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New York State Department of Environmental Conservation

Policy for Evaluating New Sound Sources

- NYSDEC has established an approach for the evaluation of new sound sources on the basis of their audibility above [the amount the source sound pressure level exceeds the] existing sound levels.
- An increase of 6 dB above previously existing sound levels is recognized as a threshold between a clearly perceptible impact and an impact that could be considered intrusive.
- Increases of more than 6 dB merit a closer analysis of impact potential, with respect to existing sound levels and the “character of the surrounding land use and receptors.”
- A site survey of existing sound levels forms the basis for assessing future noise impacts on sensitive receptors.

Report No. 1804-011908-0

Environmental Sound Level Survey Results, Summer and Wintertime Conditions

St. Lawrence Wind Farm

Prepared for: Acciona Wind Energy USA, LLA

Prepared by: David M. Hessler, P.E., INCE
Principal Consultant
Hessler Associates, Inc.

- The purpose of the surveys *...was to determine what minimum environmental sound levels are consistently present and available at the nearest potentially sensitive receptors to mask or obscure potential noise from the project under both warm weather and cold weather seasonal conditions.*
- Six (Summer) / Five (Winter) sound measurement locations were established across the proposed project site; sound levels were measured in 10-minute intervals, as was wind speed (at a single location).
- 10-minute sound levels were averaged across all monitoring positions (except position 4 which exhibited consistently higher sound levels) to produce a single, site-wide sound level for a given 10-minute interval.
 - A regression, or “best-fit” line was used to attempt to establish a relationship between measured sound level and wind speed.

- The “best-fit” lines of averaged 90th percentile sound data (L_{90} 's) established the following background sound levels:
 - Wintertime Conditions: 37 dBA
 - Summertime Conditions: 44 dBA
- Assuming an existing background of 37 dBA, project-only sound levels up to 42 dBA would not merit scrutiny (except with respect to sensitive receptors), according to the NYSDEC Policy. According to the NYSDEC Policy, a 6 dB increase is the threshold for impacts that could be considered intrusive.
 - **37 dBA** (determined existing background) + **42 dBA** (project sound levels) = **43 dBA**

Cavanaugh Tocci Associates, Inc.

Review of Existing Sound Monitor Data

- Individual measurement positions (i.e. 1 through 6) with higher typical sound levels are raising the site-wide average, potentially resulting in greater noise impacts at quieter locations than the “site average”.
- Using the linear regression line to establish existing background results in a situation where the impact will be greater than 6 dB above the existing background sound level approximately ½ the time.

Conclusion: The analysis method employed by Hessler Associates would underestimate wind turbine sound impacts half the time on average, and considerably more often at quieter receptor locations.

- CTA proposes examining the 90th percentile of the measured L_{90} sound levels to establish the existing background sound levels across the project site, to which the NYSDEC criteria is applied.
- CTA reviewed the data provided by Hessler Associates, and examined sound levels without regard for wind speed. From this, CTA determined the 90th percentile of the measured L_{90} sound levels and used this to establish the existing background sound level throughout the project site, to which the NYSDEC criteria may be applied. The results of this analysis are presented in the table below (notes on the table are given on the following page).

90th Percentile of Measured L_{90} Sound Levels (in dBA)

Measurement Period	Position 1	Position 2	Position 3	Position 4	Position 5	Position 6	Area-wide
Winter ¹	25.0	22.4	23.8	33.3	21.9	-	25.1
Hessler Associates Winter background (from “best-fit” regression)							37
Summer ²	39.1	31.8	37.4	42.4	35.5	42.6	37.5
Hessler Associates Summer background (from “best-fit” regression)							44

¹Data collected December 14, 2007 through December 30, 2007

²Data collected August 22, 2007 through September 8, 2007

Notes:

- Position-specific and area-wide values are based on data for times only when all sound monitors were operating (monitors stopped recording data at different times).
 - Position-specific and area-wide values are based on data for all wind speeds, i.e. sound levels were not evaluated with respect to wind speed for the data presented in the above table.
 - The “Area-wide” calculation omits data from Position 4 (as do the “best-fit” regressions by Hessler Associates) due to elevated sound levels.
 - The “Area-wide” calculation for the Summer data set omits Position 6, as this monitor was deployed for a brief period, when compared to the other five sound monitors.
 - The “Area-wide” calculation is presented for comparison with values achieved using “best-fit” regressions by Hessler Associates (37 dBA and 44 dBA for Winter and Summer); we do not necessarily advocate the establishment of a single value to be applied across the project site as the existing background sound level.
 - The Summer data set necessarily includes insects (as shown in spectral data from Position 6) which elevates the A-weighted sound level.
- Assuming an existing, area-wide background of 25 dBA (given in the table on the previous page), project sound levels up to 30 dBA would not merit scrutiny (except with respect to sensitive receptors), according to the NYSDEC Policy. According to the NYSDEC Policy, a 6 dB increase is the threshold for impacts that could be considered intrusive.
 - **25 dBA** (determined existing background) + **30 dBA** (project sound levels) = **31 dBA**
 - The table below presents a summary of the background sound levels determined by Hessler’s analysis and by Cavanaugh Tocci’s analysis of Hessler’s raw sound monitor data. The table also presents sound levels below which further scrutiny is not needed (except with respect to sensitive receptors) according to the NYSDEC guidelines; these values are given in bold.

Background Evaluation Method	Background Sound Level	Project-only Sound Level	Total Sound Level (Background + Project-only levels)	Increase in overall sound level
Cavanaugh Tocci 90 th percentile of L ₉₀ Winter Data	25 dBA	30 dBA	31 dBA	6 dB
Hessler Associates Winter background, from “best-fit” regression	37 dBA	42 dBA	43 dBA	6 dB

Cavanaugh Tocci Associates, Inc.
Review of CadnaA Wind Turbine Modeling

- The existing CadnaA model of the proposed project includes ground absorption in its prediction of sound level contours. CTA recommends turning-off the ground absorption calculation, as it may underestimate wind turbine sound levels by 3 to 4 dB.

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