

POST-CONSTRUCTION NOISE EVALUATION PROTOCOL

This protocol addresses Clause (l) of Stipulation 19 Noise & Vibration to confirm conformance with the Project's operational noise and vibration design goals.

Design Goals

Table 4-6A and Table 4-6B of the Pre-construction Noise Impact Assessment (PNIA) summarize the standards and design goals for the Project. Some of the standards and design goals will be confirmed through measurement of sound levels from the Project once it is operational. Many of the design goals will be confirmed by revised sound level modeling using the final layout and ultimate wind turbine model procured for the Project.

With that in mind, the following standards and design goals will be measured following this protocol:

- 1—Town of Sanford; 50 dBA at Non-Participant residence
- 3—1999 WHO Guidelines; 45 dBA 8-hour at Non-Participant residence
- 4—1999 WHO Guidelines; 55 dBA 8-hour at Participant residence
- 8—Design Goal; 16/31.5/63 Hz limit of 65 dB at Non-Participant residence
- 9—Pure tone limit at Non-Participant residence

The following standards and design goals will be modeled and evaluated for compliance using the final layout, selected wind turbine, and the techniques described in the PNIA:

- 2—NYS DEC lands
- 5—55 dBA at Non-Participant property line
- 6—40 dBA Leq, night, outside at Non-Participant (annual)
- 7—50 dBA Leq, night, outside at Participant (annual)
- 10—50 dBA at non-residential receptors
- 11—No perceptible vibration

Measurement Program

The monitoring program will be conducted consistent with ANSI S12.18-1994 "Procedures for Outdoor Measurement of Sound Pressure Level". Within ANSI S12.18-1994, Method #1: "General method for routine measurements" will be followed. The program will generally be unattended (see "Duration of Testing") but at least parts of two days and two nights will be augmented with attended observations during the program.

SCADA data showing power output (kW) and hub height wind speed for the wind turbines will be provided by Bluestone Wind following the conclusion of the program so that the operational status can be evaluated. Testing conditions must include the wind speed

producing the highest sound power level of the wind turbine ultimately selected. This will determine if a period of worst-case sound levels were generated by the wind turbines.

Proposed Testing Locations

Sound level compliance testing is proposed at eight (8) of the nearest residences to the project. Six of these would be non-participants and two would be participants. Possible compliance testing locations will be selected based on two primary criteria:

- Highest 1-hour modeled sound levels, and
- Participation status.

In addition, an attempt will be made to test at different locations within the project area. For example, ID #112 and ID #118 were both modeled at 45 dBA and are nearby, thus only one of the these two locations is recommended for testing. These locations are described below, and shown on Figure 9-2 of the PNIA. Testing at these locations is contingent upon receiving landowner permission. All sound levels listed below are 1-hour Leq from the loudest wind turbine under consideration.

- ◆ ID #392 (Participating). This location is nearest the collection substation and battery storage facility, and was modeled at 50 dBA.
- ◆ ID #268 (Participating). This location is south of WTG 5, is the highest wind-turbine influenced sound level, and was modeled at 49 dBA.
- ◆ ID #32 (Non-Participating). This location is southwest of WTG 26, and was modeled at 45 dBA.
- ◆ ID #207 (Non-Participating). This location is northeast of WTG 1, and was modeled at 45 dBA.
- ◆ ID #133 (Non-Participating). This location is south of WTG 27, and was modeled at 45 dBA.
- ◆ ID #112 (Non-Participating). This location is southwest of WTG 1, and was modeled at 45 dBA.
- ◆ ID #120 (Non-Participating). This location is northwest of WTG 22, and was modeled at 44 dBA.
- ◆ ID #180 (Non-Participating). This location is west of WTG 34, and was modeled at 44 dBA.

Proposed Measurement Equipment

Since this is a wind turbine project, the wind speeds during the sound study are important. The ground level wind speed has a direct influence on the sound levels, and is limited to 5 m/s (~11 mph) by ANSI 12.18 Method #1. Ground level wind speed data will be continuously measured at 2 meters above ground level at a minimum of three (3) locations. These wind speed locations will be coincident with sound level locations. Meteorological data, including at a minimum temperature, relative humidity, and precipitation, will be collected using either an on-site weather station or data available from the nearest New York State Mesonet system station.

Equipment which will be used for this program must include ANSI S1.4-1983 Type 1 Sound Level Meters. This instrument will have data logging capability and will be programmed to log statistical data every 10 minutes. One minute time history data will be collected as well. Audio recordings may also be collected at each site. The instruments will measure one-third octave bands from 12.5 Hz to 10,000 Hz, and A-weighted (dBA) data. This will allow for the evaluation of the 16, 31.5, and 63 Hz airborne vibration and rattle criteria. In addition, these one-third octave bands will allow for evaluation of a “pure tone” from 25 Hz to 10,000 Hz in accordance with ANSI S12.9 Part 3/Annex B Section B.1. The sound level meters will be placed no closer than 25 feet to a large reflecting surface such as the side of the house.

The following metrics will be measured at a minimum: Leq, L1, L10, and L90. All measurement equipment will be calibrated in the field before and after the surveys with the manufacturer’s acoustical calibrator which meets the standards of IEC 60942-2003 Class 1L and ANSI/ASA S1.40-2006 (R2016). All equipment shall have been certified accurate by an independent laboratory within the 12 months prior to testing.

Duration of Testing

Sound levels will be measured 24 hours/day for at least 14 consecutive days in accordance with the guidance suggested by NARUC (2011). The testing will be done twice within the first 12 months following commercial start-up: once during leaf-on (generally during the months of June to September), and once during leaf-off conditions (generally during the months of December to March). This will capture a wide range of wind speeds and thus potential sound level conditions.

Noise and Vibration Goals to be Evaluated

Table 1 below summarizes the sound levels to be evaluated from the post-construction measurement program.

Table 1 Summary of Measured Sound Standards or Design Goals – Bluestone Wind

#	Municipality or Organization	Sound Level Limit	Assessment Location	Noise descriptor	Period of Time	Participant Status
1	Town of Sanford Renewable Energy Systems §1402.5(A)(5)	50 dBA	Exterior wall of the nearest non-participating residence	Leq	1-hour; day or night	Non-participant
3	Design goal (1999 WHO Guidelines)	45 dBA	At residence	Leq	8-hour; nighttime	Non-participant
4	Design goal (1999 WHO Guidelines)	55 dBA	At residence	Leq	8-hour; nighttime	Participant
8	Design goal (Permit condition Case 14-F-0490 (Cassadaga Wind))	65 dB at 16, 31.5, 63 Hz	At residence	Leq	1-hour; day or night	Non-participant
9	Design goal (Permit condition Case 14-F-0490 (Cassadaga Wind))	No pure tone or 5 dBA penalty if a prominent tone occurs	At residence	Leq	1-hour; day or night	Non-participant

Reporting

Following completion of the each seasonal survey, a technical report showing the “as-built” sound levels from the wind energy facility will be prepared. Data will be analyzed for the time periods and metrics listed in Table 1. The “turbine only” sound levels will be compared to the project design goals. “Turbine only” sound levels may be calculated by subtracting shutdown sound levels (“background”) from the “total sound” of the measurement data with the wind turbines operating. Sound level data will be excluded from analysis during periods of precipitation, ground level wind speeds above 5 m/s, or during temperatures/relative humidity outside equipment specifications.