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Subject: North Kent Wind Power Project
NAAP Verification Audit Report Submission
REA# 5272-A9FHRL
Aercoustics Project #: 17283.03 & 17283.04

Date: December 4, 2020

Aercoustics Engineering Limited (Aercoustics) has been retained by North Kent Wind 1 LP to complete the emission audit (E-audit) and immission audit (I-audit) requirements requested by the Ministry of the Environment, Conservation and Parks (MECP) for the North Kent 1 Wind Power Project (NKWPP). NKWPP operates under REA #5272-A9FHRL, issued on June 29, 2016. Measurements were conducted per the Compliance Protocol for Wind Turbine Noise (the Protocol).

A Noise Abatement Action Plan (NAAP) was implemented at NKWPP to address the non-compliant cumulative sound impact calculated at receptor R3408 during Phase 2 of the prior I-Audit campaign. As requested by the MECP, one (1) location for I-audit measurements and two (2) turbines (T03 & T04) for E-audit measurements were required to verify the NAAP. Individual reports have been issued for each of the three requested measurements.

Documents for Submission

Individual reports and data packages have been prepared for each requested measurement. The following table summarizes the documents that accompany this submission.

Table 1: Documents for Submission

Measurement	Document	File Name	File Type
All	Summary Memo	Aerc01 - NAAP Verification Audit Summary Memo 17283.04 (2020.12.04)	PDF
R3408 I-Audit	Report	Aerc022 - NKWPP NAAP I-Audit R3408 17283.04 (2020.12.04)	PDF
	Data Package: All Data	Aerc022a - NKWPP NAAP R3408 MECP Summary (2020.12.04)	Excel
	Data Package: Narrowband Spectra	Aerc022b - NKWPP NAAP R3408 Narrowband Summary (2020.12.04)	Excel
T03 E-Audit	Report	Aerc023 – 17283.03.T3.RP1 IEC 61400-11 Test Report	PDF
	Data Package	Aerc023a – 17283.03.T3.RP1 IEC 61400-11 Report Tables in Excel	Excel
T04 E-Audit	Report	Aerc024 – 17283.03.T4.RP1 IEC 61400-11 Test Report	PDF
	Data Package	Aerc024a – 17283.03.T4.RP1 IEC 61400-11 Report Tables in Excel	Excel

I-Audit Results

The audit has been completed as per the methodology outlined in Parts D and E5.5 RAM-I (Revised Assessment Methodology) of the “*MECP Compliance Protocol for Wind Turbine Noise*” (Updated: April 21, 2017) [2].

The NAAP verification noise monitoring campaign near R3408 spanned the following dates:

Location	Monitoring Start Date	Monitoring End Date	Monitoring Duration (weeks)
R3408	September 17, 2020	November 5, 2020	6.9

Based on discussions with North Kent Wind 1 LP it was determined that to be consistent with Sections 3.8.3 and Section 5.1 of the Compliance protocol, the tonal assessment should be completed using IEC 61400-11 Ed. 3.0, with modifications to adapt the method to immission measurements and the tonal penalty structure taken from ISO 1996-2:2007 Annex C.

Based on the results presented in Section 10.2 of the report, the cumulative sound impact calculated at receptor R3408 complies with the MECP sound level limits at all wind bins having sufficient data for assessment. No tonal penalty was found to be applicable at R3408 based on the detailed tonal audibility analysis.

The following tables and figures summarize the results at R3408.

Table 2: R3408 Assessment Table – Cumulative **Downwind** Turbine-only Sound Impact

Audited Receptor	Wind speed at 10-m AGL [m/s]	1	2	3	4	5	6	7
R3408	Tonal Adjustment [dB]	0	0	0	0	0	0	0
	Cumulative Sound Impact - Receptor Location [dBA]	-	39	40	39	-	-	-
	Signal-to-noise [dB]	-	10.4	11.9	(9.1)	-	-	-
Background Sound Level [dBA]		32	29	28	(30)	-	-	-
MECP Exclusion Limit [dBA]		40	40	40	40	40	40	43
Compliance? (Y/N)		-	Yes	Yes	Yes*			-

- Significantly fewer than the minimum data counts outlined in Section 6.7 of the report were attained in this wind bin.

* Per Table 6 of the main report, Background data counts are significantly deficient from the required count of 30 in the 4 m/s bin. In accordance with Section E5.5(6b) of the Protocol, an assumed background level of 30 dBA has been used in the assessment of compliance in this wind bin.

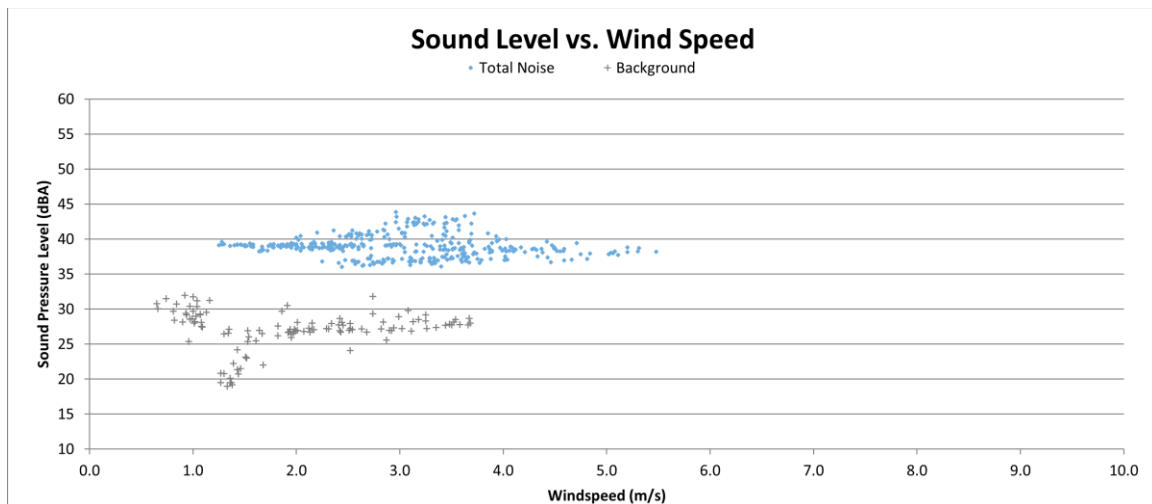


Figure 1: R3408 - Measured Downwind Sound Levels for Turbine ON and Background vs Wind Speed

Table 3: R3408 Assessment Table – Cumulative **Crosswind** Turbine-only Sound Impact

Audited Receptor	Wind speed at 10-m AGL [m/s]	1	2	3	4	5	6	7
R3408	Tonal Adjustment [dB]	0	0	0	0	0	0	0
	Cumulative Sound Impact - Receptor Location [dBA]	-	38	38	-	-	-	-
	Signal-to-noise [dB]	-	10.0	10.4	-	-	-	-
Background Sound Level [dBA]		32	29	28	-	-	-	-
MECP Exclusion Limit [dBA]		40	40	40	40	40	40	43
Compliance? (Y/N)		-	Yes	Yes	-	-	-	-

- Significantly fewer than the minimum data counts outlined in Section 6.6 of the report were attained in this wind bin.

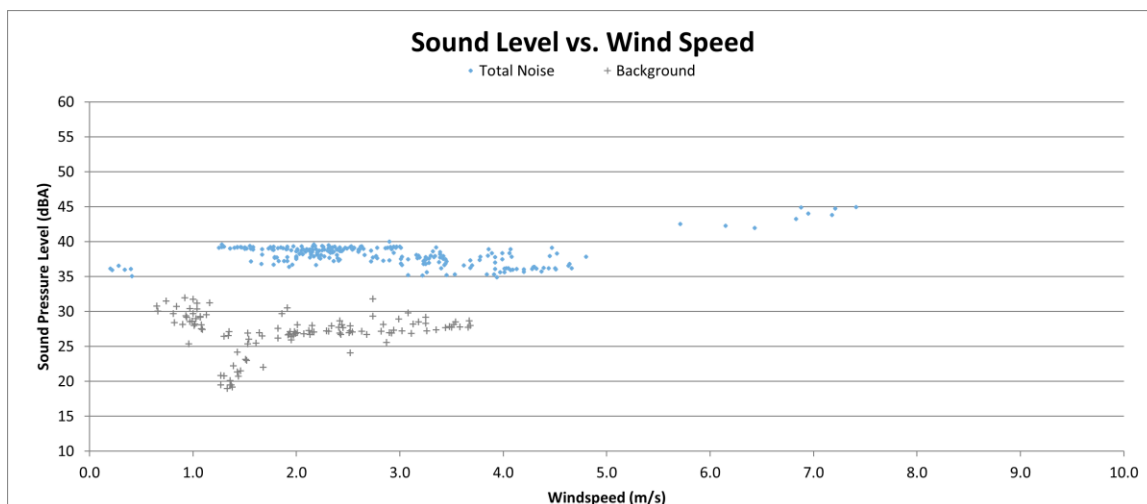


Figure 2: R3408 - Measured Crosswind Sound Levels for Turbine ON and Background vs Wind Speed

E-Audit Results

E-audit measurements were carried out in accordance with IEC 61400-11 (edition 3.0), “Wind turbine generator systems – Part 11: Acoustic noise measurement techniques”. The measured sound levels are specific to turbines T03 and T04 operating in their 2.628 MW reduced noise emission (-3 dB) mode.

Based on the results presented in Table 4 of the reports, the maximum apparent sound power levels of T03 and T04 operating in their 2.628 MW reduced noise emission (-3 dB) mode is less than the maximum sound power level in the proposed NAAP. Therefore, based on the guidance in Section E3.1.1 and E3.1.3 of the Protocol, the measured sound power levels of NKWPP turbines T03 and T04 are considered acceptable and are compliant with the maximum allowable turbine emission levels in the proposed NAAP.

The following tables and figures summarize the results at turbines T03 and T04.

Table 4: Apparent Sound Power values from T03 operating in its 2.628 MW (-3 dB) mode (from Table 11 of 17283.03.T03.RP1)

Wind Speed (m/s)	Apparent L _{WA} , (dBA)	Maximum Sound Power Level (dBA)* NAAP
7.5	101.7	103.5
8.0	102.2	103.5
8.5	102.0	103.5
9.0	102.0	103.5
9.5	101.9	103.5
10.0	101.2	103.5
10.5	101.0	103.5
11.0	101.3	103.5
11.5	100.8	103.5
12.0	101.1	103.5
12.5	101.2	103.5

* Includes +0.5 dB, per Section E3.1 of the Compliance Protocol for Wind Turbine Noise

Table 5: Apparent Sound Power values from T04 operating in its 2.628 MW (-3 dB) mode (from Table 11 of 17283.03.T4.RP1)

Wind Speed (m/s)	Apparent L _{WA} , (dBA)	Maximum Sound Power Level (dBA)* NAAP
7.5	101.1	103.5
8.0	102.0	103.5
8.5	101.8	103.5
9.0	101.6	103.5
9.5	101.6	103.5
10.0	101.5	103.5
10.5	101.2	103.5
11.0	101.4	103.5
11.5	101.6	103.5
12.0	101.5	103.5
12.5	101.5	103.5

* Includes +0.5 dB, per Section E3.1 of the Compliance Protocol for Wind Turbine Noise

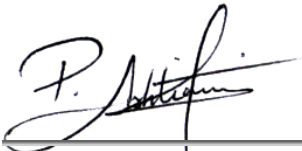
Please see the specific test reports for a detailed account of each measurement campaign and the associated data analysis and conclusions.

Sincerely,

AERCOUSTICS ENGINEERING LIMITED



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