
***ACOUSTIC STUDY OF
VESTAS V82 WIND TURBINES
FAIRHAVEN, MASSACHUSETTS***

May 2007

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FAIRHAVEN, MASSACHUSETTS**

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1.0 EXECUTIVE SUMMARY

A study of the sound effects from the Fairhaven wind turbines on nearby residential areas was performed. The Town proposes to locate two Vestas V82 wind turbines on Town land east of Sconticut Neck Road and south and east of the wastewater treatment plant. Acoustic modeling was done for low power and maximum power operating conditions and for two turbine tower layouts. Existing sound levels on the site and in nearby residential areas were measured over the period of Wednesday, May 2 through Sunday, May 6, 2007.

The study's conclusions are as follows:

- The wind turbine Project complies with the Massachusetts DEP Noise Policy and the Fairhaven Noise By-Law for "Wind Energy Facilities" at all nearby residential property.
- The Project would increase the ambient L_{90} sound level¹ by 3 dBA to 9 A-weighted decibels (dBA) at the nearest residences for Layout Plan A. Increases for Layout Plan B would be 3 dBA to 8 dBA at the nearest residences. Layout Plan B would generally produce lower sound levels at the nearest residences.
- The Vestas V82 wind turbines do not produce audible pure tones.
- The Project will not be audible north of Route 6 and will be audible at certain times in the closest residential areas to the west, south and east of the turbine towers. When three conditions all occur: 1) residents in these abutting areas are directly downwind, 2) ambient sound levels are low, and 3) wind speeds are high enough for wind turbine operation, the "swishing" sound characteristic of wind turbines will be slightly audible outdoors. Project sounds are not expected to be audible indoors at any residence.

¹ The L_{90} sound level represents the quietest 10 percent of any time period.

2.0 COMMON MEASURES OF COMMUNITY SOUND

All sounds originate with a source – a human voice, motor vehicles on a roadway, or an airplane overhead. The sound energy moves from the source to a person's ears as sound waves, which are minute variations in air pressure. The loudness of a sound depends on the sound pressure level, defined as the ratio of two pressures: the measured sound pressure from the source divided by a reference pressure (the quietest sound we can hear). The unit of sound pressure is the decibel (dB). The decibel scale is logarithmic to accommodate the wide range of sound intensities to which the human ear is subjected. On this scale, the quietest sound we can hear is 0 dB, while the loudest are 120 dB. Most sounds we encounter in our daily lives have sound pressure levels in the range of 30 dB to 100 dB.

A property of the decibel scale is that the sound pressure levels of two separate sounds do not directly add. For example, if a sound of 70 dB is added to another sound of 70 dB, the total is only a 3-decibel increase (or 73 dB), not a doubling to 140 dB. In terms of the human perception of sound, a halving or doubling of loudness requires changes in the sound pressure level of about 10 dB, and for broadband sounds, 3 dB is the minimum perceptible change. Typical sound levels associated with various activities and environments are presented in Table 1. The distance to a major road generally determines the acoustic environment in a suburban area such as Fairhaven, as roadway traffic establishes the background sound levels.

Noise exposure in a community is commonly expressed in terms of the A-weighted sound level (dBA); A-weighting approximates the frequency response of the human ear. Levels of many sounds change from moment to moment. Some are sharp impulses lasting 1 second or less, while others rise and fall over much longer periods of time. There are various measures of sound pressure designed for different purposes. To establish the background ambient sound level in an area, the L_{90} metric, which is the sound level exceeded 90 percent of the time, is typically used. The L_{90} can also be thought of as the level representing the quietest 10 percent of any time period. This is a broadband sound pressure measure, i.e., it includes sounds at all frequencies. The L_{eq} , or equivalent sound level, is the steady-state sound level over a period of time that has the same acoustic energy as the fluctuating sounds that actually occurred during that same period. It is commonly referred to as the average sound level. The

L_{\max} , or maximum sound level, represents the one second peak level experienced during a given time period.

Sound level measurements typically include an analysis of the sound spectrum into its various frequency components to determine tonal characteristics. The unit of frequency is Hertz (Hz), measuring the cycles per second of the sound pressure waves, and typically the frequency analysis examines eleven octave bands from 16 to 16,000 Hz. The DEP Noise Policy states that a source creates a pure tone if acoustic energy is concentrated in a narrow frequency range and one octave band has a sound level 3 dB greater than both adjacent octave bands.

TABLE 1
VARIOUS INDOOR AND OUTDOOR SOUND LEVELS

<u>Outdoor Sound Levels</u>	Sound Pressure (μ Pa)	-	Sound Level (dBA)	<u>Indoor Sound Levels</u>
Jet Over-Flight at 300 m	6,324,555	-	110	Rock Band at 5 m
Gas Lawn Mower at 1 m	2,000,000	-	105	Inside New York Subway Train
Diesel Truck at 15 m	632,456	-	100	Food Blender at 1 m
Noisy Urban Area--Daytime	200,000	-	95	Garbage Disposal at 1 m
Gas Lawn Mower at 30 m	63,246	-	90	Shouting at 1 m
Suburban Commercial Area	20,000	-	85	Vacuum Cleaner at 3 m
Quiet Urban Area -- Daytime	6,325	-	80	Normal Speech at 1 m
Quiet Urban Area--Nighttime	2,000	-	75	Quiet Conversation at 1m
Suburban Area--Nighttime	632	-	70	Dishwasher Next Room
Rural Area--Nighttime	200	-	65	Empty Theater or Library
Rustling Leaves	63	-	60	Quiet Bedroom at Night
Reference Pressure Level	20	-	55	Empty Concert Hall
		-	50	Average Whisper
		-	45	Broadcast and Recording Studios
		-	40	Human Breathing
		-	35	Threshold of Hearing
		-	30	
		-	25	
		-	20	
		-	15	
		-	10	
		-	5	
		-	0	

Notes:

μ Pa - Micropascals describe sound pressure levels (force/area).

dBA - A-weighted decibels describe sound pressure on a logarithmic scale with respect to 20 μ Pa.

3.0 NOISE REGULATIONS AND CRITERIA

3.1 Massachusetts DEP Noise Policy

The Department of Environmental Protection (DEP) regulates noise through 310 CMR 7.10, "Air Pollution Control". In these regulations "air contaminant" is defined to include sound and a condition of "air pollution" includes the presence of an air contaminant in such concentration and duration as to "cause a nuisance" or "unreasonably interfere with the comfortable enjoyment of life and property".

Regulation 7.10 prohibits "unnecessary emissions" of noise. The DEP Noise Policy (Policy Statement 90-001, February 1, 1990) interprets a violation of this noise regulation to have occurred if the sound source causes either:

- 1) An increase in the broadband sound pressure level of more than 10 dBA above the ambient, or
- 2) A "pure tone" condition.²

The ambient background level is defined by DEP as the lowest 1-hour L₉₀ level measured during equipment operating hours. For the Vestas V82 1.65 MW wind turbine, operation occurs whenever the wind speed at the reference height of 10 meters is 4 meters per second (m/s) or greater and the design wind speed is 12 m/s.³ At a hub height of 80 meters, wind speeds would generally be 39% higher than at the reference height.⁴ Thus, the cut-in wind speed (low power) condition has a hub height wind speed of 5.6 m/s or greater and the design wind speed (maximum power) condition has a hub height wind speed of 16.7 m/s. Wind speed measurements from two sources: 1) an on-site tower with an anemometer at 80 meters, and 2) the New Bedford Municipal Airport, five miles northwest of the site, were used to determine winds at the site and to allow a correlation between wind turbine operating conditions and the ambient sound level as defined by DEP.

² A "pure tone" condition occurs when any octave band sound pressure level exceeds both of the two adjacent octave band sound pressure levels by 3 dB or more.

³ Vestas Wind Systems, "General Specification, V82-1.65 MW MK II," Randers, Denmark.

⁴ International Standard IEC 61400-11, Edition 2.1, 2006, p. 20.

3.2 Town of Fairhaven Noise By Law

The Town's Zoning By Laws Section 198-29.5, "Wind Energy Facilities," established design standards to minimize the impacts of wind turbines on neighborhoods and to protect public health and safety. Subsection D (12) sets a limit of 60 dBA at the nearest property for a wind turbine project.

3.3 Audibility

According to ANSI Standards, an audible pure tone occurs when the 1/3-octave band in a sound power spectrum is higher than the numerical mean of the two adjacent bands by 5 to 15 dB, with the threshold of 5 dB corresponding to high frequencies (> 500 Hz) and the 15-dB threshold corresponding to low frequencies (< 125 Hz).⁵ Application of the ANSI definition to the sound power spectrum for the Vestas V82 wind turbines reveals there are no audible pure tones produced by the wind turbines.

Scientific research demonstrates a 3-dBA increase in sound is the threshold of perceptibility and occurs when a new sound source is exactly equal to the existing average (L_{eq}) sound level. Thus, when a new sound source produces a sound pressure level that is below the existing sound level, the new sound source would not be audible, if they have an identical frequency spectrum. Since a new sound source is likely to have a different spectrum from the background noise, which in suburban areas is distant motor vehicle traffic, the threshold for audibility is more difficult to quantify. A study done for the National Park Service⁶ established that aircraft flying over the Grand Canyon, which has very low background sound levels, first became audible when the aircraft sound was 8 dBA below the average background level (L_{eq}), and the audibility occurred at that low of a level because of the tonal character of the aircraft noise. The Vestas wind turbines do not have the tonal characteristics of an aircraft, thus the audibility threshold for the wind turbine sound is somewhere between 0 and 8 dBA below the existing L_{eq} sound level. For this study, an audibility threshold of 4 dBA below the Existing L_{eq} level was assumed.

⁵ American National Standards Institute, ANSI S12.0-1996/Part 4, "Noise Assessment and Prediction of Long-Term Community Response," 1996, p. 15.

⁶ National Park Service, "Review of Scientific Basis for Change in Noise Impact Assessment Method Used at Grand Canyon National Park," January 2000.

4.0 AMBIENT SOUND LEVEL AND WIND MEASUREMENTS

The Fairhaven wind turbines will be located on Town land east of Sconticut Neck Road, and south and east of the wastewater treatment plant. Figure 1 presents the turbine tower locations for Layout Plan A. Layout Plan B was also evaluated in this study in which the southern tower is moved east so that it is midway between the closest homes on Little Bay Road and Peirces Point Road and the northern tower is shifted 100 feet to the north. The closest residential neighborhoods are on Little Bay Road; Teal Circle; Timothy Street; Peirces Point Road; and Shawmut Road/Weeden Road. The long-term sound monitoring station was setup close to where the southern wind tower would be located on Town land under Layout Plan A, see Figure 2. Long-term sound level monitoring was performed from Wednesday, May 2 to Sunday, May 6 to document L_{90} and L_{eq} hourly sound levels, day and night, over a range of wind conditions. There was no rain during this period. Supplemental short-term sound monitoring, day and night, was done in the above-mentioned residential areas on Thursday, May 3 when winds strong enough that the wind turbines would be operating. The short-term monitoring locations are labeled #1 through #5 on Figure 2.

When the long-term sound monitoring station was setup, skies were partly cloudy, the temperature was 60° F and the winds were moderate (5-10 mph). The only audible sounds were the wastewater treatment plant and distant traffic.

All sound level measurements were taken with Larson Davis Model 824 and CEL Model 593 real-time sound level analyzers, which are equipped with precision condenser microphones having an operating range of 5 dB to 140 dB, and an overall frequency range of 3.5 to 20,000 Hz. These meters meet or exceed all requirements set forth in the American National Standards Institute (ANSI) Standards for Type 1 for quality and accuracy. Prior to and immediately following both measurement sessions, the sound analyzers were calibrated (no level adjustment was required) with an ANSI Type 1 calibrator which has an accuracy traceable to the National Institute of Standards and Technology (NIST). All instrumentation was laboratory calibrated per ANSI recommendations. For all measurement sessions, the microphone was fitted with an environmental windscreen to negate the effect of air movement and tripod-mounted at the height of 1.3 meters above grade, and measurements were made away from any

vertical reflecting surfaces in compliance with ANSI Standard S12.9.⁷ All data were downloaded to a computer following the measurement session for the purposes of storage and further analysis. The data are summarized in Appendix B.

The DEP Noise Policy defines the ambient sound level as the lowest 1-hour L_{90} level measured during hours when the new source (wind turbines in this case) would operate. Wind measurements from the on-site radio tower were obtained for May 3 through May 6, and for May 2 data were taken from the nearest National Weather Service (NWS) station at New Bedford Municipal Airport, five miles northwest of the Project site. The on-site tower data were collected at 80 meters and required no adjustment. The NWS measured wind speed at a height 10 meters (33 feet) above a ground elevation of 79 feet M.S.L. was extrapolated to the wind turbine hub height of 80 meters (262 feet) above a ground elevation of 24 feet M.S.L. using the standard meteorological wind profile specified in IEC Standard 61400-11 for wind turbines, and a roughness length for the Airport of 0.01 meters, corresponding to open land.⁸ The result of this calculation states that wind speeds at hub height are 1.14 times greater than the 10-meter wind speeds measured at the New Bedford Airport.

The turbine manufacturer's warranted sound power level for the cut-in wind speed condition is 101.6 dBA⁹ and only varies +/- 0.2 dBA in wind speed range of 5.6 to 8.3 m/s. For the design wind condition (16.7 m/s hub height winds), the turbine manufacturer's warranted sound power level is 110.0 dBA.¹⁰ Sustained winds this high for a 1-hour period did not occur at the site during the sound measurement program and ambient sound levels for the high wind condition had to be extrapolated from the data.

Table 2 summarizes the hourly measurements of L_{90} sound levels at the long-term monitoring station and the estimated hourly average wind speed at hub height. The values that are in bold text correspond to hours when the wind turbine equipment would be operating (hub height wind speeds of 5.6 m/s or greater). The data in Table 2 reveal 1-hour L_{90} sound levels as low as 29 dBA and as high as 44 dBA,

⁷ Acoustical Society of America, ANSI Standard S12.9-1992/Part 2, "Quantities and Procedures for Description and Measurement of Environmental Sound. Part 2: Measurement of Long-Term Wind-Area Sound."

⁸ International Electrotechnical Commission, International Standard IEC 61400-11, "Wind turbine generator systems-Part 11: Acoustic noise measurements techniques," 1998, pages 17-18.

⁹ Mass. Technology Collaborative, personal communication, April 2007.

¹⁰ Ibid.

with sound levels in the 30s and low 40s most of the time. These measured levels are typical for a suburban area. The wind direction was from the northwest from the start of the measurements on Wednesday May 2 through mid-day on Saturday May 5 (Measurement Period 1), at which time they became variable and then switched to the northeast through Sunday May 6 (Measurement Period 2).

During times when the hub height measured winds were below 5.0 m/s and near calm at the surface, the measured L_{90} levels averaged 33.5 dBA. During Measurement Period 1, there were 27 hours when hub height winds were estimated to be above the cut-in wind speed and the wind turbines would have been operating. Hub height winds were in the narrow range of 5.6 to 8.9 m/s and averaged 7.2 m/s for these hours; the corresponding L_{90} levels averaged 40.3 dBA. Extrapolating to the design wind condition of 16.7 m/s at hub height, the L_{90} sound levels during Period 1 would have been 49.3 dBA, or 9.0 dBA higher.

During Measurement Period 2, there were 12 hours when hub height winds were estimated to be above the cut-in wind speed and the wind turbines would have been operating. Hub height winds were in the averaged 7.2 m/s for these hours; the corresponding L_{90} levels averaged 37.6 dBA, or 3 dBA lower than during Period 1. The lower ambient sound levels in Period 2 are attributable to the fact that background sound levels are generally lowest on Sunday mornings when traffic is light and that the northeast wind during Period 2 shielded the monitoring station from wastewater treatment plant sounds. For the purpose of the DEP Noise Policy compliance demonstration, the lower measured 1-hour L_{90} level of 34.4 dBA (May 4, 2-3 a.m.) was used as the ambient sound level for the cut-in wind speed (low power operating) condition, and the ambient level for the design wind speed (maximum power operating) condition was estimated by adding 9.0 dBA for a total of 43.4 dBA. During the hours of wind turbine operation, measured average L_{eq} sound levels were approximately 4 dBA higher than L_{90} levels.

Short-term measurements made in the other residential areas established that L_{90} sound levels in the Little Bay Road, Shawmut/Weeden Road and Peirces Point Road residential areas are comparable to those at the long-term monitoring station (measured L_{90} levels vary by less than 1 dBA). In the two residential areas closer to the wastewater treatment plant, however, ambient sound levels are higher. The correction factors derived from the short-term measurements are +2.0 dBA for Teal Circle and +5.5 dBA for Timothy Road.



FIGURE 1.

Location of the Fairhaven Wind Turbines
Relative to the Closest Residences



FIGURE 2.

Fairhaven Sound Level Monitoring Locations

TABLE 2

MEASURED AMBIENT SOUND LEVELS AND
MEASURED WIND SPEEDS NEAR
LITTLE BAY ROAD, FAIRHAVEN

Date	Starting-Time for Hour (EDT)	1-Hour L ₉₀ Sound Level (dBA)	Hourly Average Wind Speed at 80m Hub Height (m/s)
5/2/07	3 pm	39.7	4.1
5/2/07	4 pm	40.0	4.1
5/2/07	5 pm	38.6	0
5/2/07	6 pm	37.9	4.6
5/2/07	7 pm	39.5	4.6
5/2/07	8 pm	43.3	0
5/2/07	9 pm	41.2	1.5
5/2/07	10 pm	38.2	0
5/2/07	11 pm	35.1	1.5
5/3/07	12 am	33.9	3.6
5/3/07	1 am	33.4	3.1
5/3/07	2 am	33.2	4.9
5/3/07	3 am	33.8	3.8
5/3/07	4 am	35.5	5.9
5/3/07	5 am	38.6	7.9
5/3/07	6 am	42.1	7.5
5/3/07	7 am	43.7	5.3
5/3/07	8 am	41.0	5.2
5/3/07	9 am	40.2	6.3
5/3/07	10 am	40.0	6.3
5/3/07	11 am	39.5	5.4
5/3/07	12 pm	38.7	5.8
5/3/07	1 pm	40.4	6.6
5/3/07	2 pm	40.5	7.4
5/3/07	3 pm	42.0	8.8
5/3/07	4 pm	42.1	9.2
5/3/07	5 pm	40.2	5.5
5/3/07	6 pm	38.1	4.9
5/3/07	7 pm	38.5	2.3
5/3/07	8 pm	44.2	0.6
5/3/07	9 pm	37.4	2.7
5/3/07	10 pm	35.3	7.0
5/3/07	11 pm	34.2	5.4
5/4/07	12 am	33.1	2.6
5/4/07	1 am	33.6	4.1
5/4/07	2 am	34.4	7.0
5/4/07	3 am	33.3	5.3
5/4/07	4 am	33.2	5.3

Date	Starting-Time for Hour (EDT)	1-Hour L ₉₀ Sound Level (dBA)	Hourly Average Wind Speed at 80m Hub Height (m/s)
5/4/07	5 am	38.1	7.5
5/4/07	6 am	41.2	7.2
5/4/07	7 am	42.5	5.6
5/4/07	8 am	42.5	7.5
5/4/07	9 am	42.6	8.0
5/4/07	10 am	41.6	6.9
5/4/07	11 am	42.0	7.0
5/4/07	12 pm	41.2	6.9
5/4/07	1 pm	42.3	8.9
5/4/07	2 pm	41.5	7.6
5/4/07	3 pm	41.3	7.2
5/4/07	4 pm	41.3	6.6
5/4/07	5 pm	41.2	7.9
5/4/07	6 pm	39.4	7.1
5/4/07	7 pm	39.6	5.8
5/4/07	8 pm	36.2	3.9
5/4/07	9 pm	35.0	2.4
5/4/07	10 pm	37.7	0.8
5/4/07	11 pm	35.2	0.5
5/5/07	12 am	33.4	1.6
5/5/07	1 am	31.9	1.6
5/5/07	2 am	33.2	1.8
5/5/07	3 am	31.0	3.0
5/5/07	4 am	31.5	2.9
5/5/07	5 am	35.1	4.5
5/5/07	6 am	38.2	4.8
5/5/07	7 am	39.8	3.9
5/5/07	8 am	35.4	2.6
5/5/07	9 am	35.4	3.6
5/5/07	10 am	36.0	4.3
5/5/07	11 am	36.6	4.2
5/5/07	12 pm	36.3	4.0
5/5/07	1 pm	38.4	5.0
5/5/07	2 pm	39.4	6.3
5/5/07	3 pm	39.0	5.4
5/5/07	4 pm	38.7	5.0
5/5/07	5 pm	33.4	4.3
5/5/07	6 pm	36.1	5.4
5/5/07	7 pm	33.5	4.6
5/5/07	8 pm	33.4	2.5
5/5/07	9 pm	28.6	4.2
5/5/07	10 pm	29.6	4.5
5/5/07	11 pm	34.6	6.9
5/6/07	12 am	36.6	8.5
5/6/07	1 am	37.9	9.7
5/6/07	2 am	37.3	9.5

Date	Starting-Time for Hour (EDT)	1-Hour L₉₀ Sound Level (dBA)	Hourly Average Wind Speed at 80m Hub Height (m/s)
5/6/07	3 am	37.3	9.0
5/6/07	4 am	36.4	8.6
5/6/07	5 am	35.3	7.5
5/6/07	6 am	36.8	8.0
5/6/07	7 am	38.0	7.7
5/6/07	8 am	39.4	8.3
5/6/07	9 am	42.0	9.3

Note: Values in bold text correspond to hours when wind turbines would be operating (hub height wind speeds at or above 5.6 m/s). ND = No Data. Wind data for May 2 are extrapolated from New Bedford Municipal Airport records.

5.0 CALCULATED FUTURE SOUND LEVELS

5.1 Methodology

Future sound level effects from the Fairhaven wind turbines on the residential community were calculated with the Cadna-A acoustic model. Cadna-A is a sophisticated 3-D model for sound propagation and attenuation based on International Standard ISO 9613¹¹. Atmospheric absorption is the process by which sound energy is absorbed by the air and was calculated using ANSI S1.26-1995.¹² Absorption of sound assumed standard day conditions and is significant at large distances. Soft ground absorption was assumed for the undeveloped, forested Town land, and hard ground conditions (reflection) were assumed for paved areas such as the wastewater treatment plant. The model assumes favorable sound propagation as occurs under downwind conditions or a ground-based temperature inversion, such as may occur on a clear night. At other times, atmospheric turbulence and wind shadow effects will reduce sound levels by 5 to 20 dBA from those presented below.

Two operating scenarios for the wind turbines were modeled. The first, the low power operating condition, corresponds to the cut-in wind speed when each turbine would emit sound power of 101.6 dBA. The second, the maximum power operating condition, represents when the turbines would emit sound power of 110.0 dBA. Two wind tower layouts were modeled, as described in Section 4.0.

5.2 Results and Conclusions

Figures 3 through 6 show color-coded decibel contours (5 feet above ground level) for the operation of the Fairhaven wind turbines and their sound effects on nearby property. These contours represent the maximum combined sound level under low power and high power wind facility operating conditions. Figures 3 and 4 present results for Layout Plan A, while Figures 5 and 6 show predicted sound levels for Layout Plan B. ***The color scheme in each figure has been setup so that the yellow line represents the DEP Noise Policy limit for residential property.*** Note that Figures 3 through 6 assume the sound

¹¹ International Standard, ISO 9613-2, Acoustics – Attenuation of Sound During Propagation Outdoors, -- Part 2 General Method of Calculation.

¹² American National Standards Institute, ANSI S1.26-1995, American National Standard Method for the Calculation of the Absorption of Sound by the Atmosphere, 1995.

receiving location is always downwind of the wind turbines, and the figures present a composite worst-case in which all locations are simultaneously downwind of the wind turbines.

The DEP Noise Policy compliance summary is presented in Tables 3 through 6, and the Fairhaven Noise By-Law compliance summary is given in Table 7.

Regulatory Compliance – Layout Plan A

The acoustic modeling results in Figures 3 and 4 and in Tables 3 and 4 reveal that the Fairhaven wind turbines will comply with the DEP Noise Policy at all residential locations. The Project would increase ambient sound levels by 3.1 to 9.2 dBA at the nearest residential lots. Table 7 confirms that the Project complies with the Town B-Law limit of 60 dBA.

Regulatory Compliance – Layout Plan B

The acoustic modeling results in Figures 5 and 6 and in Tables 5 and 6 reveal that the Fairhaven wind turbines will comply with the DEP Noise Policy at all residential locations. The Project would increase ambient sound levels by 3.4 to 7.7 dBA at the nearest residential lots. Table 7 confirms that the Project complies with the Town B-Law limit of 60 dBA. Sound level increases are 0.8 to 1.5 dBA less for Little Bay Road and Teal Circle under Layout Plan B, and are only 0.3 dBA more at the other residential locations. Layout Plan B generally produces lower sound levels in the nearest residential areas.

Audibility

For the low-power operating condition, the L_{90} levels averaged 37.6 dBA during the quietest period on Sunday and the corresponding average L_{eq} level is 4 dBA higher or 41.6 dBA. For the maximum-power operating condition, the L_{90} level would be 46.6 dBA and the corresponding average L_{eq} level is 4 dBA higher or 50.6 dBA. As discussed in Section 3.3, the audibility threshold for the wind turbines will be roughly 4 dBA below the existing L_{eq} level, or 37.6 dBA (low-power) and 46.6 dBA (maximum power). The dark green decibel contour line in Figures 3 through 6 roughly corresponds to the audibility threshold. These figures reveal that the Project will not be audible north of Route 6 and will

be slightly audible at certain times in the closest residential areas to the west, south and east of the turbine towers. When three conditions all occur: 1) residents in these abutting areas are directly downwind, 2) ambient sound levels are low, and 3) wind speeds are high enough for wind turbine operation, the “swishing” sound characteristic of wind turbines will be slightly audible outdoors. Project sounds are not expected to be audible indoors at any residence.

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TABLE 3

**DEP NOISE POLICY COMPLIANCE SUMMARY
FOR LOW POWER OPERATIONS
LAYOUT PLAN A (dBA)**

Residential Location	Ambient L₉₀ Level	Maximum Project Sound	Combined Sound Level	Net Increase
#1-5 Shawmut Rd.	34.4	35.2	37.8	3.4
#1-5 Peirces Point Rd.	34.4	38.7	40.1	5.7
#27 Timothy St.	39.9	42.8	44.6	4.7
#1-4 Teal Circle	36.4	39.1	41.0	4.6
#12 Little Bay Rd.	34.4	43.0	43.6	9.2

Note: DEP Noise Policy limits the increase in the ambient level to 10 dBA.

TABLE 4

**DEP NOISE POLICY COMPLIANCE SUMMARY
FOR MAXIMUM POWER OPERATIONS
LAYOUT PLAN A (dBA)**

Residential Location	Ambient L₉₀ Level	Maximum Project Sound	Combined Sound Level	Net Increase
#1-5 Shawmut Rd.	43.4	43.6	46.5	3.1
#1-5 Peirces Point Rd.	43.4	47.1	48.6	5.2
#27 Timothy St.	48.9	51.2	53.2	4.3
#1-4 Teal Circle	45.4	47.5	49.6	4.2
#12 Little Bay Rd.	43.4	51.4	52.0	8.6

Note: DEP Noise Policy limits the increase in the ambient level to 10 dBA.

TABLE 5

**DEP NOISE POLICY COMPLIANCE SUMMARY
FOR LOW POWER OPERATIONS
LAYOUT PLAN B (dBA)**

Residential Location	Ambient L₉₀ Level	Maximum Project Sound	Combined Sound Level	Net Increase
#1-5 Shawmut Rd.	34.4	35.7	38.1	3.7
#1-5 Peirces Point Rd.	34.4	39.1	40.4	6.0
#27 Timothy St.	39.9	42.3	44.3	4.4
#1-4 Teal Circle	36.4	37.7	40.1	3.7
#12 Little Bay Rd.	34.4	41.3	42.1	7.7

Note: DEP Noise Policy limits the increase in the ambient level to 10 dBA.

TABLE 6

**DEP NOISE POLICY COMPLIANCE SUMMARY
FOR MAXIMUM POWER OPERATIONS
LAYOUT PLAN B (dBA)**

Residential Location	Ambient L₉₀ Level	Maximum Project Sound	Combined Sound Level	Net Increase
#1-5 Shawmut Rd.	43.4	44.1	46.8	3.4
#1-5 Peirces Point Rd.	43.4	47.5	48.9	5.5
#27 Timothy St.	48.9	50.8	53.0	4.1
#1-4 Teal Circle	45.4	46.1	48.8	3.4
#12 Little Bay Rd.	43.4	49.7	50.6	7.2

Note: DEP Noise Policy limits the increase in the ambient level to 10 dBA.

TABLE 7

**FAIRHAVEN BY-LAW COMPLIANCE SUMMARY
FOR MAXIMUM POWER OPERATIONS (dBA)**

Residential Location	Layout Plan A	Layout Plan B	By-Law Limit
#1-5 Shawmut Rd.	43.6	44.1	60.0
#1-5 Peirces Point Rd.	47.1	47.5	60.0
#27 Timothy St.	51.2	50.8	60.0
#1-4 Teal Circle	47.5	46.1	60.0
#12 Little Bay Rd.	51.4	49.7	60.0



FIGURE 3.

Maximum Sound Levels (dBA)
Fairhaven Wind Turbines
Low Power Operating Condition
Layout A



FIGURE 4.

Maximum Sound Levels (dBA)
Fairhaven Wind Turbines
Maximum Power Operating Condition
Layout A



FIGURE 5.

Maximum Sound Levels (dBA)
 Fairhaven Wind Turbines
 Low Power Operating Condition
 Layout B

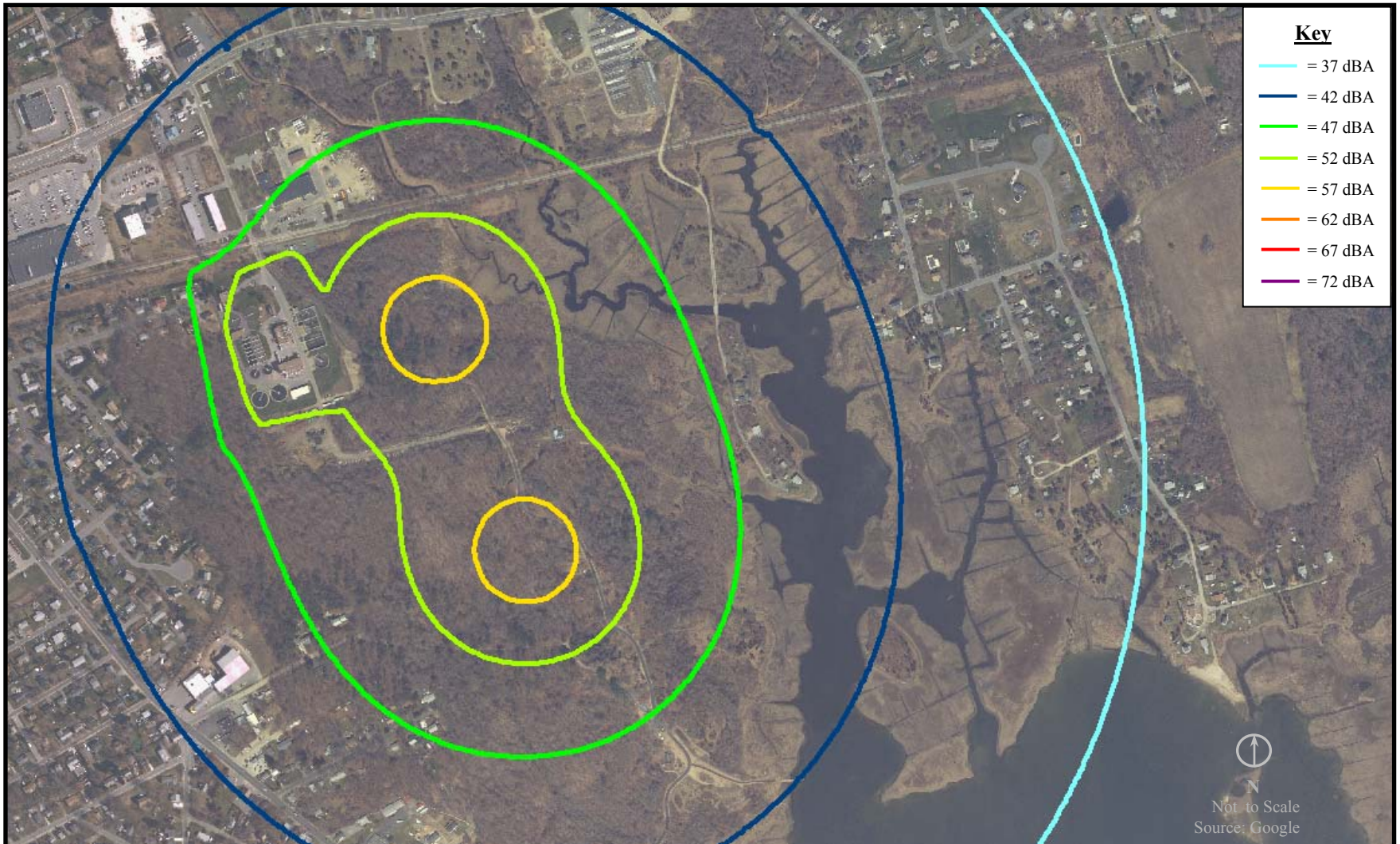


FIGURE 6.

Maximum Sound Levels (dBA)
 Fairhaven Wind Turbines
 Maximum Power Operating Condition
 Layout B

APPENDIX A

MASSACHUSETTS DEP NOISE POLICY



Massachusetts
Department
of
ENVIRONMENTAL
PROTECTION

Massachusetts Department of
Environmental Protection
One Winter Street
Boston, MA 02108-4746

Commonwealth of
Massachusetts
Mitt Romney, Governor

Executive Office of
Environmental Affairs
Ellen Roy Herzfelder, Secretary

Department of
Environmental Protection
Edward P. Kunce,
Acting Commissioner

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alternate format by calling our
ADA Coordinator at
(617) 574-6872.

fact sheet

Noise

Background

Noise is a type of air pollution that results from sounds that cause a nuisance, are or could injure public health, or unreasonably interfere with the comfortable enjoyment of life, property, or the conduct of business.

Types of sounds that may cause noise include:

- “Loud” continuous sounds from industrial or commercial activity, demolition, or highly amplified music;
- Sounds in narrow frequency ranges such as “squealing” fans or other rotary equipment; and
- Intermittent or “impact” sounds such as those from pile drivers, jackhammers, slamming truck tailgates, public address systems, etc.

Policy

A noise source will be considered to be violating the Department’s noise regulation (310 CMR 7.10) if the source:

1. Increases the broadband sound level by more than 10 dB(A) above ambient, or
2. Produce a “pure tone” condition – when any octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by 3 decibels or more.

These criteria are measured both at the property line and at the nearest inhabited residence. “Ambient” is defined as the background A-weighted sound level that is exceeded 90% of the time, measured during equipment operating hours. “Ambient” may also be established by other means with consent of the Department.

For more information:

For complaints about specific noise sources, call the Board of Health for the municipality in which the noise source is located.

To learn more about responding to noise, odor and dust complaints or to request state assistance or support, please contact the service center in the nearest DEP regional office.

- Central Region, Worcester: (508) 792-7683
- Northeast Region, Wilmington: (978) 661-7677
- Southeast Region, Lakeville: (508) 946-2714
- Western Region, Springfield: (413) 755-2214

This Policy was originally adopted by the MA Department of Public Health in the early 1970’s. It was reaffirmed by DEP’s Division of Air Quality Control on February 1, 1990, and has remained in effect.

APPENDIX B

SOUND LEVEL AND WIND MEASUREMENTS

SSA Intervals
Translated: 7-May-07 1:04 PM
Weighting: A
Peak Weighting: Flat
Detector: Fast
RTA Detector: Fast

Rec #	Date	Time	Leq	LMax	L90.00
5	2-May-07	3:00 PM	44	64	39.7
6	2-May-07	4:00 PM	45.1	66	40.0
7	2-May-07	5:00 PM	42.4	61.7	38.6
8	2-May-07	6:00 PM	44.5	65.4	37.9
9	2-May-07	7:00 PM	42.5	56.5	39.5
10	2-May-07	8:00 PM	45.2	58.1	43.3
11	2-May-07	9:00 PM	43.2	50.5	41.2
12	2-May-07	10:00 PM	40.7	54.2	38.2
13	2-May-07	11:00 PM	38.5	50.2	35.1
14	3-May-07	12:00 AM	36.5	44.8	33.9
15	3-May-07	1:00 AM	35.4	45	33.4
16	3-May-07	2:00 AM	35	46.1	33.2
17	3-May-07	3:00 AM	36	46	33.8
18	3-May-07	4:00 AM	38.5	48	35.5
19	3-May-07	5:00 AM	42.1	55.2	38.6
20	3-May-07	6:00 AM	46.8	72.4	42.1
21	3-May-07	7:00 AM	46.1	67.7	43.7
22	3-May-07	8:00 AM	43.3	61.1	41.0
23	3-May-07	9:00 AM	43.4	64.7	40.2
24	3-May-07	10:00 AM	43.3	59.8	40.0
25	3-May-07	11:00 AM	41.8	56.8	39.5
26	3-May-07	12:00 PM	43.2	58.3	38.7
27	3-May-07	1:00 PM	43.9	54.3	40.4
28	3-May-07	2:00 PM	44.4	65.2	40.5
29	3-May-07	3:00 PM	45.6	64.3	42.0
30	3-May-07	4:00 PM	45.3	61.8	42.1
31	3-May-07	5:00 PM	44.3	60.9	40.2
32	3-May-07	6:00 PM	44.4	66.7	38.1
33	3-May-07	7:00 PM	42.8	56.8	38.5
34	3-May-07	8:00 PM	46.2	57.1	44.2
35	3-May-07	9:00 PM	42.8	70.6	37.4
36	3-May-07	10:00 PM	38.9	55.1	35.3
37	3-May-07	11:00 PM	36.6	48.4	34.2
38	4-May-07	12:00 AM	36.8	54.7	33.1
39	4-May-07	1:00 AM	37.1	60	33.6
40	4-May-07	2:00 AM	37.7	50.3	34.4
41	4-May-07	3:00 AM	35	43.8	33.3
42	4-May-07	4:00 AM	35.6	47	33.2
43	4-May-07	5:00 AM	41	54.3	38.1
44	4-May-07	6:00 AM	45.6	70.2	41.2
45	4-May-07	7:00 AM	44.9	58	42.5
46	4-May-07	8:00 AM	44.9	60.7	42.5
47	4-May-07	9:00 AM	45.1	58.8	42.6
48	4-May-07	10:00 AM	43.9	61.2	41.6

Rec #	Date	Time	Leq	LMax	L90.00
49	4-May-07	11:00 AM	45	62.2	42.0
50	4-May-07	12:00 PM	45.8	63.7	41.2
51	4-May-07	1:00 PM	45.7	61.8	42.3
52	4-May-07	2:00 PM	47	71.3	41.5
53	4-May-07	3:00 PM	46	67.2	41.3
54	4-May-07	4:00 PM	46.6	69.1	41.3
55	4-May-07	5:00 PM	45.2	68.1	41.2
56	4-May-07	6:00 PM	43.3	61.7	39.4
57	4-May-07	7:00 PM	43.3	63.2	39.6
58	4-May-07	8:00 PM	40.1	50	36.2
59	4-May-07	9:00 PM	37.6	50.6	35.0
60	4-May-07	10:00 PM	39.9	53.2	37.7
61	4-May-07	11:00 PM	38.4	53.8	35.2
62	5-May-07	12:00 AM	36.7	52.4	33.4
63	5-May-07	1:00 AM	35	50.6	31.9
64	5-May-07	2:00 AM	35.4	44	33.2
65	5-May-07	3:00 AM	33.1	45.8	31.0
66	5-May-07	4:00 AM	33.9	45.7	31.5
67	5-May-07	5:00 AM	41.3	65.7	35.1
68	5-May-07	6:00 AM	44.4	64.3	38.2
69	5-May-07	7:00 AM	42.1	55.4	39.8
70	5-May-07	8:00 AM	43.9	63.5	35.4
71	5-May-07	9:00 AM	43.6	68.5	35.4
72	5-May-07	10:00 AM	42.9	66	36.0
73	5-May-07	11:00 AM	48.1	75.3	36.6
74	5-May-07	12:00 PM	46.4	68.1	36.3
75	5-May-07	1:00 PM	43.3	66.1	38.4
76	5-May-07	2:00 PM	43.8	61.8	39.4
77	5-May-07	3:00 PM	43.1	61.6	39.0
78	5-May-07	4:00 PM	46	67.2	38.7
79	5-May-07	5:00 PM	42.4	65.4	33.4
80	5-May-07	6:00 PM	41.2	65.2	36.1
81	5-May-07	7:00 PM	38.5	56.7	33.5
82	5-May-07	8:00 PM	38.5	50.5	33.4
83	5-May-07	9:00 PM	33.8	52.3	28.6
84	5-May-07	10:00 PM	34.4	49.3	29.6
85	5-May-07	11:00 PM	38.3	50	34.6
86	6-May-07	12:00 AM	40.6	54.6	36.6
87	6-May-07	1:00 AM	41.7	51.3	37.9
88	6-May-07	2:00 AM	42.2	59.8	37.3
89	6-May-07	3:00 AM	41.5	50.3	37.3
90	6-May-07	4:00 AM	40.6	54.9	36.4
91	6-May-07	5:00 AM	43.7	63.9	35.3
92	6-May-07	6:00 AM	48.8	75.8	36.8
93	6-May-07	7:00 AM	42.6	62.9	38.0
94	6-May-07	8:00 AM	43.8	62	39.4
95	6-May-07	9:00 AM	47	70.9	42.0

Wind Turbine Baseline – Fairhaven, Massachusetts
Baseline Sound Survey Results
Day Measurement Location 1: Shawmut Street off Weeden

W:\WORKDA~1\2855\NOISED~1\CEL\10050001.DTA

- Run summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run mode	Third-octave band Environmental
Run start	05/03/2007 12:48:53
Run end	05/03/2007 13:18:53
Run duration	000 00:30:00.90
Last calibration	05/03/2007 12:48:31
Measurement range	35 - 110 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	No
Low battery occurred	No
Pause was used	No
Number of records	1
Run start	05/03/2007 12:48:53
Run duration	000 00:30:00.90
Overload occurred	No
Overload %time	0.00
Low battery occurred	No
Pause was used	No

- Cumulative period results -

Number of records 1
 Run start 05/03/2007 12:48:53
 Run duration 000 00:30:00.90
 Overload occurred No
 Overload %time 0.00
 Low battery occurred No
 Pause was used No

Band (Hz)	Fw	Leq (dB)	SPLMAX F (dB)	LN1.0% F (dB)	LN10.0% F (dB)	LN50.0% F (dB)	LN90.0% F (dB)
Broadband	L	80.5	99.1	91.0	84.0	76.0	68.0
Broadband	A	42.4	62.4	48.0	44.0	41.0	40.0
12	L	68.2	88.2	79.0	72.0	63.0	53.0
16	L	66.3	85.3	77.0	70.0	60.0	50.0
20	L	64.2	85.8	75.0	67.0	57.0	48.0
25	L	62.1	87.6	73.0	65.0	55.0	47.0
32	L	58.8	81.4	70.0	62.0	52.0	46.0
40	L	55.9	77.6	67.0	58.0	50.0	45.0
50	L	53.5	75.2	64.0	56.0	50.0	46.0
63	L	51.9	81.1	61.0	54.0	49.0	45.0
80	L	51.4	73.9	62.0	53.0	48.0	45.0
100	L	48.4	68.1	56.0	51.0	47.0	44.0
125	L	46.1	69.5	53.0	48.0	45.0	42.0
160	L	43.0	66.3	49.0	45.0	42.0	39.0
200	L	39.9	64.2	46.0	42.0	39.0	36.0
250	L	37.0	57.3	44.0	39.0	36.0	---
315	L	35.0	55.8	43.0	37.0	---	---
400	L	---	53.6	41.0	---	---	---
500	L	---	54.5	38.0	---	---	---
630	L	---	52.2	39.0	---	---	---
800	L	---	53.2	38.0	35.0	---	---
1k	L	---	49.1	36.0	---	---	---
1k25	L	---	49.8	---	---	---	---
1k6	L	---	51.3	---	---	---	---
2k	L	---	47.4	---	---	---	---
2k5	L	---	50.4	42.0	---	---	---
3k15	L	---	48.3	35.0	---	---	---
4k	L	---	44.5	---	---	---	---
5k	L	---	45.1	---	---	---	---
6k3	L	---	42.4	---	---	---	---
8k	L	---	45.1	---	---	---	---
10k	L	---	40.7	---	---	---	---
12k5	L	---	40.4	---	---	---	---
16k	L	---	36.5	---	---	---	---
20k	L	---	---	---	---	---	---

Wind Turbine Baseline – Fairhaven, Massachusetts
Baseline Sound Survey Results
Day Measurement Location 2: Pierces Point (@ bridge)

W:\WORKDA~1\2855\NOISED~1\CEL\10050002.DTA
- Run summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run mode	Third-octave band Environmental
Run start	05/03/2007 13:27:07
Run end	05/03/2007 13:57:07
Run duration	000 00:30:00.90
Last calibration	05/03/2007 12:48:31
Measurement range	25 - 100 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	Yes
Low battery occurred	No
Pause was used	No

- Cumulative period results -

Number of records 1
 Run start 05/03/2007 13:27:07
 Run duration 000 00:30:00.90
 Overload occurred Yes
 Overload %time 0.00
 Low battery occurred No
 Pause was used No

Band (Hz)	Fw	Leq (dB)	SPLMAX F (dB)	LN1.0% F (dB)	LN10.0% F (dB)	LN50.0% F (dB)	LN90.0% F (dB)
Broadband	L	83.8	98.1	93.0	88.0	80.0	68.0
Broadband	A	47.5	79.9	57.0	49.0	44.0	41.0
12	L	72.3	89.2	82.0	76.0	67.0	52.0
16	L	71.1	90.1	81.0	75.0	65.0	51.0
20	L	69.2	87.3	79.0	73.0	63.0	49.0
25	L	67.3	88.1	78.0	71.0	61.0	48.0
32	L	64.6	83.0	75.0	68.0	58.0	48.0
40	L	61.8	80.6	73.0	66.0	55.0	47.0
50	L	58.7	82.7	69.0	62.0	53.0	47.0
63	L	56.1	84.8	66.0	59.0	52.0	47.0
80	L	54.3	84.7	63.0	57.0	51.0	47.0
100	L	52.2	85.1	60.0	54.0	49.0	45.0
125	L	49.6	85.2	56.0	51.0	46.0	42.0
160	L	47.5	84.1	53.0	48.0	43.0	40.0
200	L	45.2	81.1	50.0	45.0	40.0	36.0
250	L	42.6	77.7	50.0	44.0	38.0	35.0
315	L	43.4	79.7	50.0	43.0	38.0	35.0
400	L	43.4	79.7	47.0	41.0	37.0	33.0
500	L	42.0	78.4	48.0	41.0	37.0	33.0
630	L	41.9	76.9	49.0	42.0	37.0	33.0
800	L	39.5	73.5	46.0	40.0	36.0	33.0
1k	L	37.9	72.3	45.0	38.0	34.0	31.0
1k25	L	37.0	71.5	46.0	37.0	32.0	28.0
1k6	L	35.7	70.9	46.0	35.0	29.0	---.-
2k	L	33.1	66.0	45.0	34.0	25.0	---.-
2k5	L	31.7	64.9	44.0	32.0	---.-	---.-
3k15	L	31.2	63.7	43.0	32.0	---.-	---.-
4k	L	31.5	66.6	44.0	30.0	---.-	---.-
5k	L	30.4	67.1	42.0	28.0	---.-	---.-
6k3	L	27.6	65.5	37.0	25.0	---.-	---.-
8k	L	29.9	67.4	33.0	---.-	---.-	---.-
10k	L	31.0	69.6	30.0	---.-	---.-	---.-
12k5	L	25.6	63.1	27.0	---.-	---.-	---.-
16k	L	24.7	62.3	25.0	---.-	---.-	---.-
20k	L	---.-	61.6	---.-	---.-	---.-	---.-

Wind Turbine Baseline – Fairhaven, Massachusetts
Baseline Sound Survey Results
Day Measurement Location 3: End of Timothy Street

W:\WORKDA~1\2855\NOISED~1\CEL\10050003.DTA
- Run summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run mode	Third-octave band Environmental
Run start	05/03/2007 14:06:35
Run end	05/03/2007 14:36:35
Run duration	000 00:30:00.90
Last calibration	05/03/2007 12:48:31
Measurement range	35 - 110 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	No
Low battery occurred	No
Pause was used	No

- Cumulative period results -

Number of records 1
 Run start 05/03/2007 14:06:35
 Run duration 000 00:30:00.90
 Overload occurred No
 Overload %time 0.00
 Low battery occurred No
 Pause was used No

Band (Hz)	Fw	Leq (dB)	SPLMAX F (dB)	LN1.0% F (dB)	LN10.0% F (dB)	LN50.0% F (dB)	LN90.0% F (dB)
Broadband	L	75.8	98.8	88.0	78.0	67.0	63.0
Broadband	A	50.6	68.2	60.0	53.0	48.0	46.0
12	L	63.4	86.4	76.0	65.0	51.0	44.0
16	L	61.6	86.3	74.0	63.0	52.0	47.0
20	L	59.3	86.7	71.0	60.0	51.0	46.0
25	L	57.9	84.0	69.0	58.0	52.0	47.0
32	L	56.1	81.2	66.0	57.0	52.0	48.0
40	L	54.3	78.3	64.0	56.0	51.0	48.0
50	L	55.2	77.1	64.0	58.0	53.0	49.0
63	L	55.1	73.0	63.0	58.0	53.0	50.0
80	L	55.8	70.0	63.0	58.0	54.0	51.0
100	L	56.5	73.9	67.0	60.0	52.0	48.0
125	L	53.1	69.1	63.0	56.0	50.0	46.0
160	L	50.2	65.0	60.0	53.0	47.0	44.0
200	L	48.0	62.2	57.0	51.0	45.0	42.0
250	L	45.1	62.5	54.0	48.0	43.0	40.0
315	L	43.0	66.7	52.0	45.0	40.0	37.0
400	L	41.8	63.2	52.0	44.0	39.0	36.0
500	L	41.1	61.3	50.0	43.0	39.0	37.0
630	L	40.3	61.3	48.0	42.0	39.0	36.0
800	L	40.6	66.6	48.0	42.0	39.0	37.0
1k	L	40.0	57.5	47.0	42.0	39.0	37.0
1k25	L	40.2	58.9	50.0	42.0	37.0	35.0
1k6	L	40.3	63.8	51.0	42.0	35.0	---
2k	L	36.7	59.6	48.0	38.0	---	---
2k5	L	---	56.8	46.0	36.0	---	---
3k15	L	---	57.9	47.0	35.0	---	---
4k	L	---	54.8	44.0	---	---	---
5k	L	---	55.3	40.0	---	---	---
6k3	L	---	56.9	40.0	---	---	---
8k	L	---	51.5	35.0	---	---	---
10k	L	---	45.1	---	---	---	---
12k5	L	---	45.2	35.0	---	---	---
16k	L	---	37.8	---	---	---	---
20k	L	---	---	---	---	---	---

Wind Turbine Baseline – Fairhaven, Massachusetts
Baseline Sound Survey Results
Day Measurement Location 4: End of Little Bay Road (@ #12)

W:\WORKDA~1\2855\NOISED~1\CEL\10050004.DTA

- Run summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run mode	Third-octave band Environmental
Run start	05/03/2007 14:49:10
Run end	05/03/2007 15:19:11
Run duration	000 00:30:01.02
Last calibration	05/03/2007 12:48:31
Measurement range	25 - 100 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	No
Low battery occurred	No
Pause was used	No

- Cumulative period results -

Number of records 1
 Run start 05/03/2007 14:49:10
 Run duration 000 00:30:01.02
 Overload occurred No
 Overload %time 0.00
 Low battery occurred No
 Pause was used No

Band (Hz)	Fw	Leq (dB)	SPLMAX F (dB)	LN1.0% F (dB)	LN10.0% F (dB)	LN50.0% F (dB)	LN90.0% F (dB)
Broadband	L	63.2	84.0	74.0	65.0	59.0	57.0
Broadband	A	52.3	78.2	64.0	48.0	44.0	42.0
12	L	48.5	65.8	58.0	51.0	46.0	41.0
16	L	47.8	69.0	56.0	51.0	46.0	41.0
20	L	46.9	72.5	55.0	49.0	45.0	41.0
25	L	47.6	67.4	55.0	50.0	46.0	42.0
32	L	48.1	70.7	57.0	50.0	46.0	42.0
40	L	49.9	72.7	61.0	52.0	46.0	43.0
50	L	51.4	77.0	61.0	53.0	47.0	43.0
63	L	51.9	79.5	61.0	52.0	47.0	44.0
80	L	51.3	77.2	63.0	51.0	45.0	42.0
100	L	49.2	71.9	61.0	50.0	44.0	41.0
125	L	45.5	70.8	58.0	44.0	40.0	38.0
160	L	45.0	73.4	58.0	42.0	38.0	35.0
200	L	43.8	75.9	56.0	42.0	37.0	34.0
250	L	44.2	73.9	57.0	40.0	36.0	33.0
315	L	42.5	71.4	55.0	40.0	36.0	33.0
400	L	42.9	69.9	55.0	41.0	36.0	33.0
500	L	45.3	73.1	56.0	41.0	36.0	34.0
630	L	46.2	72.9	58.0	40.0	35.0	33.0
800	L	46.5	73.5	58.0	40.0	36.0	34.0
1k	L	44.3	70.7	56.0	39.0	36.0	34.0
1k25	L	41.8	67.6	53.0	38.0	35.0	32.0
1k6	L	39.5	64.8	51.0	37.0	33.0	30.0
2k	L	37.4	62.7	49.0	34.0	30.0	26.0
2k5	L	36.0	62.3	48.0	33.0	27.0	---
3k15	L	33.7	58.6	46.0	31.0	---	---
4k	L	32.0	57.4	45.0	30.0	---	---
5k	L	29.7	54.4	42.0	28.0	---	---
6k3	L	27.0	53.6	38.0	---	---	---
8k	L	25.9	54.7	37.0	---	---	---
10k	L	---	52.6	32.0	---	---	---
12k5	L	---	46.7	28.0	---	---	---
16k	L	---	43.7	---	---	---	---
20k	L	---	36.0	---	---	---	---

Wind Turbine Baseline – Fairhaven, Massachusetts
Baseline Sound Survey Results
Day Measurement Location 5: Teal Circle

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- Run summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run mode	Third-octave band Environmental
Run start	05/03/2007 15:23:13
Run end	05/03/2007 15:53:14
Run duration	000 00:30:01.22
Last calibration	05/03/2007 12:48:31
Measurement range	35 - 110 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	No
Low battery occurred	No
Pause was used	No

- Cumulative period results -

Number of records 1
 Run start 05/03/2007 15:23:13
 Run duration 000 00:30:01.22
 Overload occurred No
 Overload %time 0.00
 Low battery occurred No
 Pause was used No

Band (Hz)	Fw	Leq (dB)	SPLMAX F (dB)	LN1.0% F (dB)	LN10.0% F (dB)	LN50.0% F (dB)	LN90.0% F (dB)
Broadband	L	77.6	97.5	89.0	81.0	70.0	62.0
Broadband	A	50.6	73.3	61.0	53.0	47.0	44.0
12	L	66.0	87.6	78.0	69.0	55.0	45.0
16	L	64.3	87.8	76.0	67.0	53.0	45.0
20	L	62.2	83.9	75.0	65.0	51.0	44.0
25	L	60.1	89.9	72.0	62.0	50.0	45.0
32	L	56.8	84.0	69.0	59.0	49.0	44.0
40	L	55.0	78.1	66.0	57.0	51.0	46.0
50	L	56.5	81.1	66.0	60.0	52.0	47.0
63	L	57.0	79.9	66.0	61.0	52.0	47.0
80	L	52.9	72.8	62.0	55.0	50.0	47.0
100	L	51.1	74.6	61.0	53.0	49.0	45.0
125	L	53.1	78.3	63.0	51.0	46.0	43.0
160	L	47.6	67.8	60.0	48.0	43.0	40.0
200	L	44.7	63.1	56.0	46.0	41.0	38.0
250	L	43.8	66.3	55.0	46.0	38.0	35.0
315	L	43.6	72.7	55.0	44.0	37.0	---
400	L	41.8	67.3	54.0	42.0	35.0	---
500	L	43.4	74.5	55.0	44.0	35.0	---
630	L	41.7	64.8	53.0	44.0	35.0	---
800	L	41.7	64.2	53.0	43.0	37.0	---
1k	L	41.4	72.2	51.0	41.0	37.0	---
1k25	L	39.4	62.8	50.0	41.0	36.0	---
1k6	L	38.2	61.8	49.0	41.0	---	---
2k	L	36.1	59.4	47.0	38.0	---	---
2k5	L	38.2	64.6	50.0	40.0	---	---
3k15	L	---	54.6	44.0	35.0	---	---
4k	L	---	57.6	41.0	---	---	---
5k	L	---	57.9	37.0	---	---	---
6k3	L	---	61.5	41.0	---	---	---
8k	L	---	61.0	44.0	---	---	---
10k	L	---	55.0	35.0	---	---	---
12k5	L	---	43.0	---	---	---	---
16k	L	---	44.4	---	---	---	---
20k	L	---	37.4	---	---	---	---

Wind Turbine Baseline – Fairhaven, Massachusetts
Baseline Sound Survey Results
Night Measurement Location 1: Shawmut Street off Weeden

W:\WORKDA~1\2855\NOISED~1\CEL\10050006.DTA

- Run summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run mode	Third-octave band Environmental
Run start	05/04/2007 00:43:10
Run end	05/04/2007 01:13:15
Run duration	000 00:30:05.80
Last calibration	05/04/2007 00:42:14
Measurement range	15 - 90 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	No
Low battery occurred	No
Pause was used	No

- Cumulative period results -

Number of records 1
 Run start 05/04/2007 00:43:10
 Run duration 000 00:30:05.80
 Overload occurred No
 Overload %time 0.00
 Low battery occurred No
 Pause was used No

Band (Hz)	Fw	Leq (dB)	SPLMAX F (dB)	LN1.0% F (dB)	LN10.0% F (dB)	LN50.0% F (dB)	LN90.0% F (dB)
Broadband	L	50.4	61.5	55.0	52.0	50.0	48.0
Broadband	A	34.7	55.9	44.0	36.0	31.0	29.0
12	L	39.2	53.8	46.0	42.0	38.0	33.0
16	L	40.2	52.7	47.0	43.0	39.0	34.0
20	L	41.1	50.1	47.0	44.0	40.0	36.0
25	L	39.9	53.5	47.0	42.0	39.0	35.0
32	L	38.4	56.1	44.0	41.0	37.0	34.0
40	L	37.3	49.7	43.0	40.0	36.0	33.0
50	L	38.5	51.6	44.0	41.0	38.0	34.0
63	L	40.4	51.6	47.0	43.0	39.0	36.0
80	L	38.2	50.6	44.0	41.0	37.0	34.0
100	L	34.9	49.8	42.0	37.0	34.0	31.0
125	L	33.2	55.7	41.0	35.0	31.0	29.0
160	L	28.9	46.5	37.0	30.0	27.0	25.0
200	L	26.1	40.1	33.0	28.0	25.0	23.0
250	L	27.3	41.6	35.0	29.0	26.0	23.0
315	L	30.3	54.1	38.0	32.0	26.0	23.0
400	L	27.8	47.6	38.0	29.0	25.0	23.0
500	L	28.7	57.3	36.0	27.0	23.0	21.0
630	L	25.9	46.7	36.0	27.0	23.0	20.0
800	L	26.6	48.4	37.0	28.0	23.0	20.0
1k	L	24.7	46.8	35.0	27.0	21.0	16.0
1k25	L	23.2	51.1	33.0	26.0	19.0	---.-
1k6	L	22.3	45.0	34.0	25.0	16.0	---.-
2k	L	18.5	40.1	31.0	20.0	---.-	---.-
2k5	L	15.5	37.7	28.0	17.0	---.-	---.-
3k15	L	18.1	42.1	32.0	19.0	---.-	---.-
4k	L	18.5	42.0	32.0	18.0	---.-	---.-
5k	L	19.4	42.5	33.0	18.0	---.-	---.-
6k3	L	---.-	37.6	27.0	15.0	---.-	---.-
8k	L	15.2	36.6	28.0	15.0	---.-	---.-
10k	L	---.-	31.5	23.0	---.-	---.-	---.-
12k5	L	---.-	29.8	17.0	---.-	---.-	---.-
16k	L	---.-	24.8	15.0	---.-	---.-	---.-
20k	L	---.-	21.3	---.-	---.-	---.-	---.-

Wind Turbine Baseline – Fairhaven, Massachusetts
Baseline Sound Survey Results
Night Measurement Location 2: Pierces Point (@ bridge)

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- Run summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run mode	Third-octave band Environmental
Run start	05/04/2007 01:18:56
Run end	05/04/2007 01:48:57
Run duration	000 00:30:01.32
Last calibration	05/04/2007 00:42:14
Measurement range	15 - 90 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	No
Low battery occurred	No
Pause was used	No

- Cumulative period results -

Number of records 1
 Run start 05/04/2007 01:18:56
 Run duration 000 00:30:01.32
 Overload occurred No
 Overload %time 0.00
 Low battery occurred No
 Pause was used No

Band (Hz)	Fw	Leq (dB)	SPLMAX F (dB)	LN1.0% F (dB)	LN10.0% F (dB)	LN50.0% F (dB)	LN90.0% F (dB)
Broadband	L	52.1	66.6	56.0	54.0	52.0	50.0
Broadband	A	36.7	63.1	44.0	39.0	35.0	32.0
12	L	38.2	52.8	44.0	41.0	37.0	32.0
16	L	40.2	52.5	46.0	43.0	39.0	34.0
20	L	41.2	52.6	47.0	44.0	40.0	36.0
25	L	39.8	51.5	45.0	42.0	39.0	35.0
32	L	41.6	52.1	47.0	44.0	41.0	37.0
40	L	39.9	52.6	46.0	43.0	39.0	35.0
50	L	40.5	53.9	47.0	43.0	39.0	36.0
63	L	45.4	57.3	53.0	49.0	43.0	39.0
80	L	43.7	55.2	52.0	48.0	40.0	36.0
100	L	35.6	47.3	41.0	38.0	35.0	32.0
125	L	33.2	45.3	38.0	35.0	33.0	30.0
160	L	29.8	44.6	38.0	32.0	29.0	26.0
200	L	30.0	45.7	35.0	32.0	29.0	27.0
250	L	32.9	44.1	38.0	35.0	32.0	30.0
315	L	32.7	45.7	41.0	35.0	31.0	28.0
400	L	31.3	48.5	42.0	34.0	27.0	24.0
500	L	27.3	45.0	33.0	29.0	27.0	24.0
630	L	27.7	47.2	33.0	30.0	27.0	24.0
800	L	28.0	49.9	36.0	31.0	26.0	24.0
1k	L	27.2	54.4	35.0	30.0	24.0	22.0
1k25	L	25.6	55.3	34.0	28.0	21.0	19.0
1k6	L	24.9	58.4	34.0	27.0	19.0	17.0
2k	L	22.6	54.5	34.0	24.0	15.0	---.-
2k5	L	20.5	49.0	32.0	20.0	---.-	---.-
3k15	L	20.3	50.3	32.0	20.0	---.-	---.-
4k	L	19.0	48.9	31.0	18.0	---.-	---.-
5k	L	16.0	41.7	29.0	16.0	---.-	---.-
6k3	L	---.-	39.8	26.0	---.-	---.-	---.-
8k	L	14.8	38.0	28.0	---.-	---.-	---.-
10k	L	---.-	35.7	20.0	---.-	---.-	---.-
12k5	L	---.-	31.0	17.0	---.-	---.-	---.-
16k	L	---.-	23.6	---.-	---.-	---.-	---.-
20k	L	---.-	18.8	---.-	---.-	---.-	---.-

Wind Turbine Baseline – Fairhaven, Massachusetts
Baseline Sound Survey Results
Night Measurement Location 3: End of Timothy Street

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- Run summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run mode	Third-octave band Environmental
Run start	05/04/2007 01:56:08
Run end	05/04/2007 02:26:44
Run duration	000 00:30:36.36
Last calibration	05/04/2007 00:42:14
Measurement range	25 - 100 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	No
Low battery occurred	No
Pause was used	No

- Cumulative period results -

Number of records 1
 Run start 05/04/2007 01:56:08
 Run duration 000 00:30:36.36
 Overload occurred No
 Overload %time 0.00
 Low battery occurred No
 Pause was used No

Band (Hz)	Fw	Leq (dB)	SPLMAX F (dB)	LN1.0% F (dB)	LN10.0% F (dB)	LN50.0% F (dB)	LN90.0% F (dB)
Broadband	L	62.0	72.7	69.0	66.0	58.0	56.0
Broadband	A	49.4	61.6	57.0	53.0	47.0	45.0
12	L	39.0	59.7	45.0	42.0	38.0	33.0
16	L	43.8	55.8	49.0	47.0	43.0	39.0
20	L	46.6	56.6	52.0	49.0	46.0	41.0
25	L	45.1	59.3	50.0	48.0	44.0	41.0
32	L	50.0	63.9	59.0	53.0	48.0	44.0
40	L	48.8	67.3	60.0	51.0	45.0	41.0
50	L	47.5	69.3	56.0	49.0	45.0	42.0
63	L	54.5	71.3	66.0	58.0	49.0	45.0
80	L	58.7	71.9	68.0	63.0	51.0	48.0
100	L	46.8	59.8	55.0	50.0	44.0	42.0
125	L	44.0	53.9	50.0	46.0	43.0	40.0
160	L	43.2	53.0	49.0	46.0	42.0	39.0
200	L	39.2	52.4	45.0	42.0	38.0	35.0
250	L	39.5	51.0	46.0	43.0	38.0	35.0
315	L	42.1	61.0	51.0	45.0	39.0	35.0
400	L	47.3	64.7	59.0	49.0	41.0	36.0
500	L	42.8	54.4	51.0	47.0	40.0	37.0
630	L	41.4	55.7	49.0	45.0	39.0	36.0
800	L	41.5	56.4	50.0	45.0	39.0	35.0
1k	L	39.5	50.8	46.0	42.0	38.0	35.0
1k25	L	38.1	49.4	45.0	41.0	37.0	34.0
1k6	L	36.8	55.9	44.0	40.0	35.0	33.0
2k	L	34.7	49.5	41.0	37.0	33.0	31.0
2k5	L	32.2	44.7	38.0	35.0	31.0	29.0
3k15	L	30.2	51.0	35.0	33.0	29.0	28.0
4k	L	27.7	41.5	34.0	30.0	27.0	26.0
5k	L	25.3	38.7	32.0	27.0	---	---
6k3	L	---	39.0	29.0	---	---	---
8k	L	---	36.4	30.0	---	---	---
10k	L	---	35.9	---	---	---	---
12k5	L	---	28.6	---	---	---	---
16k	L	---	25.2	---	---	---	---
20k	L	---	---	---	---	---	---

Wind Turbine Baseline – Fairhaven, Massachusetts
Baseline Sound Survey Results
Night Measurement Location 4: End of Little Bay Road (@ #12)

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- Run summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run mode	Third-octave band Environmental
Run start	05/04/2007 02:31:01
Run end	05/04/2007 03:01:02
Run duration	000 00:30:01.36
Last calibration	05/04/2007 00:42:14
Measurement range	15 - 90 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	No
Low battery occurred	No
Pause was used	No

- Cumulative period results -

Number of records 1
 Run start 05/04/2007 02:31:01
 Run duration 000 00:30:01.36
 Overload occurred No
 Overload %time 0.00
 Low battery occurred No
 Pause was used No

Band (Hz)	Fw	Leq (dB)	SPLMAX F (dB)	LN1.0% F (dB)	LN10.0% F (dB)	LN50.0% F (dB)	LN90.0% F (dB)
Broadband	L	50.3	61.6	56.0	52.0	50.0	48.0
Broadband	A	36.4	60.5	44.0	38.0	34.0	33.0
12	L	36.8	51.2	43.0	40.0	36.0	31.0
16	L	38.5	51.5	45.0	41.0	37.0	33.0
20	L	39.8	53.6	45.0	43.0	39.0	35.0
25	L	38.3	52.3	44.0	41.0	37.0	34.0
32	L	38.7	55.4	44.0	41.0	38.0	34.0
40	L	39.5	55.5	47.0	42.0	38.0	35.0
50	L	40.9	57.1	49.0	43.0	39.0	36.0
63	L	41.1	57.1	48.0	43.0	40.0	37.0
80	L	41.1	58.3	52.0	43.0	37.0	34.0
100	L	35.2	45.5	41.0	37.0	35.0	32.0
125	L	34.8	47.4	41.0	37.0	34.0	32.0
160	L	32.4	42.0	38.0	35.0	31.0	28.0
200	L	29.3	39.6	34.0	31.0	29.0	27.0
250	L	30.1	40.2	35.0	32.0	30.0	28.0
315	L	31.1	44.1	38.0	33.0	30.0	28.0
400	L	34.6	55.6	45.0	37.0	30.0	28.0
500	L	30.8	49.0	39.0	33.0	29.0	27.0
630	L	28.2	53.3	35.0	30.0	27.0	25.0
800	L	28.7	55.5	37.0	31.0	27.0	24.0
1k	L	26.2	53.9	31.0	28.0	25.0	23.0
1k25	L	23.2	49.2	29.0	25.0	22.0	20.0
1k6	L	20.1	47.6	28.0	22.0	17.0	15.0
2k	L	17.6	46.1	27.0	17.0	---	---
2k5	L	16.3	48.8	25.0	---	---	---
3k15	L	17.3	48.1	26.0	16.0	---	---
4k	L	17.1	53.6	25.0	---	---	---
5k	L	15.4	47.0	23.0	---	---	---
6k3	L	15.7	48.5	23.0	---	---	---
8k	L	15.9	50.0	22.0	---	---	---
10k	L	---	44.6	19.0	---	---	---
12k5	L	---	44.0	17.0	---	---	---
16k	L	---	40.1	---	---	---	---
20k	L	---	29.5	---	---	---	---

Wind Turbine Baseline – Fairhaven, Massachusetts
Baseline Sound Survey Results
Night Measurement Location 5: Teal Circle

W:\WORKDA~1\2855\NOISED~1\CEL\10050010.DTA
- Run summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run mode	Third-octave band Environmental
Run start	05/04/2007 03:05:02
Run end	05/04/2007 03:35:03
Run duration	000 00:30:01.40
Last calibration	05/04/2007 00:42:14
Measurement range	15 - 90 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	No
Low battery occurred	No
Pause was used	No

- Cumulative period results -

Number of records 1
 Run start 05/04/2007 03:05:02
 Run duration 000 00:30:01.40
 Overload occurred No
 Overload %time 0.00
 Low battery occurred No
 Pause was used No

Band (Hz)	Fw	Leq (dB)	SPLMAX F (dB)	LN1.0% F (dB)	LN10.0% F (dB)	LN50.0% F (dB)	LN90.0% F (dB)
Broadband	L	52.0	65.1	55.0	53.0	52.0	50.0
Broadband	A	38.6	58.1	43.0	40.0	38.0	36.0
12	L	39.0	58.3	45.0	42.0	38.0	33.0
16	L	42.4	55.1	48.0	45.0	41.0	37.0
20	L	39.8	49.5	45.0	43.0	39.0	35.0
25	L	40.1	54.2	46.0	43.0	39.0	35.0
32	L	40.8	51.5	46.0	44.0	40.0	36.0
40	L	38.8	55.1	45.0	41.0	38.0	35.0
50	L	40.4	55.0	48.0	43.0	39.0	36.0
63	L	44.1	54.1	50.0	47.0	43.0	39.0
80	L	39.9	56.1	46.0	42.0	39.0	37.0
100	L	39.0	49.2	43.0	41.0	39.0	36.0
125	L	38.4	48.0	43.0	40.0	38.0	36.0
160	L	36.9	46.2	42.0	39.0	36.0	34.0
200	L	32.9	41.8	37.0	35.0	32.0	31.0
250	L	32.2	43.2	36.0	34.0	32.0	29.0
315	L	30.4	47.0	36.0	32.0	30.0	28.0
400	L	32.3	49.8	38.0	34.0	32.0	30.0
500	L	33.1	55.5	38.0	35.0	32.0	30.0
630	L	32.0	55.8	37.0	34.0	31.0	29.0
800	L	31.0	51.9	36.0	33.0	30.0	28.0
1k	L	30.4	49.0	36.0	33.0	30.0	27.0
1k25	L	28.3	39.4	34.0	31.0	28.0	25.0
1k6	L	25.1	37.9	31.0	27.0	24.0	21.0
2k	L	19.6	36.6	29.0	22.0	17.0	---.-
2k5	L	14.7	33.5	26.0	17.0	---.-	---.-
3k15	L	15.6	38.5	29.0	16.0	---.-	---.-
4k	L	---.-	34.7	27.0	---.-	---.-	---.-
5k	L	---.-	35.5	26.0	---.-	---.-	---.-
6k3	L	---.-	36.7	24.0	---.-	---.-	---.-
8k	L	15.1	35.1	28.0	---.-	---.-	---.-
10k	L	---.-	34.0	19.0	---.-	---.-	---.-
12k5	L	---.-	33.3	15.0	---.-	---.-	---.-
16k	L	---.-	29.8	---.-	---.-	---.-	---.-
20k	L	---.-	24.4	---.-	---.-	---.-	---.-

New Bedford, New Bedford Regional Airport KEWB

Wind Speed in mph & Wind Direction for 14 days // Apr 24, 2007 - May 7, 2007

Local Hour of Day	Apr 24	Apr 25	Apr 26	Apr 27	Apr 28	Apr 29	Apr 30	May 01	May 02	May 03	May 04	May 05	May 06	May 07
00	-	0	0	9/S	5/NE	6/S	3/E	8/NW	8/W	3/N	0	0	13/N	0
01	17/SW	0	0	10/S	3/NE	0	0	10/NW	5/SW	0	0	5/W	9/N	0
02	17/SW	0	0	7/SE	3/NE	0	0	10/NW	12/SW	3/NE	0	0	12/NE	0
03	13/SW	0	0	12/SE	5/N	3/W	0	5/NW	13/SW	0	0	0	13/NE	0
04	8/SW	0	0	10/SE	3/N	0	3/SW	12/W	3/SW	0	3/S	0	18/NE	0
05	9/SW	0	0	5/E	5/N	0	7/SW	8/W	0	0	0	0	13/NE	0
06	0	0	0	9/E	0	0	8/SW	7/NW	0	5/NW	0	0	15/NE	0
07	3/SW	0	0	12/E	0	0	7/SW	12/NW	0	-	5/NW	0	13/NE	0
08	7/W	3/NE	3/N	10/E	0	0	7/SW	18/W	0	7/NW	9/NW	0	13/NE	5/N
09	6/W	5/N	7/E	13/SE	0	3/N	8/SW	17/NW	3/N	12/NW	13/NW	8/W	16/NE	5/NE
10	9/W	5/NE	-	8/SE	5/W	-	13/SW	14/W	6/N	-	9/NW	9/W	10/NE	7/E
11	12/NW	10/SE	5/E	5/S	0	-	12/S	12/W	5/N	10/W	-	8/W	13/NE	0
12	14/NW	9/SE	8/S	8/SW	7/SE	7/N	9/SW	12/W	-	10/NW	12/NW	15/SW	16/NE	9/SE
13	12/W	13/S	10/SE	5/SE	9/S	12/NE	17/SW	9/W	6/N	9/W	12/N	10/W	12/NE	-
14	8/W	13/S	12/S	6/SW	10/SE	3/NE	17/SW	9/SW	6/NW	14/W	17/NW	10/NW	17/NE	-
15	7/SW	10/S	9/S	7/SW	8/S	7/NE	17/SW	13/W	8/NW	15/W	10/NW	9/NW	17/NE	-
16	14/E	8/S	10/S	7/S	13/SW	8/NE	9/W	13/W	8/NW	13/NW	13/W	10/NW	15/NE	-
17	14/SE	8/S	9/S	0	14/SW	9/NE	22/NW	8/W	0	13/NW	8/N	-	17/E	-
18	10/SE	3/N	9/S	5/SE	9/S	9/NE	18/NW	12/SW	9/S	10/N	8/N	9/E	13/NE	-
19	8/SE	5/N	8/SW	-	9/SW	-	20/W	7/SW	9/S	6/N	9/NW	7/SW	12/E	-
20	6/SE	0	9/S	0	8/SW	7/NE	10/NW	9/SW	0	0	3/NW	10/E	6/NE	-
21	5/SE	0	6/SW	5/E	7/S	3/N	6/NW	7/SW	3/SW	3/N	0	8/SE	3/NE	-
22	0	0	3/SE	7/N	8/S	5/NE	-	8/SW	0	0	0	7/E	0	-
23	0	0	3/S	7/NE	6/S	0	12/NW	5/W	3/NW	3/N	0	6/N	0	-

SDR 5.8.6

-----Logger Information-----

Model #
Serial # 369
Hardware Rev. 008-006-000

-----Site Information-----

Site # 369
Site Desc CCI Energy 5/7/07
Project Code New
Project Desc New Project
Site Location
Site Elevation
Latitude N 000° 00.000'
Longitude W 000° 00.000'
Time offset (hrs) -5

-----Sensor Information-----

Channel # 1
Type 1
Description NRG #40 Anemomete
Details
Serial Number SN:
Height ft
Scale Factor 1.711
Offset 0.78
Units mph

Channel # 2
Type 1
Description NRG #40 Anemomete
Details
Serial Number SN:
Height ft
Scale Factor 1.711
Offset 0.78
Units mph

Channel # 3
Type 1
Description NRG #40 Anemomete
Details
Serial Number SN:
Height ft
Scale Factor 1.711
Offset 0.78
Units mph

Channel # 4

Type 0
Description No SCM Installed
Details
Serial Number -----
Height -----
Scale Factor 0
Offset 0
Units -----

Channel # 5
Type 0
Description No SCM Installed
Details
Serial Number -----
Height -----
Scale Factor 0
Offset 0
Units -----

Channel # 6
Type 0
Description No SCM Installed
Details
Serial Number -----
Height -----
Scale Factor 0
Offset 0
Units -----

Channel # 7
Type 3
Description #200P Wind Vane
Details
Serial Number SN:
Height 0
Scale Factor 0.351
Offset 0
Units deg

Channel # 8
Type 3
Description #200P Wind Vane
Details
Serial Number SN:
Height 0
Scale Factor 0.351
Offset 0
Units deg

Channel # 9
Type 0

Description No SCM Installed

Details

Serial Number -----

Height -----

Scale Factor 0

Offset 0

Units -----

Channel # 10

Type 0

Description No SCM Installed

Details

Serial Number -----

Height -----

Scale Factor 0

Offset 0

Units -----

Channel # 11

Type 0

Description No SCM Installed

Details

Serial Number -----

Height -----

Scale Factor 0

Offset 0

Units -----

Channel # 12

Type 0

Description No SCM Installed

Details

Serial Number -----

Height -----

Scale Factor 0

Offset 0

Units -----

Date & Time Stam CH1Avg Avg m/s

5/3/2007 0:00 12.7

5/3/2007 0:10 9.2

5/3/2007 0:20 7

5/3/2007 0:30 7.2

5/3/2007 0:40 7.2

5/3/2007 0:50 5.5 3.6356

5/3/2007 1:00 5

5/3/2007 1:10 6

5/3/2007 1:20 6.2

5/3/2007 1:30 7

5/3/2007 1:40 7.8

5/3/2007 1:50 10.3 3.15135

5/3/2007 2:00	11.5	
5/3/2007 2:10	11.1	
5/3/2007 2:20	11.1	
5/3/2007 2:30	10.9	
5/3/2007 2:40	10.5	
5/3/2007 2:50	11.1	4.9319
5/3/2007 3:00	9.6	
5/3/2007 3:10	8.7	
5/3/2007 3:20	7.5	
5/3/2007 3:30	7.4	
5/3/2007 3:40	8.6	
5/3/2007 3:50	9.1	3.79205
5/3/2007 4:00	10.7	
5/3/2007 4:10	11.9	
5/3/2007 4:20	12.8	
5/3/2007 4:30	13.7	
5/3/2007 4:40	14.8	
5/3/2007 4:50	15.4	5.90785
5/3/2007 5:00	16	
5/3/2007 5:10	16.7	
5/3/2007 5:20	17.6	
5/3/2007 5:30	18.4	
5/3/2007 5:40	18.8	
5/3/2007 5:50	19.1	7.9417
5/3/2007 6:00	19.2	
5/3/2007 6:10	18	
5/3/2007 6:20	16.7	
5/3/2007 6:30	15.9	
5/3/2007 6:40	15.6	
5/3/2007 6:50	15.1	7.48725
5/3/2007 7:00	14.1	
5/3/2007 7:10	14	
5/3/2007 7:20	12.7	
5/3/2007 7:30	11.1	
5/3/2007 7:40	10.6	
5/3/2007 7:50	8.8	5.31185
5/3/2007 8:00	11	
5/3/2007 8:10	12.8	
5/3/2007 8:20	11.1	
5/3/2007 8:30	10.4	
5/3/2007 8:40	11.8	
5/3/2007 8:50	13.2	5.23735
5/3/2007 9:00	13.2	
5/3/2007 9:10	13.6	
5/3/2007 9:20	11.4	
5/3/2007 9:30	16.8	
5/3/2007 9:40	12.8	
5/3/2007 9:50	16.5	6.28035
5/3/2007 10:00	15.6	
5/3/2007 10:10	16.8	
5/3/2007 10:20	13.9	

5/3/2007 10:30	13.4	
5/3/2007 10:40	12.3	
5/3/2007 10:50	12.7	6.31015
5/3/2007 11:00	10.6	
5/3/2007 11:10	12.6	
5/3/2007 11:20	11.7	
5/3/2007 11:30	12.2	
5/3/2007 11:40	12.9	
5/3/2007 11:50	12	5.364
5/3/2007 12:00	13.2	
5/3/2007 12:10	12.4	
5/3/2007 12:20	12.4	
5/3/2007 12:30	12.6	
5/3/2007 12:40	13.8	
5/3/2007 12:50	13.3	5.78865
5/3/2007 13:00	14.8	
5/3/2007 13:10	12.9	
5/3/2007 13:20	14.2	
5/3/2007 13:30	14.3	
5/3/2007 13:40	16.8	
5/3/2007 13:50	15.4	6.5858
5/3/2007 14:00	17.4	
5/3/2007 14:10	14.2	
5/3/2007 14:20	11.6	
5/3/2007 14:30	17.5	
5/3/2007 14:40	21.1	
5/3/2007 14:50	17.9	7.42765
5/3/2007 15:00	19.9	
5/3/2007 15:10	16.1	
5/3/2007 15:20	21.7	
5/3/2007 15:30	20.7	
5/3/2007 15:40	19.1	
5/3/2007 15:50	20.6	8.79845
5/3/2007 16:00	24.1	
5/3/2007 16:10	23.1	
5/3/2007 16:20	23.4	
5/3/2007 16:30	19.6	
5/3/2007 16:40	18.3	
5/3/2007 16:50	15.6	9.24545
5/3/2007 17:00	14.3	
5/3/2007 17:10	15.5	
5/3/2007 17:20	11.7	
5/3/2007 17:30	8.5	
5/3/2007 17:40	10.3	
5/3/2007 17:50	13.2	5.47575
5/3/2007 18:00	11.4	
5/3/2007 18:10	8.6	
5/3/2007 18:20	8.1	
5/3/2007 18:30	11.9	
5/3/2007 18:40	14.6	
5/3/2007 18:50	11.5	4.92445

5/3/2007 19:00	12.3	
5/3/2007 19:10	9	
5/3/2007 19:20	3.8	
5/3/2007 19:30	1.8	
5/3/2007 19:40	2.5	
5/3/2007 19:50	0.9	2.25735
5/3/2007 20:00	0.8	
5/3/2007 20:10	1.2	
5/3/2007 20:20	0.9	
5/3/2007 20:30	1.2	
5/3/2007 20:40	2	
5/3/2007 20:50	2.1	0.6109
5/3/2007 21:00	2.8	
5/3/2007 21:10	3.5	
5/3/2007 21:20	4.4	
5/3/2007 21:30	5.7	
5/3/2007 21:40	8.5	
5/3/2007 21:50	10.8	2.65965
5/3/2007 22:00	15.8	
5/3/2007 22:10	16.2	
5/3/2007 22:20	16	
5/3/2007 22:30	15.4	
5/3/2007 22:40	15.2	
5/3/2007 22:50	15.3	6.99555
5/3/2007 23:00	14.5	
5/3/2007 23:10	13.2	
5/3/2007 23:20	12.3	
5/3/2007 23:30	11.5	
5/3/2007 23:40	11.2	
5/3/2007 23:50	10.2	5.43105
5/4/2007 0:00	9.2	
5/4/2007 0:10	6.6	
5/4/2007 0:20	4.7	
5/4/2007 0:30	3.8	
5/4/2007 0:40	4.5	
5/4/2007 0:50	6.1	2.60005
5/4/2007 1:00	7.2	
5/4/2007 1:10	7.4	
5/4/2007 1:20	8.9	
5/4/2007 1:30	9.8	
5/4/2007 1:40	10.1	
5/4/2007 1:50	11.4	4.0826
5/4/2007 2:00	12.6	
5/4/2007 2:10	14.2	
5/4/2007 2:20	15.6	
5/4/2007 2:30	16.5	
5/4/2007 2:40	17.3	
5/4/2007 2:50	17.8	7.003
5/4/2007 3:00	15.3	
5/4/2007 3:10	11.6	
5/4/2007 3:20	10.5	

5/4/2007 3:30	10.1	
5/4/2007 3:40	11.4	
5/4/2007 3:50	10.6	5.17775
5/4/2007 4:00	12.6	
5/4/2007 4:10	12.2	
5/4/2007 4:20	11.8	
5/4/2007 4:30	10.3	
5/4/2007 4:40	10.8	
5/4/2007 4:50	13.4	5.29695
5/4/2007 5:00	14.5	
5/4/2007 5:10	14.7	
5/4/2007 5:20	16.6	
5/4/2007 5:30	18.8	
5/4/2007 5:40	18.1	
5/4/2007 5:50	17.6	7.47235
5/4/2007 6:00	17.9	
5/4/2007 6:10	17.3	
5/4/2007 6:20	16.5	
5/4/2007 6:30	16	
5/4/2007 6:40	14.2	
5/4/2007 6:50	14.9	7.2116
5/4/2007 7:00	13.4	
5/4/2007 7:10	12.1	
5/4/2007 7:20	11.2	
5/4/2007 7:30	12	
5/4/2007 7:40	12.5	
5/4/2007 7:50	14.4	5.6322
5/4/2007 8:00	13.4	
5/4/2007 8:10	17.8	
5/4/2007 8:20	18.4	
5/4/2007 8:30	16.6	
5/4/2007 8:40	15.8	
5/4/2007 8:50	18	7.45
5/4/2007 9:00	15.6	
5/4/2007 9:10	19.2	
5/4/2007 9:20	17.4	
5/4/2007 9:30	20.3	
5/4/2007 9:40	17.7	
5/4/2007 9:50	16.8	7.9715
5/4/2007 10:00	15.3	
5/4/2007 10:10	15.2	
5/4/2007 10:20	14.8	
5/4/2007 10:30	15.6	
5/4/2007 10:40	16.2	
5/4/2007 10:50	15.1	6.8689
5/4/2007 11:00	17.4	
5/4/2007 11:10	14.6	
5/4/2007 11:20	15.2	
5/4/2007 11:30	14.9	
5/4/2007 11:40	15.2	
5/4/2007 11:50	16.4	6.98065

5/4/2007 12:00	17.6	
5/4/2007 12:10	14.2	
5/4/2007 12:20	17	
5/4/2007 12:30	14	
5/4/2007 12:40	16.5	
5/4/2007 12:50	13	6.87635
5/4/2007 13:00	17.8	
5/4/2007 13:10	17.7	
5/4/2007 13:20	19.8	
5/4/2007 13:30	24.2	
5/4/2007 13:40	19.9	
5/4/2007 13:50	19.5	8.85805
5/4/2007 14:00	17.3	
5/4/2007 14:10	15.1	
5/4/2007 14:20	19.5	
5/4/2007 14:30	15.8	
5/4/2007 14:40	17.5	
5/4/2007 14:50	16.9	7.60645
5/4/2007 15:00	13.8	
5/4/2007 15:10	15.2	
5/4/2007 15:20	17.9	
5/4/2007 15:30	18.8	
5/4/2007 15:40	12.4	
5/4/2007 15:50	19	7.23395
5/4/2007 16:00	13.8	
5/4/2007 16:10	13.7	
5/4/2007 16:20	16.3	
5/4/2007 16:30	16.9	
5/4/2007 16:40	15.5	
5/4/2007 16:50	12.5	6.60815
5/4/2007 17:00	18.4	
5/4/2007 17:10	15.4	
5/4/2007 17:20	17	
5/4/2007 17:30	15.1	
5/4/2007 17:40	20.6	
5/4/2007 17:50	18.9	7.8523
5/4/2007 18:00	18.2	
5/4/2007 18:10	17.5	
5/4/2007 18:20	14	
5/4/2007 18:30	16.4	
5/4/2007 18:40	14.8	
5/4/2007 18:50	14.1	7.0775
5/4/2007 19:00	13.9	
5/4/2007 19:10	12.9	
5/4/2007 19:20	11.7	
5/4/2007 19:30	13.9	
5/4/2007 19:40	13.6	
5/4/2007 19:50	12	5.811
5/4/2007 20:00	8.3	
5/4/2007 20:10	6.2	
5/4/2007 20:20	8.9	

5/4/2007 20:30	10.2	
5/4/2007 20:40	9.6	
5/4/2007 20:50	8.6	3.8591
5/4/2007 21:00	6.9	
5/4/2007 21:10	6.7	
5/4/2007 21:20	6.3	
5/4/2007 21:30	5.4	
5/4/2007 21:40	4.8	
5/4/2007 21:50	2.7	2.4436
5/4/2007 22:00	3	
5/4/2007 22:10	1.5	
5/4/2007 22:20	2.2	
5/4/2007 22:30	1.5	
5/4/2007 22:40	1.3	
5/4/2007 22:50	1.7	0.8344
5/4/2007 23:00	1.3	
5/4/2007 23:10	1	
5/4/2007 23:20	1.7	
5/4/2007 23:30	1.3	
5/4/2007 23:40	0.9	
5/4/2007 23:50	0.9	0.52895
5/5/2007 0:00	1.4	
5/5/2007 0:10	3.2	
5/5/2007 0:20	3.4	
5/5/2007 0:30	3.5	
5/5/2007 0:40	4.5	
5/5/2007 0:50	5.1	1.57195
5/5/2007 1:00	5.1	
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