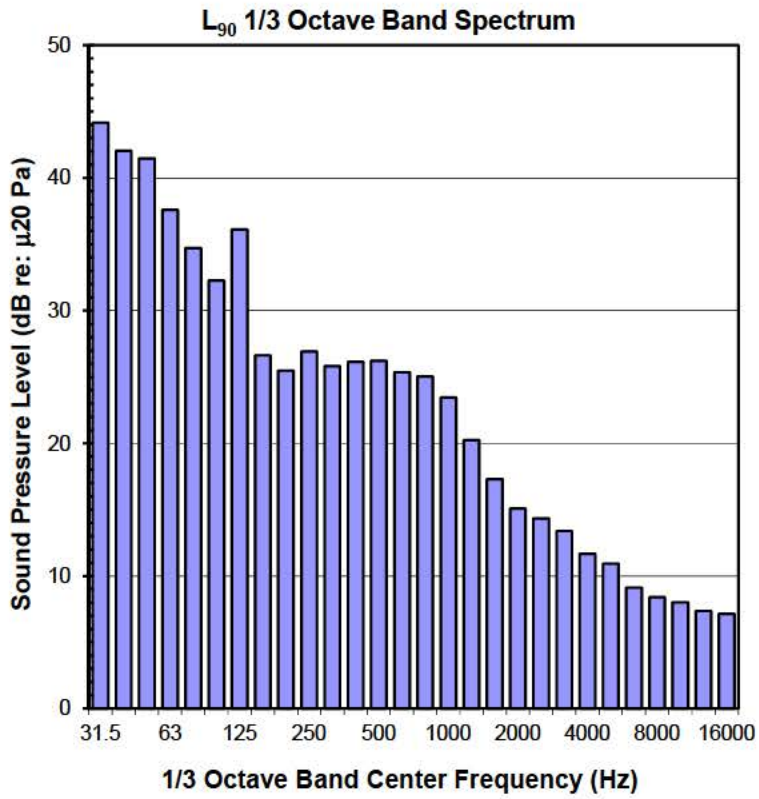
Run016

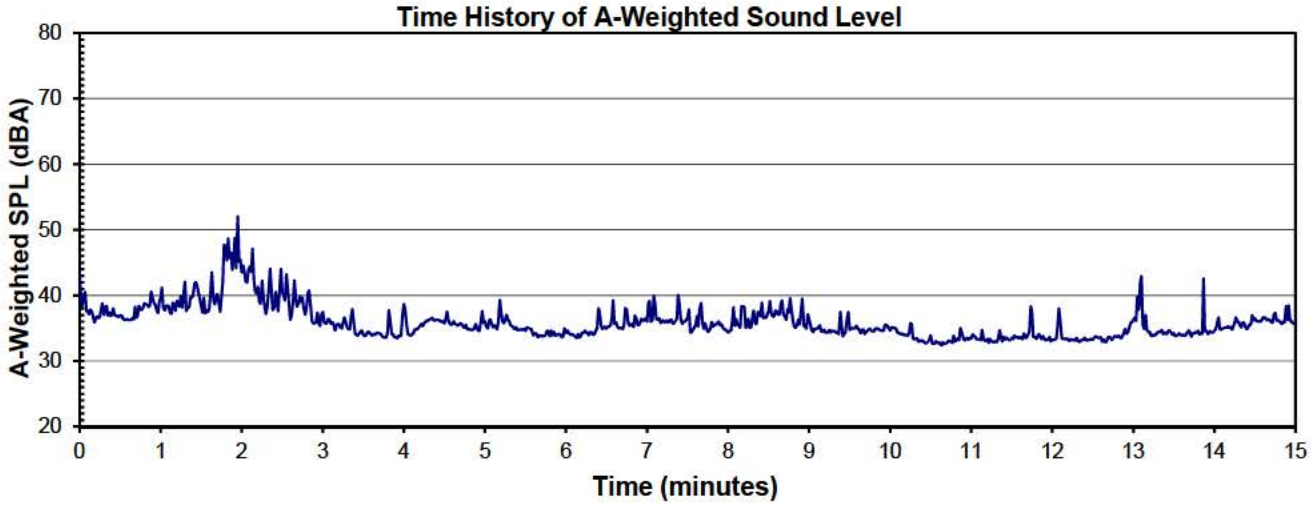
Scobie Pond IM-N - Summer - Day

Measured Monday, June 16, 2014, Between 3:23 PM & 3:38 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**37.1**
L_{max}:	55.1
L_{01}:	45.8
L_{10}:	39.0
L_{50}:	35.2
L_{90}:	**33.4**
L_{99}:	32.6
L_{min}:	31.9





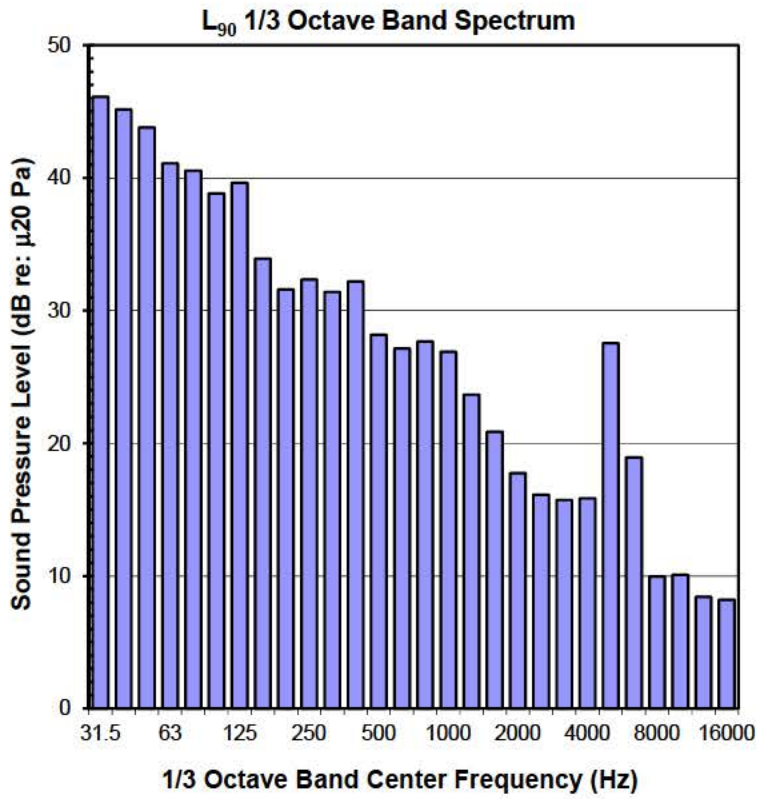
Run007

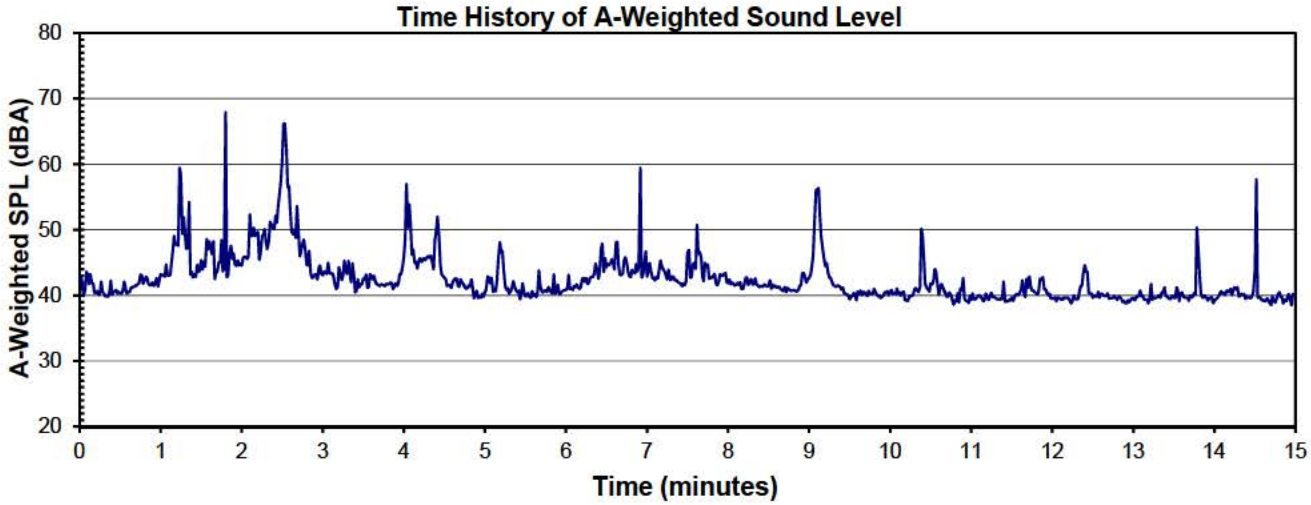
Scobie Pond IM-S - Summer - Day

Measured Monday, June 16, 2014, Between 3:42 PM & 3:57 PM

A-Weighted Descriptors (dBA)

L_{eq}:	**46.9**
L_{max}:	75.3
L_{01}:	56.9
L_{10}:	46.5
L_{50}:	41.4
L_{90}:	**39.4**
L_{99}:	38.6
L_{min}:	37.6





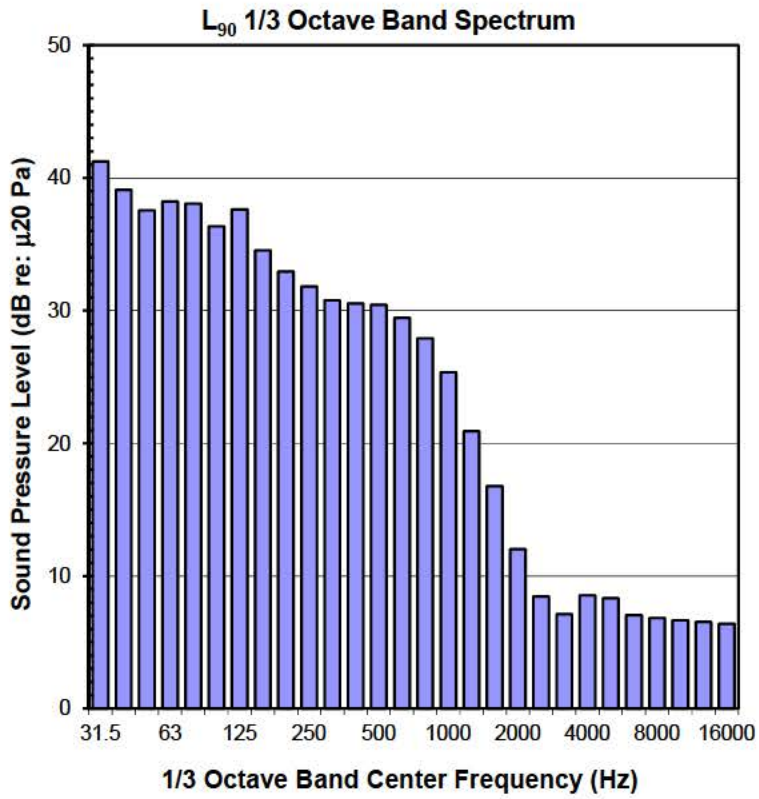
Run008

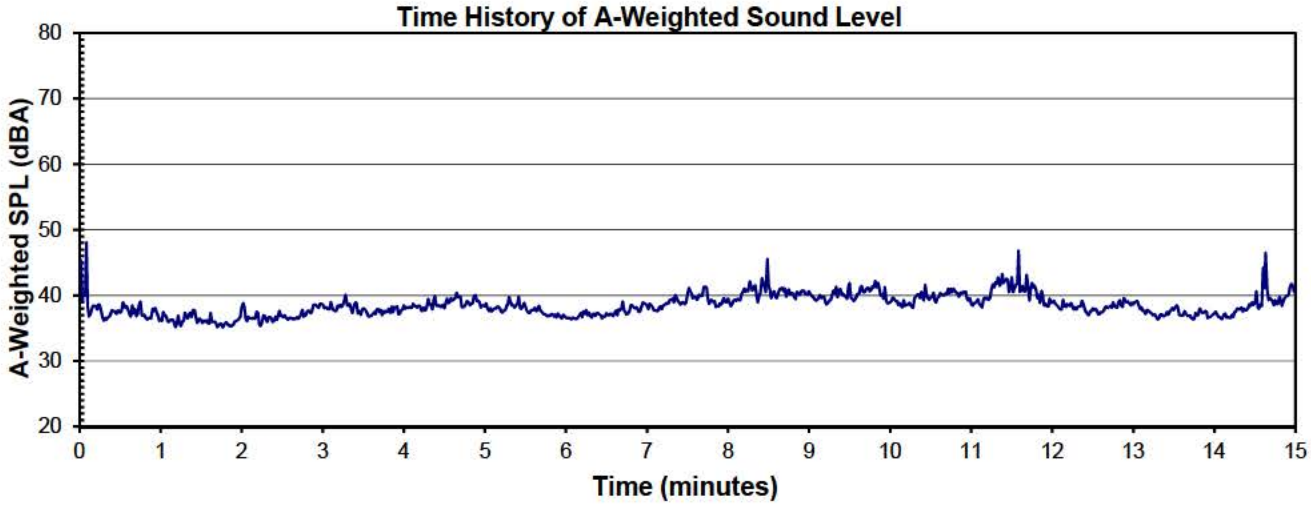
Scobie Pond IM-N - Summer - Night

Measured Tuesday, June 17, 2014, Between 3:21 AM & 3:36 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**38.9**
L_{max}:	51.3
L_{01}:	43.0
L_{10}:	40.6
L_{50}:	38.3
L_{90}:	**36.5**
L_{99}:	35.4
L_{min}:	34.4





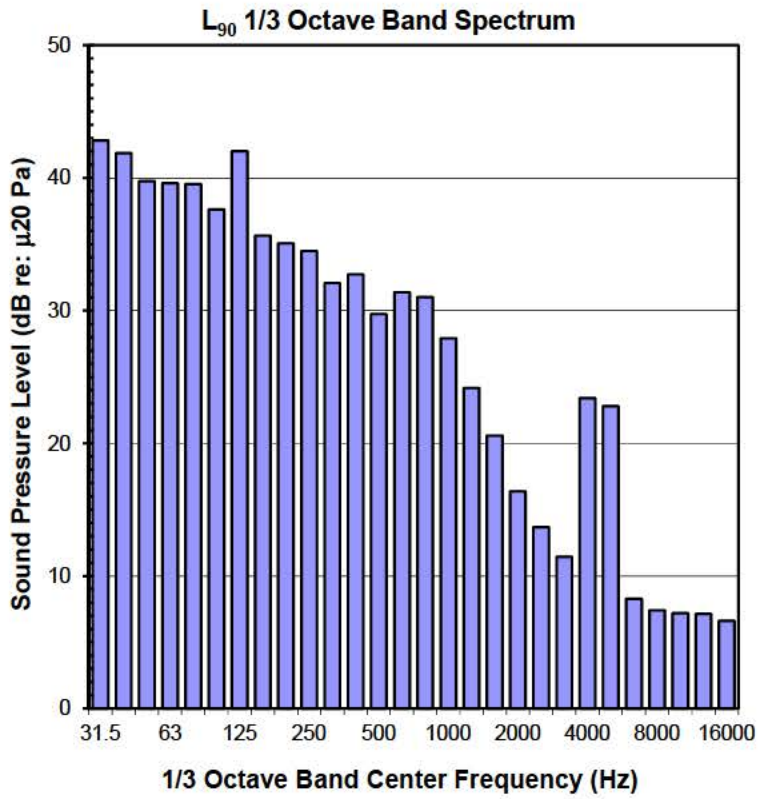
Run015

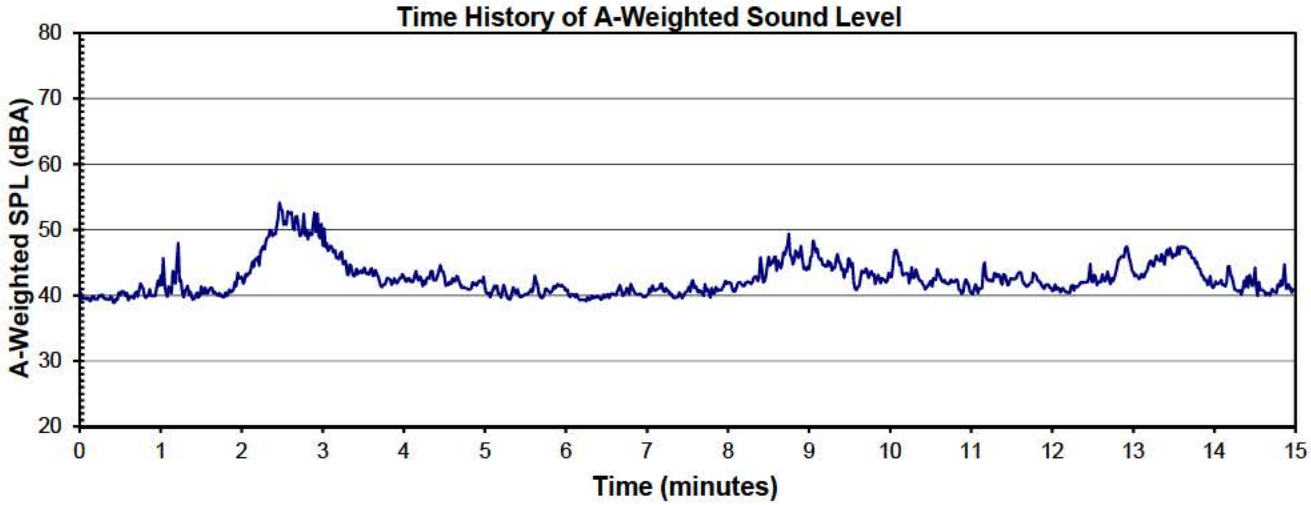
Scobie Pond IM-S - Summer - Night

Measured Tuesday, June 17, 2014, Between 3:38 AM & 3:53 AM

A-Weighted Descriptors (dBA)

L_{eq}:	**43.8**
L_{max}:	55.6
L_{01}:	52.0
L_{10}:	46.3
L_{50}:	41.9
L_{90}:	**39.9**
L_{99}:	38.9
L_{min}:	37.7





Run016

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CHRISTOPHER A. STORCH

Northern Pass Project – Sound Report 5

Project Construction

Sound Impact Assessment

Introduction

Cavanaugh Tocci Associates, Inc. has evaluated sound produced by various construction activities associated with the proposed Northern Pass Project. In that this evaluation precedes the development of detailed construction plans and schedules, this evaluation provides a high level overview of construction activities and their potential sound impacts. Appendix A of this report is a glossary of acoustical terminology.

General Overview

Construction of the Northern Pass Project will take place over a timeframe of approximately 2 ½ years. For the most part construction activities will only take place during daytime hours as permitted during the Project siting process. The construction schedule will include many overlapping phases that will occur throughout the Project construction timeframe. Construction tasks for this project can be grouped into the following categories:

- Overhead Transmission Line Construction
- Underground Transmission Line Construction
- Fixed Site Construction and Improvements

A discussion of sound impacts for each these categories follows:

Overhead Transmission Line Construction

Construction of new overhead transmission lines involves the following tasks:

- ***Rights-of-Way Clearing and Work Area Preparation***

  This task includes, brush and tree removal, construction of permanent and temporary roads, and preparation of crane pads and staging areas. A wide variety of diesel powered machines are typically used for this process. Equipment may include: log trucks, sky trimmers, log skidders, bulldozers, excavators w/ mulching heads, marooka carriers, whole tree chippers, tree harvesters, feller bunchers, front loaders, dump trucks, and backhoes. Sound produced by this equipment can be significant, particularly during tree cutting and log chipping operations. Fortunately, these activities occur for relatively brief periods of time, and move along at a rapid pace (typically 1,000 to 2,000 feet per day). In existing overhead transmission line rights-of way, the scale of work will be greatly reduced. In some cases, fixed operations (e.g. chipping) may occur at one location for several weeks. When these fixed operations are to occur near occupied residences (within 500 feet), appropriate sound mitigation strategies will be developed.

- ***Structure Foundation Installation and Structure Erection***

  This task typically involves drilling large holes which are then filled with rebar and concrete to form the structure foundation. Drilling operations occur for only a few days at each new structure location, which are typically spaced between 600 to 650 feet apart. Drilling for these foundations is typically conducted with vehicle mounted augers supported by backhoes and other diesel powered equipment. In the event that drilling is impeded by rock, then a hoe ram may be used to clear the rock. This activity can produce significant sound impact, and extended use of hoe rams in proximity of residences will require a sound mitigation plan. Mitigation options may include installation of temporary sound barriers around the work area, or the use of controlled blasting to remove the rock.

  Concrete for the foundations will be delivered to the structure sites using concrete trucks or helicopters when the terrain prohibits truck access. Structures will be erected on site using diesel powered cranes. This activity typically lasts for 3-5 days.

The specific foundation type may change based upon the detail design but the construction activities and associated sound profile will be consistent with above description.

- ***Wire Stringing***

  The wire stringing operation requires equipment at each end of the section that is being strung. These pulling sites are set up at various intervals (typically 1 -3 miles) along the right-of way. Specific pulling sites are determined close to the time the stringing activity takes place. Equipment used for this operation include, tractors, bucket trucks, tensioners (bull wheel), and pullers (drum type). Helicopters may be used during wire stringing operations. These operations typically take 5 to 7 days to complete.

Underground Transmission Line Construction

The high voltage direct current (HVDC) underground transmission line will be routed in public highway rights-of way. The process for installing underground transmission lines is similar to that of laying underground piping. Pavement saw cutters, backhoes, excavators, trenchers, and vacuum trucks will be used to prepare trenches. Excavated material will be regularly removed from the construction sites. Conduits for the cables will be placed in trenches, and covered. The trenches will be backfilled with a controlled backfill material, and street restoration will follow. Extended work will be required to construct the transition stations (underground to overhead transitions), and to perform horizontal direction drilling (HDD) or jack and bore operations at certain locations. Some of the HDD and jack and bore locations may be in close proximity to residences and may have extended construction hours. A noise mitigation plan will be required in these locations.

Fixed Site Construction and Expansion

For the Northern Pass Project, there are nine fixed site construction projects proposed.

- Construction of the Franklin Converter Terminal
- Expansion of the Deerfield Substation
- Expansion of the Scobie Pond Substation
- Six transition stations along the underground cable route

Construction noise for these sites will consist of a series of intermittent sources, including controlled blasting to remove rock and diesel engine driven systems used to power construction equipment. Various combinations of equipment are used during these different phases of construction. Most construction schedules for these facilities can be divided into the following five phases:

1. Site clearing, grading and excavation,
2. Foundation work,
3. Tower and building erection,
4. Equipment installation, and
5. Site clean-up and facility commissioning.

Typical construction equipment used during these phases include, site clearing equipment (chain saws, feller bunchers, chippers, skidders, etc.), heavy earthmoving equipment (bulldozers, front-end loaders, excavators, dump trucks, graders etc.), material transport and handling equipment (cranes, concrete mix trucks, concrete pumps, delivery trucks etc.), and auxiliary equipment (air compressors, portable generators, pumps, welders, etc.). The extent of offsite sound impact depends on many factors:

- The numbers of each type of construction machines typically present at the site for each phase of construction,
- The usage factor for each type of construction machines,
- The typical A-weighted sound level at a distance of 50 feet from each type of construction machine,
- The distance between construction machines and various receptors, and
- Excess attenuation associated with natural or man-made barriers, propagation through foliage, atmospheric absorption and other anomalous effects.

Figures 1 -3 are aerial photographs of the major project sites indicating the construction areas, and the nearest residential receptors. At the Franklin and Deerfield sites, receptor properties are a minimum of 900 feet from the center of the construction areas. At the Scobie Pond site, the nearest residences are approximately 600 feet from the proposed construction area.

For typical construction projects, the first two phases produce the highest sound levels. We estimate that construction sound levels (L_{eq}) during these phases at the nearest residences will range between 55 and 60 dBA. Although distances between the Scobie Pond site and receptors are less than those at the other two sites, due to the smaller scale project, we also anticipate using less equipment at this site. Therefore, our estimates of construction sound impacts at all three sites are similar. During the last three phases of construction, sound propagating from the site will become significantly more intermittent. During these phases, energy average sound levels will likely be below 55 dBA at the nearest receptors.

Conclusion

The above overview indicates that due to the temporary nature of most construction components of this Project, construction noise is not expected to result in an unreasonable impact at sensitive receptors. It is likely that during the detailed design process and during construction, areas where activities may occur for extended periods of time will be identified. The need for noise mitigation measures at these locations will depend on proximity to sensitive receptors and the anticipated duration of sound impact. Construction noise is difficult to control because of the mobile nature of its sources and the flexibility of schedule inherent in most construction. However, as a starting point, the following noise abatement measures will apply throughout the project:

- The federal regulations limiting truck noise will be complied with,
- The construction equipment manufacturers' normal sound muffling devices will be used, and will be kept in good repair throughout the construction process,
- The majority of the potentially noisy construction work will be performed during daytime hours, and as permitted by local regulations,
- The Project will maintain communication with the communities during the construction process in order to inform of potential impact during construction, and to respond to community concerns.

It is my professional opinion that sound produced by the construction of proposed Northern Pass Project will not have an unreasonable adverse effect in the community.

Aerial Photograph Indicating Franklin Project Site and Nearest Residences

Figure 1

cta

Aerial Photograph Indicating Deerfield Project Site and Nearest Residences

Figure 2

cta

Aerial Photograph Indicating Scobie Pond Project Site and Nearest Residences

Figure 3

cta

Annex A

Sound Measurement Terminology

cta

SOUND MEASUREMENT TERMINOLOGY

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.

Spectral Characteristics – 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.

- L_{90} is the sound level in dBA exceeded 90 percent of the time during the measurement period. 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.

- L_{50} is the median sound level: the sound level in dBA exceeded 50 percent of the time during the measurement period.

- L_{10} is the sound level exceeded only 10 percent of the time. It is close to the maximum level observed during the measurement period. The L_{10} is sometimes called the *intrusive* sound level because it is caused by occasional louder noises like those from passing motor vehicles or aircraft.

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.

When a steady continuous sound is measured, the L_{10}, L_{50}, L_{90} and L_{eq} are all equal. For a constant sound level, such as from a power plant operating continuously for a 24-hour period, the L_{dn} is approximately 6 dBA higher than the directly measured sound level.

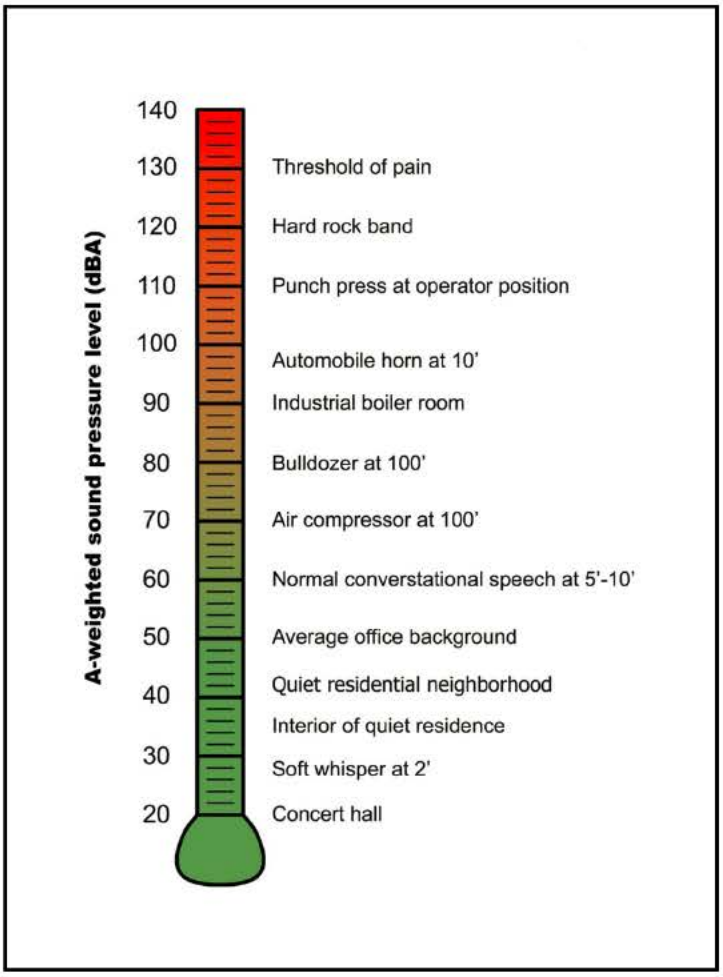

Figure A-1

Typical Sound Levels for Common Interior and Environmental Sources