

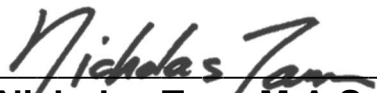
REPORT ID: **16227.00.T46.RP1**

Niagara Region Wind Farm – Turbine T46 IEC 61400-11 Edition 3.0 Measurement Report

Prepared for:

1021702 B.C. Ltd
as general partner for and on behalf of FWRN LP

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03 November 2017 – Revision 1



Revision History

Revision Number	Description	Date
1	Issued Edition 3.0 test report	November 03,2017

This report in its entirety, including appendices contains 81 pages.

Statement Qualifications and Limitations

This report was prepared by Aercoustics Engineering Limited in accordance with International Standard IEC 61400-11 (Edition 3.0, released 2012-11), “Wind turbine generator systems – Part 11: Acoustic noise measurement techniques”. This report is specific only to the Wind Turbine identified in this report.

Aercoustics Engineering Limited shall not be responsible for any events or circumstances that may have occurred since the date on which the Wind Turbine was tested and/or this report was prepared, or for any inaccuracies contained in information that was provided to Aercoustics Engineering Limited. Further, Aercoustics Engineering Limited agrees that this report represents test data analysed as per the above described standard for the specific Wind Turbine described in this report, but Aercoustics Engineering Limited makes no other representations with respect to this report or any part thereof.

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This Statement of Qualifications and Limitations is attached to and forms part of this report.

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1 Introduction

Aercoustics Engineering Limited (Aercoustics) was retained by 1021702 B.C. Ltd as a general partner for and behalf of Niagara Region Wind Farm (“FWRN”) to conduct an acoustic measurement of turbine T46 at the Niagara Region Wind Farm. The purpose of the measurement was to provide verification of the maximum noise emission of the turbine. The measurement was carried out in accordance with International Standard IEC 61400-11 (Edition 3.0, released 2012-11), “Wind turbine generator systems – Part 11: Acoustic noise measurement techniques”. This report is specific only to Turbine T46.

2 Wind Turbine Information

2.1 Wind turbine equipment specific information

Wind turbine specific equipment information for turbine T46 was provided by FWRN and is summarized in Tables 1 – 5.

Table 1 - Wind Turbine Details

Wind Turbine Details	
Manufacturer	Enercon
Model Number	E-101
Turbine ID	1011199

Table 2 - Operating Details

Operating Details	
Vertical or Horizontal axis wind turbine	Horizontal
Upwind or downwind rotor	Upwind
Hub height	124 m
Horizontal distance from rotor centre to tower axis	6 m
Diameter of rotor	101 m
Tower type (lattice or tube)	Tube
Passive stall, active stall, or pitch controlled turbine	Pitch Controlled
Constant or variable speed	Variable Speed
Power curve	Please see Figure B.01
Rotational speed at each integer standardised wind speed	Please see Figure B.02
Rated power output	2900 kW
Control software version	5.20 (main board), 5.87 (pitching system)

Table 3 - Rotor Details

Rotor Details	
Rotor control devices	Electric Pitch
Presence of vortex generators, stall strips, serrated trailing edges	Tip bows (winglet type devices)
Blade type	Composite (Epoxy Resin, Balsa)
Serial number	N/A
Number of blades	3

Table 4 - Gearbox Details

Gearbox Details	
Manufacturer	N/A
Model number	N/A
Serial number	N/A

Table 5 - Generator Details

Generator Details	
Manufacturer	Enercon
Model number	G4 Annular Generator
Serial number	N/A

2.2 Wind Turbine Location

Turbine T46 is located in the county of Haldimand near the town of Dunnville, approximately 450 m South of Feeder Canal Road, and 970 m East of Bird Road. The coordinates of Turbine T46 are 17T 622737 m Easting and 4748968 m Northing. The area surrounding T46 is flat and consists primarily of farmland.

A general layout of the area in which the turbine is located is provided in the site plan (Figure A.01).

3 Measurement Details

3.1 Measurement Equipment

3.1.1 Acoustic Measurement Equipment

A summary of acoustic equipment utilized by Aercoustics for the measurement of turbine T46 is summarized in Table 6.

Table 6 - Acoustic Measurement Equipment

Equipment	Manufacturer Name & Model	Serial Number
Acoustic Data acquisition system	LMS SCADA Mobile	22163146†
Microphone	B&K 4189	3060528‡ 2625417*
Pre-amplifier	B&K 2671	2369795‡ 2614900*
Acoustic calibrator	B&K 4231	2053016‡ 1807640*

†Instrument used on both days of testing

‡Instruments used on Aug 18, 2017

* Instruments used on August 31, 2017

Calibration of the measurement setup was carried out before and after Aercoustics set of measurements.

3.1.2 Meteorological Equipment

Wind speed for Turbine ON was derived from the power curve (as per procedures outlined in IEC 61400-11). Wind direction for turbine ON measurements was utilized from the nacelle anemometer located at hub height (124 m high) from turbine T46. Data for background measurements was obtained from a 10m high anemometer, which was placed as per guidelines outlined in IEC-61400-11.

The meteorological equipment is summarized in Table 7.

Table 7 – Meteorological Measurement Equipment

Equipment	Manufacturer Name & Model	Serial Number
Anemometer	VAISALA WXT520	G4420002
Serial to Analog Converter	NOKEVAL 7470	A159784

3.2 Measurement Setup

3.2.1 Microphone Placement

The measurement microphone was setup 179.5 m from the base of the turbine in ‘Position 1’, (i.e. downwind of the turbine, as per IEC 61400-11) at an elevation of 0m relative to the

base of T46. The microphone was placed in the centre of a circular, acoustically reflective board.

During the measurement period only data points for which the microphone was within 15 degrees of downwind from the turbine were used. The microphone position relative to downwind of the turbine was monitoring via the yaw angle output provided from the turbine system (discussed further in Section 3.5). During placement of the microphone the turbine was parked and the reference yaw angle for that measurement logged.

When measurements of T46 were taken, the surrounding land was planted with soy beans crop. The crop was short and as such the influence on the measurement was considered negligible. There were no nearby reflecting surfaces (houses, barns etc.); as such the influence from reflecting surfaces was considered to be negligible.

Photos of the measurement setup are provided in Figure A.02, Appendix A.

3.2.2 Double Windscreen Setup

A double windscreen setup was not utilized.

3.3 Measurement Schedule

Table 8 provides a summary of the test date and times. Data was logged in 10 second intervals for post-processing (as per the measurement standard).

Table 8 - Measurement Schedule Summary

Date	Test Type	Start Time	Finish time
Aug 18, 2017	Turbine ON	12:56 pm	1:16 pm
	Background	1:37 pm	2:07 pm
	Turbine ON	2:19 pm	2:59 pm
	Background	3:05 pm	3:15 pm
	Turbine ON	3:34 pm	3:46 pm
Aug 31, 2017	Turbine ON	2:33 pm	4:00 pm
	Background	4:03 pm	5:05 pm

3.4 Meteorological Conditions

Detailed meteorological data relevant to the measurement is provided in Appendix E.

As previously mentioned, wind speed for Turbine ON was derived from T46’s power curve (as per the standard), while wind direction was provided by T46’s nacelle anemometer (located at hub height). Background data was obtained from an anemometer located 10m above ground level near T46.

Temperature and pressure readings during the measurement period were provided by the 10m anemometer, located near turbine T46 for the duration of Aercoustics measurements.

3.5 Turbine operational information

Output data from the turbine (Power, yaw, RPM, pitch angle, and nacelle wind speed) were obtained as analog output signals that were simultaneously acquired with the acoustic and anemometer measurement data using Aercoustics data acquisition system.

4 Measurement Results

4.1 Deviations from IEC-61400-11 Edition 3.0

Due to Electromagnetic Interference affecting microphone signal in the test cabling at 1/3 octave frequency bands at 6.3 kHz and above, the analysis excludes these affected frequency bands. As wind turbines do not generate sound of notable levels at high frequencies, this has a negligible impact on the conclusions of the analysis.

4.2 Special Notes & Considerations

Turbines T45 and T47 are located in the immediate vicinity of T46. During the measurements, Turbines T45 and T47 are parked and not in operation. As such, they do not have any contributions to the results.

4.3 Analysis Details

The following section outlines analysis of the measurement data acquired for T46. The data presented is exclusive of transient events such as vehicle traffic, wildlife, air traffic etc. The site has been assessed to have a roughness length of 0.05m, representative of farmland with some vegetation.

4.3.1 Double Windscreen Adjustment

As previously mentioned, no double wind screen was used, as such the measurement data did not require adjustment.

4.3.2 Wind Speed Correction

The wind speed for each measurement data point for Turbine ON was derived through the power curve (as per Section 8.2.1.1 of IEC-61400-11). For data points during Turbine ON that were outside the allowed range of the power curve, the wind speed was derived from the nacelle anemometer wind speed (as specified in Section 8.2.1.2 of IEC-61400-11).

Background wind speed was derived utilizing data acquired with the 10m anemometer and normalizing the wind speed (as per Section 8.2.2 of IEC-61400-11).

4.4 Type B uncertainties

Type B uncertainties were obtained through interpretation of information provided in Annex C of IEC-61400-11, and instrument uncertainties obtained from the calibration certificate. A summary of Type B uncertainties is provided in Table 9, while detailed information (including data in 1/3 octave) is provided in Appendix C.

Table 9 - Summary of Type B uncertainties

Component	Typical (dB)	Used (dB)
Calibration	0.2	0.2
Board	0.3	0.3
Distance & direction	0.1	0.1
Air absorption	0	0
Weather conditions	0.5	0.5
Wind speed measured	0.7	0.7
Wind speed derived	0.2	0.2
Wind speed from power curve	0.2	0.2

4.5 Sound Pressure Level Measurements

Sound pressure level measurements are summarized in Table 10. Detailed 1/3 Octave band spectrum data, respective uncertainties, and analysis plots are provided in Appendix C. A copy of the measurement data used for analysis is provided in Appendix E and includes meteorological and turbine operational data.

Table 10 - Summary of Sound Pressure Level Measurements

Wind Speed (m/s)	Turbine ON		Background		Turbine ON, Background adjusted L_{eq} , (dBA)
	L_{eq} , (dBA)	# of data pts	L_{eq} , (dBA)	# of data pts	
8.5	48.2	13	39.8	24	47.5
9	50.1	12	40.5	15	49.6
9.5	50.9	17	42.1	10	50.2
10	50.5	18	42.2	11	49.8
10.5	51.0	31	41.9	19	50.4
11	51.2	35	41.4	16	50.7
11.5	51.2	16	42.5	13	50.6
12	51.2	12	41.0	15	50.8
12.5	52.0	22	42.5	16	51.4
13	51.9	23	42.4	15	51.4
13.5	51.4	20	42.5	12	50.8
14	51.8	12	42.6	14	51.3

4.6 Sound Power Level of Turbine

The calculated sound power level of the turbine T46 (as per IEC 61400-11) is summarized in Table 11 (hub height) and Table 12 (10m height). Detailed 1/3 Octave band spectrum data and respective uncertainties are provided in Appendix C.

Table 11 - $L_{WA, K}$ at each integer wind speed

Wind Speed (m/s)	Apparent L_{WA} , (dBA)	Uncertainty (dB)
8.5	99.5	0.9
9	101.6	1.0
9.5	102.2	0.9
10	101.8	1.0
10.5	102.4	0.9
11	102.7	0.8
11.5	102.5	1.0
12	102.7	0.9
12.5	103.4	0.9
13	103.4	0.9
13.5	102.7	0.8
14	103.2	0.9

Table 12 - $L_{WA 10m, K}$ at each integer wind speed

Wind Speed (m/s)	Apparent L_{WA} , (dBA)	Uncertainty (dB)
5	96.0	1.0
6	100.6	0.9
7	102.3	0.8
8	102.8	0.8
9	103.2	0.8
10	103.1	0.8

4.7 Tonality Analysis

The tonality analysis for Turbine T46 is summarized in Table 13, while plots of narrow band spectra at each wind speed are provided in Appendix D. The ΔL_{tn} and ΔL_a values reported represent the energy average of all data points with an identified tone that falls within the same frequency origin (as specified in Section 9.5.8 in IEC-61400-11).

The narrow band spectra provided in the plots represents an energy average of all data points in the given wind speed bin for both Turbine ON and Background.

Table 13 - Tonality Assessment Summary

Wind Speed (m/s)	Frequency (Hz)	Tonality, ΔL_{tn} (dB)	Tonal audibility, ΔL_a (dB)	FFT's with tones	Total # of FFT's	Presence (%)
No Reportable Tones						

5 Closure

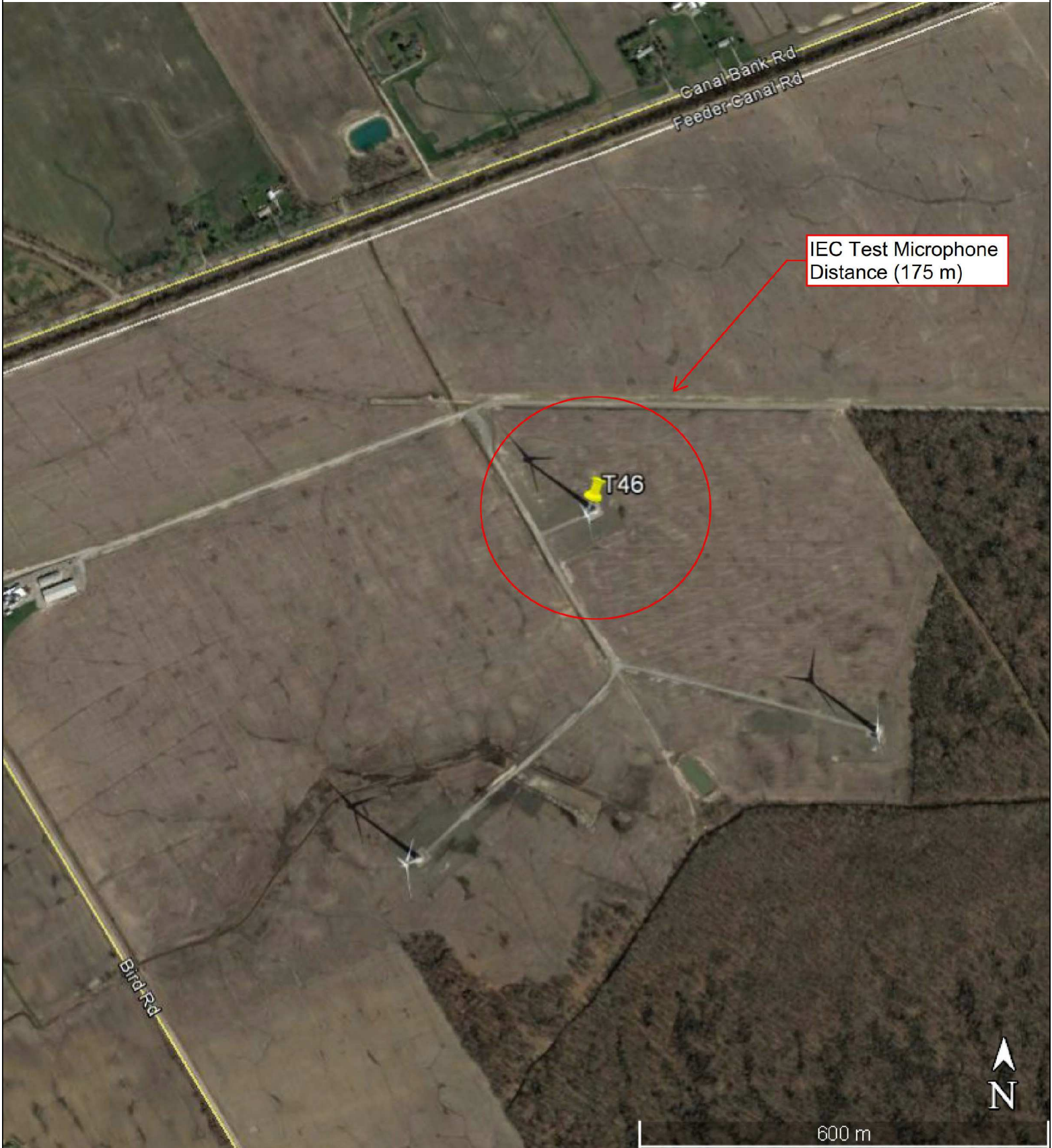
Measurements and analysis were carried on Turbine T46 of the Niagara Region Wind Farm, located in the county of Haldimand as per International IEC 61400-11 (Edition 3.0, released 2012-11), "Wind turbine generator systems – Part 11: Acoustic noise measurement techniques".


Should you have any questions or comments please do not hesitate to contact the authors of this report.

6 References


1. International Standard IEC 61400-11 (Edition 3.0, released 2012-11), "Wind turbine generator systems – Part 11: Acoustic noise measurement techniques".

Appendix A Site Details



	16227.00.T46.RP2	Project Name Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46
	Scale: As Shown Drawn by: NT Reviewed by: PA Date: Sept 8, 2017 Revision: 1	Figure Title Site Plan

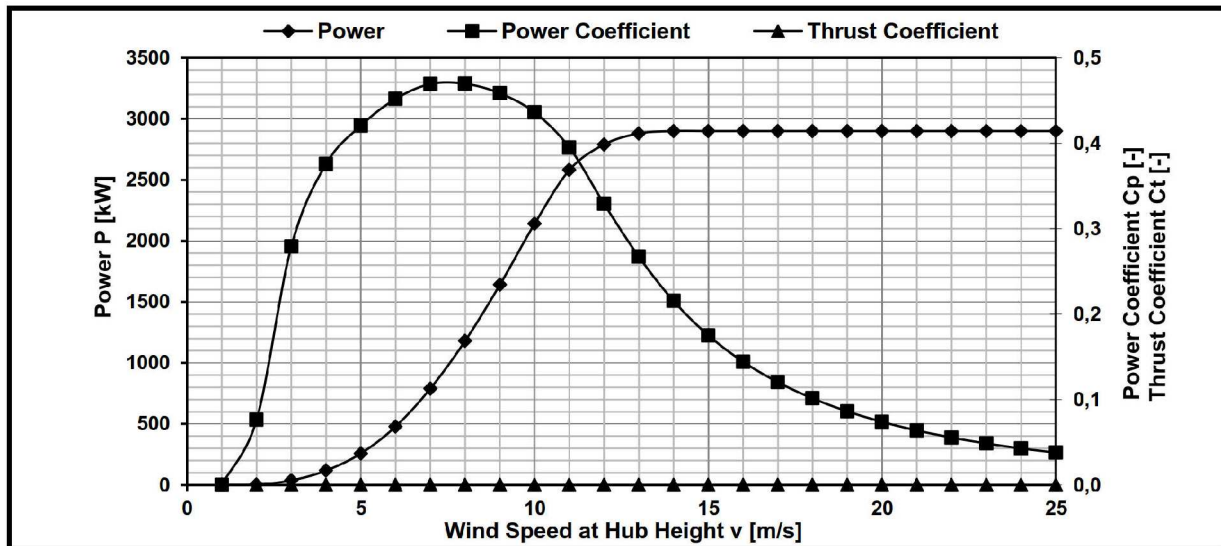


	<p>16227.00.T46.RP1</p>	<p>Project Name</p>	<p>Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46</p>
	<p>Scale: NTS Drawn by: NT Reviewed by: PA Date: Sept 8, 2017 Revision: 1</p>	<p>Figure Title</p>	
		<p>Site Photos</p>	

Appendix B Turbine Information

Rated Power Output: 3050 kW
Operation Mode: OMII 2900 kW
Designation: PC_E-101_3050_kW_OMII_2900_kW_calculated_V1.0
Standard Air Density: 1.225 kg/m³

Wind Speed v [m/s]	Power P [kW]	Power Coefficient Cp [-]	Thrust Coefficient Ct [-]
1	0	0.00	-
2	3	0.08	-
3	37	0.28	-
4	118	0.38	-
5	258	0.42	-
6	479	0.45	-
7	790	0.47	-
8	1180	0.47	-
9	1640	0.46	-
10	2140	0.44	-
11	2580	0.40	-
12	2790	0.33	-
13	2880	0.27	-
14	2900	0.22	-
15	2900	0.18	-
16	2900	0.14	-
17	2900	0.12	-
18	2900	0.10	-
19	2900	0.09	-
20	2900	0.07	-
21	2900	0.06	-
22	2900	0.06	-
23	2900	0.05	-
24	2900	0.04	-
25	2900	0.04	-



Document Information:

Author: Benjamin Ahrens
 Department: WRD Power Performance
 Date: 15.09.2015

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Document No: D0428030/0

16227.00.T46.RP1

Project Name



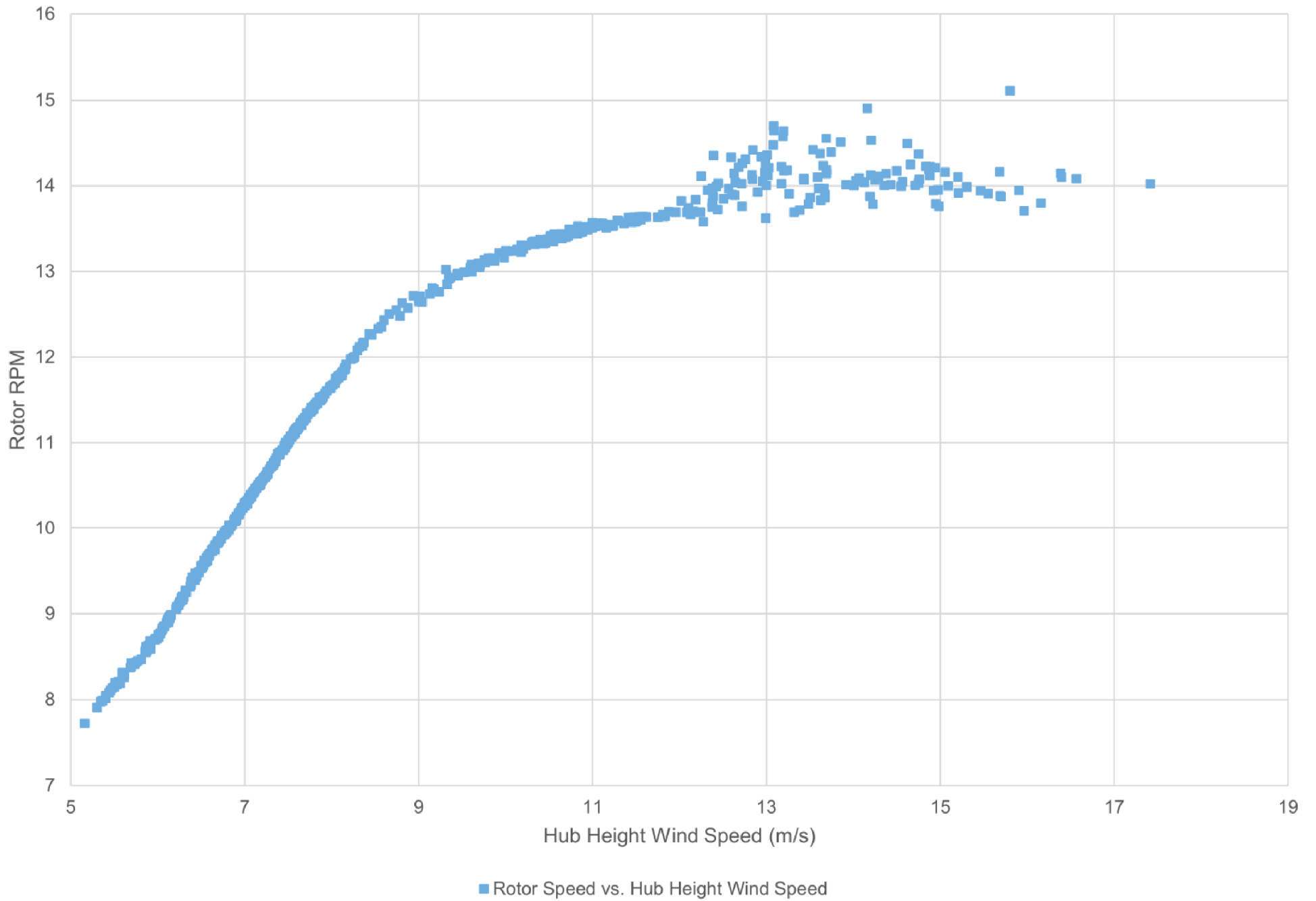
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 Date: Nov 1, 2017
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Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T046

Figure Title

Power Curve

Figure B.01



■ Rotor Speed vs. Hub Height Wind Speed



16227.00.T46.RP1

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Project Name

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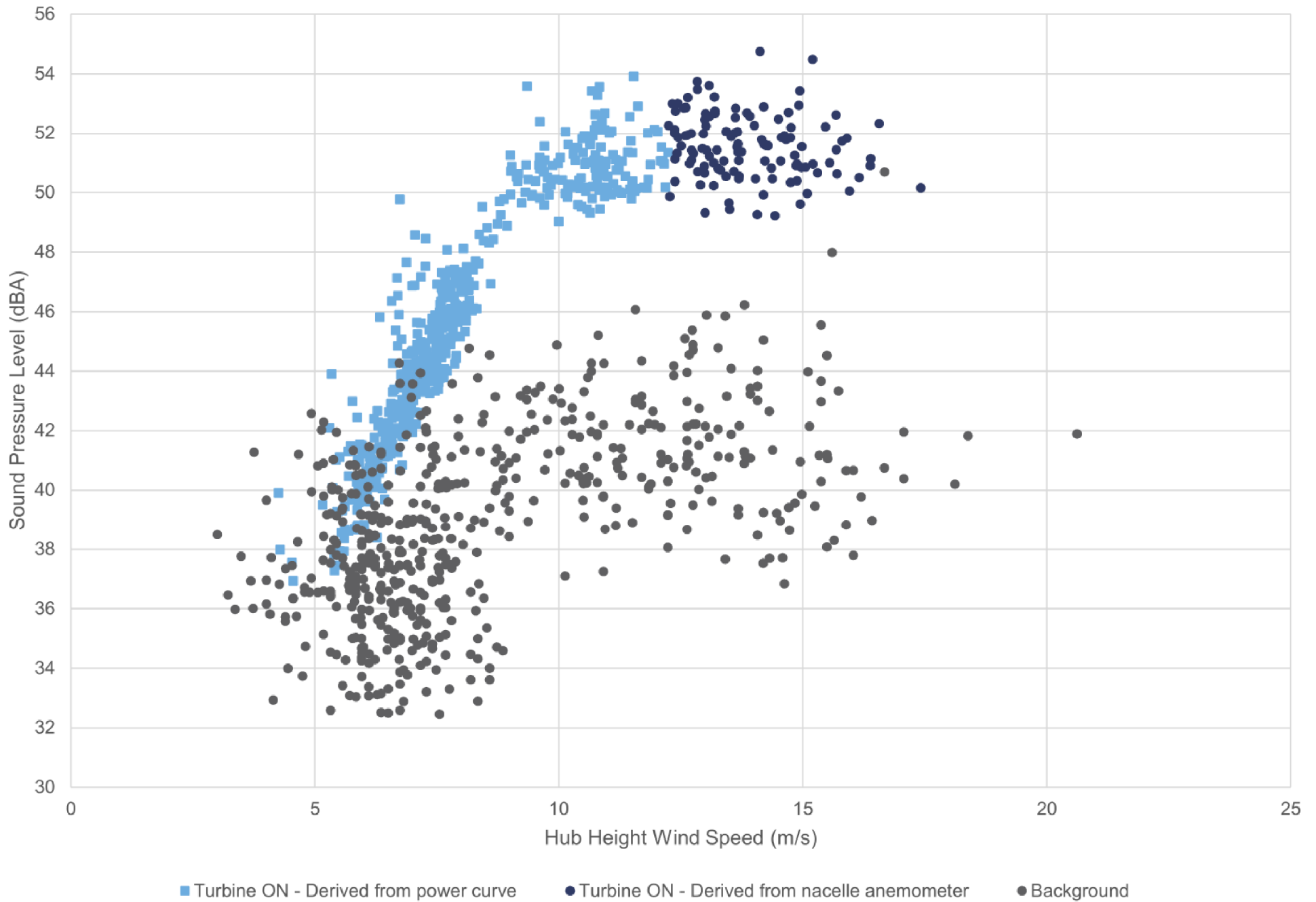
Figure Title

Rotor RPM vs. Wind Speed

Figure B.02

Appendix C

Apparent Sound Power Level



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 Date: Nov 1, 2017
 Revision: 1

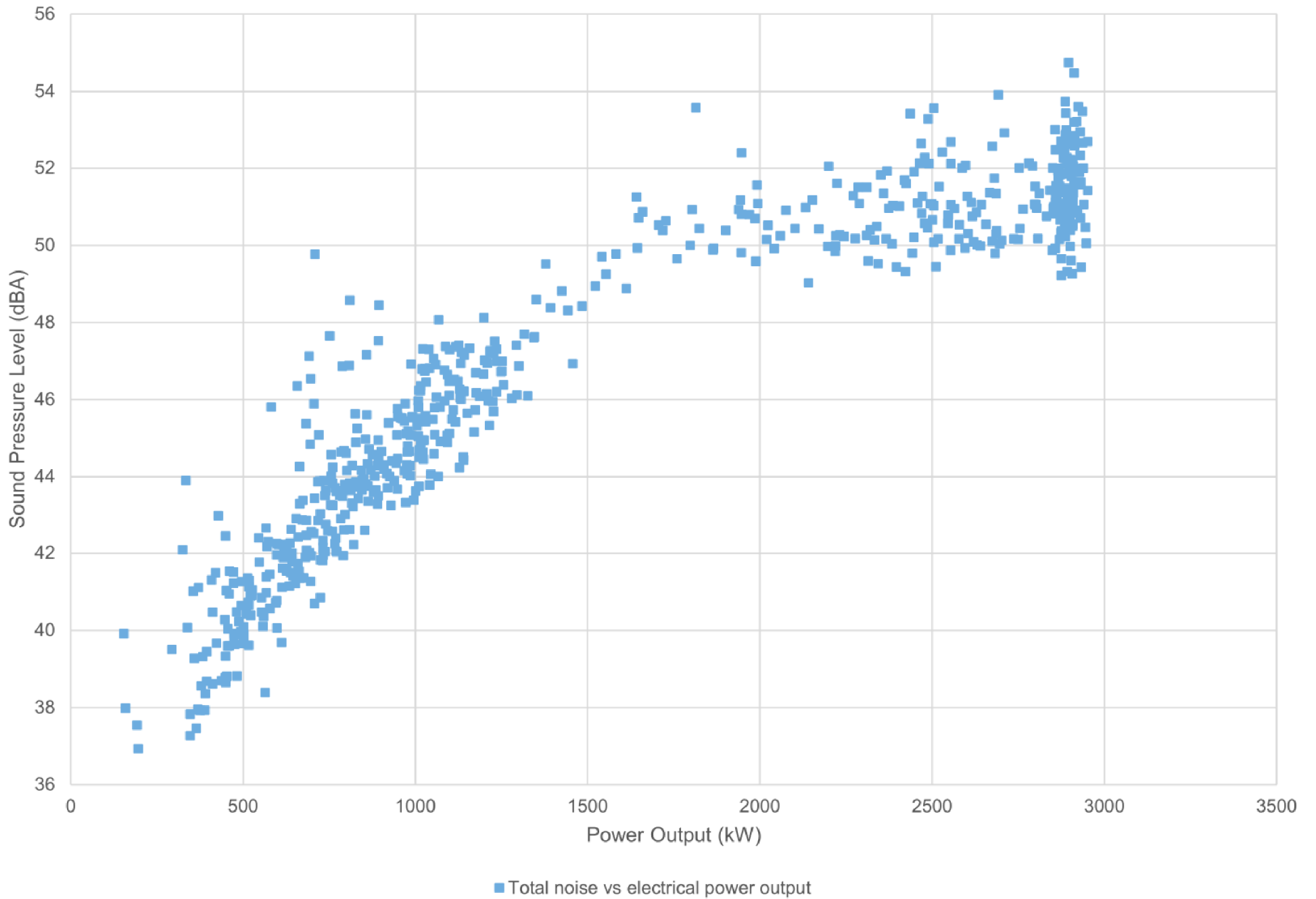
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Figure Title

Plot of overall measurement data pairs at Position 1 (Turbine ON & Background)

Figure C.01



■ Total noise vs electrical power output



16227.00.T46.RP1

Scale: NTS
 Drawn by: NT
 Reviewed by: PA
 Date: Nov 1, 2017
 Revision: 1

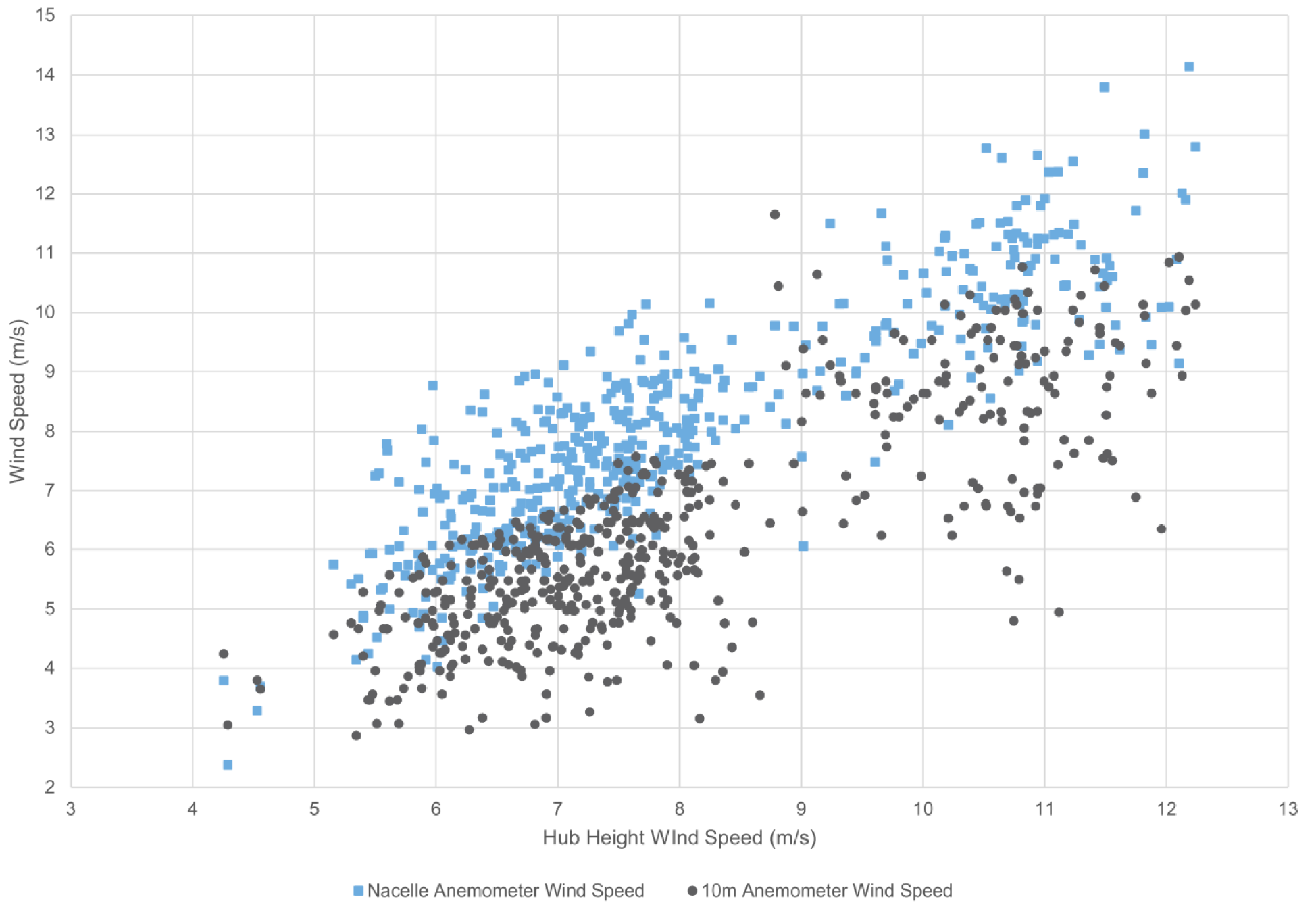
Project Name

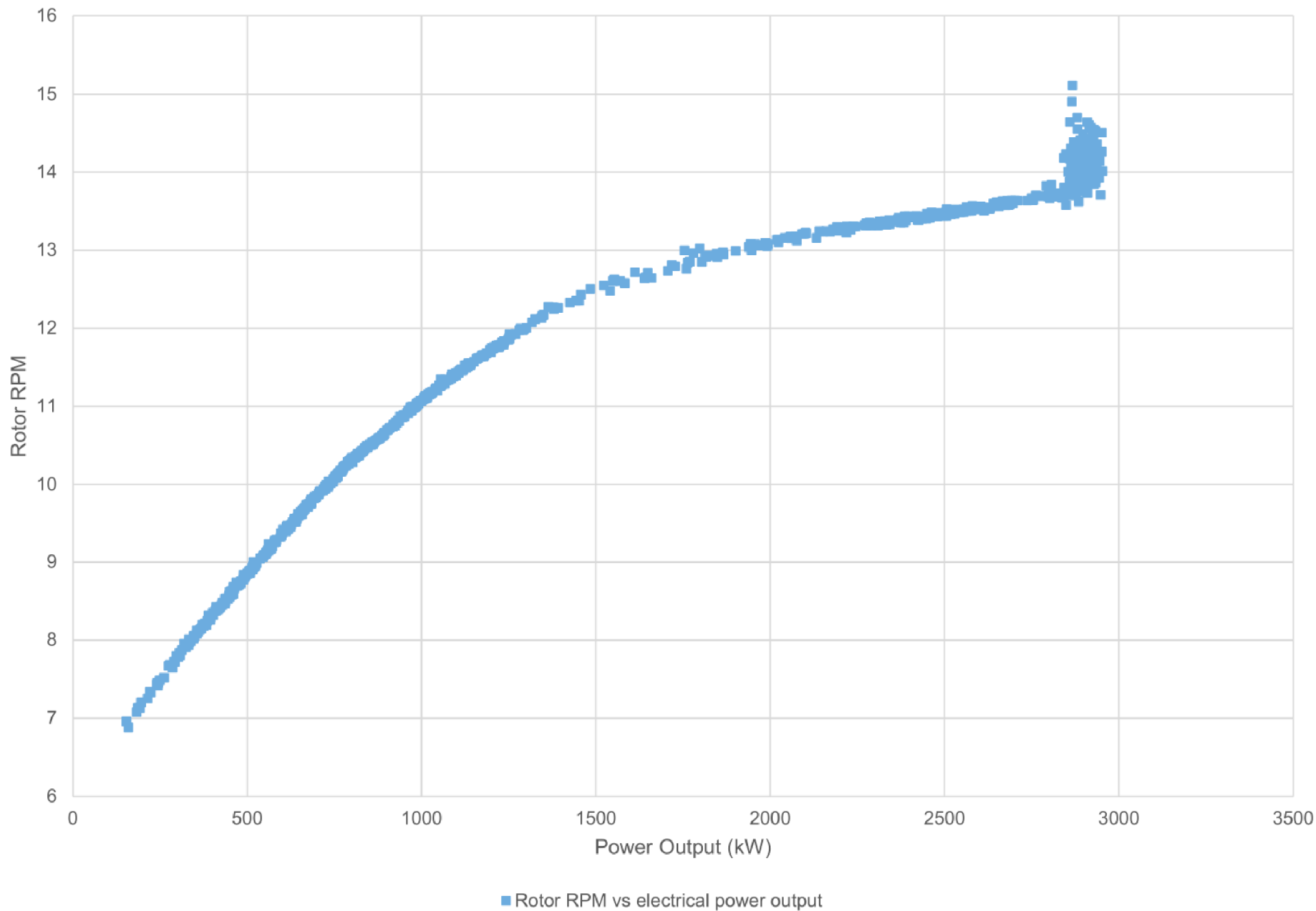
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of measured total noise vs. electrical power output

Figure C.02





16227.00.T46.RP1

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 Reviewed by: PA
 Date: Nov 1, 2017
 Revision: 1

Project Name

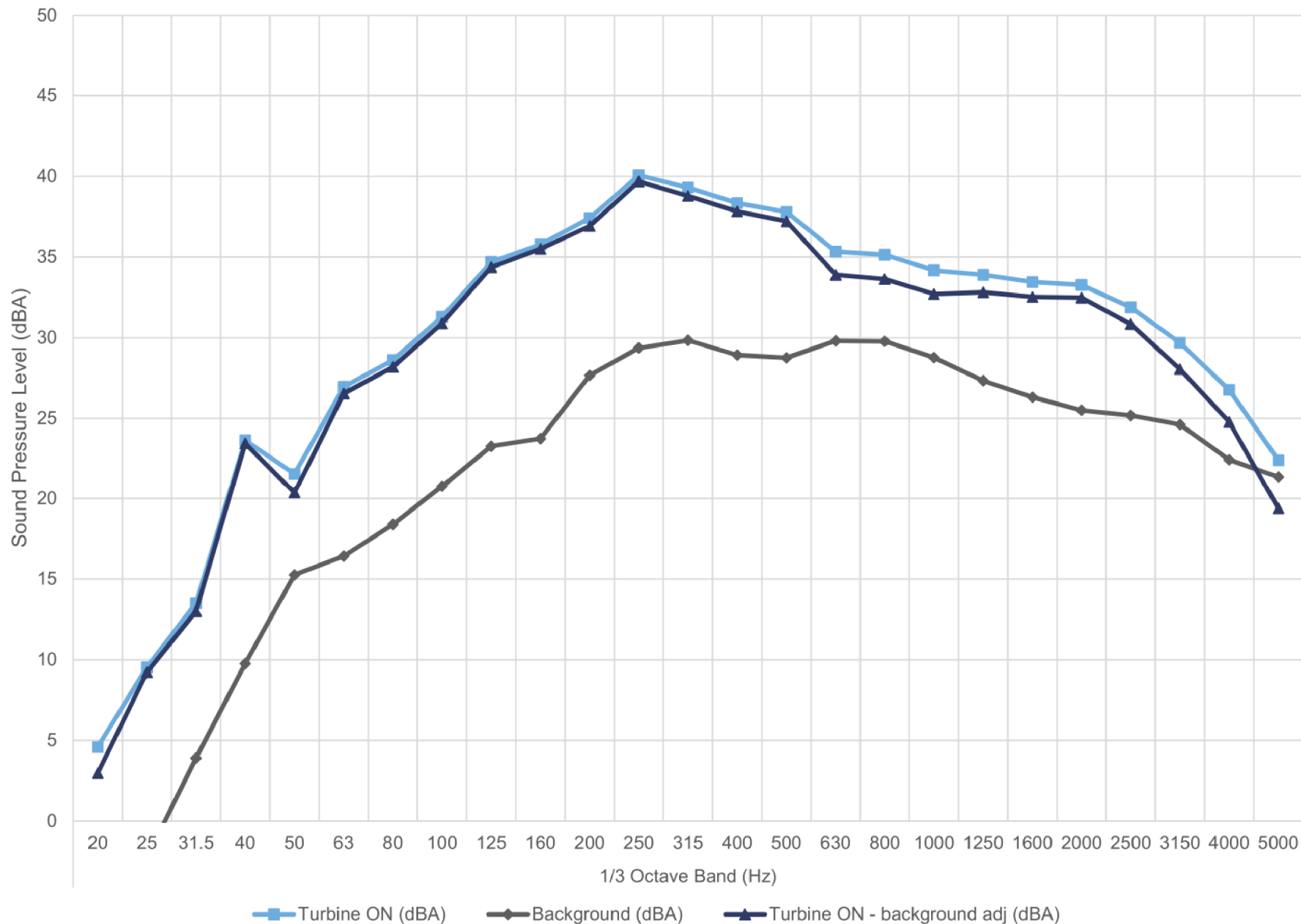
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of rotor RPM vs. electrical power output

Figure C.04

8.5 m/s - Hub Height



16227.00.T46.RP1

Scale: NTS
 Drawn by: NT
 Reviewed by: PA
 Date: Nov 1, 2017
 Revision: 1

Project Name

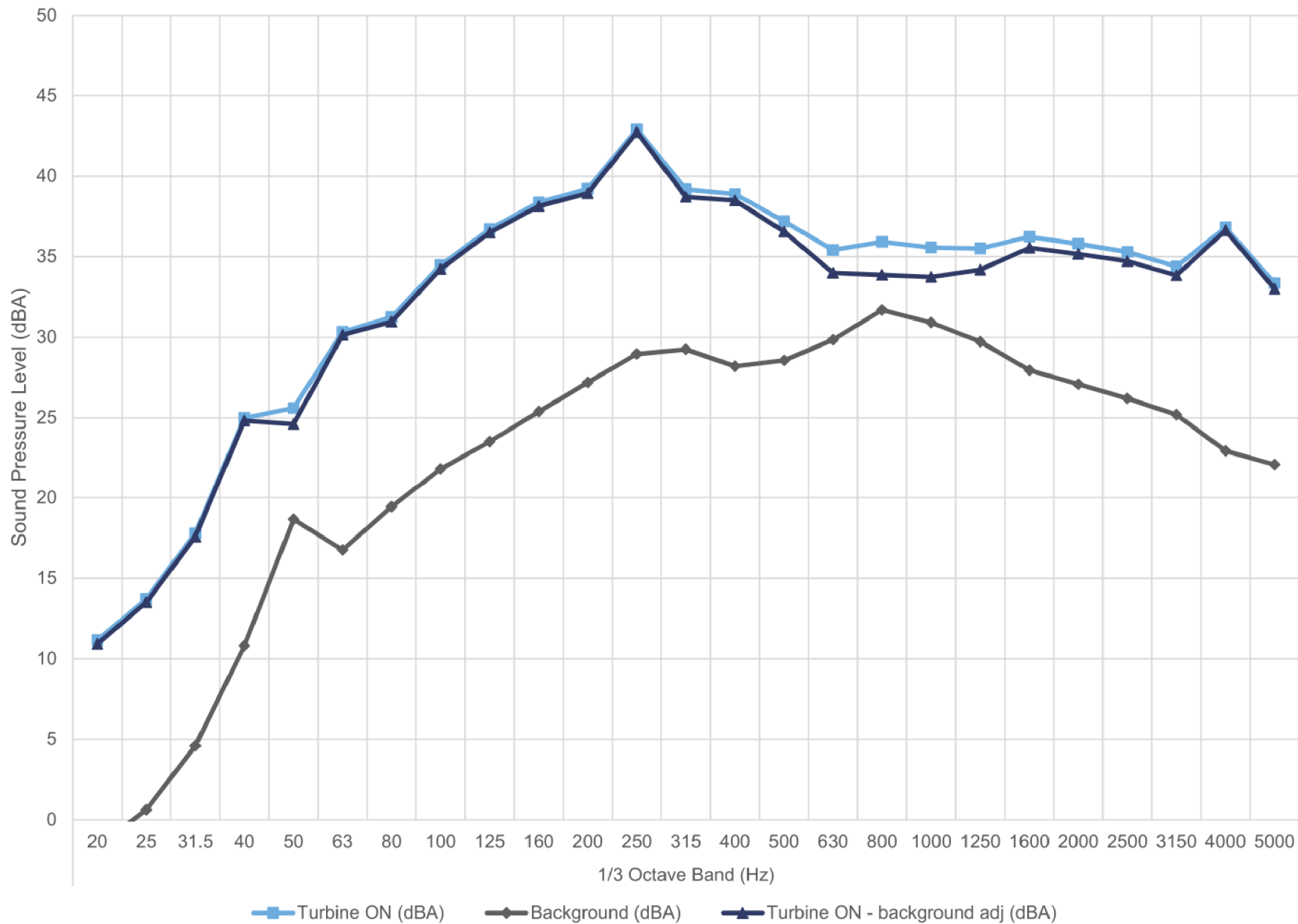
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of sound pressure spectrum in 1/3 Octave at 8.5 m/s

Figure C.05

9.0 m/s - Hub Height



16227.00.T46.RP1

Scale: NTS
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 Reviewed by: PA
 Date: Nov 1, 2017
 Revision: 1

Project Name

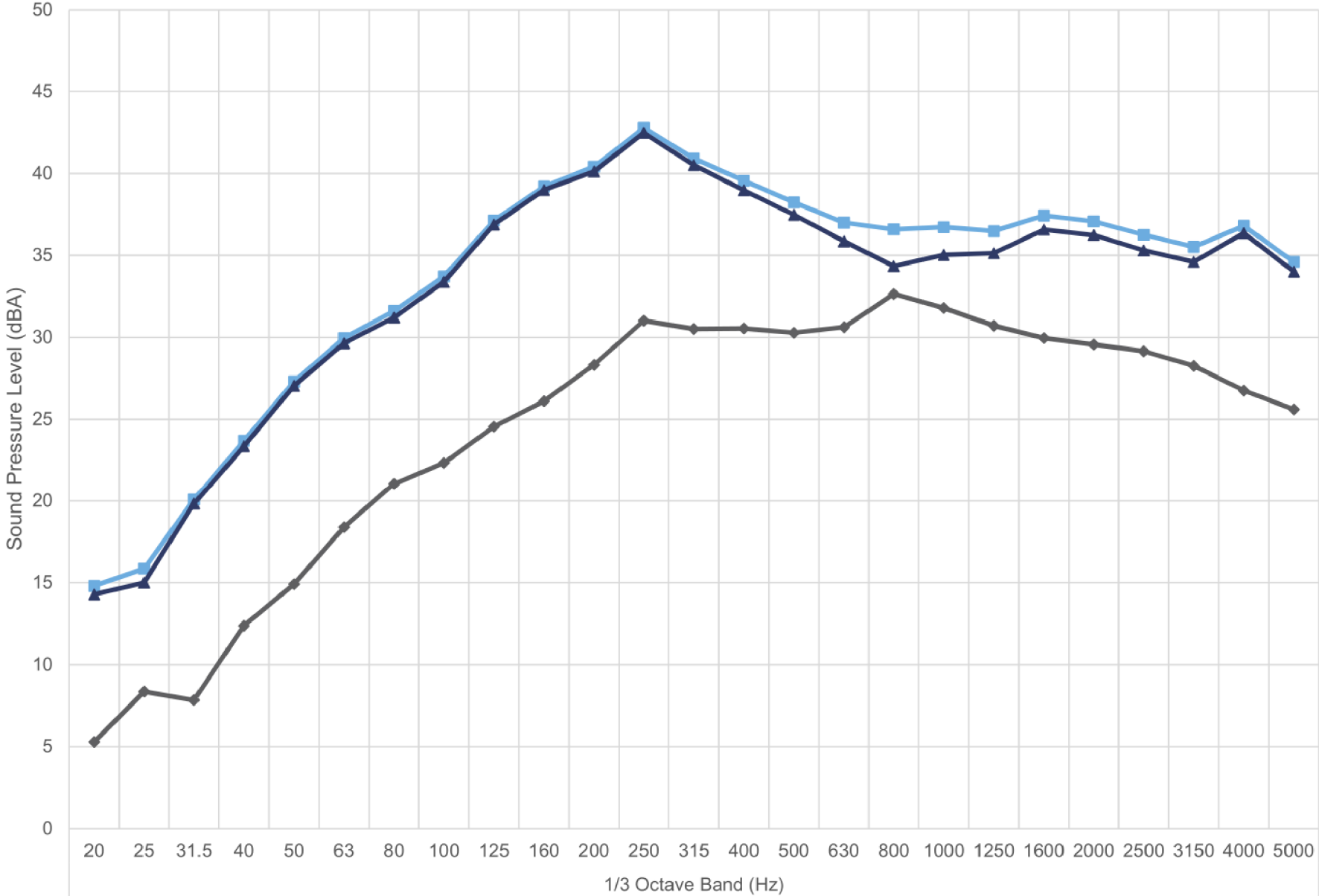
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of sound pressure spectrum in 1/3 Octave at 9 m/s

Figure C.06

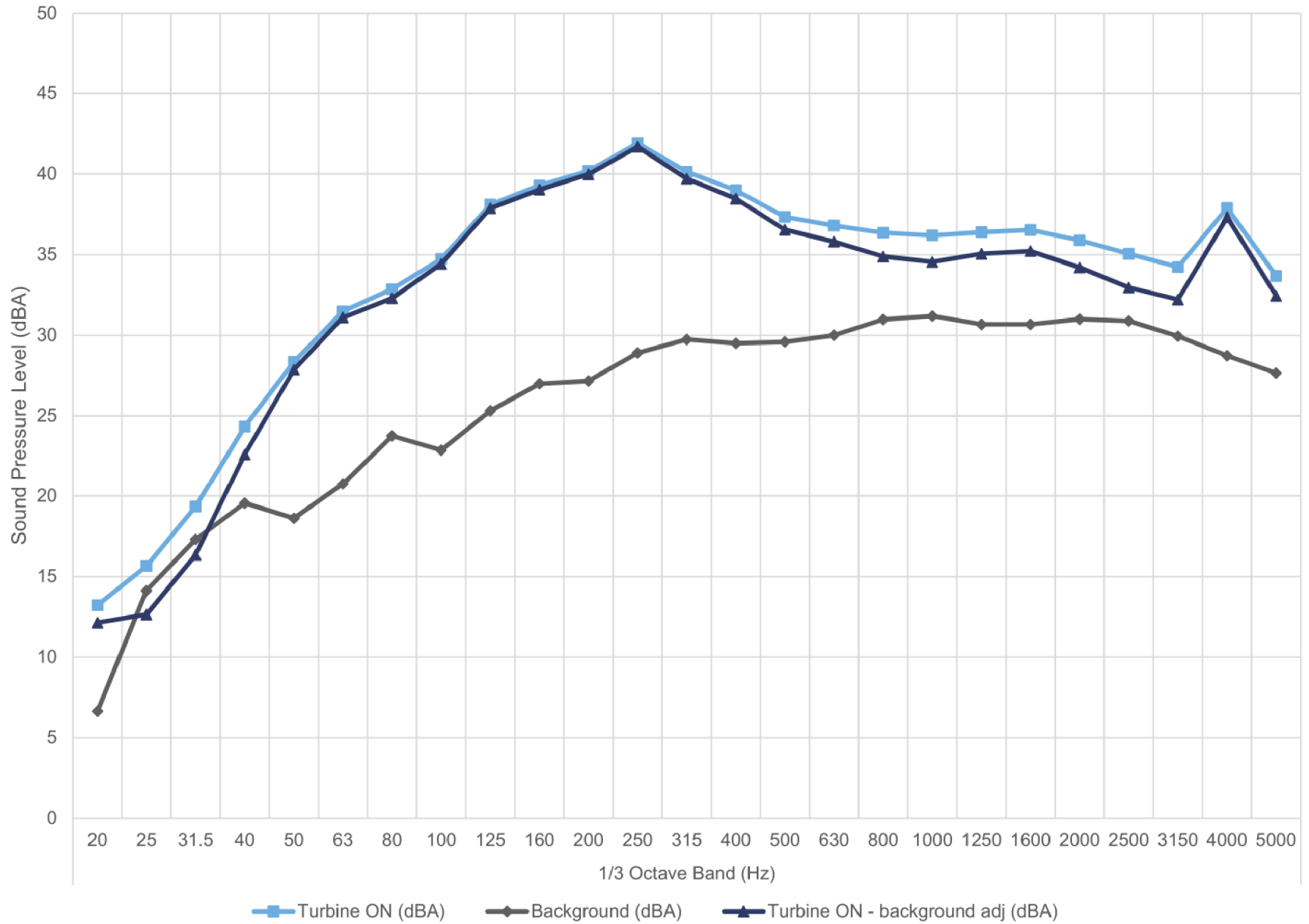
9.5 m/s - Hub Height



■ Turbine ON (dBA)
 ◆ Background (dBA)
 ▲ Turbine ON - background adj (dBA)

	16227.00.T46.RP1	Project Name Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46	Figure C.07
	Scale: NTS Drawn by: NT Reviewed by: PA Date: Nov 1, 2017 Revision: 1	Figure Title Plot of sound pressure spectrum in 1/3 Octave at 9.5 m/s	

10.0 m/s - Hub Height



16227.00.T46.RP1

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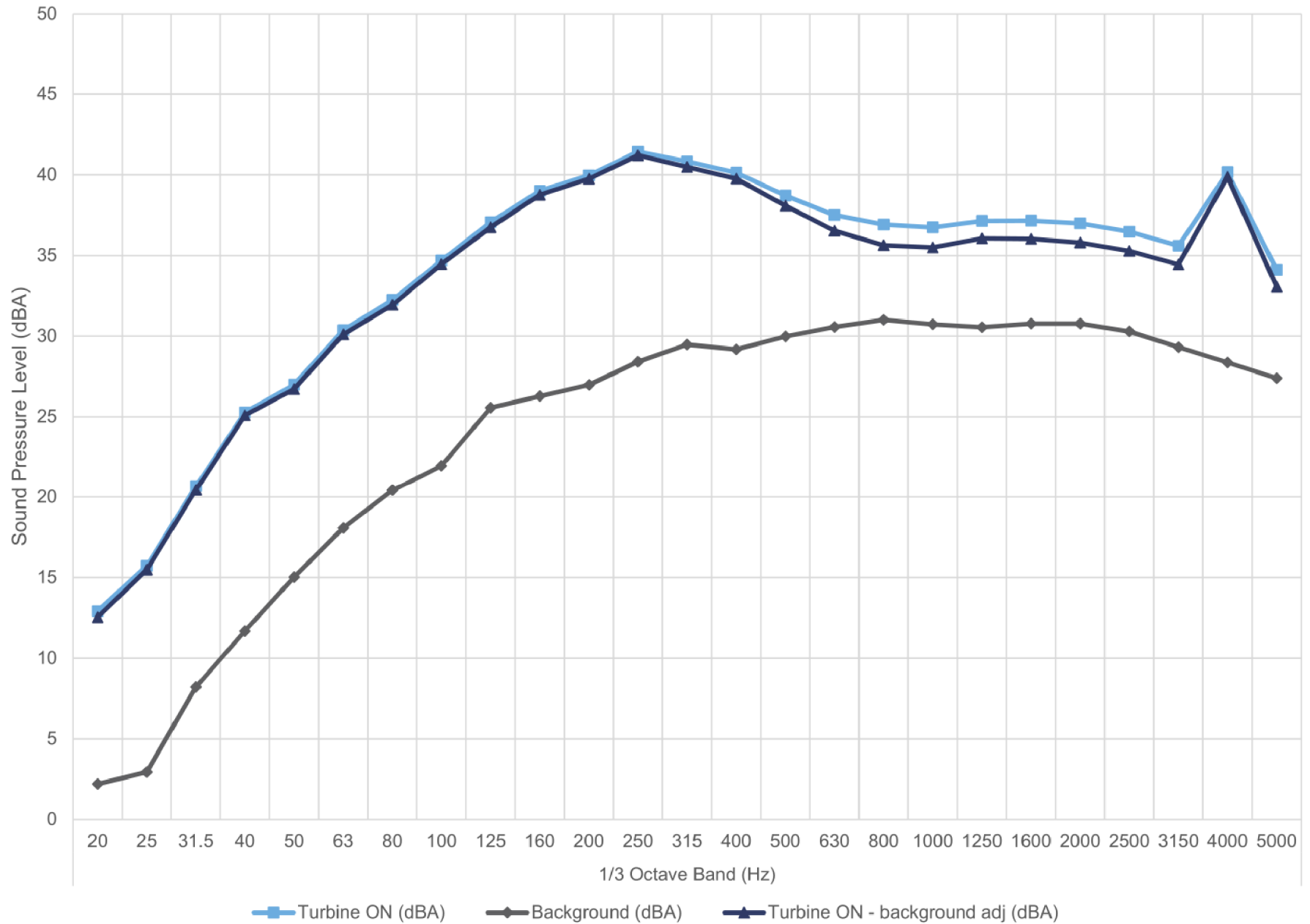
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of sound pressure spectrum in 1/3 Octave at 10 m/s

Figure C.08

10.5 m/s - Hub Height



16227.00.T46.RP1

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 Revision: 1

Project Name

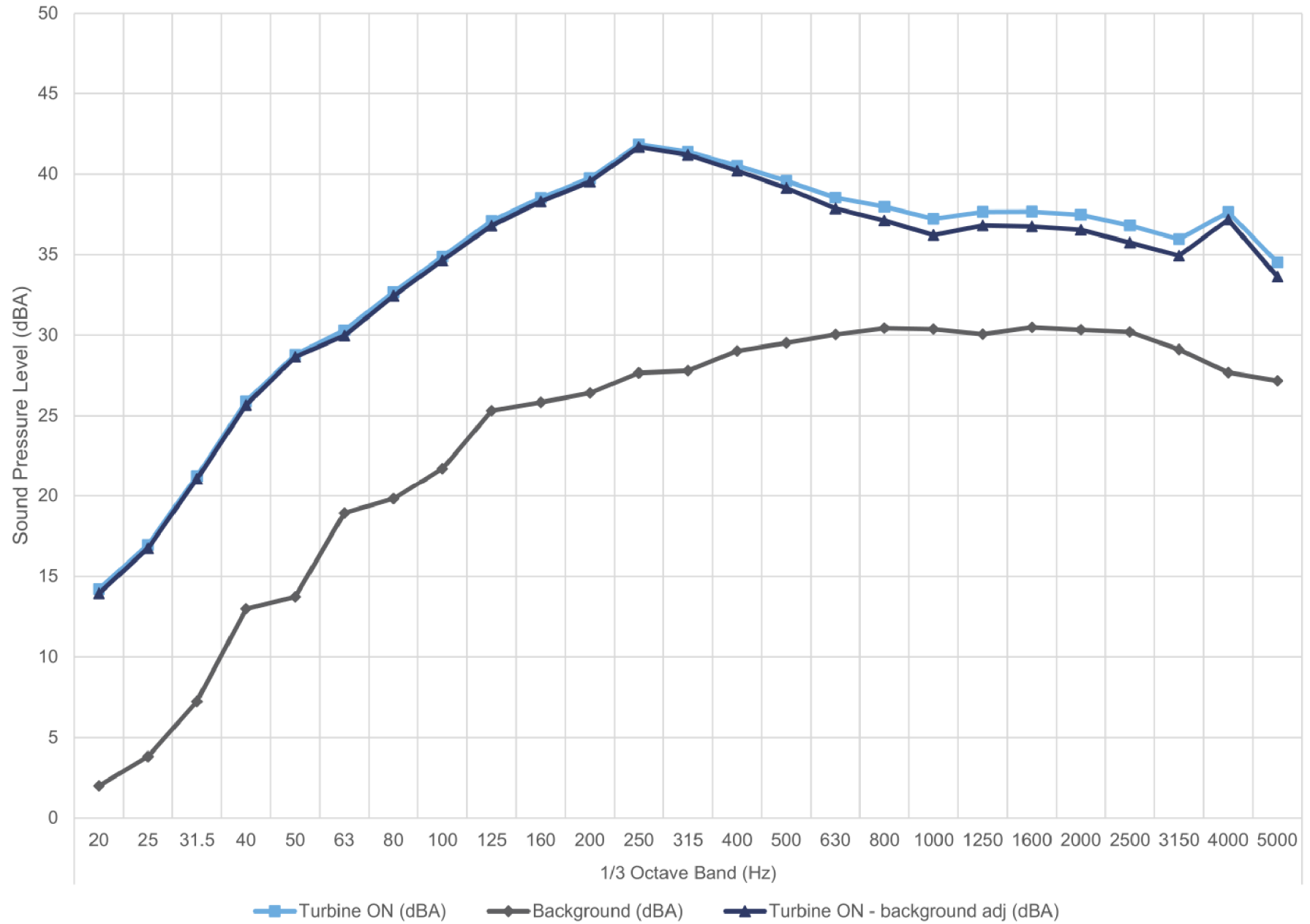
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of sound pressure spectrum in 1/3 Octave at 10.5 m/s

Figure C.09

11.0 m/s - Hub Height



16227.00.T46.RP1

Scale: NTS
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 Reviewed by: PA
 Date: Nov 1, 2017
 Revision: 1

Project Name

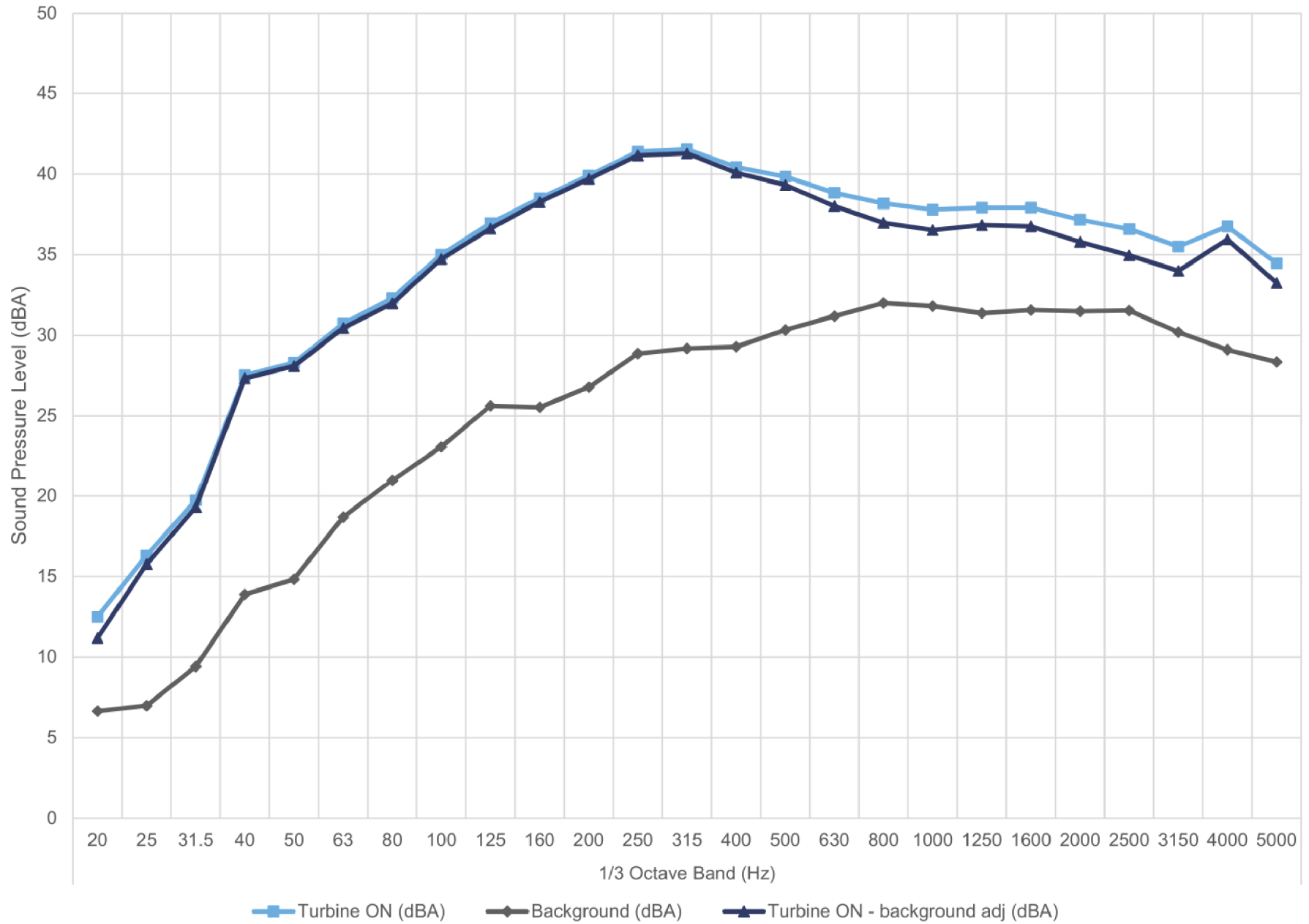
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of sound pressure spectrum in 1/3 Octave at 11 m/s

Figure C.10

11.5 m/s - Hub Height



16227.00.T46.RP1

Scale: NTS
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 Reviewed by: PA
 Date: Nov 1, 2017
 Revision: 1

Project Name

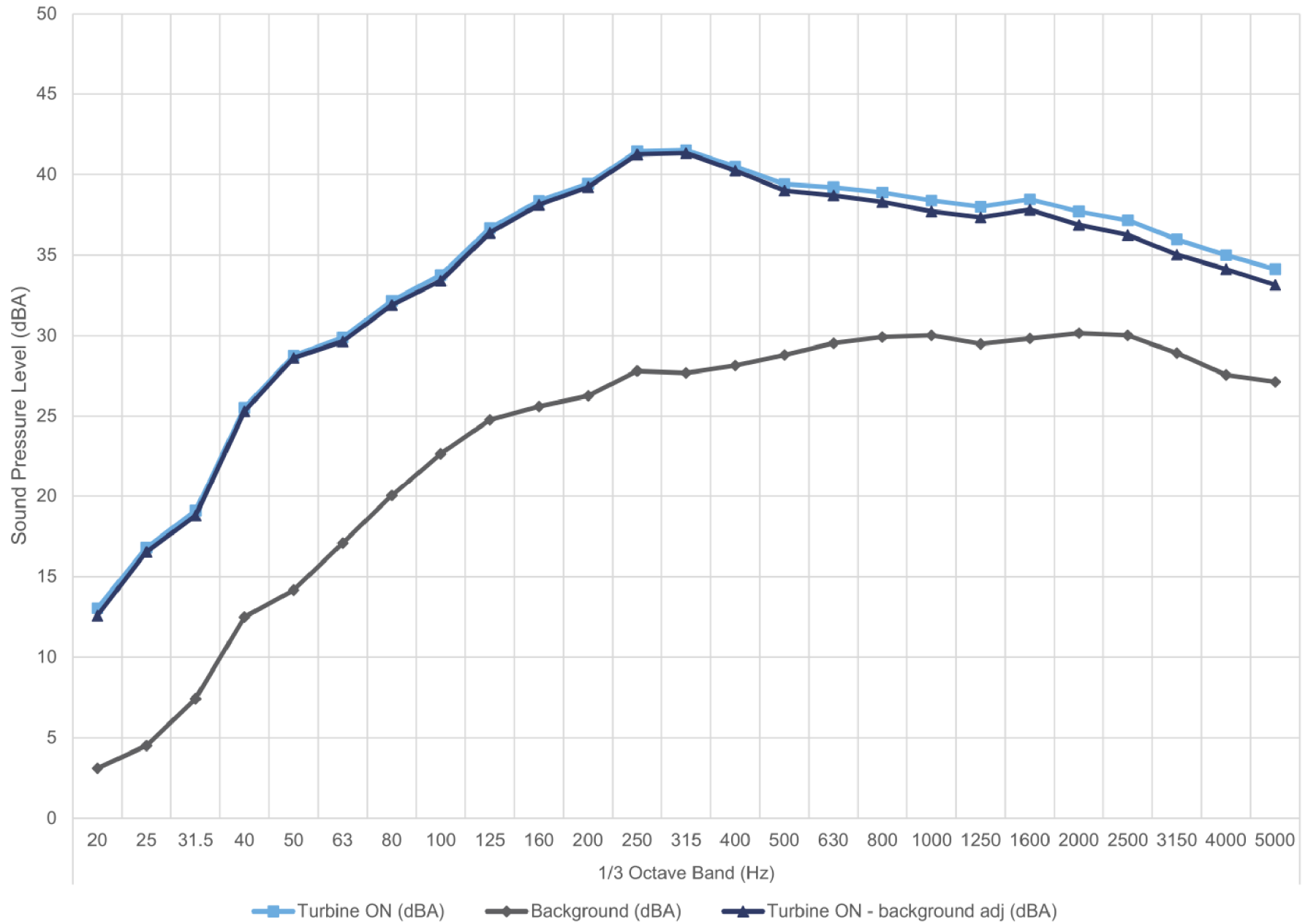
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of sound pressure spectrum in 1/3 Octave at 11.5 m/s

Figure C.11

12.0 m/s - Hub Height



16227.00.T46.RP1

Scale: NTS
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 Reviewed by: PA
 Date: Nov 1, 2017
 Revision: 1

Project Name

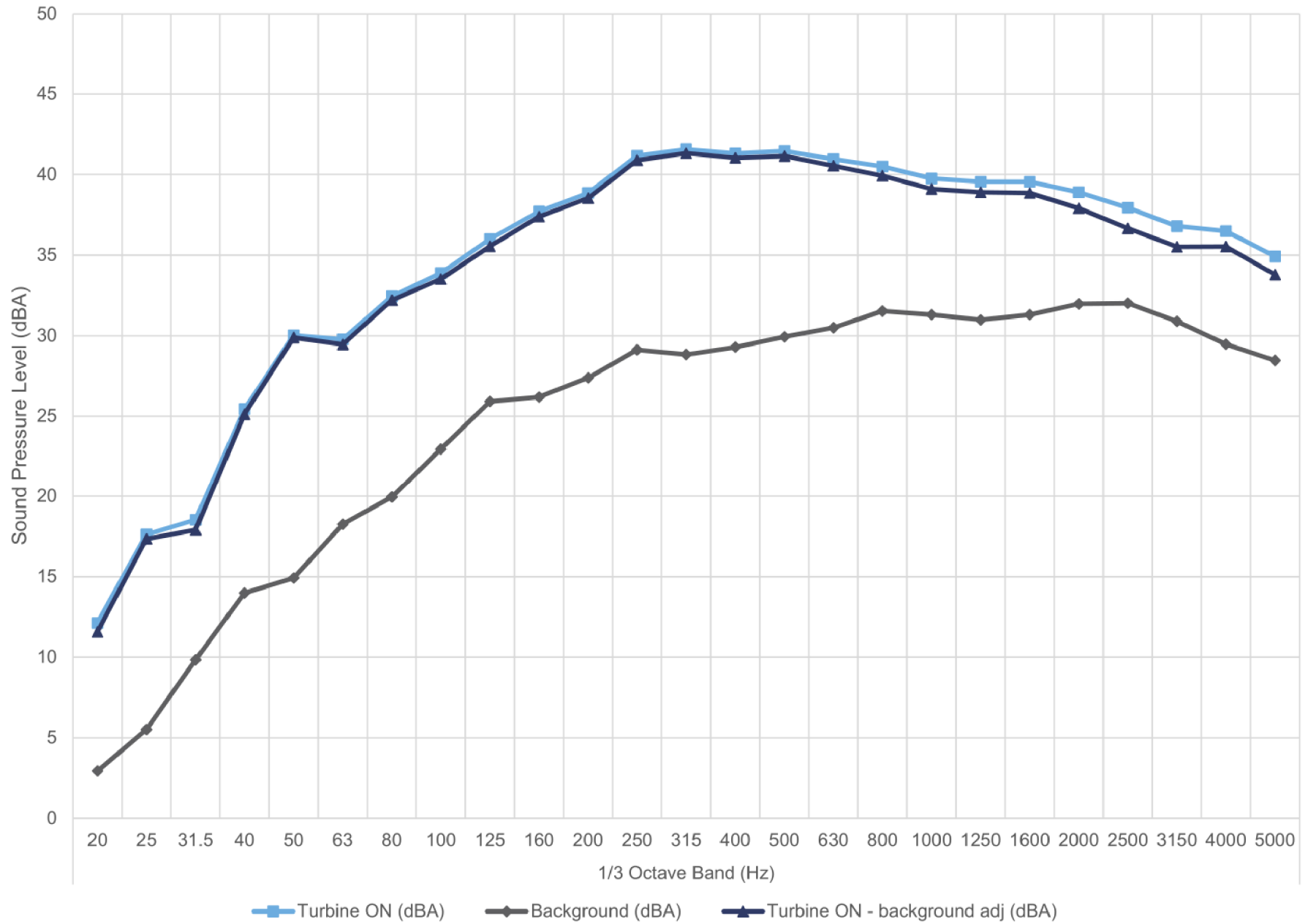
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of sound pressure spectrum in 1/3 Octave at 12 m/s

Figure C.12

12.5 m/s - Hub Height



16227.00.T46.RP1

Scale: NTS
 Drawn by: NT
 Reviewed by: PA
 Date: Nov 1, 2017
 Revision: 1

Project Name

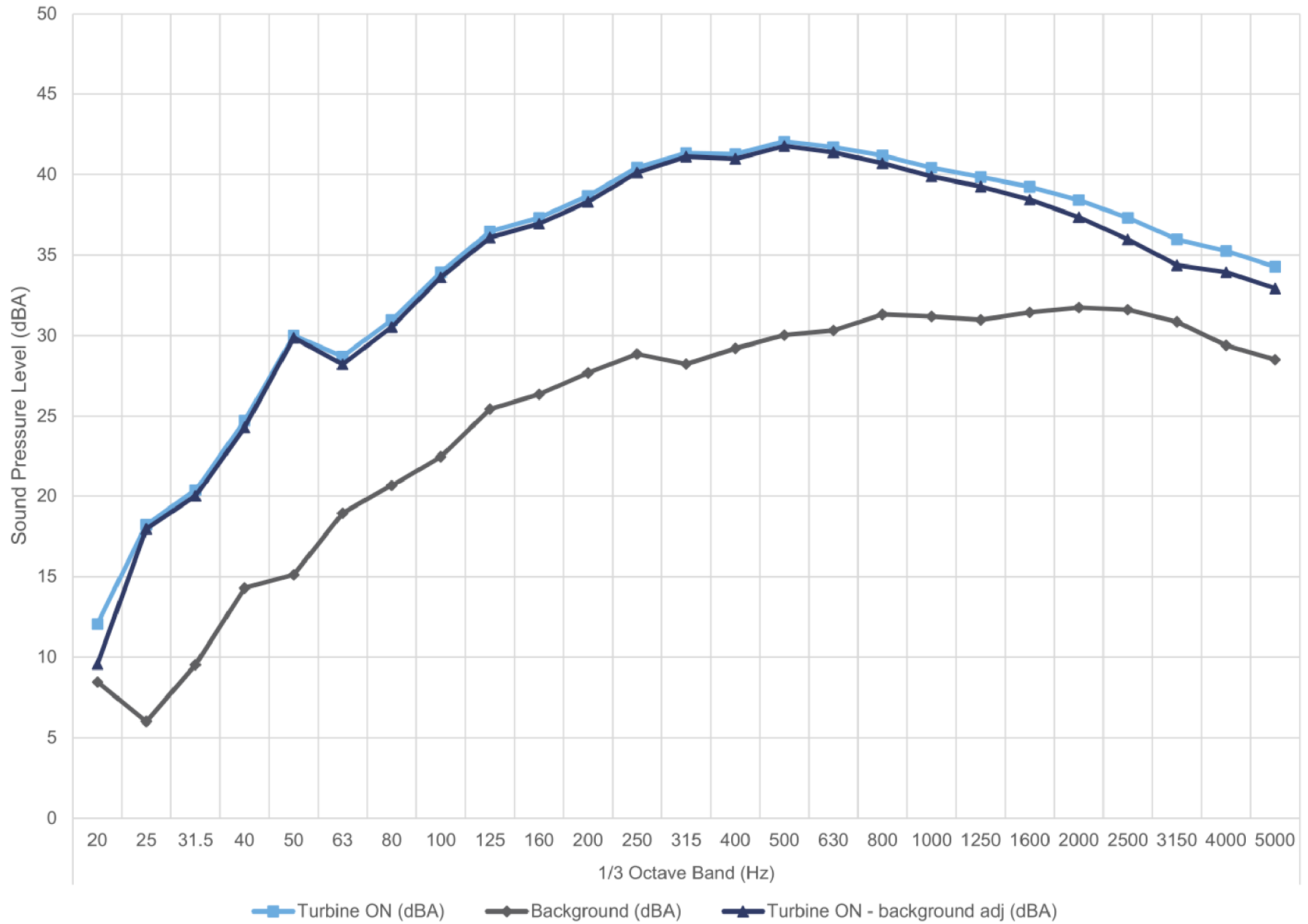
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of sound pressure spectrum in 1/3 Octave at 12.5 m/s

Figure C.13

13.0 m/s - Hub Height



16227.00.T46.RP1

Scale: NTS
 Drawn by: NT
 Reviewed by: PA
 Date: Nov 1, 2017
 Revision: 1

Project Name

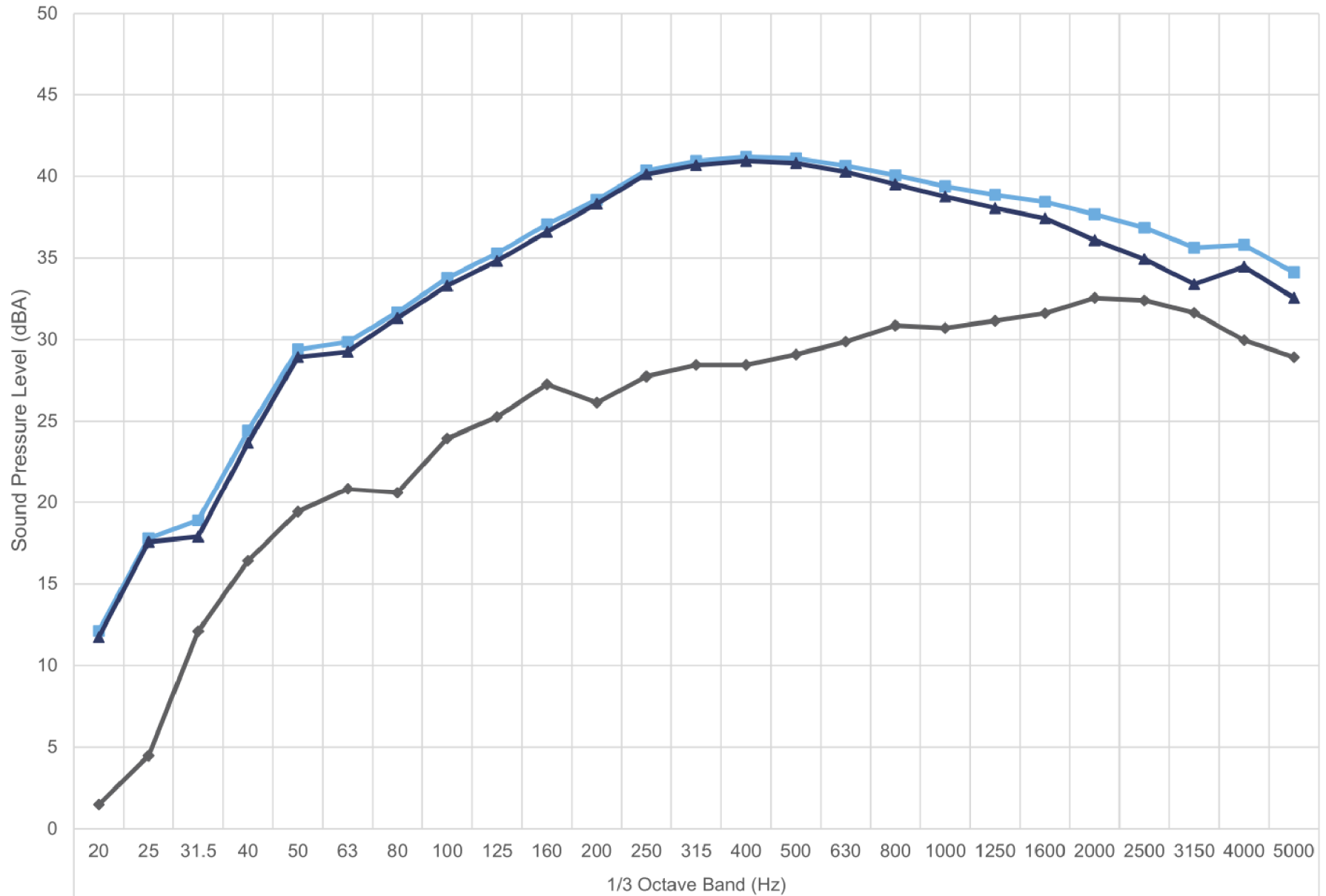
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of sound pressure spectrum in 1/3 Octave at 13 m/s

Figure C.14

13.5 m/s - Hub Height



■ Turbine ON (dBA)
 ◆ Background (dBA)
 ▲ Turbine ON - background adj (dBA)

16227.00.T46.RP1



Scale: NTS
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Project Name

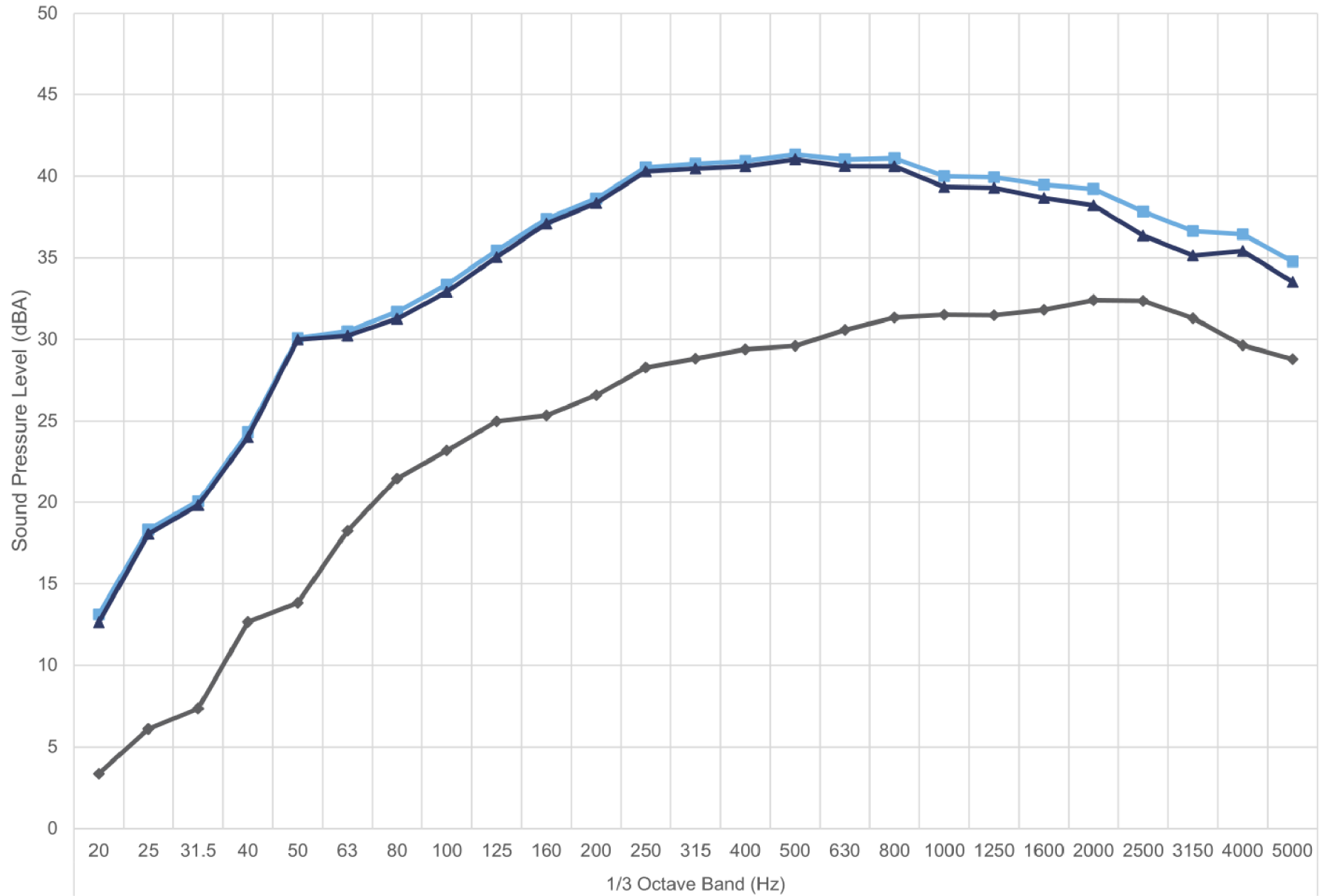
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of sound pressure spectrum in 1/3 Octave at 13.5 m/s

Figure C.15

14.0 m/s - Hub Height



■ Turbine ON (dBA)
 ◆ Background (dBA)
 ▲ Turbine ON - background adj (dBA)



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Scale: NTS
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Project Name

Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of sound pressure spectrum in 1/3 Octave at 14 m/s

Figure C.16

Table C.01 Detailed apparent sound power level data at hub height

Project: Niagara Region Wind Farm - Turbine T46 - IEC 61400-11 Measurement
 Report ID: 16227.00.T46.RP1

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 Created on: 11/3/2017

1/3 Octave values marked with brackets [] denote less than 3 dB difference between Turbine ON and Background

Overall levels marked with an asterisk * denote 3 to 6 dB difference between Turbine ON and Background, while Overall values with less than 3 dB difference between Turbine ON and Background are not reported

Wind Bin (m/s)	Parameter	1/3 Octave Band (Hz)																			Overall						
		20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250		1600	2000	2500	3150	4000	5000
8.5	Turbine ON (dBA)	4.6	9.5	13.5	23.6	21.5	27.0	28.6	31.3	34.7	35.8	37.4	40.1	39.3	38.4	37.8	35.3	35.1	34.2	33.9	33.5	33.3	31.9	29.7	26.8	22.4	48.2
	Background (dBA)	-0.5	-2.2	3.9	9.8	15.3	16.4	18.4	20.8	23.3	23.8	27.7	29.4	29.8	28.9	28.8	29.8	29.8	28.8	27.3	26.3	25.5	25.2	24.6	22.4	21.4	39.8
	Turbine ON - background adj (dBA)	3.0	9.2	13.0	23.5	20.4	26.6	28.2	30.9	34.4	35.5	36.9	39.7	38.8	37.8	37.2	33.9	33.6	32.7	32.8	32.5	32.5	30.9	28.1	24.8	[19.4]	47.5
	Signal to noise (dB)	5.1	11.8	9.6	13.9	6.3	10.5	10.2	10.5	11.4	12.0	9.7	10.7	9.5	9.4	9.0	5.5	5.4	5.4	6.6	7.2	7.8	6.7	5.1	4.3	1.0	8.4
	Uncertainty (dB)	2.3	1.7	1.3	1.1	1.4	1.1	1.1	0.9	1.0	0.9	0.8	0.8	0.9	0.9	0.9	1.1	1.1	1.0	1.0	1.0	1.0	1.3	1.4	1.6	2.6	0.9
	PWL (dBA)	54.9	61.2	65.0	75.4	72.3	78.5	80.2	82.9	86.3	87.5	88.9	91.7	90.8	89.8	89.2	85.9	85.6	84.7	84.8	84.5	84.4	82.8	80.0	76.8	[71.4]	99.5
9.0	Turbine ON (dBA)	11.2	13.7	17.8	25.0	25.6	30.3	31.3	34.5	36.7	38.4	39.2	42.9	39.2	38.9	37.2	35.4	35.9	35.6	35.5	36.2	35.8	35.3	34.4	36.8	33.4	50.1
	Background (dBA)	-1.7	0.6	4.6	10.8	18.7	16.8	19.4	21.8	23.5	25.4	27.2	29.0	29.3	28.2	28.6	29.8	31.7	30.9	29.7	28.0	27.1	26.2	25.2	22.9	22.1	40.5
	Turbine ON - background adj (dBA)	10.9	13.5	17.6	24.8	24.6	30.1	31.0	34.2	36.5	38.2	38.9	42.7	38.7	38.5	36.6	34.0	33.9	33.8	34.2	35.6	35.2	34.7	33.8	36.6	33.0	49.6
	Signal to noise (dB)	12.8	13.1	13.2	14.2	6.9	13.6	11.8	12.7	13.2	13.0	12.0	13.9	9.9	10.7	8.6	5.6	4.2	4.7	5.8	8.3	8.7	9.1	9.2	13.9	11.3	9.6
	Uncertainty (dB)	1.6	1.4	1.2	1.5	1.5	1.0	0.9	1.0	1.1	1.0	0.8	1.0	0.8	0.8	0.9	1.1	1.4	1.2	1.1	0.9	0.9	1.0	1.1	1.5	1.4	1.0
	PWL (dBA)	62.9	65.5	69.5	76.8	76.6	82.1	82.9	86.2	88.5	90.1	90.9	94.7	90.7	90.5	88.5	86.0	85.8	85.7	86.2	87.5	87.1	86.7	85.8	88.6	85.0	101.6
9.5	Turbine ON (dBA)	14.8	15.9	20.1	23.7	27.3	30.0	31.6	33.7	37.1	39.2	40.4	42.8	40.9	39.6	38.2	37.0	36.6	36.7	36.5	37.4	37.1	36.3	35.5	36.8	34.6	50.9
	Background (dBA)	5.3	8.4	7.8	12.4	14.9	18.4	21.1	22.3	24.6	26.1	28.3	31.0	30.5	30.5	30.3	30.6	32.7	31.8	30.7	30.0	29.6	29.2	28.3	26.8	25.6	42.1
	Turbine ON - background adj (dBA)	14.3	15.0	19.8	23.4	27.1	29.7	31.2	33.4	36.9	39.0	40.1	42.5	40.5	39.0	37.5	35.9	34.3	35.0	35.1	36.6	36.2	35.3	34.6	36.4	34.0	50.2
	Signal to noise (dB)	9.5	7.5	12.3	11.3	12.4	11.6	10.5	11.4	12.6	13.1	12.1	11.8	10.4	9.0	7.9	6.4	3.9	4.9	5.8	7.5	7.5	7.1	7.2	10.1	9.0	8.7
	Uncertainty (dB)	1.5	1.7	1.3	0.9	1.0	1.0	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.9	1.0	1.4	1.2	1.1	1.0	1.1	1.2	1.2	1.0	1.0	0.9
	PWL (dBA)	66.3	67.0	71.8	75.3	79.0	81.6	83.2	85.4	88.9	91.0	92.1	94.4	92.5	90.9	89.4	87.8	86.3	87.0	87.1	88.5	88.2	87.3	86.6	88.3	86.0	102.2
10.0	Turbine ON (dBA)	13.2	15.6	19.3	24.4	28.4	31.5	32.9	34.7	38.1	39.3	40.2	41.9	40.1	39.0	37.4	36.8	36.4	36.2	36.4	36.5	35.9	35.1	34.2	37.9	33.7	50.5
	Background (dBA)	6.7	14.1	17.3	19.6	18.6	20.8	23.8	22.9	25.3	27.0	27.2	28.9	29.8	29.5	29.6	30.0	31.0	31.2	30.7	30.7	31.0	30.9	29.9	28.7	27.7	42.2
	Turbine ON - background adj (dBA)	12.1	[12.6]	[16.3]	22.6	27.9	31.1	32.3	34.4	37.9	39.0	40.0	41.7	39.7	38.5	36.6	35.8	34.9	34.6	35.1	35.2	34.2	33.0	32.2	37.3	32.5	49.8
	Signal to noise (dB)	6.6	1.5	2.0	4.8	9.7	10.7	9.1	11.9	12.8	12.3	13.0	13.0	10.4	9.5	7.8	6.8	5.4	5.0	5.7	5.9	4.9	4.2	4.3	9.2	6.0	8.4
	Uncertainty (dB)	1.7	4.3	3.7	2.0	1.1	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.9	1.0	1.1	1.2	1.1	1.1	1.3	1.7	1.7	1.3	1.2	1.0
	PWL (dBA)	64.1	[64.6]	[68.3]	74.6	79.8	83.1	84.3	86.4	89.8	91.0	91.9	93.7	91.7	90.4	88.5	87.8	86.9	86.5	87.0	87.2	86.2	84.9	84.2	89.3	84.4	101.8
10.5	Turbine ON (dBA)	12.9	15.7	20.7	25.3	27.0	30.4	32.2	34.7	37.1	39.0	40.0	41.4	40.8	40.1	38.7	37.5	36.9	36.8	37.1	37.2	37.0	36.5	35.6	40.2	34.1	51.0
	Background (dBA)	2.2	2.9	8.2	11.7	15.0	18.1	20.4	22.0	25.6	26.3	27.0	28.4	29.5	29.2	30.0	30.6	31.0	30.7	30.6	30.8	30.8	30.3	29.3	28.4	27.4	41.9
	Turbine ON - background adj (dBA)	12.5	15.5	20.4	25.1	26.7	30.1	31.9	34.5	36.7	38.8	39.8	41.2	40.5	39.8	38.1	36.5	35.6	35.5	36.1	36.0	35.8	35.3	34.4	39.9	33.1	50.4
	Signal to noise (dB)	10.7	12.8	12.5	13.6	12.0	12.3	11.8	12.7	11.5	12.7	13.0	13.0	11.3	11.0	8.7	7.0	5.9	6.0	6.6	6.4	6.2	6.2	6.3	11.8	6.7	9.1
	Uncertainty (dB)	1.2	1.1	1.0	0.9	0.8	0.9	0.9	0.8	0.9	0.8	0.7	0.7	0.7	0.7	0.8	0.9	1.0	0.9	0.9	0.9	1.0	1.2	1.1	1.1	1.1	0.9
	PWL (dBA)	64.5	67.4	72.4	77.1	78.7	82.1	83.9	86.4	88.7	90.7	91.7	93.2	92.5	91.7	90.1	88.5	87.6	87.5	88.0	88.0	87.8	87.2	86.4	91.8	85.0	102.4
11.0	Turbine ON (dBA)	14.2	17.0	21.3	25.9	28.8	30.3	32.7	34.9	37.1	38.5	39.7	41.8	41.4	40.5	39.6	38.5	38.0	37.2	37.7	37.7	37.5	36.8	36.0	37.6	34.5	51.2
	Background (dBA)	2.0	3.8	7.2	13.0	13.7	18.9	19.8	21.7	25.3	25.8	26.4	27.7	27.8	29.0	29.5	30.1	30.4	30.4	30.1	30.5	30.3	30.2	29.1	27.7	27.2	41.4
	Turbine ON - background adj (dBA)	13.9	16.7	21.1	25.7	28.7	30.0	32.5	34.7	36.8	38.3	39.5	41.7	41.2	40.2	39.1	37.9	37.1	36.2	36.8	36.8	36.5	35.8	34.9	37.2	33.6	50.7
	Signal to noise (dB)	12.2	13.1	14.0	12.9	15.1	11.4	12.9	13.2	11.8	12.7	13.3	14.2	13.6	11.5	10.1	8.5	7.5	6.8	7.6	7.2	7.1	6.6	6.8	10.0	7.4	9.8
	Uncertainty (dB)	1.3	1.1	0.9	0.9	0.8	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.8	0.9	0.9	1.1	1.0	1.0	1.0	0.8
	PWL (dBA)	65.9	68.7	73.0	77.6	80.6	81.9	84.4	86.6	88.8	90.3	91.5	93.6	93.2	92.2	91.1	89.8	89.1	88.2	88.8	88.7	88.5	87.7	86.9	89.1	85.6	102.7

Table C.01 Detailed apparent sound power level data at hub height

Project: Niagara Region Wind Farm - Turbine T46 - IEC 61400-11 Measurement
 Report ID: 16227.00.T46.RP1

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1/3 Octave values marked with brackets [] denote less than 3 dB difference between Turbine ON and Background

Overall levels marked with an asterisk * denote 3 to 6 dB difference between Turbine ON and Background, while Overall values with less than 3 dB difference between Turbine ON and Background are not reported

Wind Bin (m/s)	Parameter	1/3 Octave Band (Hz)																				Overall					
		20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600		2000	2500	3150	4000	5000
11.5	Turbine ON (dBA)	12.5	16.3	19.7	27.5	28.3	30.7	32.3	35.0	37.0	38.5	39.9	41.4	41.5	40.4	39.8	38.8	38.2	37.8	37.9	37.9	37.2	36.6	35.5	36.8	34.5	51.2
	Background (dBA)	6.6	7.0	9.4	13.9	14.8	18.7	21.0	23.1	25.6	25.5	26.8	28.9	29.2	29.3	30.3	31.2	32.0	31.8	31.4	31.6	31.5	31.5	30.2	29.1	28.3	42.5
	Turbine ON - background adj (dBA)	11.2	15.8	19.3	27.3	28.1	30.5	32.0	34.7	36.6	38.3	39.7	41.2	41.3	40.1	39.3	38.0	37.0	36.5	36.8	36.8	35.8	35.0	34.0	35.9	33.2	50.6
	Signal to noise (dB)	5.8	9.3	10.3	13.6	13.5	12.0	11.3	11.9	11.3	13.0	13.1	12.5	12.4	11.1	9.5	7.6	6.2	6.0	6.6	6.3	5.7	5.1	5.3	7.6	6.1	8.7
	Uncertainty (dB)	2.2	1.5	1.2	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.9	1.0	1.1	1.1	1.1	1.2	1.5	1.4	1.3	1.2	1.0	1.0
	PWL (dBA)	63.1	67.7	71.3	79.3	80.1	82.4	83.9	86.7	88.6	90.2	91.7	93.1	93.2	92.1	91.3	90.0	88.9	88.5	88.8	88.7	87.8	86.9	86.0	87.9	85.2	102.5
12.0	Turbine ON (dBA)	13.0	16.8	19.1	25.5	28.8	29.9	32.2	33.8	36.7	38.4	39.4	41.5	41.5	40.5	39.4	39.2	38.9	38.4	38.0	38.5	37.7	37.2	36.0	35.0	34.1	51.2
	Background (dBA)	3.1	4.5	7.4	12.5	14.2	17.1	20.0	22.7	24.8	25.6	26.3	27.8	27.7	28.1	28.8	29.5	29.9	30.0	29.5	29.8	30.2	30.0	28.9	27.6	27.1	41.0
	Turbine ON - background adj (dBA)	12.6	16.5	18.8	25.3	28.6	29.6	31.9	33.4	36.4	38.1	39.2	41.3	41.3	40.3	39.0	38.7	38.3	37.7	37.3	37.8	36.9	36.2	35.0	34.1	33.1	50.8
	Signal to noise (dB)	9.9	12.3	11.7	13.0	14.6	12.8	12.1	11.1	11.9	12.7	13.2	13.6	13.8	12.4	10.6	9.7	9.0	8.4	8.5	8.6	7.6	7.2	7.1	7.4	7.0	10.2
	Uncertainty (dB)	1.6	1.3	1.4	1.0	1.0	1.1	1.0	0.9	1.0	0.9	0.8	0.9	0.8	0.8	0.9	0.9	1.0	0.9	0.9	0.9	1.0	1.2	1.2	1.1	1.1	0.9
	PWL (dBA)	64.5	68.5	70.8	77.3	80.6	81.6	83.9	85.4	88.4	90.1	91.2	93.2	93.3	92.2	91.0	90.7	90.3	89.7	89.3	89.8	88.8	88.2	87.0	86.1	85.1	102.7
12.5	Turbine ON (dBA)	12.1	17.6	18.5	25.4	30.0	29.8	32.5	33.9	36.0	37.7	38.9	41.2	41.6	41.3	41.5	41.0	40.5	39.8	39.6	39.6	38.9	37.9	36.8	36.5	34.9	52.0
	Background (dBA)	2.9	5.5	9.8	14.0	14.9	18.3	20.0	23.0	25.9	26.2	27.4	29.1	28.8	29.3	29.9	30.5	31.5	31.3	31.0	31.3	32.0	32.0	30.9	29.5	28.5	42.5
	Turbine ON - background adj (dBA)	11.6	17.3	17.9	25.1	29.9	29.5	32.2	33.5	35.6	37.4	38.5	40.9	41.3	41.0	41.2	40.6	39.9	39.1	38.9	38.9	37.9	36.7	35.5	35.5	33.8	51.4
	Signal to noise (dB)	9.2	12.1	8.7	11.5	15.1	11.5	12.5	10.9	10.1	11.5	11.5	12.1	12.7	12.0	11.5	10.5	9.0	8.5	8.6	8.3	6.9	5.9	5.9	7.0	6.4	9.5
	Uncertainty (dB)	1.3	1.3	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	0.9	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	1.0	1.2	1.3	1.2	1.1	0.9
	PWL (dBA)	63.5	69.3	69.9	77.1	81.8	81.4	84.2	85.5	87.5	89.4	90.5	92.9	93.3	93.0	93.1	92.5	91.9	91.1	90.9	90.8	89.9	88.6	87.5	87.5	85.8	103.4
13.0	Turbine ON (dBA)	12.1	18.2	20.4	24.7	30.0	28.7	31.0	34.0	36.5	37.3	38.7	40.4	41.3	41.3	42.1	41.7	41.2	40.4	39.9	39.2	38.4	37.3	36.0	35.3	34.3	51.9
	Background (dBA)	8.5	6.0	9.5	14.3	15.1	18.9	20.7	22.5	25.5	26.4	27.7	28.9	28.2	29.2	30.0	30.3	31.3	31.2	31.0	31.4	31.7	31.6	30.9	29.4	28.5	42.4
	Turbine ON - background adj (dBA)	9.6	18.0	20.0	24.3	29.9	28.2	30.5	33.6	36.1	37.0	38.3	40.1	41.1	41.0	41.8	41.4	40.7	39.9	39.3	38.4	37.4	36.0	34.4	34.0	32.9	51.4
	Signal to noise (dB)	3.6	12.2	10.9	10.4	14.9	9.8	10.3	11.5	11.0	11.0	11.0	11.6	13.1	12.1	12.0	11.4	9.9	9.2	8.9	7.8	6.7	5.7	5.1	5.9	5.8	9.6
	Uncertainty (dB)	2.9	1.2	1.2	1.1	0.9	1.0	0.9	1.0	1.0	0.9	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	1.0	1.2	1.3	1.3	1.1	0.9
	PWL (dBA)	61.5	69.9	72.0	76.3	81.8	80.2	82.5	85.6	88.1	88.9	90.3	92.1	93.1	93.0	93.7	93.3	92.7	91.9	91.2	90.4	89.3	87.9	86.3	85.9	84.9	103.4
13.5	Turbine ON (dBA)	12.1	17.8	18.9	24.4	29.4	29.9	31.7	33.8	35.3	37.1	38.6	40.4	40.9	41.2	41.1	40.7	40.1	39.4	38.9	38.4	37.7	36.9	35.6	35.8	34.1	51.4
	Background (dBA)	1.5	4.5	12.1	16.4	19.4	20.8	20.6	24.0	25.3	27.3	26.2	27.7	28.5	28.5	29.1	29.9	30.9	30.7	31.2	31.6	32.6	32.4	31.6	30.0	28.9	42.5
	Turbine ON - background adj (dBA)	11.7	17.6	17.9	23.7	28.9	29.3	31.3	33.3	34.8	36.6	38.3	40.1	40.7	41.0	40.8	40.3	39.5	38.8	38.1	37.4	36.1	34.9	33.4	34.5	32.6	50.8
	Signal to noise (dB)	10.6	13.3	6.8	8.0	10.0	9.0	11.1	9.8	10.0	9.8	12.4	12.6	12.5	12.7	12.0	10.8	9.2	8.7	7.7	6.8	5.1	4.5	4.0	5.8	5.2	8.9
	Uncertainty (dB)	1.1	1.2	1.3	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.9	1.1	1.4	1.6	1.2	1.2	0.8
	PWL (dBA)	63.7	69.5	69.9	75.6	80.9	81.2	83.3	85.3	86.8	88.6	90.3	92.1	92.7	92.9	92.8	92.2	91.5	90.7	90.0	89.4	88.1	86.9	85.4	86.4	84.5	102.7
14.0	Turbine ON (dBA)	13.1	18.3	20.1	24.3	30.1	30.5	31.7	33.4	35.4	37.4	38.6	40.5	40.8	40.9	41.3	41.0	41.1	40.0	39.9	39.5	39.2	37.8	36.6	36.4	34.8	51.8
	Background (dBA)	3.4	6.1	7.4	12.7	13.8	18.2	21.5	23.2	25.0	25.4	26.6	28.3	28.8	29.4	29.6	30.6	31.3	31.5	31.5	31.8	32.4	32.4	31.3	29.6	28.8	42.6
	Turbine ON - background adj (dBA)	12.6	18.0	19.8	24.0	30.0	30.2	31.3	32.9	35.0	37.1	38.3	40.3	40.5	40.6	41.0	40.6	40.6	39.3	39.3	38.7	38.2	36.4	35.1	35.4	33.5	51.3
	Signal to noise (dB)	9.8	12.2	12.7	11.7	16.3	12.3	10.2	10.2	10.5	12.0	12.0	12.3	11.9	11.5	11.7	10.4	9.8	8.5	8.5	7.7	6.8	5.5	5.3	6.8	6.0	9.2
	Uncertainty (dB)	1.5	1.0	1.1	1.0	1.0	1.1	1.1	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.8	0.9	0.9	0.9	0.9	1.1	1.3	1.4	1.3	1.1	0.9
	PWL (dBA)	64.6	70.0	71.8	76.0	82.0	82.2	83.2	84.9	87.0	89.1	90.3	92.2	92.4	92.6	93.0	92.6	92.6	91.3	91.2	90.6	90.2	88.3	87.1	87.4	85.5	103.2

Table C.02 Detailed apparent sound power level data at 10m height

Project: Niagara Wind Farm - Turbine T46 - IEC 61400-11 Measurement

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1/3 Octave values marked with brackets [] denote less than 3 dB difference between Turbine ON and Background

Overall levels marked with an asterisk * denote 3 to 6 dB difference between Turbine ON and Background, while Overall values with less than 3 dB difference between Turbine ON and Background are not reported

Wind Bin (m/s)	Parameter	1/3 Octave Band (Hz)																			Overall						
		20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250		1600	2000	2500	3150	4000	5000
5.0	Turbine ON (dBA)	1.6	5.2	12.6	16.3	25.7	24.1	27.2	29.1	31.7	33.3	34.8	36.5	35.7	33.9	33.4	32.4	32.8	32.3	31.9	31.3	30.5	29.1	27.2	25.3	21.1	45.2
	Background (dBA)	-4.5	-1.0	3.7	10.6	15.9	14.8	18.7	23.7	22.3	22.9	26.0	26.9	27.4	26.2	26.7	28.1	30.0	29.8	28.0	26.2	24.3	23.0	23.0	20.4	18.5	38.8
	Turbine ON - background adj (dBA)	0.4	4.0	12.0	14.9	25.3	23.6	26.6	27.6	31.2	32.9	34.2	36.0	35.0	33.1	32.4	30.5	[29.8]	[29.3]	29.6	29.6	29.3	27.9	25.2	23.6	[18.1]	44.0
	Signal to noise (dB)	6.1	6.2	8.9	5.6	9.8	9.3	8.5	5.4	9.5	10.4	8.8	9.6	8.4	7.7	6.7	4.4	2.8	2.5	3.9	5.1	6.2	6.1	4.2	4.9	2.7	6.4
	Uncertainty (dB)	1.5	1.4	1.0	1.2	0.9	0.9	1.0	1.2	0.9	0.9	0.8	0.8	0.8	0.9	0.9	1.2	1.6	1.6	1.3	1.1	1.0	1.1	1.4	1.3	1.9	1.0
	PWL (dBA)	52.4	56.0	63.9	66.8	77.2	75.5	78.5	79.6	83.2	84.9	86.1	88.0	87.0	85.1	84.3	82.4	[81.8]	[81.3]	81.5	81.6	81.2	79.9	77.1	75.5	[70.1]	96.0
6.0	Turbine ON (dBA)	11.0	12.9	17.8	24.0	24.7	29.1	29.7	32.8	35.8	37.1	38.3	41.4	39.4	38.4	37.3	35.6	35.5	35.1	35.0	35.5	35.1	34.4	33.2	34.5	31.5	49.3
	Background (dBA)	0.9	2.7	5.2	10.9	16.8	16.5	19.0	21.4	23.5	24.6	27.3	29.2	29.4	28.7	28.8	29.7	30.9	30.1	28.9	27.9	27.3	26.8	26.1	24.1	23.0	40.4
	Turbine ON - background adj (dBA)	10.6	12.4	17.6	23.8	24.0	28.8	29.4	32.5	35.5	36.9	37.9	41.1	38.9	38.0	36.7	34.3	33.7	33.5	33.8	34.7	34.3	33.5	32.3	34.1	30.8	48.7
	Signal to noise (dB)	10.1	10.1	12.6	13.1	8.0	12.6	10.7	11.4	12.3	12.5	11.0	12.2	10.0	9.7	8.6	5.8	4.6	5.0	6.1	7.7	7.8	7.6	7.2	10.5	8.5	8.8
	Uncertainty (dB)	1.5	1.4	1.2	0.9	1.1	0.9	0.9	0.9	0.9	0.9	0.7	0.8	0.8	0.8	0.8	1.0	1.1	1.1	1.0	0.9	1.0	1.1	1.2	1.4	1.7	0.9
	PWL (dBA)	62.5	64.4	69.5	75.7	75.9	80.8	81.3	84.5	87.5	88.9	89.9	93.1	90.9	89.9	88.7	86.2	85.7	85.5	85.8	86.7	86.3	85.5	84.3	86.1	82.8	100.6
7.0	Turbine ON (dBA)	13.6	16.1	20.6	24.9	27.7	30.6	32.5	34.6	37.3	38.9	40.0	41.9	40.8	39.9	38.7	37.6	37.0	36.7	37.0	37.1	36.9	36.2	35.4	38.6	34.0	50.9
	Background (dBA)	3.7	9.2	12.7	15.4	15.9	19.4	21.5	22.1	25.3	26.4	27.1	28.8	29.5	29.5	29.9	30.5	31.1	30.9	30.5	30.7	30.7	30.4	29.4	28.2	27.3	41.9
	Turbine ON - background adj (dBA)	13.2	15.2	19.8	24.4	27.4	30.2	32.1	34.4	37.0	38.6	39.8	41.7	40.5	39.5	38.1	36.6	35.8	35.4	35.9	36.0	35.7	34.9	34.1	38.2	33.0	50.3
	Signal to noise (dB)	9.9	7.0	7.9	9.5	11.8	11.2	11.0	12.6	11.9	12.5	12.9	13.1	11.3	10.4	8.8	7.1	6.0	5.8	6.5	6.4	6.2	5.9	6.0	10.4	6.8	9.0
	Uncertainty (dB)	1.2	1.3	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.1	1.1	0.9	1.0	0.8
	PWL (dBA)	65.1	67.1	71.8	76.4	79.4	82.2	84.1	86.3	89.0	90.6	91.8	93.6	92.4	91.5	90.0	88.6	87.7	87.4	87.9	88.0	87.7	86.9	86.1	90.2	85.0	102.3
8.0	Turbine ON (dBA)	12.7	16.9	19.7	26.4	29.1	30.1	32.1	34.4	36.7	38.4	39.4	41.3	41.6	40.7	40.1	39.3	38.9	38.3	38.2	38.3	37.7	37.0	35.9	36.2	34.4	51.3
	Background (dBA)	4.5	5.4	9.1	13.7	14.6	17.7	20.3	22.7	25.2	25.8	26.8	28.4	28.4	28.7	29.5	30.1	30.7	30.7	30.3	30.5	30.7	29.5	28.2	27.7	41.7	
	Turbine ON - background adj (dBA)	12.0	16.6	19.3	26.2	28.9	29.9	31.8	34.1	36.3	38.2	39.1	41.1	41.4	40.4	39.7	38.7	38.1	37.4	37.4	37.6	36.7	35.8	34.8	35.5	33.4	50.8
	Signal to noise (dB)	8.2	11.5	10.5	12.7	14.5	12.4	11.9	11.7	11.5	12.7	12.6	12.9	13.2	12.0	10.6	9.2	8.1	7.5	7.9	7.8	7.0	6.3	6.4	8.0	6.7	9.6
	Uncertainty (dB)	1.3	1.2	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.7	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	1.1	1.1	1.0	1.1	0.8
	PWL (dBA)	64.0	68.6	71.2	78.1	80.9	81.8	83.8	86.1	88.3	90.1	91.1	93.0	93.3	92.4	91.7	90.7	90.1	89.4	89.4	89.5	88.6	87.8	86.7	87.5	85.3	102.8
9.0	Turbine ON (dBA)	12.0	17.9	19.6	24.6	29.8	29.6	31.7	33.7	35.9	37.1	38.7	40.4	41.1	41.2	41.6	41.3	40.8	40.0	39.6	39.1	38.4	37.4	36.1	35.9	34.4	51.8
	Background (dBA)	6.5	6.0	10.0	14.7	16.6	19.4	20.7	23.2	25.6	26.4	27.2	28.7	28.7	29.2	29.8	30.5	31.5	31.3	31.2	31.7	32.3	32.2	31.3	29.8	28.8	42.6
	Turbine ON - background adj (dBA)	10.5	17.6	19.1	24.2	29.6	29.2	31.3	33.3	35.4	36.8	38.4	40.1	40.9	41.0	41.3	40.9	40.3	39.4	38.9	38.2	37.2	35.8	34.4	34.7	33.0	51.2
	Signal to noise (dB)	5.5	11.9	9.7	10.0	13.2	10.2	11.0	10.5	10.3	10.7	11.6	11.8	12.4	12.0	11.8	10.8	9.4	8.8	8.3	7.4	6.1	5.2	4.8	6.1	5.6	9.2
	Uncertainty (dB)	1.5	1.1	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.9	0.9	1.2	1.2	1.1	1.1	0.8
	PWL (dBA)	62.5	69.6	71.1	76.2	81.5	81.2	83.3	85.3	87.4	88.7	90.4	92.1	92.9	92.9	93.3	92.9	92.2	91.4	90.8	90.2	89.1	87.7	86.3	86.6	85.0	103.2
10.0	Turbine ON (dBA)	12.2	17.6	19.0	24.5	29.7	29.5	31.2	33.1	34.8	36.9	37.8	39.9	40.6	40.6	41.3	41.2	41.0	40.3	39.9	39.2	38.6	37.4	36.2	36.1	34.4	51.6
	Background (dBA)	3.7	6.4	7.6	13.5	15.3	17.3	20.0	21.9	25.2	25.2	25.9	27.5	27.9	28.2	28.7	29.7	30.3	30.3	30.7	30.8	31.2	30.9	30.0	28.5	27.8	41.5
	Turbine ON - background adj (dBA)	11.6	17.2	18.6	24.1	29.6	29.3	30.9	32.8	34.3	36.6	37.5	39.6	40.4	40.4	41.0	40.9	40.7	39.8	39.3	38.6	37.7	36.3	35.0	35.3	33.3	51.1
	Signal to noise (dB)	8.5	11.2	11.4	11.0	14.5	12.3	11.2	11.2	9.7	11.7	11.9	12.4	12.8	12.4	12.6	11.5	10.8	10.0	9.2	8.5	7.4	6.5	6.2	7.6	6.6	10.0
	Uncertainty (dB)	1.3	1.2	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.9	1.1	1.2	1.0	1.0	0.8
	PWL (dBA)	63.5	69.2	70.6	76.1	81.5	81.2	82.8	84.8	86.3	88.6	89.4	91.6	92.4	92.4	93.0	92.9	92.6	91.8	91.3	90.5	89.6	88.3	87.0	87.3	85.3	103.1

Table C.03 Type B measurement uncertainty summary

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Overall Equipment Uncertainties		
	Typical values	Used values
Calibration	0.2 dB	0.2 dB
Board	0.3 dB	0.3 dB
Distance	0.1 dB	0.1 dB
Air absorption	0 dB	0 dB
Weather	0.5 dB	0.5 dB

1/3 Octave Band Uncertainties		
Frequency (Hz)	Microphone Uncertainty	Overall (including overall equipment Uncertainties)
20	0.8 dB	1 dB
25	0.8 dB	1 dB
31.5	0.5 dB	0.8 dB
40	0.5 dB	0.8 dB
50	0.5 dB	0.8 dB
63	0.5 dB	0.8 dB
80	0.5 dB	0.8 dB
100	0.5 dB	0.8 dB
125	0.5 dB	0.8 dB
160	0.5 dB	0.8 dB
200	0.3 dB	0.7 dB
250	0.3 dB	0.7 dB
315	0.3 dB	0.7 dB
400	0.3 dB	0.7 dB
500	0.3 dB	0.7 dB
630	0.3 dB	0.7 dB
800	0.3 dB	0.7 dB
1000	0.3 dB	0.7 dB
1250	0.3 dB	0.7 dB
1600	0.3 dB	0.7 dB
2000	0.3 dB	0.7 dB
2500	0.5 dB	0.8 dB
3150	0.5 dB	0.8 dB
4000	0.5 dB	0.8 dB
5000	0.5 dB	0.8 dB
6300	0.5 dB	0.8 dB
8000	0.5 dB	0.8 dB
10000	1.3 dB	1.4 dB

Table C.04 Detailed measurement uncertainty at hub height

Project: Niagara Region Wind Farm - Turbine T46 - IEC 61400-11 Measurement
 Report ID: 16227.00.T46.RP1

Wind Bin (m/s)	Parameter	Average Wind Speed (m/s)	# of data points	Parameter	1/3 Octave Band (Hz)																Overall												
					20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630		800	1000	1250	1600	2000	2500	3150	4000	5000			
7.0	Turbine ON	7.00	79	Average (dBA)	0.0	4.1	12.8	13.9	27.5	21.6	25.7	28.2	31.0	32.2	33.7	34.9	33.8	31.8	31.6	31.4	32.2	31.9	31.3	30.5	29.6	28.3	26.4	24.8	20.4	44.0			
				Uncertainty A (dB)	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3		0.4		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8		0.8	0.8	
	Background	7.03	41	Average (dBA)	-5.7	-1.9	3.2	10.9	15.9	14.9	18.2	20.0	21.3	22.0	23.0	25.4	26.7	25.8	26.4	28.0	30.6	30.3	28.2	26.2	24.0	22.8	22.9	19.9	18.2	38.5			
				Uncertainty A (dB)	1.0	0.6	0.7	1.0	1.1	0.7	0.5	0.5	0.7	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.7	0.6	0.5	0.6	0.6	0.7	0.5	0.8		0.7		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8		0.8		
7.5	Turbine ON	7.50	84	Average (dBA)	0.7	4.7	12.5	16.6	23.8	23.4	26.6	29.3	31.8	33.5	35.0	36.7	36.0	34.2	33.7	32.7	32.9	32.3	31.9	31.3	30.6	29.2	27.3	25.4	21.1	45.3			
				Uncertainty A (dB)	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		0.3		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8		0.8	0.8	
	Background	7.48	50	Average (dBA)	1.4	1.2	1.0	1.3	1.4	1.0	0.9	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.1	1.0	1.1	1.1	38.6		
				Uncertainty A (dB)	1.1	0.7	0.6	0.7	0.9	0.6	0.4	0.8	0.7	0.5	0.7	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.5	0.7		0.6	
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8		0.8	
8.0	Turbine ON	7.97	58	Average (dBA)	4.6	8.4	13.5	19.0	24.3	27.6	26.8	30.0	32.9	34.6	36.1	38.3	37.5	35.7	35.0	33.0	33.2	32.9	32.8	32.4	31.5	30.3	28.3	25.7	22.0	46.4			
				Uncertainty A (dB)	0.7	0.8	0.7	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3		0.3	0.4	
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8		0.8	0.8	0.8
	Background	7.95	22	Average (dBA)	-3.9	-0.9	4.0	10.9	16.6	14.8	18.9	22.7	23.0	23.3	26.8	26.9	27.1	26.3	26.4	27.7	29.5	29.2	27.6	26.0	24.3	23.2	23.1	20.3	18.4	39.8			
				Uncertainty A (dB)	1.6	0.9	0.8	1.2	1.2	0.7	0.6	1.3	0.9	0.6	1.1	1.1	1.0	1.0	0.9	0.7	0.7	0.7	0.7	0.7	0.7	0.8	1.0	1.2	0.9		1.4	1.3	
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8		0.8	0.8	
8.5	Turbine ON	8.46	13	Average (dBA)	1.2	1.4	1.0	0.8	0.7	0.7	0.6	0.4	0.5	0.4	0.4	0.3	0.4	0.4	0.5	0.4	0.4	0.3	0.4	0.4	0.4	0.5	0.7	0.6	0.5	0.6	48.1		
				Uncertainty A (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8		0.8	0.8
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8		0.8	0.8
	Background	8.50	24	Average (dBA)	-0.5	-2.2	3.9	9.8	15.3	16.4	18.4	20.8	23.3	23.8	27.7	29.4	29.8	28.9	28.8	29.8	29.8	28.8	28.8	27.3	26.3	25.5	25.2	24.6	22.4	21.4	39.8		
				Uncertainty A (dB)	2.1	0.9	1.0	0.9	1.1	1.0	0.6	0.7	1.1	0.8	1.2	1.2	1.2	1.2	0.9	0.9	0.7	0.5	0.5	0.8	1.1	1.3	0.9	1.3	1.5	1.5			
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8		0.8	0.8
9.0	Turbine ON	9.02	12	Average (dBA)	11.4	13.9	17.9	25.0	25.7	30.4	31.3	34.6	36.8	38.5	39.3	43.0	39.2	38.9	37.2	35.4	36.0	35.6	35.6	36.3	35.9	35.4	34.5	37.1	33.7	50.2			
				Uncertainty A (dB)	1.2	0.9	0.8	1.2	0.8	0.6	0.4	0.5	0.7	0.6	0.4	0.7	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.5	0.6		1.2	1.0	
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8		0.8	0.8	0.8
	Background	8.98	15	Average (dBA)	-2.0	0.3	4.5	10.8	18.8	16.7	19.4	21.8	23.5	25.4	27.1	28.9	29.2	28.1	28.5	29.8	31.6	30.9	29.7	27.9	27.0	26.1	25.1	22.8	21.9	40.5			
				Uncertainty A (dB)	1.9	1.4	1.2	1.3	2.0	1.2	0.7	0.8	1.0	0.7	0.9	1.0	0.9	0.7	0.6	0.7	0.7	0.7	0.6	0.8	1.1	1.3	1.1	1.4	1.7		1.7		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8		0.8	0.8	0.8
9.5	Turbine ON	9.55	17	Average (dBA)	15.1	16.1	20.3	23.6	27.5	29.9	31.6	33.6	37.2	39.3	40.5	42.8	41.1	39.6	38.3	37.2	36.7	36.8	36.6	37.5	37.2	36.3	35.6	36.8	34.7	50.9			
				Uncertainty A (dB)	1.0	0.9	1.0	0.5	0.6	0.6	0.5	0.4	0.4	0.5	0.5	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.5	0.4	0.6	0.6	0.6	0.6	0.5		0.3		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8		0.8	0.8	0.8
	Background	9.47	10	Average (dBA)	1.4	1.4	1.3	0.9	1.0	1.0	1.0	0.9	0.9	1.0	0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	42.1		
				Uncertainty A (dB)	5.2	8.0	7.3	11.9	14.7	18.3	20.9	22.3	24.5	26.1	28.4	31.2	30.6	30.6	30.3	30.7	32.8	31.8	30.7	29.9	29.5	29.1	28.2	26.6	25.5	2.1		2.5	
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8		0.8	0.8

Table C.04 Detailed measurement uncertainty at hub height

Project: Niagara Region Wind Farm - Turbine T46 - IEC 61400-11 Measurement
 Report ID: 16227.00.T46.RP1

Wind Bin (m/s)	Parameter	Average Wind Speed (m/s)	# of data points	Parameter	1/3 Octave Band (Hz)																				Overall								
					20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600		2000	2500	3150	4000	5000			
10.0	Turbine ON	10.03	18	Average (dBA)	13.1	15.6	19.3	24.4	28.4	31.6	32.9	34.8	38.2	39.3	40.2	41.9	40.1	39.0	37.3	36.8	36.4	36.2	36.4	36.5	35.8	35.0	34.2	38.0	33.6	50.5			
				Uncertainty A (dB)	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.4	0.3	0.5	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4		0.4	0.8	0.4
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7		0.8	0.8	0.8
	Background	10.01	11	Combined Uncertainty (dB)	1.2	1.3	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9		1.2	0.9	
				Average (dBA)	6.7	14.2	17.5	19.7	18.7	20.8	23.8	22.9	25.3	27.0	27.2	28.9	29.7	29.5	29.6	30.0	31.0	31.2	30.7	30.7	31.0	30.9	30.0	28.8	27.7		42.2		
				Uncertainty A (dB)	2.7	3.5	3.1	2.8	1.3	1.5	1.7	0.9	0.6	0.6	0.7	0.8	0.7	0.5	0.6	0.7	0.8	0.9	0.8	0.8	1.2	1.4	1.5	1.5	1.3				
10.5	Turbine ON	10.54	31	Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8			
				Combined Uncertainty (dB)	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.9	1.1	0.9	
				Average (dBA)	2.1	2.7	8.1	11.5	15.0	18.0	20.4	21.9	25.6	26.3	27.0	28.4	29.5	29.2	30.0	30.6	31.0	30.7	30.6	30.8	30.8	30.3	29.3	28.4	27.4	41.9			
	Background	10.51	19	Uncertainty A (dB)	1.3	0.6	0.9	0.5	0.7	0.5	0.4	0.3	0.5	0.4	0.3	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.6	0.7	0.8	0.8	0.9	0.7			
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8		
				Combined Uncertainty (dB)	1.6	1.2	1.2	0.9	1.0	1.0	0.9	0.9	0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.9	1.1	1.1	1.2	1.1			
11.0	Turbine ON	10.95	35	Average (dBA)	14.4	17.0	21.4	25.7	28.9	30.3	32.7	34.9	37.1	38.5	39.7	41.9	41.4	40.5	39.6	38.5	38.0	37.2	37.6	37.7	37.5	36.9	36.0	37.7	34.5	51.2			
				Uncertainty A (dB)	0.9	0.6	0.6	0.4	0.4	0.3	0.4	0.3	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.6	0.3		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	
	Background	10.96	16	Combined Uncertainty (dB)	1.3	1.2	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.9	0.9	1.0	0.8			
				Average (dBA)	1.6	3.6	7.1	12.9	13.6	19.0	19.7	21.6	25.3	25.9	26.4	27.6	27.7	29.0	29.5	30.0	30.3	30.3	30.0	30.4	30.2	30.4	30.2	29.0	27.6	27.1	41.3		
				Uncertainty A (dB)	0.9	0.7	0.7	0.7	0.6	0.9	0.4	0.6	0.5	0.5	0.4	0.4	0.3	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.7	0.7	0.8	0.9	1.0	0.6			
11.5	Turbine ON	11.49	16	Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8			
				Combined Uncertainty (dB)	1.5	1.3	1.1	1.0	1.0	0.9	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	1.0	1.0	1.0	0.9			
				Average (dBA)	12.5	16.3	19.7	27.6	28.3	30.8	32.3	35.0	37.0	38.5	39.9	41.4	41.5	40.4	39.9	38.8	38.2	37.8	37.9	37.9	37.2	36.6	36.5	36.8	34.5	51.2			
	Background	11.54	13	Uncertainty A (dB)	1.1	0.9	0.8	0.5	0.5	0.6	0.5	0.4	0.3	0.3	0.3	0.4	0.3	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.7	0.4			
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8		
				Combined Uncertainty (dB)	2.5	2.1	1.6	1.3	1.0	1.3	1.1	1.1	1.1	0.9	0.8	0.9	0.9	0.9	0.9	0.8	0.9	0.9	0.9	1.0	1.0	1.2	1.2	1.2	1.0				
12.0	Turbine ON	12.02	12	Average (dBA)	13.1	16.8	19.1	25.5	28.8	29.9	32.2	33.7	36.7	38.4	39.4	41.5	41.5	40.5	39.4	39.2	38.9	38.4	38.0	38.5	37.7	37.2	36.0	34.9	34.1	51.2			
				Uncertainty A (dB)	1.0	0.7	1.1	0.5	0.7	0.8	0.6	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.6	0.6	0.4	0.4		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	
	Background	12.07	15	Combined Uncertainty (dB)	1.5	1.2	1.4	0.9	1.0	1.1	1.0	0.9	0.9	0.9	0.9	0.8	0.9	0.8	0.8	0.8	0.9	0.9	0.8	0.8	0.8	0.8	0.9	1.0	1.0	0.9	0.9		
				Average (dBA)	2.5	4.1	7.1	12.3	14.1	16.9	19.9	22.6	24.6	25.6	26.2	27.6	27.5	28.0	28.6	29.3	29.6	29.7	29.2	29.6	29.9	29.8	28.7	27.3	27.0	40.8			
				Uncertainty A (dB)	1.6	1.0	0.8	0.7	0.5	0.6	0.4	0.6	0.4	0.4	0.4	0.5	0.3	0.3	0.5	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.3			
12.5	Turbine ON	12.50	22	Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8			
				Combined Uncertainty (dB)	1.2	1.2	1.1	0.9	1.0	1.0	1.0	1.0	1.0	1.0	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8		
				Average (dBA)	3.0	5.7	10.3	14.2	15.0	18.5	20.0	23.0	26.1	26.3	27.6	29.3	29.0	29.5	30.1	30.7	31.8	31.5	31.3	31.6	32.3	32.4	31.2	29.8	28.7	42.7			
	Background	12.57	16	Uncertainty A (dB)	1.1	1.2	1.2	1.2	0.8	0.7	0.4	0.4	0.5	0.3	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.9	0.9	0.9	0.9	0.6				
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8		
				Combined Uncertainty (dB)	1.5	1.5	1.5	1.4	1.2	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	1.1	1.2	1.2	1.2	1.0		

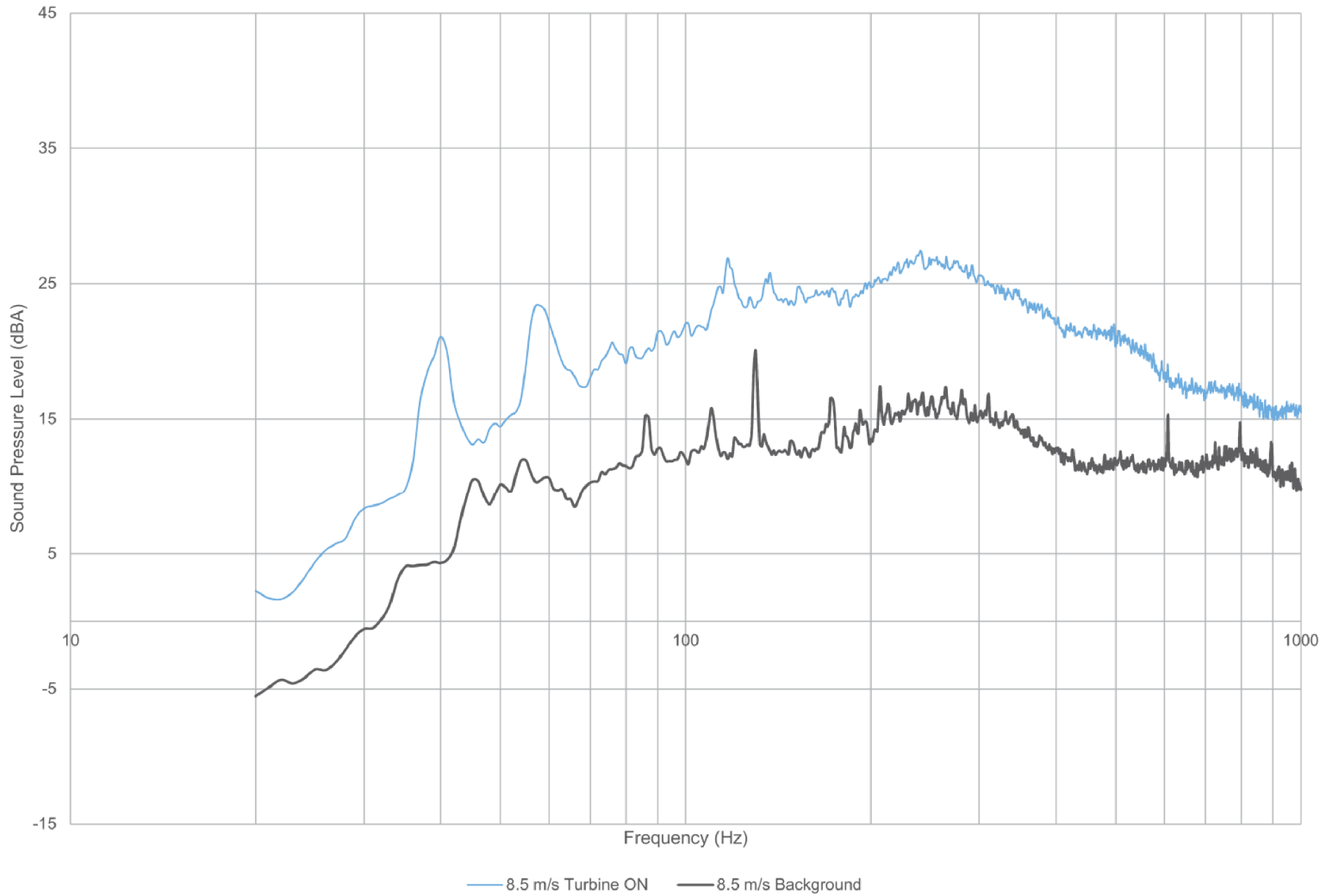
Table C.04 Detailed measurement uncertainty at hub height

Project: Niagara Region Wind Farm - Turbine T46 - IEC 61400-11 Measurement
 Report ID: 16227.00.T46.RP1

Wind Bin (m/s)	Parameter	Average Wind Speed (m/s)	# of data points	Parameter	1/3 Octave Band (Hz)																			Overall									
					20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250		1600	2000	2500	3150	4000	5000			
13.0	Turbine ON	13.02	23	Average (dBA)	12.1	18.3	20.5	24.7	30.0	28.7	30.9	34.0	36.5	37.3	38.7	40.4	41.3	41.3	42.1	41.7	41.2	40.5	39.9	39.2	38.4	37.3	35.9	35.2	34.2	52.0			
				Uncertainty A (dB)	0.8	0.6	0.8	0.6	0.5	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.3	0.4	0.4	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4		0.5	0.3	
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7		0.8	0.8	0.8
				Combined Uncertainty (dB)	1.3	1.2	1.2	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9		0.9	1.0	0.8
	Background	12.91	15	Average (dBA)	9.8	6.3	9.0	13.9	14.3	18.6	20.7	22.2	25.5	26.2	28.0	29.1	28.2	29.4	30.2	30.4	31.4	31.3	31.0	31.4	31.6	31.5	30.7	29.3	28.4	42.4			
				Uncertainty A (dB)	2.8	1.3	0.9	1.0	0.6	0.7	0.9	0.6	0.4	0.4	0.8	0.6	0.5	0.6	0.6	0.6	0.6	0.7	0.6	0.5	0.6	0.7	0.8	0.9	0.9		0.6		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8		0.8		
13.5	Turbine ON	13.56	20	Average (dBA)	12.1	17.7	18.7	24.4	29.3	30.0	31.8	33.8	35.1	37.0	38.6	40.4	40.9	41.2	41.0	40.5	39.9	39.3	38.7	38.3	37.6	36.8	35.6	35.9	34.1	51.3			
				Uncertainty A (dB)	0.4	0.8	0.7	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.5		0.2		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8		0.8	0.8	
				Combined Uncertainty (dB)	1.1	1.3	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9		1.0	0.8	
	Background	13.47	12	Average (dBA)	1.4	4.4	12.4	16.6	19.7	21.0	20.6	24.0	25.3	27.4	26.1	27.7	28.4	28.4	29.1	29.8	30.8	30.7	31.1	31.6	32.6	32.4	31.7	30.0	28.9	42.5			
				Uncertainty A (dB)	0.9	1.0	2.2	1.6	2.4	1.6	0.9	0.8	0.6	0.9	0.7	0.6	0.6	0.5	0.5	0.6	0.7	0.8	0.8	0.9	1.0	1.0	1.1	1.0	0.8				
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8		0.8		
14.0	Turbine ON	14.10	12	Average (dBA)	13.4	18.5	20.4	24.3	30.3	30.6	31.7	33.3	35.5	37.5	38.6	40.6	40.7	40.9	41.4	41.2	41.4	40.2	40.2	39.8	39.6	38.1	36.9	36.6	34.9	52.0			
				Uncertainty A (dB)	1.3	0.6	1.0	0.7	0.9	1.0	1.0	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.7	0.5	0.6	0.6	0.6	0.7	0.7	0.7		0.8	0.6	
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8		0.8	0.8	
				Combined Uncertainty (dB)	1.6	1.2	1.2	1.1	1.2	1.3	1.3	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.8	0.8	1.0	0.9	0.9	0.9	1.0	1.1	1.1		1.2	1.0	
	Background	13.99	14	Average (dBA)	3.4	6.1	7.4	12.6	13.8	18.3	21.5	23.2	25.0	25.4	26.6	28.3	28.9	29.4	29.7	30.6	31.4	31.6	31.5	31.9	32.5	32.4	31.4	29.7	28.8	42.6			
				Uncertainty A (dB)	1.4	1.3	1.0	0.9	0.7	0.7	1.0	0.8	0.6	0.5	0.5	0.7	0.5	0.6	0.5	0.6	0.7	0.8	0.8	0.9	1.0	1.1	1.1	1.0	0.7				
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8		0.8		
Combined Uncertainty (dB)					1.7	1.6	1.2	1.2	1.1	1.1	1.3	1.1	1.0	1.0	0.9	1.0	0.9	0.9	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.3	1.4	1.3	1.1				

Appendix D Tonality Assessment

8.5 m/s



16227.00.T46.RP1

Scale: NTS
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Reviewed by: PA
Date: Nov 1, 2017
Revision: 1

Project Name

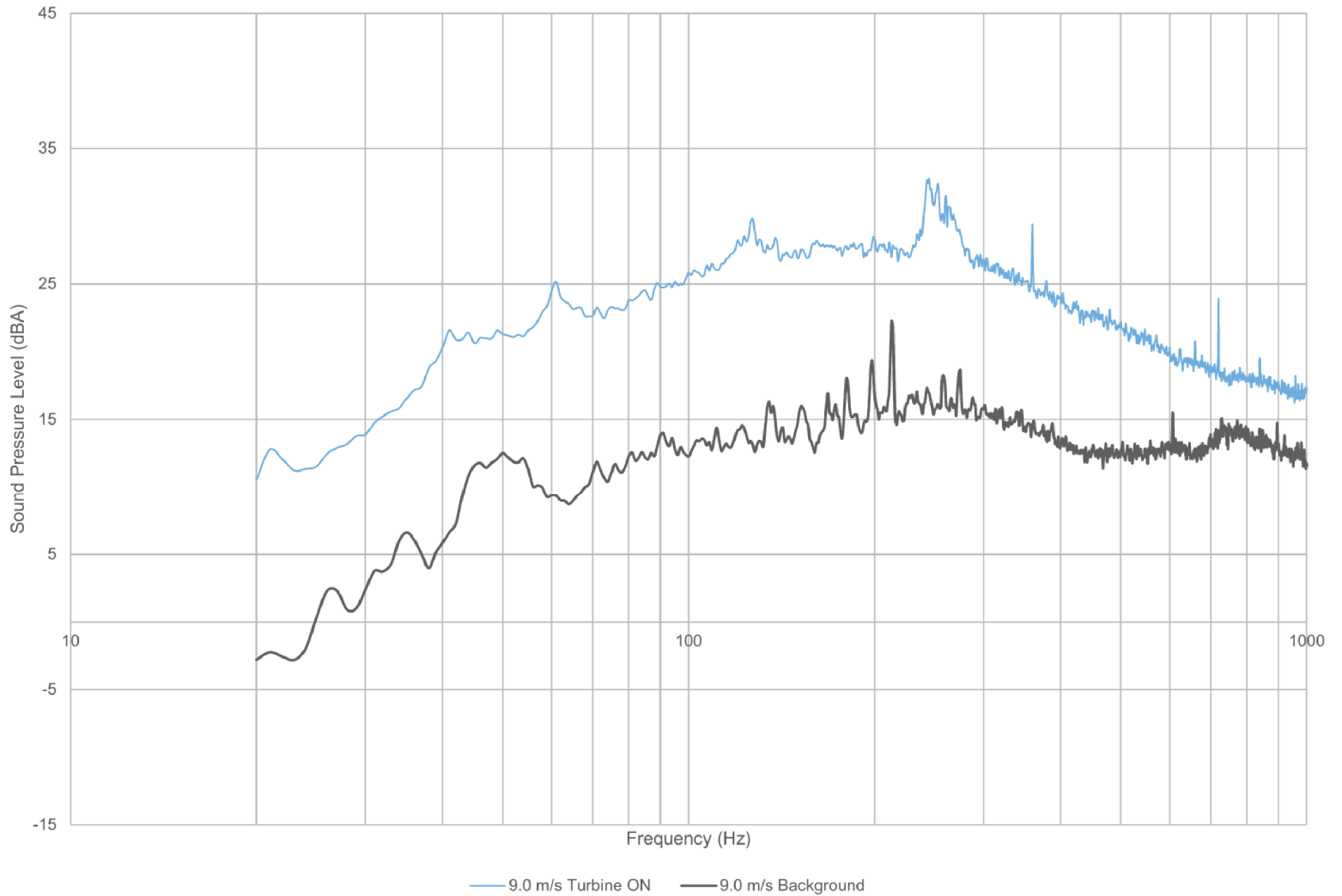
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of narrow band spectra - Turbine ON vs. Background at 8.5 m/s

Figure D.01

9.0 m/s



16227.00.T46.RP1

Scale: NTS
Drawn by: NT
Reviewed by: PA
Date: Nov 1, 2017
Revision: 1

Project Name

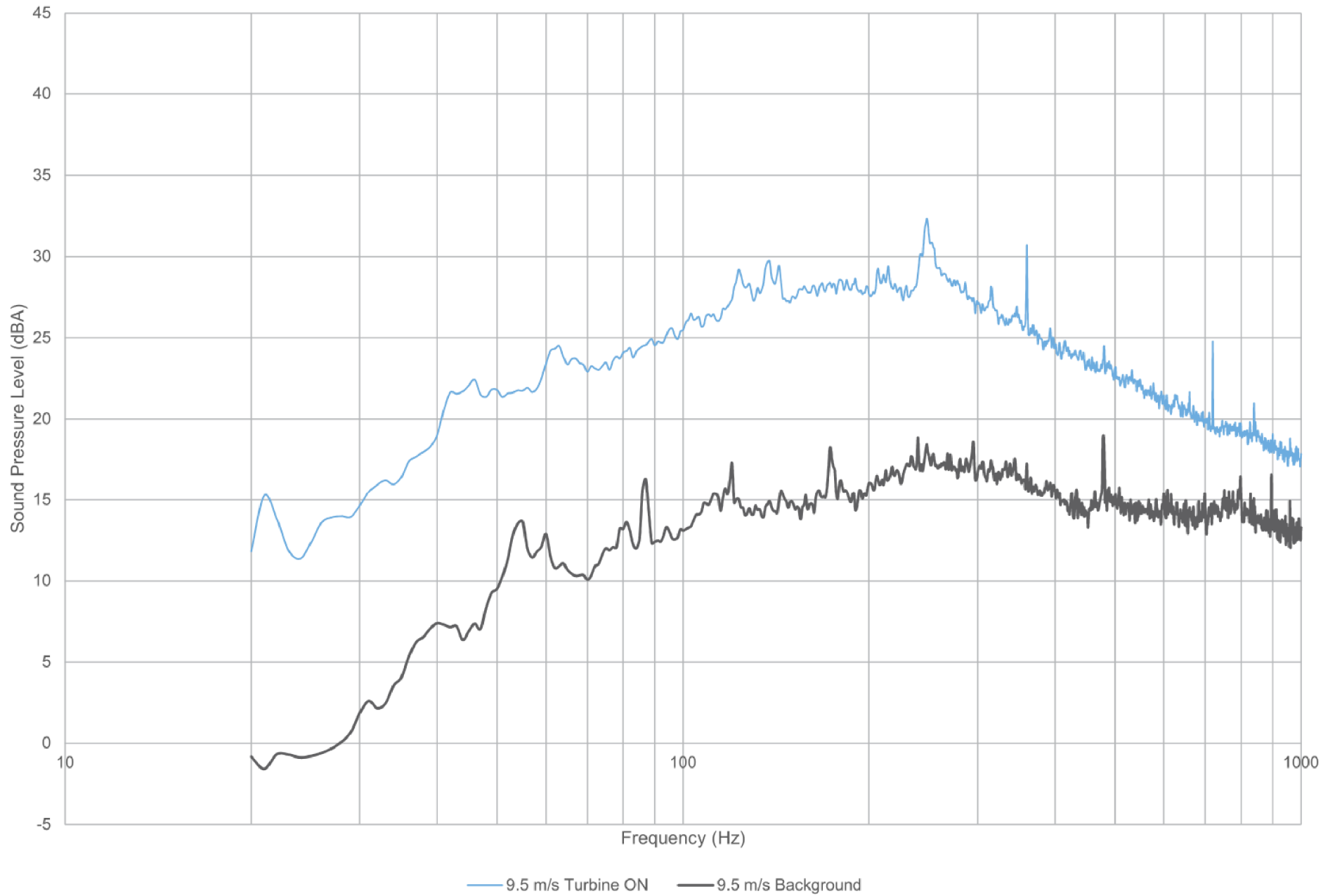
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of narrow band spectra - Turbine ON vs. Background at 9 m/s

Figure D.02

9.5 m/s



16227.00.T46.RP1

Scale: NTS
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Date: Nov 1, 2017
Revision: 1

Project Name

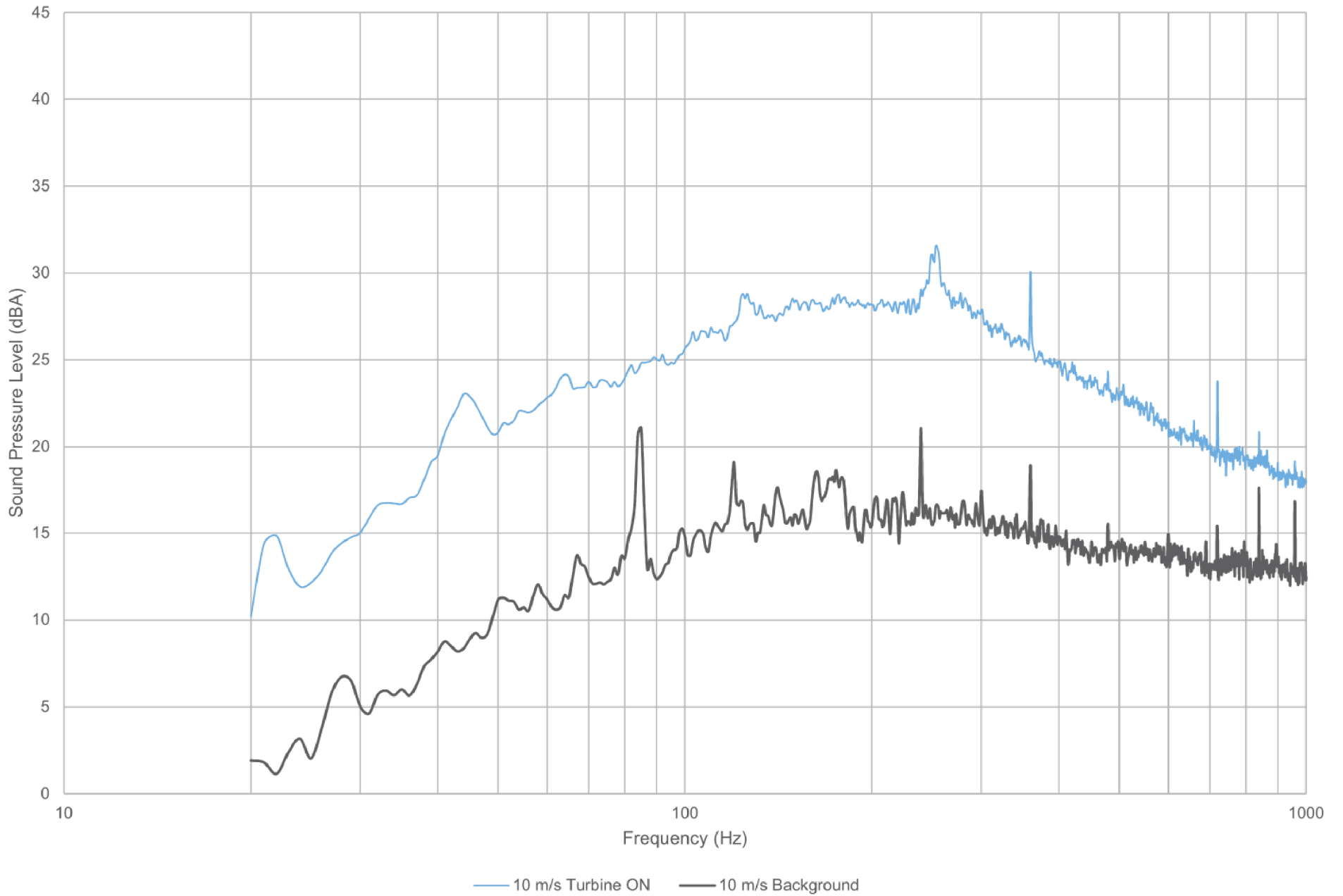
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of narrow band spectra - Turbine ON vs. Background at 9.5 m/s

Figure D.03

10 m/s



16227.00.T46.RP1

Scale: NTS
Drawn by: NT
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Date: Nov 1, 2017
Revision: 1

Project Name

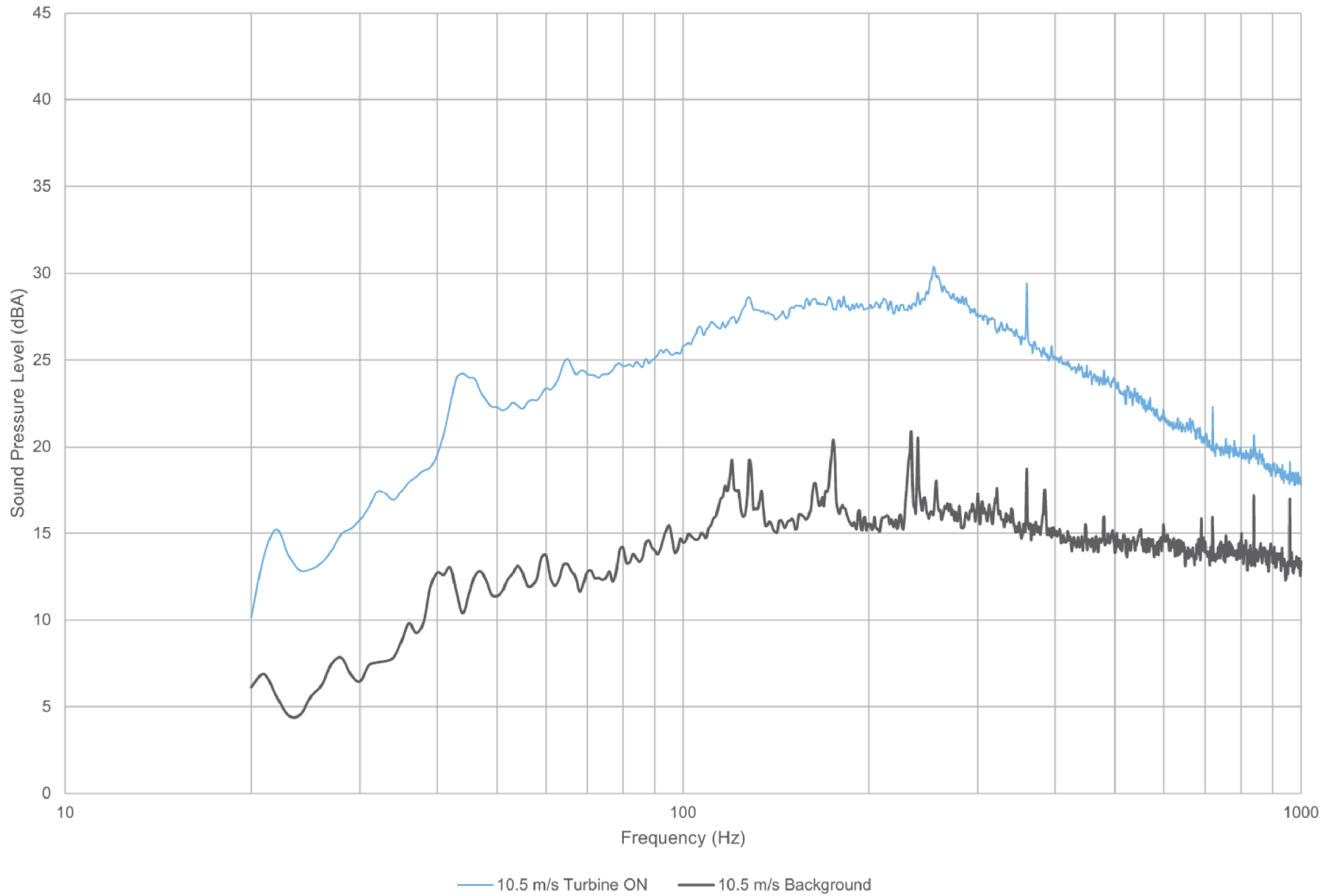
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of narrow band spectra - Turbine ON vs. Background at 10 m/s

Figure D.04

10.5 m/s



16227.00.T46.RP1

Scale: NTS
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Date: Nov 1, 2017
Revision: 1

Project Name

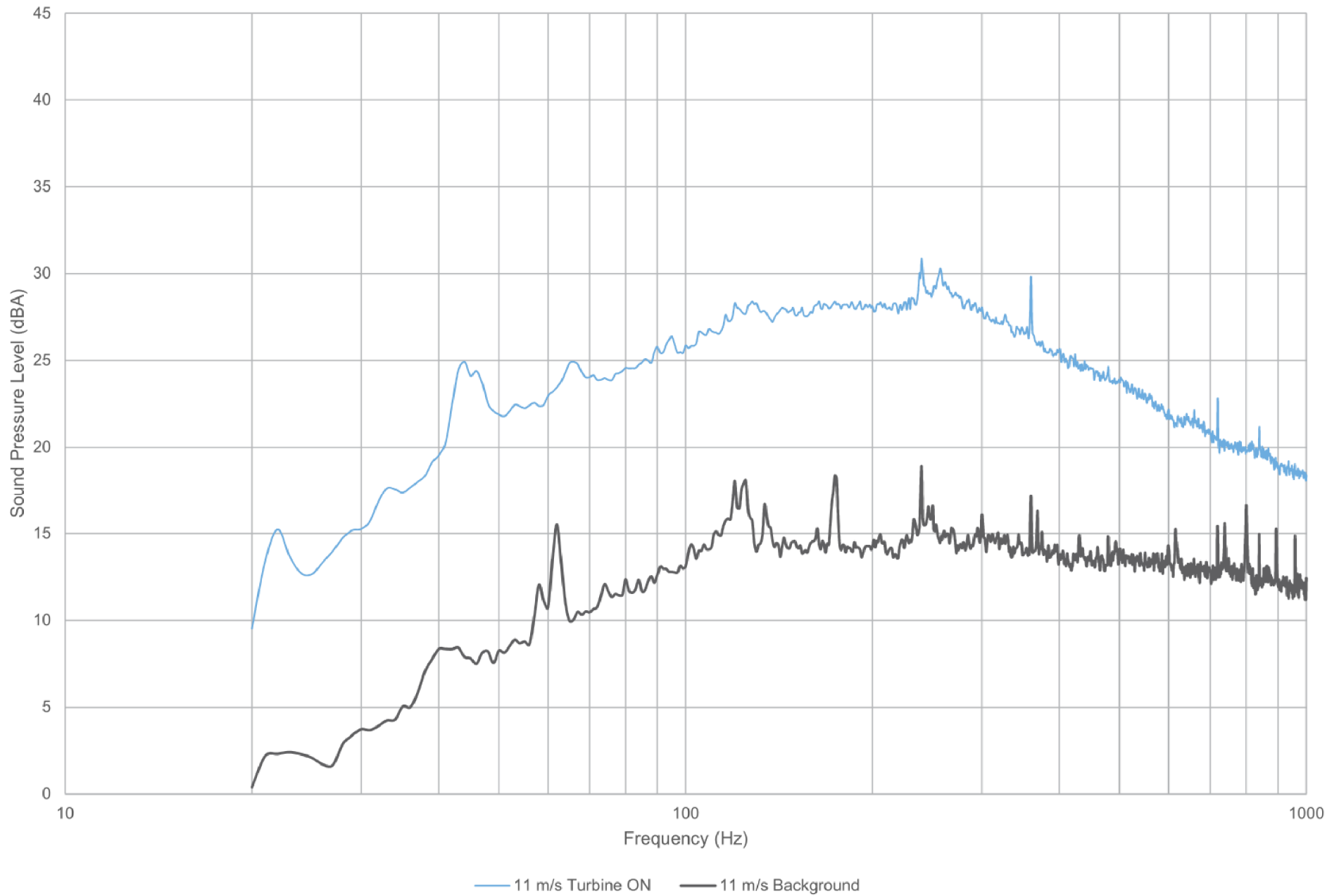
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of narrow band spectra - Turbine ON vs. Background at 10.5 m/s

Figure D.05

11 m/s



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Date: Nov 1, 2017
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Project Name

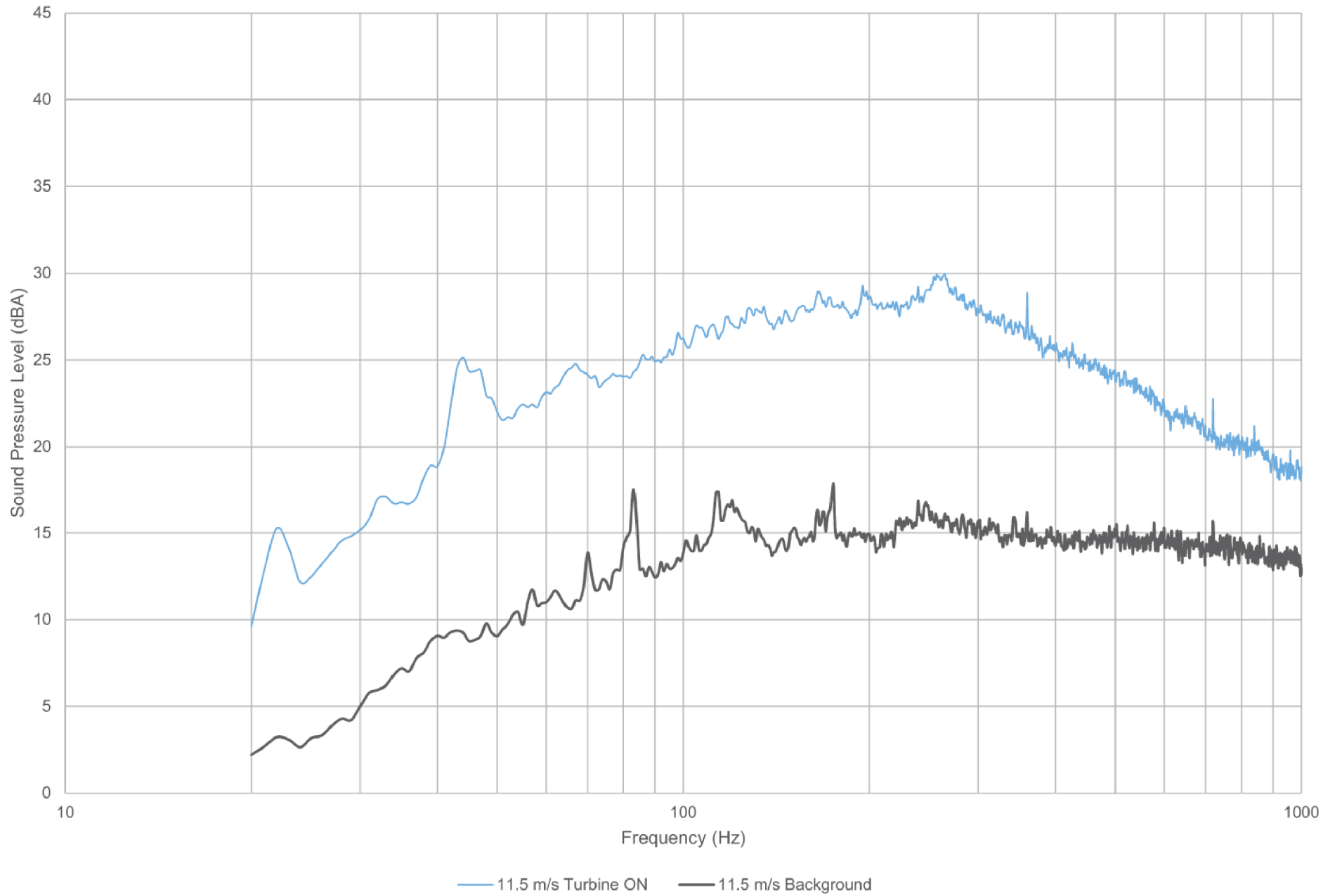
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of narrow band spectra - Turbine ON vs. Background at 11 m/s

Figure D.06

11.5 m/s



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Project Name

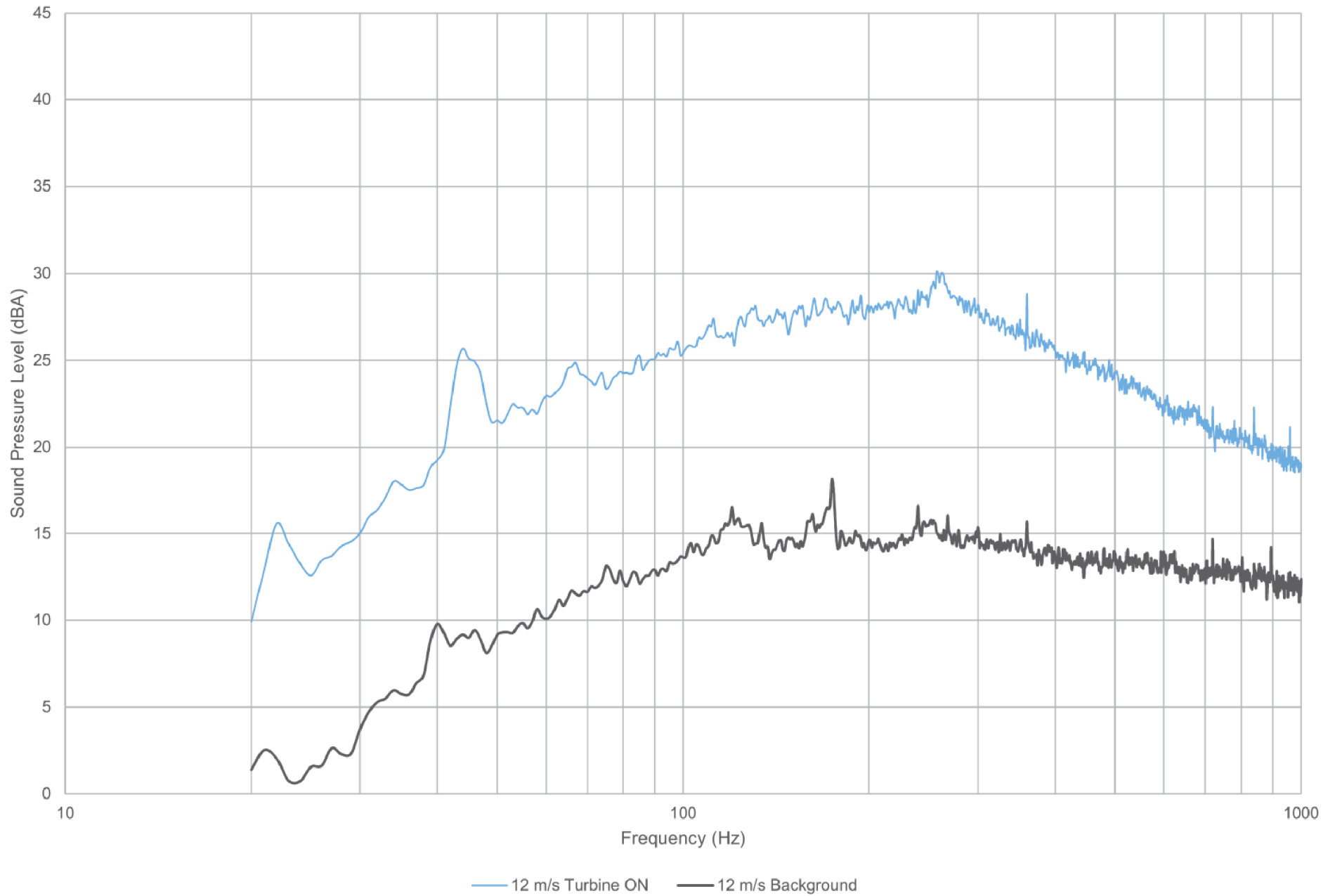
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of narrow band spectra - Turbine ON vs. Background at 11.5 m/s

Figure D.07

12 m/s



16227.00.T46.RP1

Scale: NTS
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Revision: 1

Project Name

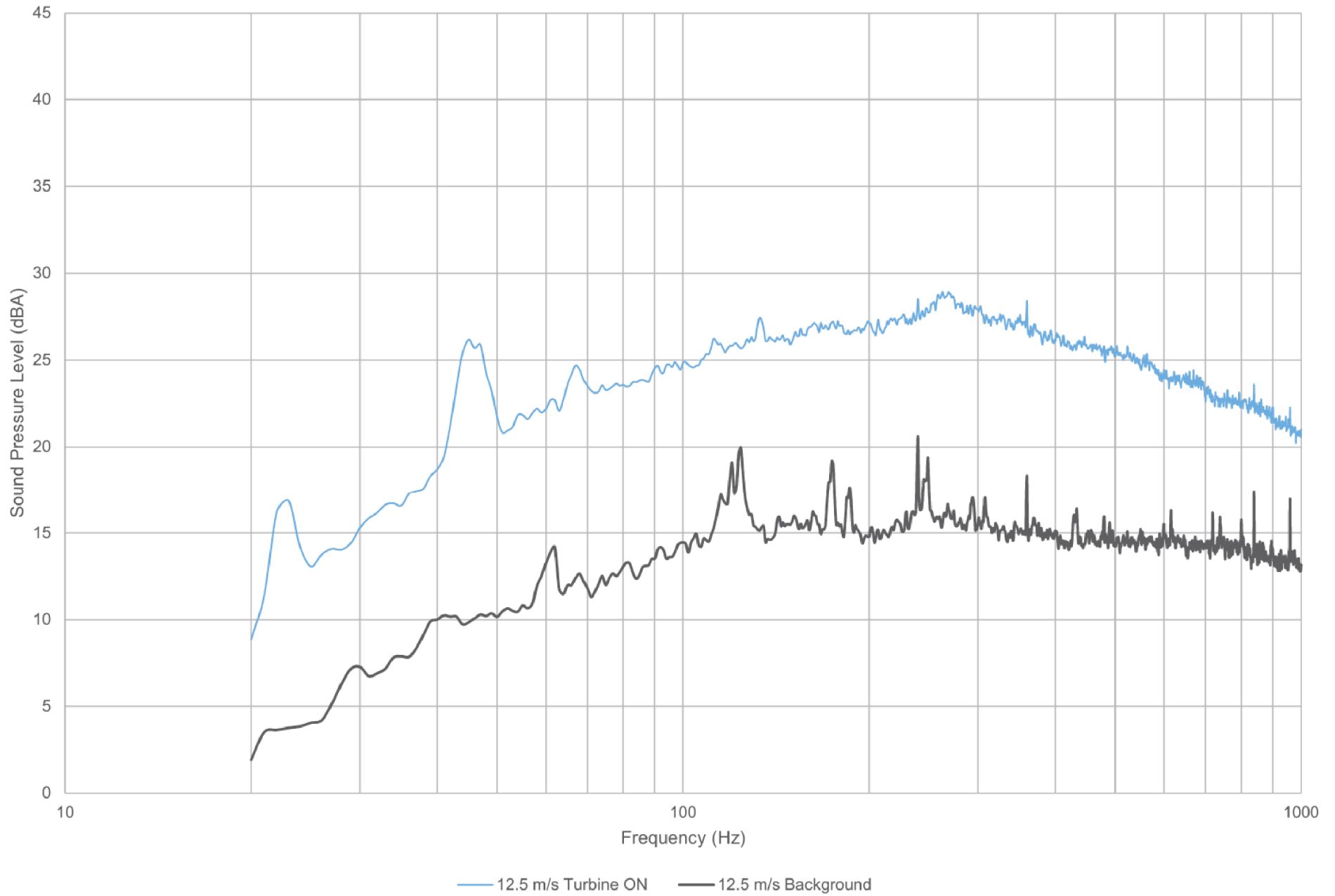
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of narrow band spectra - Turbine ON vs. Background at 12 m/s

Figure D.08

12.5 m/s



16227.00.T46.RP1

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Date: Nov 1, 2017
Revision: 1

Project Name

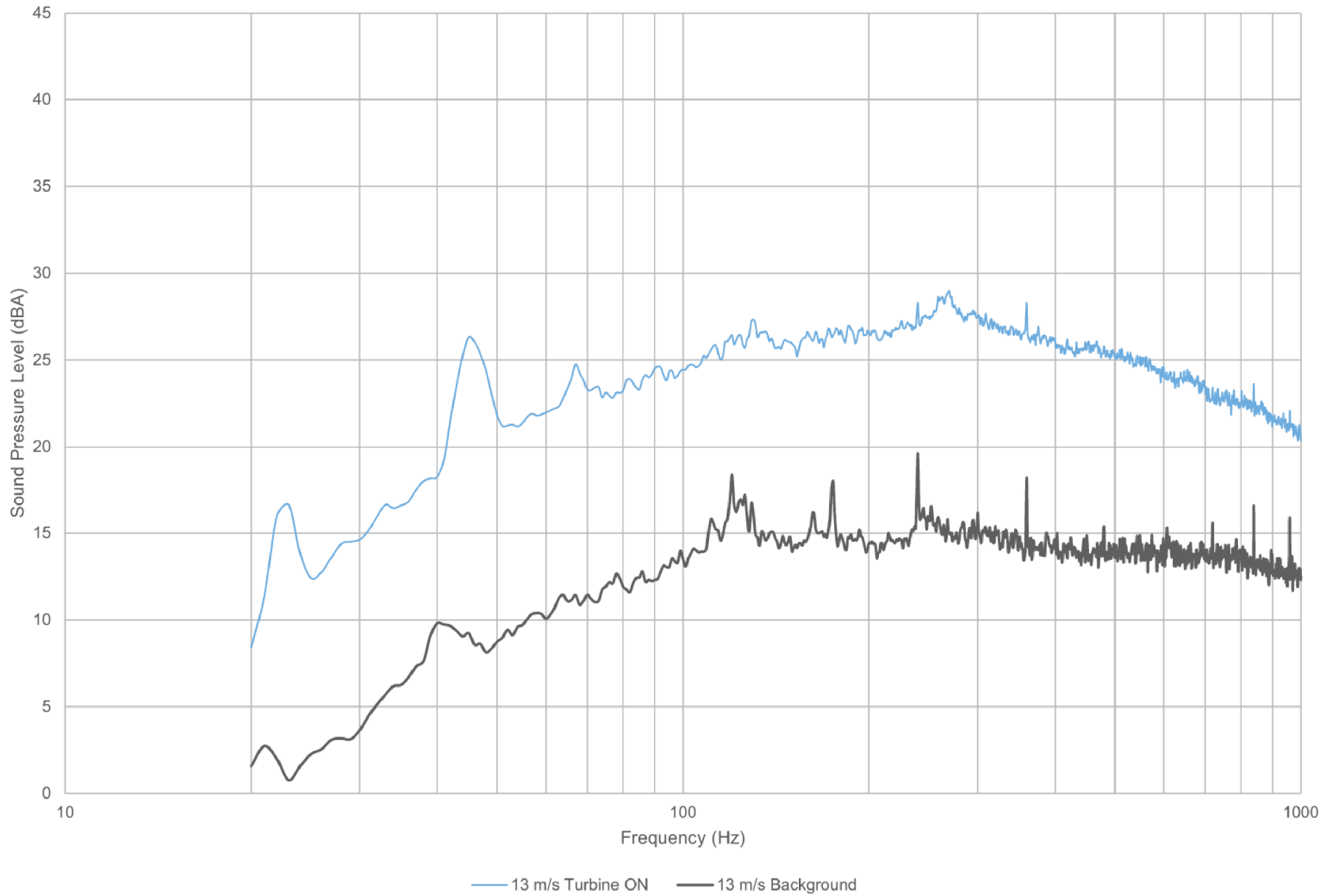
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of narrow band spectra - Turbine ON vs. Background at 12.5 m/s

Figure D.09

13 m/s



16227.00.T46.RP1

Scale: NTS
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Reviewed by: PA
Date: Nov 1, 2017
Revision: 1

Project Name

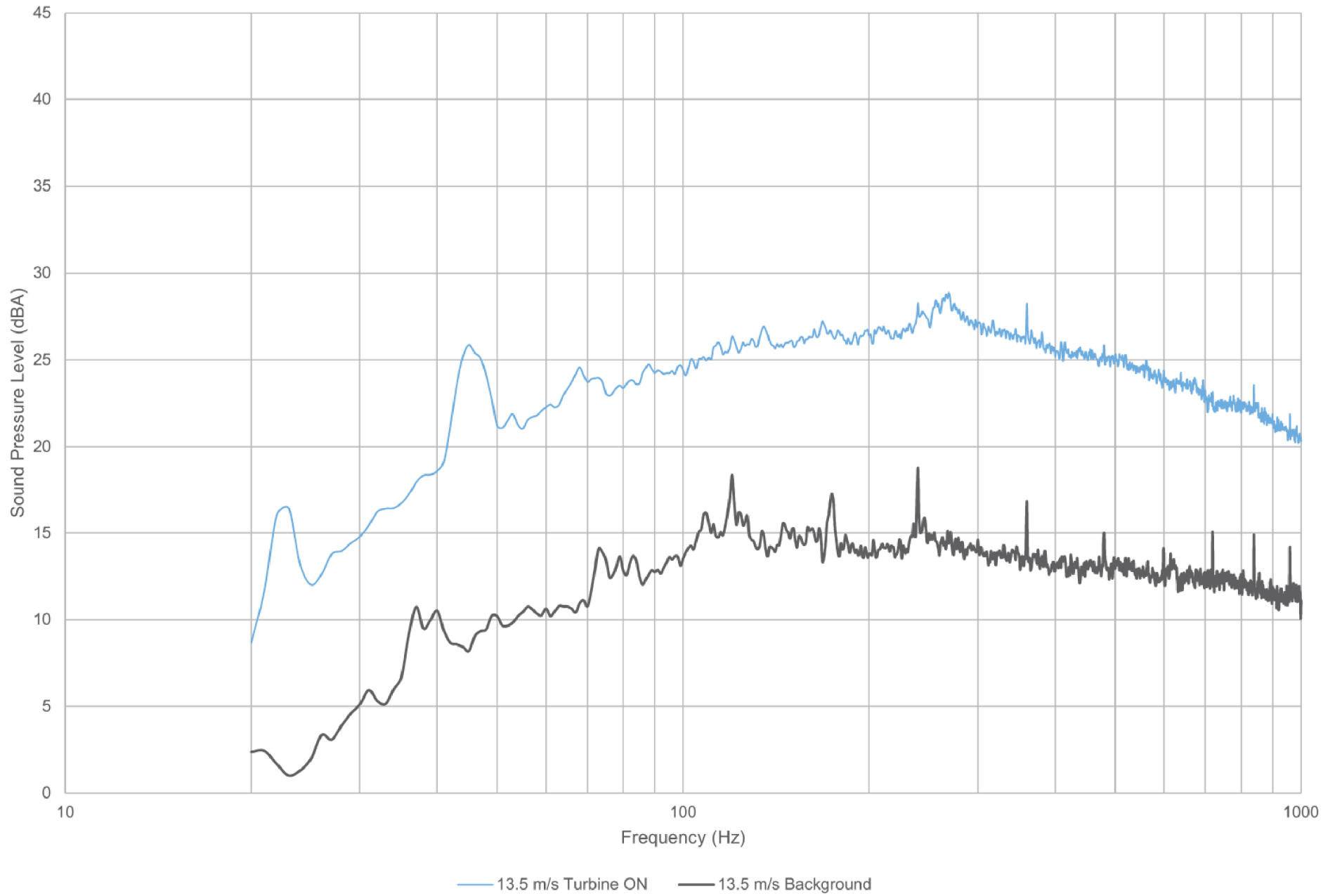
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of narrow band spectra - Turbine ON vs. Background at 13 m/s

Figure D.10

13.5 m/s



16227.00.T46.RP1

Scale: NTS
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Date: Nov 1, 2017
Revision: 1

Project Name

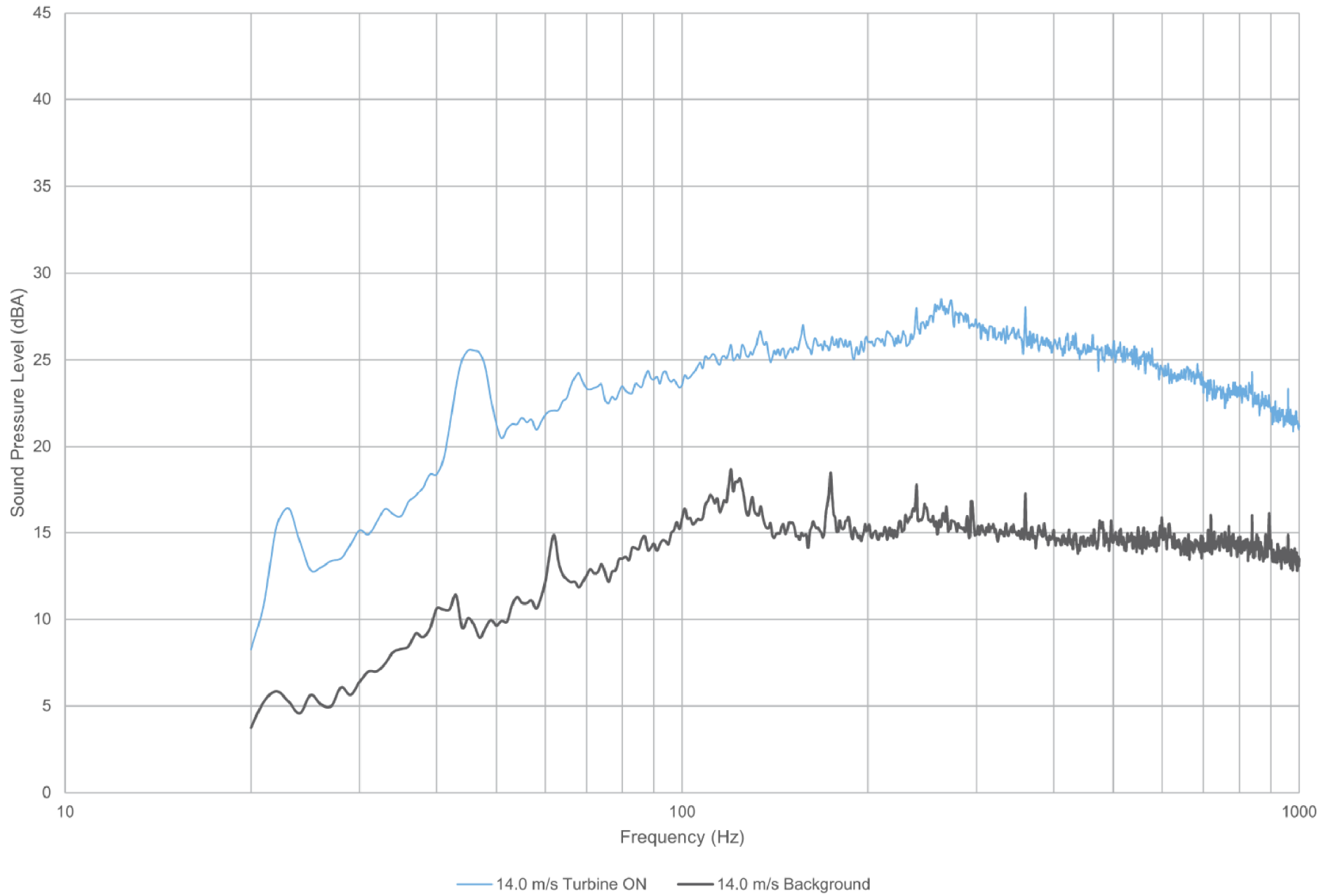
Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of narrow band spectra - Turbine ON vs. Background at 13.5 m/s

Figure D.11

14 m/s



16227.00.T46.RP1

Scale: NTS
Drawn by: NT
Reviewed by: PA
Date: Nov 1, 2017
Revision: 1

Project Name

Niagara Region Wind Farm - IEC 61400-11 Edition 3.0 - Turbine T46

Figure Title

Plot of narrow band spectra - Turbine ON vs. Background at 14 m/s

Figure D.12

Table D.01 Tonality Assessment Table - 8.5 m/s

Project: Niagara Region Wind Farm- Turbine T46 - IEC 61400-11 Measurement

Report ID: 16227.00.T46.RP1

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Created on: 11/1/2017

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
No Reportable Tones									

Table D.02 Tonality Assessment Table - 9 m/s

Project: Niagara Region Wind Farm- Turbine T46 - IEC 61400-11 Measurement

Report ID: 16227.00.T46.RP1

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Created on: 11/1/2017

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
No Reportable Tones									

Table D.03 Tonality Assessment Table - 9.5 m/s

Project: Niagara Region Wind Farm- Turbine T46 - IEC 61400-11 Measurement

Report ID: 16227.00.T46.RP1

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Created on: 11/1/2017

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
No Reportable Tones									

Table D.04 Tonality Assessment Table - 10 m/s

Project: Niagara Region Wind Farm- Turbine T46 - IEC 61400-11 Measurement

Report ID: 16227.00.T46.RP1

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Created on: 11/1/2017

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
No Reportable Tones									

Table D.05 Tonality Assessment Table - 10.5 m/s

Project: Niagara Region Wind Farm- Turbine T46 - IEC 61400-11 Measurement

Report ID: 16227.00.T46.RP1

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Created on: 11/1/2017

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
No Reportable Tones									

Table D.06 Tonality Assessment Table - 11 m/s

Project: Niagara Region Wind Farm- Turbine T46 - IEC 61400-11 Measurement

Report ID: 16227.00.T46.RP1

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Created on: 11/1/2017

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
No Reportable Tones									

Table D.07 Tonality Assessment Table - 11.5 m/s

Project: Niagara Region Wind Farm- Turbine T46 - IEC 61400-11 Measurement

Report ID: 16227.00.T46.RP1

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Created on: 11/1/2017

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
No Reportable Tones									

Table D.08 Tonality Assessment Table - 12 m/s

Project: Niagara Region Wind Farm- Turbine T46 - IEC 61400-11 Measurement

Report ID: 16227.00.T46.RP1

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Created on: 11/1/2017

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
No Reportable Tones									

Table D.09 Tonality Assessment Table - 12.5 m/s

Project: Niagara Region Wind Farm- Turbine T46 - IEC 61400-11 Measurement

Report ID: 16227.00.T46.RP1

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Created on: 11/1/2017

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
No Reportable Tones									

Table D.10 Tonality Assessment Table - 13 m/s

Project: Niagara Region Wind Farm- Turbine T46 - IEC 61400-11 Measurement

Report ID: 16227.00.T46.RP1

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Created on: 11/1/2017

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
No Reportable Tones									

Table D.11 Tonality Assessment Table - 13.5 m/s

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Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
No Reportable Tones									

Table D.12 Tonality Assessment Table - 14 m/s

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Created on: 11/1/2017

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
No Reportable Tones									

Appendix E Measurement Data

Table E.01 Measurement data - Turbine ON

Project: Niagara Region Wind Farm - Turbine T46 - IEC 61400-11 Measurement
 Report ID: 16227.00.T46.RP1

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	L_Aeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPS	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
1			2879	220.0	219.8	0.0	14.3	11.2	10.6	24	98.6	70
2			2869	220.0	219.8	0.0	14.0	9.7	9.6	24	98.6	70
3			2530	220.0	219.8	0.0	13.5	11.0	10.6	24	98.6	71
4			2329	220.0	219.8	0.0	13.4	9.0	9.3	24	98.6	71
5			2929	220.0	222.8	0.0	13.7	11.6	8.9	24	98.6	71
6			2931	220.0	222.8	0.0	14.0	13.7	7.1	24	98.6	71
7			2907	220.0	222.8	0.0	14.1	9.8	7.4	24	98.6	71
8			2886	220.0	222.8	0.0	14.2	11.1	6.7	24	98.6	71
9			2922	220.0	222.8	0.0	13.9	12.2	6.2	24	98.6	75
10			2572	220.0	222.8	0.0	13.5	11.0	5.5	24	98.6	75
11			2450	220.0	222.8	0.0	13.4	10.9	5.7	24	98.6	75
12			2922	220.0	222.8	0.0	13.7	10.7	6.4	24	98.6	75
13			2901	220.0	222.8	0.0	14.1	10.9	5.9	24	98.6	75
14			2498	220.0	222.8	0.0	13.4	11.1	6.3	24	98.6	75
15			2871	220.0	222.8	0.0	13.6	12.0	6.9	24	98.6	76
16			2568	220.0	222.8	0.0	13.5	10.4	7.9	24	98.6	76
17			2862	220.0	222.8	0.0	14.0	12.7	5.8	24	98.6	76
18			2310	220.0	222.8	0.0	13.3	10.6	6.8	24	98.6	76
19			2817	220.0	222.8	0.0	13.7	11.6	10.9	24	98.6	76
20			2874	220.0	222.8	0.0	14.0	12.5	10.1	24	98.6	76
21			2763	220.0	222.8	0.0	13.7	10.2	8.0	24	98.6	72
22			2563	220.0	222.8	0.0	13.6	11.2	9.0	24	98.6	72
23			2855	220.0	222.8	0.0	13.7	11.3	7.8	24	98.6	72
24			2623	220.0	222.8	0.0	13.5	10.5	8.6	24	98.6	72
25			2678	220.0	222.8	0.0	13.6	11.6	9.1	24	98.6	72
26			2840	220.0	222.8	0.0	13.7	11.4	9.3	24	98.6	72
27			2412	220.0	222.8	0.0	13.4	10.8	8.3	24	98.6	73
28			1763	220.0	222.8	0.0	12.8	10.7	5.8	24	98.6	73
29			2098	220.0	222.8	0.0	13.2	11.0	4.8	24	98.6	73
30			2342	220.0	222.8	0.0	13.4	11.2	8.6	24	98.6	73
31	9.8	50.2	2020	220.0	222.8	0.0	13.1	9.7	8.2	24	98.6	73
32			2860	220.0	222.8	0.0	13.8	9.9	8.5	24	98.6	73
33	10.6	49.3	2423	220.0	222.8	0.0	13.4	10.2	8.3	24	98.6	72
34			2835	220.0	222.8	0.0	13.7	10.1	5.1	24	98.6	72
35	10.5	51.0	2374	220.0	222.8	0.0	13.4	9.4	9.5	24	98.6	72
36	11.3	51.1	2643	220.0	222.8	0.0	13.6	11.1	10.3	24	98.6	72
37	10.7	50.2	2417	220.0	222.8	0.0	13.4	11.5	6.7	24	98.6	72
38			2927	220.0	222.8	0.0	14.2	10.6	8.5	24	98.6	72
39	10.6	50.0	2383	220.0	222.8	0.0	13.4	8.6	8.3	24	98.6	73
40	11.1	49.9	2586	220.0	222.8	0.0	13.6	11.3	8.9	24	98.6	73
41	13.5	49.7	2875	220.0	222.8	0.0	13.8	13.4	8.5	24	98.6	73
42			2908	220.0	222.8	0.0	14.1	10.8	8.5	24	98.6	73
43			2849	220.0	222.8	0.0	14.2	12.1	7.3	24	98.6	73
44	14.4	50.8	2866	220.0	222.8	0.0	14.0	14.2	7.0	24	98.6	73
45	14.8	50.3	2874	220.0	222.8	0.0	14.0	14.6	8.1	24	98.6	73
46			2888	220.0	222.8	0.0	13.9	11.2	9.1	24	98.6	73
47			2935	220.0	222.8	0.0	14.3	9.8	8.4	24	98.6	73
48	12.9	50.3	2887	220.0	225.8	0.0	13.9	12.8	6.5	24	98.6	73
49	12.6	52.9	2906	220.0	225.8	0.0	14.0	12.5	7.3	24	98.6	73
50			2894	220.0	225.8	0.0	14.1	11.0	6.7	24	98.6	73
51			2878	220.0	225.8	0.0	14.3	10.1	6.3	24	98.6	75
52	10.7	49.8	2443	220.0	225.8	0.0	13.4	10.2	5.6	24	98.6	75
53	10.9	51.0	2555	220.0	225.8	0.0	13.5	9.2	7.0	24	98.6	75
54	10.8	50.1	2506	220.0	225.8	0.0	13.4	9.9	7.8	24	98.6	75
55	10.7	51.1	2458	220.0	225.8	0.0	13.4	10.8	6.6	24	98.6	75
56	10.2	50.3	2232	220.0	225.8	0.0	13.3	8.1	6.5	24	98.6	75
57	10.8	53.3	2488	220.0	226.8	0.0	13.5	9.0	5.5	24	98.6	74
58	12.4	52.0	2850	220.0	231.8	0.0	13.8	12.3	11.7	24	98.6	74
59	12.4	53.0	2858	220.0	233.8	0.0	13.7	12.3	10.4	24	98.6	74
60			2925	220.0	233.8	0.0	14.1	11.8	8.1	24	98.6	74
61			2906	220.0	233.8	0.0	14.3	11.8	8.8	24	98.6	74
62	12.7	51.1	2897	220.0	233.8	0.0	13.8	12.6	6.1	24	98.6	74
63			2842	220.0	231.8	0.0	13.7	11.2	5.8	24	98.6	74
64	10.9	49.9	2554	220.0	230.8	0.0	13.5	11.2	6.9	24	98.6	74
65	11.1	52.1	2588	220.0	230.8	0.0	13.5	10.8	6.6	24	98.6	74
66	13.7	51.1	2882	220.0	230.8	0.0	14.6	13.6	7.5	24	98.6	74
67			2900	220.0	230.8	0.0	13.8	11.6	7.3	24	98.6	74
68			2911	220.0	230.8	0.0	14.1	10.6	7.1	24	98.6	74
69	14.9	50.4	2902	220.0	230.8	0.0	14.1	14.8	7.1	24	98.6	73
70	14.8	52.2	2908	220.0	230.8	0.0	14.1	14.6	7.5	24	98.6	73
71	9.7	51.6	1992	220.0	230.8	0.0	13.0	9.9	7.7	24	98.6	73
72	12.8	53.7	2886	220.0	230.8	0.0	14.1	12.7	11.0	24	98.6	73
73	10.5	49.5	2344	220.0	230.8	0.0	13.3	11.5	9.0	24	98.6	73
74			2877	220.0	230.8	0.0	13.9	10.6	9.7	24	98.6	73
75	10.8	51.1	2499	220.0	230.8	0.0	13.5	9.8	10.8	24	98.6	73
76			2659	220.0	230.8	0.0	13.6	10.9	10.6	24	98.6	70
77	11.1	51.3	2603	220.0	230.8	0.0	13.6	12.4	7.4	24	98.6	70
78	14.6	51.9	2898	220.0	230.8	0.0	14.5	14.5	10.9	24	98.6	70
79	11.0	50.5	2390	220.0	230.8	0.0	13.6	11.9	9.3	24	98.6	70
80			2912	220.0	230.8	0.0	13.1	10.2	10.2	24	98.6	71
81	10.8	51.0	2506	220.0	230.8	0.0	13.5	11.1	8.1	24	98.6	71
82	10.2	50.0	2274	220.0	230.8	0.0	13.3	11.2	11.5	24	98.6	71
83			2220	220.0	230.8	0.0	13.1	9.1	9.1	24	98.6	71
84			1847	220.0	230.8	0.0	13.0	9.7	11.1	24	98.6	71
85	9.6	50.8	1947	220.0	230.8	0.0	13.0	9.5	8.7	24	98.6	71
86	9.7	49.6	1988	220.0	230.8	0.0	13.1	11.1	8.8	24	98.6	71
87	8.9	49.6	1583	220.0	230.8	0.0	12.6	8.1	9.6	24	98.6	71
88			1365	220.0	230.8	0.0	12.3	9.6	10.4	24	98.6	71

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	L_Aeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPS	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
89	8.8	49.3	1554	220.0	230.8	0.0	12.6	8.6	10.4	24	98.6	71
90	9.3	50.0	1798	220.0	230.8	0.0	13.0	10.1	8.9	24	98.6	71
91			1780	220.0	230.8	0.0	13.0	9.7	11.2	24	98.6	71
92	10.4	49.6	2314	220.0	230.8	0.0	13.4	8.9	9.6	24	98.6	71
93	10.8	51.3	2472	220.0	230.8	0.0	13.5	10.9	10.2	24	98.6	69
94	11.2	50.8	2617	220.0	230.8	0.0	13.5	10.5	9.3	24	98.6	69
95			2936	220.0	230.8	0.0	14.0	11.6	10.1	24	98.6	69
96			2897	220.0	230.8	0.0	13.8	11.6	9.9	24	98.6	69
97	11.0	51.0	2565	220.0	230.8	0.0	13.5	11.8	7.0	24	98.6	69
98	10.1	50.0	2197	220.0	230.8	0.0	13.3	9.7	8.8	24	98.6	69
99	12.6	51.9	2913	220.0	230.8	0.0	14.3	12.5	10.3	24	98.6	68
100			2555	220.0	230.8	0.0	13.9	11.6	8.7	24	98.6	68
101	11.5	49.8	2683	220.0	230.8	0.0	13.6	13.8	10.4	24	98.6	68
102	13.3	50.7	2832	220.0	230.8	0.0	13.7	13.2	11.2	24	98.6	68
103	10.4	50.1	2334	220.0	228.7	0.0	13.3	11.5	9.7	24	98.6	68
104	10.0	51.2	2153	220.0	227.8	0.0	13.2	10.3	8.6	24	98.6	68
105	10.3	51.5	2285	220.0	227.8	0.0	13.4	10.4	8.4	24	98.6	69
106			2385	220.0	227.8	0.						

Table E.01 Measurement data - Turbine ON

Project: Niagara Region Wind Farm - Turbine T46 - IEC 61400-11 Measurement
 Report ID: 16227.00.T46.RP1

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	L/Aeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
177			1769	220.0	221.8	0.0	19.9	9.5	9.5	24	98.6	75
178	9.0	51.2	1642	220.0	221.8	0.0	12.6	7.6	8.2	24	98.6	75
179	9.2	50.6	1728	220.0	221.8	0.0	12.8	9.8	9.5	24	98.6	75
180	9.0	49.9	1645	220.0	221.8	0.0	12.6	9.0	6.6	24	98.6	74
181	10.8	53.6	2596	220.0	221.8	0.0	13.5	10.8	7.0	24	98.6	74
182			2613	220.0	221.8	0.0	13.5	10.6	11.2	24	98.6	74
183			2864	220.0	221.8	0.0	13.8	10.2	8.2	24	98.6	74
184			2843	220.0	221.8	0.0	13.9	11.3	9.2	24	98.6	74
185	11.5	51.7	2681	220.0	221.8	0.0	13.6	10.7	7.5	24	98.6	74
186			2939	220.0	221.8	0.0	14.2	11.8	6.8	24	98.6	74
187			2887	220.0	221.8	0.0	14.1	11.6	7.9	24	98.6	74
188			2865	220.0	221.8	0.0	14.3	12.4	7.8	24	98.6	74
189			2918	220.0	221.8	0.0	14.1	11.1	8.7	24	98.6	74
190			2920	220.0	221.8	0.0	14.2	11.8	9.4	24	98.6	74
191	11.6	52.9	2710	220.0	221.8	0.0	13.6	9.4	9.4	24	98.6	74
192			2376	220.0	221.8	0.0	13.4	10.2	11.6	24	98.6	71
193			2507	220.0	221.8	0.0	13.5	11.7	11.0	24	98.6	71
194	11.5	50.1	2675	220.0	221.8	0.0	13.6	9.5	9.7	24	98.6	71
195			2902	220.0	221.8	0.0	14.4	11.2	11.1	24	98.6	71
196	14.7	51.8	2904	220.0	221.8	0.0	14.2	14.5	9.6	24	98.6	71
197	11.5	52.6	2675	220.0	221.8	0.0	13.6	10.4	9.6	24	98.6	71
198			2912	220.0	221.8	0.0	13.9	10.5	10.9	24	98.6	72
199			2902	220.0	221.8	0.0	13.8	10.8	9.1	24	98.6	72
200			2896	220.0	221.8	0.0	14.0	10.2	8.8	24	98.6	72
201	10.9	50.8	2547	220.0	221.8	0.0	13.5	9.8	6.7	24	98.6	72
202	10.4	50.3	2311	220.0	221.8	0.0	13.3	9.3	8.5	24	98.6	72
203	10.7	51.9	2448	220.0	221.8	0.0	13.4	11.3	8.8	24	98.6	72
204	15.8	51.7	2868	220.0	221.8	0.0	15.1	15.7	8.7	24	98.6	72
205	14.4	49.2	2875	220.0	221.8	0.0	14.0	14.3	10.5	24	98.6	72
206			2929	220.0	221.8	0.0	14.5	13.7	9.2	24	98.6	72
207	13.6	50.7	2931	220.0	221.8	0.0	14.1	13.5	8.8	24	98.6	72
208	15.1	50.0	2901	220.0	221.8	0.0	14.0	15.0	8.5	24	98.6	72
209			2907	220.0	221.8	0.0	14.1	11.1	8.5	24	98.6	72
210			2954	220.0	221.8	0.0	14.0	11.7	10.0	24	98.6	73
211	13.1	53.6	2924	220.0	221.8	0.0	14.5	13.0	7.7	24	98.6	73
212	14.9	52.9	2930	220.0	221.8	0.0	13.9	14.8	7.3	24	98.6	73
213	15.7	52.6	2902	220.0	224.8	0.0	14.2	15.9	7.4	24	98.6	73
214			2929	220.0	224.8	0.0	14.0	11.9	9.8	24	98.6	73
215			2917	220.0	224.8	0.0	13.9	10.8	9.6	24	98.6	73
216	10.6	51.6	2425	220.0	224.8	0.0	13.4	12.6	6.2	24	98.6	73
217	12.6	53.2	2913	220.0	224.8	0.0	14.0	12.5	7.5	24	98.6	73
218	11.2	60.9	2629	220.0	224.8	0.0	13.5	12.5	10.0	24	98.6	73
219	11.5	50.3	2686	220.0	224.8	0.0	13.6	10.1	8.3	24	98.6	73
220			2887	220.0	224.8	0.0	14.2	10.6	8.3	24	98.6	73
221	10.9	52.1	2555	220.0	224.8	0.0	13.5	11.2	11.2	24	98.6	73
222	9.6	52.4	1947	220.0	224.8	0.0	13.1	9.7	8.7	24	98.6	73
223	9.6	49.8	1947	220.0	224.8	0.0	13.0	9.6	8.7	24	98.6	73
224	12.1	51.5	2739	220.0	224.8	0.0	13.7	8.1	10.9	24	98.6	73
225			2894	220.0	224.8	0.0	13.8	11.5	9.9	24	98.6	73
226			2884	220.0	224.8	0.0	13.8	11.1	8.6	24	98.6	73
227	10.8	52.3	2480	220.0	224.8	0.0	13.5	11.8	9.4	24	98.6	73
228	11.5	50.4	2688	220.0	224.8	0.0	13.6	10.5	7.6	24	98.6	72
229			2911	220.0	224.8	0.0	14.0	10.8	10.4	24	98.6	72
230			2872	220.0	224.8	0.0	14.3	11.6	9.2	24	98.6	72
231	12.4	50.4	2976	220.0	224.8	0.0	14.0	12.3	10.3	24	98.6	72
232	10.9	51.5	2520	220.0	224.8	0.0	13.5	10.7	10.3	24	98.6	72
233	10.9	50.6	2546	220.0	224.8	0.0	13.5	10.9	9.2	24	98.6	72
234			2855	220.0	224.8	0.0	13.9	11.9	9.5	24	98.6	72
235	12.4	51.9	2904	220.0	224.8	0.0	14.0	12.4	11.0	24	98.6	72
236	11.5	51.3	2687	220.0	224.8	0.0	13.6	10.9	8.7	24	98.6	72
237	9.9	50.9	2076	220.0	224.8	0.0	13.1	10.1	8.4	24	98.6	72
238	10.1	50.4	2172	220.0	224.8	0.0	13.2	9.8	9.5	24	98.6	72
239	14.2	51.8	2933	220.0	224.8	0.0	14.5	14.1	7.4	24	98.6	72
240	13.5	49.4	2933	220.0	224.8	0.0	13.9	13.4	6.8	24	98.6	72
241			2860	220.0	224.8	0.0	13.7	11.3	9.2	24	98.6	72
242	13.5	51.9	2927	220.0	224.8	0.0	14.4	13.4	7.2	24	98.6	72
243			2827	220.0	224.8	0.0	13.7	11.0	6.9	24	98.6	72
244			2915	220.0	224.8	0.0	13.9	11.4	8.8	24	98.6	72
245	13.0	51.4	2887	220.0	224.8	0.0	14.2	12.9	9.4	24	98.6	72
246			2944	220.0	224.8	0.0	13.9	15.1	10.3	24	98.6	73
247	14.5	51.1	2941	220.0	224.8	0.0	14.0	14.0	10.3	24	98.6	73
248	12.8	53.5	2937	220.0	224.8	0.0	14.1	10.7	10.1	24	98.6	73
249	16.2	50.5	2908	220.0	227.8	0.0	13.8	16.4	9.5	24	98.6	73
250	13.0	52.0	2919	220.0	227.8	0.0	14.0	12.9	10.0	24	98.6	73
251	12.7	51.4	2951	220.0	227.8	0.0	14.3	12.6	14.1	24	98.6	73
252	14.1	49.3	2907	220.0	227.8	0.0	14.1	14.6	11.6	24	98.6	72
253	17.4	50.2	2870	220.0	227.8	0.0	14.0	17.3	10.0	24	98.6	72
254	16.0	50.0	2948	220.0	227.8	0.0	13.7	15.8	7.9	24	98.6	72
255	14.9	50.9	2902	220.0	227.8	0.0	14.2	14.8	7.6	24	98.6	72
256	15.6	52.3	2904	220.0	227.8	0.0	14.1	16.4	9.1	24	98.6	72
257	16.4	50.9	2923	220.0	227.8	0.0	14.1	16.3	7.3	24	98.6	72
258	15.2	51.0	2888	220.0	227.8	0.0	13.9	15.1	8.2	24	98.6	72
259			2929	220.0	227.8	0.0	13.9	11.5	9.2	24	98.6	72
260	12.5	51.6	2929	220.0	227.8	0.0	13.8	12.4	8.8	24	98.6	72
261	13.7	50.5	2890	220.0	227.8	0.0	14.1	13.6	7.3	24	98.6	72
262	15.7	51.4	2895	220.0	227.8	0.0	13.9	15.6	10.6	24	98.6	72
263	15.5	52.2	2903	220.0	227.8	0.0	13.9	15.3	9.9	24	98.6	71
264	14.7	52.7	2874	220.0	227.8	0.0	14.0	14.6	9.1	24	98.6	71

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	L/Aeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
265			2927	220.0	227.8	0.0	13.9	11.9	8.7	24	98.6	71
266	10.9	52.4	2530	220.0	227.8	0.0	13.5	10.8	8.3	24	98.6	71
267	10.8	52.7	2555	220.0	227.8	0.0	13.5	12.6	10.0	24	98.6	71
268	12.8	50.7	2890	220.0	227.8	0.0	14.4	12.8	8.4	24	98.6	71
269			2932	220.0	227.8	0.0	14.1	11.6	11.0	24	98.6	72
270	14.2	51.1	2888	220.0	227.8	0.0	13.8	14.1	12.8	24	98.6	72
271	15.7	50.6	2900	220.0	227.8	0.0	13.9	15.6	9.8	24	98.6	72
272	15.6	51.0	2898	220.0	227.8	0.0	13.9	15.4	9.3	24	98.6	72
273	15.0	49.6	2904	220.0	227.8	0.0	13.8	14.8	9.4	24	98.6	72
274			2905	220.0	227.8	0.0	13.8	12.0	12.1	24	98.6	72
275	13.9	52.7	2952	220.0	227.8	0.0	14.5	13.0	10.6	24	98.6	70
276	15.0	51.5	2890	220.0	227.8	0.0	13.8	14.9	12.4	24	98.6	70
277	12.4	51.1	2860	220.0	227.8	0.0	13.9	12.3	12.2	24	98.6	70
278	13.7	51.5	2870	220.0	227.8	0.0	14.2	13.6	10.1	24	98.6	70
279	13.6	52.8	2806	220.0	227.8	0.0	13.8					

Table E.01 Measurement data - Turbine ON

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***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Date Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
353	10.6	51.0	2387	220.0	224.8	0.0	13.9	10.1	9.7	24	98.6	71
354			2181	220.0	224.8	0.0	13.3	8.9	10.5	24	98.6	71
355	10.5	51.8	2352	220.0	224.8	0.0	13.4	10.4	8.7	24	98.6	71
356	10.7	53.4	2437	220.0	224.8	0.0	13.4	10.2	10.0	24	98.6	71
357	10.8	51.1	2496	220.0	224.8	0.0	13.4	9.4	9.3	24	98.6	71
358			2877	220.0	224.8	0.0	13.7	11.3	8.0	24	98.6	71
359	13.2	51.0	2853	220.0	224.8	0.0	14.2	13.1	9.4	24	98.6	71
360			2890	220.0	224.8	0.0	14.3	11.4	10.5	24	98.6	71
361	12.9	51.5	2890	220.0	224.8	0.0	14.3	12.8	9.7	24	98.6	71
362	12.7	51.0	2874	220.0	224.8	0.0	14.2	12.6	10.0	24	98.6	71
363			2922	220.0	231.8	0.0	14.2	15.3	10.6	24	98.6	72
364	13.2	52.8	2914	220.0	231.8	0.0	14.2	13.1	11.1	24	98.6	72
365	13.0	50.9	2884	220.0	231.8	0.0	14.2	12.9	7.9	24	98.6	72
366	13.2	53.2	2921	220.0	231.8	0.0	14.6	13.1	10.4	24	98.6	71
367			2934	220.0	231.8	0.0	14.2	11.7	9.4	24	98.6	71
368	14.4	50.5	2945	220.0	231.8	0.0	14.1	14.3	10.0	24	98.6	71
369	16.4	51.1	2909	220.0	231.8	0.0	14.1	16.3	11.2	24	98.6	71
370	14.6	51.9	2892	220.0	231.8	0.0	14.0	14.5	11.8	24	98.6	71
371	14.2	49.9	2858	220.0	231.8	0.0	13.9	14.1	10.6	24	98.6	71
372	13.0	49.3	2893	220.0	231.8	0.0	14.0	12.9	10.6	24	98.6	71
373			2520	220.0	231.8	0.0	13.5	12.4	11.4	24	98.6	71
374			2239	220.0	231.8	0.0	13.3	10.6	10.7	24	98.6	71
375			2302	220.0	231.8	0.0	13.3	13.6	10.5	24	98.6	71
376	13.4	51.1	2869	220.0	227.8	0.0	13.7	13.3	13.8	24	98.6	71
377			2462	220.0	227.8	0.0	13.4	11.6	11.9	24	98.6	71
378	9.8	50.5	2924	220.0	227.8	0.0	13.1	8.7	9.6	24	98.6	71
379			2842	220.0	227.8	0.0	13.7	9.9	9.4	24	98.6	71
380			2900	220.0	227.8	0.0	13.9	9.2	6.3	24	98.6	71
381	12.1	51.1	2798	220.0	227.8	0.0	13.7	10.9	9.4	24	98.6	71
382	11.0	50.2	2878	220.0	227.8	0.0	13.5	11.2	8.8	24	98.6	71
383			2822	220.0	227.8	0.0	13.7	10.1	8.9	24	98.6	71
384	10.7	50.8	2470	220.0	227.8	0.0	13.4	10.3	9.4	24	98.6	73
385			2073	220.0	227.8	0.0	13.2	13.9	9.1	24	98.6	73
386	9.1	50.5	1706	220.0	227.8	0.0	12.7	8.7	10.6	24	98.6	73
387	9.0	50.9	1860	220.0	227.8	0.0	12.6	9.5	8.4	24	98.6	73
388			2877	220.0	227.8	0.0	14.1	10.8	9.6	24	98.6	73
389			2426	220.0	227.8	0.0	14.0	10.9	12.1	24	98.6	73
390	14.3	51.6	2915	220.0	227.8	0.0	14.1	14.2	10.4	24	98.6	71
391	13.4	50.5	2905	220.0	227.8	0.0	14.1	13.3	10.2	24	98.6	71
392	12.3	49.9	2849	220.0	227.8	0.0	13.6	12.2	8.3	24	98.6	71
393			2837	220.0	227.8	0.0	13.7	10.9	9.8	24	98.6	71
394	12.6	51.9	2908	220.0	227.8	0.0	13.9	12.5	9.8	24	98.6	71
395	14.1	54.7	2897	220.0	227.8	0.0	14.0	14.0	11.1	24	98.6	71
396			2476	220.0	227.8	0.0	13.4	10.6	11.9	24	98.6	72
397	9.0	50.7	1649	220.0	227.8	0.0	12.7	6.1	9.4	24	98.6	72
398	12.0	52.0	2792	220.0	230.8	0.0	13.8	10.1	10.8	24	98.6	72
399	13.7	51.4	2871	220.0	230.8	0.0	14.4	13.6	13.1	24	98.6	72
400	13.7	51.6	2912	220.0	230.8	0.0	13.9	13.6	12.4	24	98.6	72
401			2892	220.0	230.8	0.0	13.8	10.7	11.0	24	98.6	72
402			1848	220.0	230.8	0.0	12.9	9.3	12.4	24	98.6	71
403	9.2	50.4	1718	220.0	230.8	0.0	12.8	9.0	8.6	24	98.6	71
404	9.3	50.9	1804	220.0	230.8	0.0	12.8	9.2	8.8	24	98.6	71
405			2915	220.0	228.7	0.0	14.6	11.0	9.6	24	98.6	71
406	15.0	50.8	2912	220.0	227.9	0.0	13.9	14.9	11.3	24	98.6	71
407	14.8	51.8	2889	220.0	227.8	0.0	14.4	14.6	7.2	24	98.6	71
408			2890	220.0	227.8	0.0	14.0	10.8	9.6	24	98.6	73
409	14.5	52.6	2859	220.0	227.8	0.0	14.2	14.4	8.4	24	98.6	73
410	14.0	52.3	2892	220.0	227.8	0.0	14.0	13.9	8.6	24	98.6	73
411			2888	220.0	228.7	0.0	14.1	12.1	11.5	24	98.6	73
412	12.8	51.3	2862	220.0	227.8	0.0	14.3	12.7	12.8	24	98.6	73
413	13.6	52.0	2940	220.0	227.8	0.0	14.0	13.5	10.0	24	98.6	73
414	15.2	54.6	2913	220.0	228.7	0.0	14.1	15.1	12.5	24	98.6	72
415	13.9	52.6	2914	220.0	228.7	0.0	14.0	13.8	13.0	24	98.6	72
416	13.7	52.0	2910	220.0	228.2	0.0	14.0	13.6	10.6	24	98.6	72
417	12.3	52.3	2881	220.0	228.7	0.0	14.1	12.2	7.4	24	98.6	72
418	13.7	50.5	2909	220.0	228.7	0.0	14.2	13.6	6.1	24	98.6	72
419			2873	220.0	227.8	0.0	13.9	11.4	6.5	24	98.6	72
420	10.8	52.1	2491	220.0	228.8	0.0	13.5	10.1	6.5	24	98.6	74
421	10.7	52.1	2464	220.0	228.2	0.0	13.5	11.2	7.2	24	98.6	74
422	9.9	50.4	2103	220.0	228.8	0.0	13.2	9.3	8.3	24	98.6	74
423	12.0	52.1	2782	220.0	228.7	0.0	13.7	10.1	6.3	24	98.6	74
424			2906	220.0	227.8	0.0	14.2	7.8	7.1	24	98.6	74
425	11.9	50.9	2764	220.0	227.8	0.0	13.7	9.5	8.6	24	98.6	74
426	10.0	49.0	2142	220.0	227.8	0.0	13.2	10.7	8.6	24	98.6	73
427	9.2	49.6	1760	220.0	227.8	0.0	12.8	11.5	9.1	24	98.6	73
428			2873	220.0	227.8	0.0	13.8	11.6	9.0	24	98.6	73
429	13.6	52.6	2881	220.0	224.8	0.0	14.4	13.5	12.6	24	98.6	73
430	14.0	50.5	2885	220.0	224.8	0.0	14.1	13.9	10.8	24	98.6	73
431	15.9	51.8	2872	220.0	224.8	0.0	13.9	15.8	8.3	24	98.6	73
432	15.3	50.7	2872	220.0	224.8	0.0	14.0	15.2	7.9	24	98.6	72
433	14.9	53.4	2888	220.0	224.8	0.0	14.2	14.8	6.5	24	98.6	72
434			1078	355.0	342.8	0.0	11.3	8.9	5.0	18	99.8	52
435	7.2	43.8	863	355.0	349.8	0.0	10.5	7.3	6.7	18	99.8	52
436	6.8	43.0	725	355.0	345.2	0.0	10.0	6.2	6.0	18	99.8	52
437	6.6	44.3	864	355.0	342.8	0.0	9.7	7.6	5.5	18	99.8	52
438	6.5	41.1	835	355.0	342.8	0.0	9.5	8.0	4.9	18	99.8	52
439	40.6	51.6	345.0	355.0	342.8	0.0	8.9	6.6	4.5	18	99.8	52
440	5.7	41.5	420	355.0	342.8	0.0	8.4	6.3	3.7	18	99.8	52

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Date Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
441	5.3	42.1	325	355.0	342.8	0.0	7.9	5.4	4.8	18	99.8	52
442			320	355.0	342.8	0.0	8.0	7.0	5.4	18	99.8	52
443	5.6	37.9	389	355.0	342.8	0.0	8.3	7.8	4.7	18	99.8	52
444	5.5	37.5	364	355.0	342.8	0.0	8.1	5.9	3.6	18	99.8	52
445			346	355.0	338.8	0.0	8.1	4.8	3.9	18	99.8	52
446			506	355.0	338.8	0.0	8.9	5.5	4.2	18	99.8	49
447			664	355.0	338.8	0.0	9.7	6.1	3.9	18	99.8	49
448			660	355.0	338.8	0.0	9.7	5.2	5.0	18	99.8	49
449			641	355.0	338.8	0.0	9.6	6.2	4.1	18	99.8	49
450	6.0	40.6	495	355.0	340.4	0.0	8.8	4.8	3.6	18	99.8	49
451	5.4	37.3	347	355.0	342.8	0.0	8.0	4.8	4.2	18	99.8	49
452			350	355.0	342.8	0.0	8.1	5.6	5.9	18	99.8	49
453			402	355.0	342.8	0.0	8.3	5.7	5.7	18	99.8	49
454			491	355.0	342.8	0.0	8.8	6.5	6.3	18	99.8	49
455			613	355.0	342.8	0.0	9.5	7.4	6.8	18	99.8	49
456	6.9	42.6	746	355.0	342.8							

Table E.01 Measurement data - Turbine ON

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***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Date Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
529	7.6	44.5	1024	355.0	353.8	0.0	12	8.1	9.8	18	99.8	46
530	7.3	44.3	909	355.0	353.8	0.0	10.7	7.4	6.9	18	99.8	47
531	7.1	43.8	810	355.0	353.8	0.0	10.3	6.7	6.7	18	99.8	47
532	6.9	42.0	772	355.0	353.8	0.0	10.2	6.1	5.3	18	99.8	47
533			891	355.0	353.8	0.0	9.8	5.9	6.8	18	99.8	47
534	6.7	42.5	684	355.0	353.8	0.0	9.8	5.9	6.0	18	99.8	47
535	6.4	40.1	599	355.0	353.8	0.0	9.3	5.3	5.8	18	99.8	47
536	5.9	41.5	461	355.0	353.8	0.0	8.6	4.1	5.3	18	99.8	45
537	6.3	40.6	579	355.0	356.8	0.0	9.3	6.3	4.7	18	99.8	45
538	7.2	42.6	854	355.0	356.8	0.0	10.5	7.2	5.2	18	99.8	45
539	7.6	44.9	1024	355.0	356.8	0.0	11.2	7.1	4.9	18	99.8	45
540	7.6	44.7	1024	355.0	356.8	0.0	11.1	6.9	5.1	18	99.8	45
541	7.5	45.6	991	355.0	356.8	0.0	11.0	7.3	5.5	18	99.8	45
542	7.8	45.7	1111	355.0	356.7	0.0	11.5	8.6	7.0	18	99.8	48
543	7.7	46.1	1055	355.0	356.8	0.0	11.3	8.3	7.3	18	99.8	48
544	7.7	44.6	1055	355.0	356.8	0.0	11.3	9.2	5.7	18	99.8	48
545	7.8	45.1	1099	355.0	356.7	0.0	11.4	8.3	6.4	18	99.8	48
546	8.1	45.9	1225	355.0	356.8	0.0	11.8	9.4	7.0	18	99.8	48
547	8.2	47.0	1252	355.0	356.7	0.0	11.9	8.6	7.0	18	99.8	48
548			1196	355.0	356.8	0.0	11.7	8.5	8.4	18	99.8	48
549			1095	355.0	356.8	0.0	11.4	7.7	8.7	18	99.8	48
550			1106	355.0	356.7	0.0	11.4	8.0	8.2	18	99.8	48
551			1197	355.0	356.7	0.0	11.7	9.1	8.7	18	99.8	48
552			1042	355.0	356.8	0.0	11.2	8.1	8.3	18	99.8	48
553			951	355.0	356.8	0.0	10.9	8.3	7.9	18	99.8	48
554	7.5	44.8	979	355.0	356.8	0.0	10.8	8.8	6.6	18	99.8	48
555	7.3	44.0	926	355.0	356.8	0.0	10.8	7.9	5.0	18	99.8	48
556	7.0	44.6	784	355.0	355.8	0.0	10.2	7.5	6.1	18	99.8	48
557	6.5	41.5	637	355.0	351.8	0.0	9.6	6.3	6.1	18	99.8	48
558	6.4	40.8	598	355.0	351.8	0.0	9.3	6.2	6.2	18	99.8	48
559			613	355.0	351.8	0.0	9.4	6.5	7.1	18	99.8	48
560	6.9	44.6	756	355.0	351.8	0.0	10.1	8.1	5.5	18	99.8	47
561	7.1	44.2	841	355.0	351.8	0.0	10.5	6.7	5.0	18	99.8	47
562	7.2	44.0	882	355.0	351.8	0.0	10.6	6.8	5.0	18	99.8	47
563	7.6	46.5	1032	355.0	351.9	0.0	11.2	7.0	6.5	18	99.8	47
564			1162	355.0	351.8	0.0	11.6	7.6	8.0	18	99.8	47
565			1237	355.0	351.8	0.0	11.9	7.2	8.5	18	99.8	47
566			1284	355.0	351.8	0.0	12.0	7.8	8.3	18	99.8	47
567			1181	355.0	351.8	0.0	11.7	7.1	8.2	18	99.8	47
568			1120	355.0	351.8	0.0	11.5	7.4	8.2	18	99.8	47
569	7.6	46.8	1041	355.0	351.9	0.0	11.2	7.4	7.6	18	99.8	47
570			951	355.0	351.9	0.0	10.9	7.0	8.0	18	99.8	47
571	7.3	45.0	893	355.0	351.8	0.0	10.6	7.1	6.1	18	99.8	47
572	7.4	45.5	949	355.0	351.9	0.0	10.9	7.5	6.5	17	99.8	48
573	7.8	46.5	1098	355.0	351.8	0.0	11.4	8.5	6.6	17	99.8	48
574	7.8	45.1	1092	355.0	351.8	0.0	11.4	7.3	6.4	17	99.8	48
575	7.6	44.9	1016	355.0	351.9	0.0	11.1	7.4	5.8	17	99.8	48
576	7.5	43.4	995	355.0	351.9	0.0	11.1	8.3	5.1	17	99.8	48
577	7.1	44.9	828	355.0	351.8	0.0	10.4	6.5	5.5	17	99.8	48
578			812	355.0	351.8	0.0	10.4	6.8	5.0	17	99.8	49
579	7.7	45.8	1072	355.0	351.8	0.0	11.3	8.1	5.9	17	99.8	49
580	7.6	46.0	1009	355.0	351.9	0.0	11.1	7.8	5.6	17	99.8	49
581	7.3	45.4	923	355.0	351.9	0.0	10.8	7.9	6.4	17	99.8	49
582	7.1	45.3	832	355.0	351.8	0.0	10.4	6.8	6.1	17	99.8	49
583	7.1	43.7	845	355.0	351.8	0.0	10.5	8.2	5.3	17	99.8	49
584	7.2	44.2	871	355.0	351.8	0.0	10.6	8.1	5.5	17	99.8	49
585	7.1	42.2	821	355.0	351.8	0.0	10.4	8.4	5.5	17	99.8	49
586	7.4	44.9	949	355.0	351.9	0.0	10.9	8.9	4.4	17	99.8	49
587	7.2	43.8	856	355.0	351.8	0.0	10.5	7.8	4.4	17	99.8	49
588	7.3	44.3	889	355.0	351.8	0.0	10.6	7.9	3.9	17	99.8	49
589	7.9	47.1	1142	355.0	351.8	0.0	11.5	8.8	5.1	17	99.8	49
590	8.4	48.5	1379	355.0	351.8	0.0	12.3	9.5	4.4	17	99.8	49
591	8.4	47.6	1344	355.0	351.8	0.0	12.1	8.7	3.9	17	99.8	49
592	8.0	48.1	1199	355.0	347.8	0.0	11.7	8.6	7.3	17	99.8	49
593			1207	355.0	347.8	0.0	11.7	8.2	5.6	17	99.8	49
594	8.1	46.1	1180	355.0	347.8	0.0	11.6	8.1	8.0	17	99.8	49
595			1198	355.0	347.8	0.0	11.7	8.0	8.1	17	99.8	49
596	8.1	47.2	1217	355.0	347.8	0.0	11.8	7.3	7.4	17	99.8	49
597			1108	355.0	347.8	0.0	11.4	6.2	7.4	17	99.8	49
598	7.8	46.7	1094	355.0	347.8	0.0	11.4	7.0	6.5	17	99.8	49
599	7.6	47.3	1040	355.0	347.8	0.0	11.2	6.8	7.1	17	99.8	49
600	7.6	45.4	983	355.0	347.8	0.0	11.2	6.5	7.0	17	99.8	49
601			1090	355.0	347.8	0.0	11.4	7.7	8.1	17	99.8	49
602	7.6	45.8	1010	355.0	347.8	0.0	11.1	6.9	6.5	17	99.8	49
603	7.3	44.2	909	355.0	347.8	0.0	10.7	6.3	5.7	17	99.8	48
604	7.2	44.7	895	355.0	347.8	0.0	10.6	6.0	6.1	17	99.8	48
605	7.3	43.3	891	355.0	347.8	0.0	10.6	7.5	5.6	17	99.8	48
606	7.4	44.4	933	355.0	347.8	0.0	10.8	6.7	4.2	17	99.8	48
607	7.5	44.6	978	355.0	351.2	0.0	11.0	7.4	5.1	17	99.8	48
608	7.3	47.5	893	355.0	352.8	0.0	10.7	7.0	4.2	17	99.8	50
609			758	355.0	352.8	0.0	10.1	6.4	7.1	17	99.8	50
610			892	355.0	352.8	0.0	9.8	6.2	6.7	17	99.8	50
611	6.5	42.3	640	355.0	352.8	0.0	9.5	5.7	6.3	17	99.8	50
612	6.3	42.6	573	355.0	352.8	0.0	9.2	6.0	6.1	17	99.8	50
613	6.4	41.9	617	355.0	352.8	0.0	9.4	6.8	4.8	17	99.8	50
614	6.6	41.4	665	355.0	352.8	0.0	9.7	6.3	4.4	17	99.8	49
615	6.7	42.5	705	355.0	352.8	0.0	9.9	6.5	5.1	17	99.8	49
616	7.0	41.9	791	355.0	352.8	0.0	10.3	5.9	5.5	17	99.8	49

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Date Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
617	7.0	43.8	796	355.0	352.8	0.0	10.3	6.1	5.4	17	99.8	49
618	6.8	40.8	725	355.0	352.8	0.0	10.0	6.5	6.3	17	99.8	49
619	6.6	41.7	660	355.0	352.8	0.0	9.7	6.1	5.2	17	99.8	49
620	6.6	41.2	652	355.0	352.8	0.0	9.6	6.0	5.0	17	99.8	49
621			661	355.0	352.8	0.0	9.7	5.9	7.1	17	99.8	49
622	6.5	42.0	643	355.0	352.8	0.0	9.6	5.6	6.2	17	99.8	49
623	6.3	40.1	568	355.0	352.8	0.0	9.1	5.3	5.5	17	99.8	49
624	6.1	40.4	510	355.0	356.8	0.0	8.9	5.5	4.6	17	99.8	49
625	6.1	41.1	517	355.0	1.9	0.0	8.9	6.5	4.0	17	99.8	49
626	6.0	41.2	472	355.0	3.0	0.0	8.7	6.1	4.8	17	99.8	51
627	5.9	40.3	447	355.0	3.0	0.0	8.5	5.9	4.8	17	99.8	51
628	6.0	39.9	475	355.0	3.0	0.0	8.7	7.8	4.7	17	99.8	51
629	6.0	39.6	476	355.0	3.0	0.0	8.7	6.9	5.3	17	99.8	51
630	5.9	38.8	449	355.0	3.0	0.0	8.6	7.0	5.6	17	99.8	51
631			404	355.0	1.0	0.0	8.3	6.2	5.9	17	99.8	51
632	5.7	38.6	412	355.0	358.8	0.0	8.4	6.1	5.3	18	99.8	50
633	6.0	40.5	482	355.0								

Table E.01 Measurement data - Turbine ON

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***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Date Point #	Standardized Wind Speed	L/Aeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPS	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (Pa)	Relative Humidity (%)
705	7.2	47.2	852	355.0	357.8	0.0	8.1	8.1	18	99.8	48	48
706	7.0	43.6	776	355.0	357.8	0.0	10.2	8.0	18	99.8	48	48
707	6.7	41.9	681	355.0	357.8	0.0	9.8	7.1	18	99.8	48	48
708	6.4	40.7	596	355.0	357.8	0.0	9.3	5.7	18	99.8	48	48
709	6.3	42.2	570	355.0	357.8	0.0	9.2	6.9	18	99.8	48	48
710	6.1	40.4	522	355.0	357.8	0.0	8.9	6.2	18	99.8	49	49
711	6.1	40.1	502	355.0	357.8	0.0	8.9	5.8	18	99.8	49	49
712	5.9	42.4	450	355.0	357.8	0.0	8.6	4.7	18	99.8	49	49
713			465	355.0	357.8	0.0	8.7	6.1	18	99.8	49	49
714			568	355.0	357.8	0.0	9.2	7.2	18	99.8	49	49
715			582	355.0	357.8	0.0	9.3	6.6	18	99.8	49	49
716			508	355.0	357.8	0.0	8.9	6.4	18	99.8	48	48
717			438	355.0	357.8	0.0	8.5	5.7	18	99.8	48	48
718			417	355.0	357.8	0.0	8.4	6.0	18	99.8	48	48
719	5.6	39.5	355	355.0	357.8	0.0	8.3	5.9	18	99.8	48	48
720	5.5	38.6	379	355.0	357.8	0.0	8.2	5.3	18	99.8	48	48
721	5.4	37.8	347	355.0	357.8	0.0	8.0	4.9	18	99.8	48	48
722	5.4	40.1	338	355.0	357.8	0.0	8.0	5.5	18	99.8	49	49
723			322	355.0	357.8	0.0	7.9	7.0	18	99.8	49	49
724	5.2	39.5	293	355.0	357.8	0.0	7.7	5.7	18	99.8	49	49
725			244	355.0	357.8	0.0	7.4	4.3	18	99.8	49	49
726			274	355.0	357.8	0.0	7.7	6.8	18	99.8	49	49
727	5.6	38.4	360	355.0	357.8	0.0	8.3	7.7	18	99.8	49	49
728	5.5	37.9	376	355.0	357.8	0.0	8.2	7.3	18	99.8	50	50
729	5.5	38.0	369	355.0	357.8	0.0	8.1	7.3	18	99.8	50	50
730	6.0	39.8	474	355.0	357.8	0.0	8.7	8.8	18	99.8	50	50
731	6.3	41.4	568	355.0	349.4	0.0	9.2	8.4	18	99.8	50	50
732	6.0	40.2	489	355.0	344.8	0.0	8.8	5.8	18	99.8	50	50
733			412	355.0	339.8	0.0	8.4	5.9	18	99.8	50	50
734			348	355.0	335.1	0.0	8.0	5.2	18	99.8	50	50
735			286	355.0	333.8	0.0	7.6	4.5	18	99.8	50	50
736			278	355.0	333.8	0.0	7.7	4.2	18	99.8	50	50
737			333	355.0	333.8	0.0	8.0	6.1	18	99.8	50	50
738			333	355.0	333.8	0.0	7.9	5.5	18	99.8	50	50
739			313	355.0	333.8	0.0	7.9	5.7	18	99.8	50	50
740			366	355.0	333.8	0.0	8.1	5.2	18	99.8	48	48
741			396	355.0	333.8	0.0	8.2	5.4	18	99.8	48	48
742			385	355.0	333.8	0.0	8.2	5.3	18	99.8	48	48
743			331	355.0	333.8	0.0	7.9	4.6	18	99.8	48	48
744			284	355.0	333.8	0.0	7.7	4.3	18	99.8	48	48
745			297	355.0	333.8	0.0	7.8	5.1	18	99.8	48	48
746			302	355.0	333.8	0.0	7.8	4.7	18	99.8	51	51
747			326	355.0	336.2	0.0	7.9	4.9	18	99.8	51	51
748			390	355.0	336.8	0.0	8.3	5.8	18	99.8	51	51
749			436	355.0	336.8	0.0	8.5	6.0	18	99.8	51	51
750			475	355.0	336.8	0.0	8.7	6.4	18	99.8	51	51
751			478	355.0	336.8	0.0	8.7	4.8	18	99.8	51	51
752			423	355.0	336.8	0.0	8.4	5.0	18	99.8	49	49
753			518	355.0	336.8	0.0	9.0	5.2	18	99.8	49	49
754	7.0	43.7	802	355.0	340.8	0.0	10.3	6.4	18	99.8	49	49
755	7.9	47.4	1127	355.0	343.8	0.0	11.5	7.3	18	99.8	49	49
756	8.0	46.7	1176	355.0	343.8	0.0	11.7	7.4	18	99.8	49	49
757			1135	355.0	343.8	0.0	11.6	7.3	18	99.8	49	49
758	7.7	45.5	1051	355.0	343.9	0.0	11.3	5.3	18	99.8	50	50
759			844	355.0	346.5	0.0	10.5	8.4	18	99.8	50	50
760			696	355.0	349.8	0.0	9.8	6.6	18	99.8	50	50
761			636	355.0	349.8	0.0	9.5	7.1	18	99.8	50	50
762			560	355.0	349.8	0.0	9.2	6.0	18	99.8	50	50
763			445	355.0	349.8	0.0	8.5	4.9	18	99.8	50	50
764			562	355.0	349.8	0.0	9.2	5.6	18	99.8	49	49
765			727	355.0	349.8	0.0	10.0	6.8	18	99.8	49	49
766			800	355.0	349.8	0.0	10.3	6.3	18	99.8	49	49
767			775	355.0	349.8	0.0	10.2	6.1	18	99.8	49	49
768			683	355.0	349.8	0.0	9.6	5.6	18	99.8	49	49
769			776	355.0	349.8	0.0	10.2	6.9	18	99.8	49	49
770			962	355.0	349.8	0.0	10.9	6.7	18	99.8	48	48
771			968	355.0	349.8	0.0	11.0	6.7	18	99.8	48	48
772			904	355.0	349.8	0.0	10.7	6.6	18	99.8	48	48
773			769	355.0	349.8	0.0	10.1	5.5	18	99.8	48	48
774			705	355.0	350.8	0.0	9.9	5.2	18	99.8	48	48
775			727	355.0	355.8	0.0	10.0	6.3	18	99.8	48	48
776			723	355.0	355.0	0.0	10.2	6.4	18	99.8	47	47
777			773	355.0	355.0	0.0	10.2	8.4	18	99.8	47	47
778			936	355.0	3.0	0.0	10.8	8.9	18	99.8	47	47
779	8.2	46.7	1252	355.0	3.0	0.0	11.9	8.6	18	99.8	47	47
780	47.8	1346	355.0	3.0	0.0	12.2	8.2	7.2	18	99.8	47	47
781	8.2	47.4	1294	355.0	3.0	0.0	12.0	8.2	18	99.8	47	47
782	8.1	47.2	1228	355.0	3.0	0.0	11.8	8.4	18	99.8	47	47
783	8.0	46.1	1187	355.0	3.0	0.0	11.7	8.0	18	99.8	47	47
784	7.8	45.4	1116	355.0	0.1	0.0	11.5	7.6	18	99.8	47	47
785	7.9	45.6	1151	355.0	0.1	0.0	11.6	7.5	18	99.8	47	47
786	8.1	47.5	1231	355.0	0.1	0.0	11.8	8.0	18	99.8	47	47
787	8.1	46.7	1249	355.0	0.1	0.0	11.9	7.4	18	99.8	47	47
788	8.1	46.0	1212	355.0	0.1	0.0	11.8	7.5	18	99.8	47	47
789	7.8	47.4	1118	355.0	0.1	0.0	11.5	7.1	18	99.8	48	48
790	7.7	45.8	1056	355.0	0.1	0.0	11.3	7.3	18	99.8	48	48
791	7.7	47.1	1053	355.0	0.1	0.0	11.3	7.1	18	99.8	48	48
792	7.5	45.1	974	355.0	0.1	0.0	11.0	6.9	18	99.8	48	48

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Date Point #	Standardized Wind Speed	L/Aeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPS	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (Pa)	Relative Humidity (%)		
793			7.4	43.7	943	355.0	0.1	0.0	10.9	6.9	6.3	17	99.8	48
794			7.5	44.7	934	355.0	0.1	0.0	10.8	6.9	7.7	17	99.8	48
795			7.4	44.7	984	355.0	0.1	0.0	11.0	7.3	7.5	17	99.8	48
796			8.1	46.2	1207	355.0	0.1	0.0	11.8	8.0	7.0	17	99.8	48
797			8.1	47.0	1237	355.0	0.1	0.0	11.8	7.7	5.9	17	99.8	48
798			8.5	48.4	1392	355.0	0.1	0.0	12.3	8.0	6.8	17	99.8	48
799			8.7	48.9	1523	355.0	0.1	0.0	12.5	8.4	6.5	17	99.8	48
800			8.5	48.8	1426	355.0	0.1	0.0	12.3	8.2	6.0	17	99.8	49
801			8.3	46.9	1301	355.0	0.1	0.0	12.0	8.0	7.5	17	99.8	49
802			8.1	47.3	1217	355.0	0.1	0.0	11.8	7.9	6.7	17	99.8	49
803			7.9	47.2	1134	355.0	0.1	0.0	11.5	7.7	6.4	17	99.8	49
804			7.6	44.6	1023	355.0	0.1	0.0	11.2	7.5	5.3	17	99.8	49
805			7.6	46.2	1016	355.0	0.1	0.0	11.1	7.5	7.3	17	99.8	49
806			7.9	46.3	1129	355.0	0.1	0.0	11.5	7.7	6.4	17	99.8	49
807			8.0	45.2	1171	355.0	0.1	0.0	11.6	8.1	4.8	17	99.8	47
808			8.1	45.7	1228	355.0	0.1	0.0	11.8	8.5	5.8	17	99.8	47
809			8.1	46.2	1236	355.0	0.1	0.0	11.8	8.2	5.7	17	99.8	47
810			8.1	46.9	1209	355.0	0.1	0.0	11.8	7.7	7.2	17	99.8	47
811			7.9	46.2	1141	355.0	0.1	0.0	11.5	8.0	6.6			

Table E.02 Measurement data - Background

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***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (C)	Pressure (kPa)	Relative Humidity (%)
1			0.0	8.1	24	98.6	74
2	12.8	39.5	0.0	9.7	24	98.6	74
3	13.1	39.6	0.0	10.0	24	98.6	71
4	10.6	40.2	0.0	8.1	24	98.6	71
5	10.5	43.3	0.0	8.0	24	98.6	71
6	10.1	40.2	0.0	7.7	24	98.6	71
7	10.5	40.3	0.0	8.0	24	98.6	71
8	10.5	39.1	0.0	8.0	24	98.6	71
9	11.8	40.1	0.0	9.0	24	98.6	72
10	11.2	38.8	0.0	8.5	24	98.6	72
11	10.5	40.4	0.0	8.0	24	98.6	72
12	10.1	37.1	0.0	7.7	24	98.6	72
13	10.5	39.7	0.0	8.0	24	98.6	72
14	12.2	40.3	0.0	9.3	24	98.6	72
15	15.4	43.0	0.0	11.7	24	98.6	71
16	13.5	41.1	0.0	10.3	24	98.6	71
17	12.2	39.2	0.0	9.3	24	98.6	71
18	12.6	43.0	0.0	9.6	24	98.6	71
19	11.8	42.2	0.0	9.0	24	98.6	71
20	10.1	42.3	0.0	7.7	24	98.6	71
21	11.3	41.1	0.0	8.6	24	98.6	73
22	10.9	44.3	0.0	8.3	24	98.6	73
23	10.8	40.3	0.0	8.2	24	98.6	73
24	9.2	43.2	0.0	7.0	24	98.6	73
25	12.7	44.6	0.0	9.7	24	98.6	73
26			0.0	8.6	24	98.6	73
27	9.2	41.7	0.0	7.0	24	98.6	73
28	11.3	41.4	0.0	8.6	24	98.6	73
29			0.0	9.3	24	98.6	73
30			0.0	8.0	24	98.6	73
31			0.1	7.9	24	98.6	73
32	11.7	43.2	0.1	8.9	24	98.6	73
33	11.5	39.2	0.0	8.0	24	98.6	73
34	13.5	44.1	0.0	10.3	24	98.6	73
35	12.9	41.5	0.0	9.8	24	98.6	73
36	13.8	40.9	0.0	10.5	24	98.6	73
37	15.1	42.1	0.0	11.6	24	98.6	73
38	15.5	44.5	0.0	11.8	24	98.6	73
39	14.1	38.5	0.0	10.7	24	98.6	70
40	12.3	39.6	0.0	9.4	24	98.6	70
41	12.9	40.0	0.0	9.8	24	98.6	70
42	10.8	41.9	0.0	8.2	24	98.6	70
43	12.7	45.4	0.0	9.7	24	98.6	70
44	10.3	42.4	0.0	7.8	24	98.6	70
45	12.6	44.0	0.1	9.6	24	98.6	73
46	11.9	42.7	0.0	9.1	24	98.6	73
47			0.0	6.2	24	98.6	73
48			0.0	9.8	24	98.6	73
49			0.0	9.4	24	98.6	73
50	9.9	43.1	0.0	7.5	24	98.6	73
51	11.7	42.0	0.0	8.9	24	98.6	74
52	13.4	43.2	0.0	10.3	24	98.6	74
53	11.6	42.9	0.0	8.8	24	98.6	74
54	9.5	39.6	0.1	7.2	24	98.6	74
55	14.4	41.4	0.0	11.0	24	98.6	74
56	12.0	42.2	0.0	9.1	24	98.6	74
57			0.0	6.6	24	98.6	74
58	11.1	41.4	0.0	8.5	24	98.6	73
59	11.6	43.1	0.0	8.8	24	98.6	73
60	14.7	39.4	0.1	11.2	24	98.6	73
61	14.8	39.6	0.1	11.3	24	98.6	73
62	15.3	39.5	0.1	11.6	24	98.6	73
63	14.3	42.7	0.1	10.9	24	98.6	71
64	11.5	38.9	0.1	8.8	24	98.6	71
65	15.9	38.8	0.1	12.1	24	98.6	71
66			0.0	8.9	24	98.6	71
67	14.6	37.7	0.0	11.1	24	98.6	71
68	10.3	41.9	0.1	7.8	24	98.6	71
69	13.0	42.1	0.0	9.9	24	98.6	71
70			0.1	13.0	24	98.6	71
71	16.5	38.1	0.1	11.8	24	98.6	71
72	16.4	39.0	0.1	12.5	24	98.6	70
73	12.8	44.9	0.1	9.7	24	98.6	70
74	10.9	39.8	0.1	8.3	24	98.6	70
75	12.8	42.2	0.0	9.8	24	98.6	70
76	12.2	40.3	0.0	9.3	24	98.6	70
77	11.8	40.0	0.0	9.0	24	98.6	70
78	10.5	40.2	0.0	8.0	24	98.6	72
79			0.0	8.6	24	98.6	72
80	10.5	40.8	0.1	8.0	24	98.6	72
81	11.2	40.7	0.3	8.6	24	98.6	72
82	8.4	42.3	0.1	6.4	24	98.6	72
83	8.7	43.1	0.0	6.6	24	98.6	72

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (C)	Pressure (kPa)	Relative Humidity (%)
84	10.2	40.6	0.1	7.8	24	98.6	74
85	14.1	44.0	0.0	10.7	24	98.6	74
86	10.8	41.1	0.0	9.2	24	98.6	74
87	10.6	40.5	0.0	8.1	24	98.6	74
88	12.6	41.1	0.0	9.6	24	98.6	74
89	10.7	44.0	0.0	8.1	24	98.6	74
90			0.1	6.6	24	98.6	71
91	12.4	43.9	0.0	9.4	24	98.6	71
92	13.8	46.2	0.0	10.5	24	98.6	71
93	12.7	40.9	0.0	9.7	24	98.6	71
94	11.6	46.1	0.0	8.8	24	98.6	71
95			0.0	9.6	24	98.6	71
96			0.1	8.0	24	98.6	71
97	13.3	42.0	0.0	10.1	24	98.6	71
98	13.9	41.1	0.0	10.6	24	98.6	71
99	16.2	39.8	0.0	12.4	24	98.6	71
100	12.1	41.2	0.0	9.2	24	98.6	71
101	15.5	41.2	0.0	11.8	24	98.6	71
102	11.9	40.2	0.0	9.1	24	98.6	70
103	12.8	42.2	0.0	9.7	24	98.6	70
104			0.0	9.2	24	98.6	70
105	15.5	41.1	0.0	11.8	24	98.6	70
106	18.1	45.2	0.0	13.8	24	98.6	70
107	14.2	45.0	0.0	10.8	24	98.6	70
108	13.8	41.1	0.1	10.6	24	98.6	69
109			0.0	11.3	24	98.6	69
110			0.0	11.4	24	98.6	69
111	8.6	41.0	0.0	8.0	24	98.6	69
112	13.4	45.9	0.0	10.2	24	98.6	69
113	12.9	42.8	0.0	9.8	24	98.6	69
114	14.9	41.0	0.0	11.4	24	98.6	71
115	15.0	39.9	0.0	11.4	24	98.6	71
116	13.8	41.3	0.0	11.8	24	98.6	71
117	13.1	41.8	0.1	10.0	24	98.6	71
118	12.4	40.8	0.0	9.4	24	98.6	71
119			0.0	6.9	24	98.6	71
120			0.0	9.7	24	98.6	71
121	8.8	41.2	0.1	6.7	24	98.6	71
122	11.2	39.4	0.0	8.5	24	98.6	71
123	10.9	39.8	0.2	8.3	24	98.6	71
124	14.1	43.0	0.0	10.7	24	98.6	71
125	11.3	40.5	0.0	8.6	24	98.6	71
126	12.6	43.8	0.1	9.1	24	98.6	71
127	12.1	40.9	0.1	9.2	24	98.6	71
128	13.7	39.4	0.0	10.4	24	98.6	71
129	14.5	39.0	0.0	11.1	24	98.6	71
130	12.2	38.1	0.1	9.3	24	98.6	71
131	14.2	39.2	0.0	10.8	24	98.6	71
132	12.6	38.7	0.1	9.6	24	98.6	71
133	13.1	40.5	0.0	10.0	24	98.6	71
134	12.2	39.2	0.0	9.3	24	98.6	71
135	10.9	38.7	0.0	8.4	24	98.6	71
136	10.9	37.2	0.0	8.3	24	98.6	71
137	11.4	42.2	0.0	8.7	24	98.6	71
138	10.0	41.3	0.0	7.7	24	98.6	71
139	10.9	42.2	0.0	8.3	24	98.6	71
140	12.4	44.2	0.0	9.4	24	98.6	71
141	15.3	41.2	0.0	11.7	24	98.6	71
142	13.3	41.1	0.0	10.1	24	98.6	71
143	13.7	39.2	0.0	10.4	24	98.6	71
144	14.2	37.5	0.0	10.8	24	98.6	71
145	13.0	40.4	0.0	9.9	24	98.6	71
146	14.3	37.7	0.1	10.9	24	98.6	71
147	14.6	36.8	0.0	11.2	24	98.6	71
148	16.0	37.8	0.0	12.2	24	98.6	71
149	15.6	38.3	0.0	11.9	24	98.6	71
150	14.7	38.6	0.1	11.2	24	98.6	70
151	13.9	43.2	0.2	10.6	24	98.6	70
152	8.7	41.0	0.0	6.6	24	98.6	70
153	8.7	40.0	0.2	6.6	24	98.6	70
154	13.4	37.7	0.0	10.2	24	98.6	70
155	15.4	45.5	0.0	11.7	24	98.6	70
156	13.7	42.2	0.1	10.5	24	98.6	70
157	13.5	41.9	0.0	10.3	24	98.6	70
158	13.9	43.4	0.3	10.6	24	98.6	70
159	10.8	45.2	0.0	8.3	24	98.6	70
160	11.7	42.9	0.0	8.9	24	98.6	70
161			0.0	6.8	24	98.6	70
162			0.0	7.7	24	98.6	73
163			0.0	8.2	24	98.6	73
164			0.0	8.4	24	98.6	73
165			0.0	7.7	24	98.6	73
166	9.3	43.4	0.1	7.1	24	98.6	73

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (C)	Pressure (kPa)	Relative Humidity (%)
167	11.7	40.4	0.0	8.9	24	98.6	73
168	9.8	41.2	0.0	7.5	24	98.6	72
169	9.3	42.0	0.0	7.1	24	98.6	72
170	7.5	40.1	0.0	5.7	24	98.6	72
171	12.6	45.1					

Table E.02 Measurement data - Background

Project: Niagara Region Wind Farm - Turbine T46 - IEC 61400-11 Measurement
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***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (C)	Pressure (kPa)	Relative Humidity (%)
250	6.4	32.5	1.5	4.9	17	99.8	49
251	7.3	34.2	1.3	5.6	17	99.8	49
252	6.5	37.8	1.3	4.9	17	99.8	49
253	5.4	38.2	1.2	4.2	17	99.8	49
254	6.9	39.0	1.2	5.3	17	99.8	49
255	5.7	36.8	1.1	4.3	17	99.8	49
256	5.4	34.5	1.1	4.2	17	99.8	49
257	6.2	34.3	1.2	4.8	17	99.8	49
258	6.0	34.7	1.1	4.6	17	99.8	49
259	6.5	36.6	1.0	5.0	17	99.8	49
260	4.9	37.0	0.9	3.8	17	99.8	49
261	4.5	37.4	0.8	3.5	17	99.8	49
262	4.3	36.8	0.8	3.3	17	99.8	49
263	3.4	36.0	0.8	2.6	17	99.8	49
264	3.7	36.9	0.9	2.8	17	99.8	51
265	3.2	36.5	1.0	2.5	17	99.8	51
266	4.0	36.2	1.1	3.1	17	99.8	51
267	6.1	35.9	1.1	4.7	17	99.8	51
268	5.8	35.0	1.2	4.5	17	99.8	51
269	6.0	37.4	1.1	4.6	17	99.8	51
270	5.8	36.5	1.1	4.5	17	99.8	48
271	6.7	41.4	1.2	5.2	17	99.8	48
272	5.7	36.7	1.3	4.4	17	99.8	48
273	5.8	35.0	1.3	4.4	17	99.8	48
274	7.6	32.5	1.3	5.8	17	99.8	48
275	6.5	33.3	1.2	5.0	17	99.8	48
276	6.8	32.9	1.1	5.2	17	99.8	48
277	6.1	33.5	1.1	5.2	17	99.8	48
278	7.8	35.6	1.1	6.0	17	99.8	48
279	7.8	33.3	1.1	5.9	17	99.8	48
280	9.0	38.4	1.0	6.9	17	99.8	48
281	8.6	34.0	1.2	6.6	17	99.8	48
282	7.4	34.7	1.1	5.7	17	99.8	48
283	7.6	37.8	1.0	5.8	17	99.8	48
284	7.7	36.3	1.0	5.9	17	99.8	48
285	6.3	36.7	1.2	4.8	17	99.8	48
286	8.3	34.3	1.3	6.4	17	99.8	48
287	8.9	34.6	1.3	6.8	17	99.8	48
288	7.1	35.4	1.2	5.4	17	99.8	47
289	7.6	35.0	1.3	5.8	17	99.8	47
290	7.7	34.4	1.4	5.9	17	99.8	47
291	6.8	36.2	1.4	5.2	17	99.8	47
292	6.1	33.4	1.3	4.7	17	99.8	47
293	7.2	34.1	1.2	5.5	17	99.8	47
294	6.7	36.9	1.3	5.2	17	99.8	50
295	6.7	33.9	1.2	5.2	17	99.8	50
296	6.0	34.5	1.2	4.6	17	99.8	50
297	6.6	36.2	1.3	5.0	17	99.8	50
298	5.3	34.5	1.2	4.1	17	99.8	50
299	3.5	37.8	1.2	2.7	17	99.8	50
300	4.8	34.7	1.3	3.7	17	99.8	49
301	5.2	39.8	1.3	4.0	17	99.8	49
302	4.4	35.7	1.2	3.4	17	99.8	49
303	3.7	36.0	1.0	2.9	17	99.8	49
304			0.9	3.1	17	99.8	49
305			0.8	3.5	17	99.8	49
306			0.7	3.5	17	99.8	49
307	4.9	42.6	0.8	3.8	17	99.8	48
308	3.8	41.3	0.1	2.9	17	99.8	48
309	5.3	40.1	0.1	4.1	17	99.8	48
310	6.7	43.6	0.2	5.2	17	99.8	48
311	6.2	37.4	0.8	4.8	17	99.8	48
312	7.2	36.4	1.2	5.5	18	99.8	46
313	7.3	40.6	1.3	5.6	18	99.8	46
314	6.7	38.0	1.4	5.2	18	99.8	46
315	6.4	36.6	1.6	4.9	18	99.8	46
316	6.6	35.9	1.6	5.1	18	99.8	46
317	6.0	35.0	1.5	4.6	18	99.8	46
318	6.1	34.2	1.5	4.7	18	99.8	47
319	5.3	36.6	1.6	4.1	18	99.8	47
320	7.2	37.4	1.4	5.5	18	99.8	47
321	6.7	38.3	1.3	5.1	18	99.8	47
322	6.0	38.2	1.2	4.6	18	99.8	47
323	9.0	39.3	1.2	6.9	18	99.8	47
324	7.0	38.9	1.2	5.3	18	99.8	46
325	7.3	35.5	1.3	5.6	18	99.8	46
326	8.7	34.7	1.4	6.7	18	99.8	46
327	8.5	35.3	1.4	6.5	18	99.8	46
328	6.0	36.0	1.3	4.6	18	99.8	46
329	7.7	35.1	1.3	5.9	18	99.8	46
330	6.0	33.7	1.1	4.6	18	99.8	48
331	5.7	33.1	1.1	4.4	18	99.8	48
332	4.4	35.6	1.3	3.4	18	99.8	48

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (C)	Pressure (kPa)	Relative Humidity (%)
333	6.8	33.9	1.2	5.2	18	99.8	48
334	6.0	34.7	1.3	4.6	18	99.8	48
335	6.7	34.9	1.3	5.2	18	99.8	48
336	6.3	33.1	1.4	4.8	18	99.8	48
337	5.3	32.6	1.3	4.1	18	99.8	48
338	6.5	32.5	1.2	5.0	18	99.8	48
339	6.9	35.9	1.0	5.3	18	99.8	48
340	8.2	33.6	1.1	6.3	18	99.8	48
341	8.3	32.9	1.1	6.4	18	99.8	48
342	8.6	33.6	1.1	6.6	18	99.8	45
343	5.8	36.9	1.2	4.5	18	99.8	45
344	6.1	36.3	1.3	4.7	18	99.8	45
345	6.3	39.0	1.3	6.3	18	99.8	45
346	6.1	39.2	1.4	4.7	18	99.8	45
347	5.8	36.8	1.4	4.5	18	99.8	45
348	4.5	36.3	1.4	3.5	18	99.8	45
349	5.8	36.7	1.5	4.5	18	99.8	45
350	5.3	36.5	1.5	4.1	18	99.8	45
351	4.1	35.8	1.5	3.1	18	99.8	45
352	6.5	35.0	1.4	5.0	18	99.8	45
353	6.9	37.4	1.2	5.3	18	99.8	45
354	5.9	39.2	1.1	4.5	18	99.8	46
355	6.2	38.5	1.4	4.8	18	99.8	46
356	6.2	39.5	1.7	4.8	18	99.8	46
357			1.5	4.2	18	99.8	46
358			1.1	5.3	18	99.8	46
359	8.1	41.3	1.1	6.2	18	99.8	46
360	8.4	36.8	1.3	6.4	18	99.8	47
361	6.4	38.0	1.4	4.9	18	99.8	47
362	5.4	42.0	1.4	4.2	18	99.8	47
363	7.8	43.6	1.2	6.0	18	99.8	47
364	7.2	42.5	1.3	5.5	18	99.8	47
365	7.2	40.1	1.3	5.5	18	99.8	47
366	6.1	41.5	1.3	4.7	18	99.8	47
367	7.7	40.3	1.1	5.9	18	99.8	47
368	6.5	39.0	1.2	5.0	18	99.8	47
369	5.2	39.2	1.1	4.0	18	99.8	47
370	5.4	37.2	1.0	4.2	18	99.8	47
371	4.0	37.0	1.0	3.1	18	99.8	47
372	5.3	36.4	1.1	4.1	18	99.9	49
373	6.0	34.2	1.2	4.6	18	99.9	49
374	4.1	32.9	1.3	3.2	18	99.9	49
375	4.7	33.8	1.2	4.5	18	99.8	47
376	4.8	36.7	1.1	3.7	18	99.9	49
377	5.6	39.4	1.1	4.3	18	99.9	49
378	5.8	41.3	1.1	4.4	18	99.8	48
379	5.2	40.9	1.2	4.4	18	99.8	48
380	9.5	43.3	1.2	7.3	18	99.8	48
381	9.6	43.5	1.2	7.4	18	99.8	48
382	8.6	39.4	1.4	6.6	18	99.8	48
383	8.2	38.7	1.4	6.3	18	99.8	48
384	8.9	40.7	1.6	6.8	18	99.8	48
385	9.0	39.8	1.7	6.9	18	99.8	48
386	8.7	41.4	1.6	6.7	18	99.8	46
387	9.4	42.6	1.6	7.2	18	99.8	46
388	9.0	42.0	1.7	6.9	18	99.8	46
389	8.6	44.5	1.7	6.6	18	99.8	46
390	9.7	40.7	1.6	7.4	18	99.8	46
391	10.4	41.8	1.6	8.0	18	99.8	46
392	8.5	42.5	1.6	6.5	18	99.8	46
393	7.4	38.7	1.6	5.7	18	99.8	46
394	8.3	43.8	1.5	6.4	18	99.8	46
395	7.3	39.5	1.4	5.6	18	99.8	46
396	8.9	39.6	1.4	6.8	18	99.8	47
397	9.4	38.9	1.5	7.2	18	99.8	47
398	6.4	41.3	1.6	4.9	18	99.8	47
399	8.8	38.6	1.5	6.7	18	99.8	47
400	8.7	40.2	1.5	6.7	18	99.8	47
401	7.3	38.8	1.5	5.6	18	99.8	47
402	7.5	41.5	1.5	5.7	18	99.8	46
403	7.8	40.2	1.5	6.0	18	99.8	46
404	8.5	38.9	1.4	6.5	18	99.8	46
405	8.4	41.3	1.3	6.4	18	99.8	46
406	7.9	42.4	1.3	6.1	18	99.8	46
407	7.8	41.1	1.2	6.0	18	99.8	46
408	6.2	40.6	1.3	4.7	18	99.8	45
409	6.0	38.6	1.3	4.6	18	99.8	45
410	5.7	37.2	1.3	4.4	18	99.8	45
411	7.5	39.4	1.4	5.7	18	99.8	45
412	7.3	42.0	1.5	5.6	18	99.8	45
413	6.0	37.3	1.4	4.6	18	99.8	45
414	7.6	36.0	1.3	5.8	18	99.8	49
415	7.6	37.2	1.2	5.8	18	99.8	49

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (C)	Pressure (kPa)	Relative Humidity (%)
416	7.2	35.6	1.2	5.5	18	99.8	49
417	7.2	39.0	1.1	5.5	18	99.8	49
418	7.4	37.0	1.1	5.7	18	99.8	

Table E.02 Measurement data - Background

Project: Niagara Region Wind Farm - Turbine T46 - IEC 61400-11 Measurement
Report ID: 16227.00.T46.RP1

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (C)	Pressure (kPa)	Relative Humidity (%)
499	7.4	41.4	1.3	5.7	18	99.8	48
500	6.2	39.1	1.2	4.8	18	99.8	48
501	5.4	41.0	1.2	4.1	18	99.8	48
502	6.4	39.1	1.2	4.9	18	99.8	48
503	7.3	42.7	1.4	5.6	18	99.8	48
504			1.4	5.2	18	99.8	46
505	9.0	40.9	1.4	6.9	18	99.8	46
506	9.8	42.4	1.4	7.5	18	99.8	46
507	8.1	40.2	1.4	6.2	18	99.8	46
508	9.1	40.4	1.4	7.0	18	99.8	46
509	7.2	41.4	1.5	5.5	18	99.8	46
510	7.0	43.1	1.5	5.3	18	99.8	45
511	7.7	38.8	1.5	5.9	18	99.8	45
512	8.9	40.3	1.5	6.8	18	99.8	45
513	7.9	37.6	1.5	6.0	18	99.8	45
514	7.7	37.7	1.4	5.9	18	99.8	45
515	7.4	38.3	1.4	5.7	18	99.8	45
516	7.9	40.1	1.4	5.8	17	99.8	46
517	7.0	39.0	1.3	5.4	17	99.8	46
518	8.2	36.6	1.2	6.3	17	99.8	46
519	6.1	37.8	1.2	4.7	17	99.8	46
520	8.5	36.3	1.3	6.5	17	99.8	46
521	9.1	41.1	1.4	7.0	17	99.8	46
522	8.3	35.9	1.3	6.3	17	99.8	46
523	5.6	37.7	1.2	4.3	17	99.8	46
524	6.1	37.5	1.1	4.7	17	99.8	46
525	8.0	38.2	1.2	6.1	17	99.8	46
526	7.0	38.2	1.2	5.4	17	99.8	46
527	7.0	36.7	1.3	5.4	17	99.8	46
528	7.6	37.9	1.3	5.8	17	99.8	47
529	6.6	37.3	1.3	5.1	17	99.8	47
530	7.8	37.4	1.3	6.0	17	99.8	47
531	7.5	37.4	1.3	5.8	17	99.8	47
532	7.9	39.1	1.2	6.1	17	99.8	47
533	7.6	37.0	1.3	5.8	17	99.8	47
534	7.8	37.5	1.3	5.9	17	99.8	47
535	7.4	36.9	1.3	5.7	17	99.8	47
536	6.2	37.5	1.3	4.8	17	99.8	47
537	5.9	38.7	1.2	4.5	17	99.8	47
538	7.2	35.9	1.2	5.5	17	99.8	47
539	6.1	34.5	1.1	4.7	17	99.8	47
540	4.4	34.0	1.2	3.4	17	99.8	48
541	4.4	37.3	1.1	3.4	17	99.8	48
542	6.9	33.8	1.1	5.3	17	99.8	48
543	7.2	37.9	1.2	5.5	17	99.8	48
544	6.4	40.7	1.1	4.9	17	99.8	48
545	5.1	36.5	1.1	3.9	17	99.8	48
546	6.7	36.8	1.1	5.1	17	99.8	48
547	6.0	40.6	1.2	4.6	17	99.8	48
548	5.3	37.5	1.2	4.1	17	99.8	48
549	5.4	38.3	1.2	4.1	17	99.8	48
550	5.7	37.0	1.2	4.4	17	99.8	48
551	6.1	38.4	1.2	4.7	17	99.8	48
552	6.5	37.5	1.2	5.0	17	99.8	49
553	5.2	36.6	1.3	4.0	17	99.8	49
554	5.4	39.1	1.2	4.2	17	99.8	49
555	7.4	41.2	1.2	5.7	17	99.8	49
556	3.0	38.5	1.2	2.3	11	76.7	31
557	7.2	43.9	1.1	5.5	17	99.8	49
558	6.5	40.2	1.1	5.0	17	99.8	48
559	4.7	41.2	1.2	3.6	17	99.8	48
560	6.0	35.5	1.2	4.6	17	99.8	48
561	7.5	33.9	1.3	5.7	17	99.8	48
562	6.9	36.2	1.3	5.3	17	99.8	48
563	8.3	35.0	1.3	6.4	17	99.8	48
564	6.7	34.3	1.2	5.1	17	99.8	48
565	6.5	39.6	1.2	5.0	17	99.8	48
566	6.1	36.4	1.2	4.7	17	99.8	48
567	6.2	39.0	1.1	4.7	17	99.8	48
568	5.6	38.9	1.1	4.3	17	99.8	48
569	5.2	38.4	1.2	4.0	17	99.8	48
570	5.5	40.0	1.2	4.2	17	99.8	49
571	4.9	39.9	1.2	3.8	17	99.8	49
572	6.1	39.7	1.3	4.7	17	99.8	49
573	5.8	39.9	1.3	4.5	17	99.8	49
574	5.8	40.8	1.4	4.5	17	99.8	49
575	5.1	40.8	1.5	3.9	17	99.8	49
576	5.1	42.0	1.5	3.9	17	99.8	50
577	6.0	38.1	1.4	4.6	17	99.8	50
578	4.0	39.7	1.3	3.1	17	99.8	50
579	5.4	40.0	1.3	4.1	17	99.8	50
580	5.2	42.3	1.3	4.0	17	99.8	50
581	5.8	37.1	1.4	4.5	17	99.8	50

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (C)	Pressure (kPa)	Relative Humidity (%)
582	7.1	34.8	1.4	5.4	17	99.8	50
583	6.6	34.8	1.4	5.1	17	99.8	50
584	7.3	35.1	1.4	5.6	17	99.8	50
585	6.0	34.4	1.3	4.6	17	99.8	50
586	6.1	33.1	1.3	4.7	17	99.8	50
587	6.4	33.1	1.3	4.9	17	99.8	50
588	4.6	35.7	1.4	3.5	17	99.8	49
589	7.3	33.2	1.4	5.6	17	99.8	49
590	6.5	35.3	1.3	5.0	17	99.8	49
591	7.2	34.8	1.3	5.5	17	99.8	49
592	6.6	36.9	1.3	5.1	17	99.8	49
593	4.8	36.6	1.3	3.7	17	99.8	49
594	6.0	36.7	1.2	4.6	17	99.8	50
595	6.6	35.2	1.1	5.1	17	99.8	50
596	6.7	32.6	1.2	5.2	17	99.8	50
597	5.8	36.2	1.2	4.4	17	99.8	50
598	6.7	36.2	1.2	5.2	17	99.8	50
599	7.4	34.8	1.1	5.7	17	99.8	50
600	6.5	37.4	1.2	5.0	17	99.8	48
601	5.7	36.6	1.3	4.4	17	99.8	48
602			1.4	3.8	17	99.8	48
603	7.2	36.0	1.5	5.5	17	99.8	48
604	6.7	35.0	1.4	5.2	17	99.8	48
605	6.0	36.0	1.5	4.6	17	99.8	48
606	6.3	35.6	1.4	4.8	17	99.8	49
607	7.0	35.0	1.3	5.4	17	99.8	49
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***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (C)	Pressure (kPa)	Relative Humidity (%)
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End of Report
