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REPORT ID**: 14355.00.T2.RP1**

Port Ryerse Wind Power Project – Turbine T2 IEC 61400-11 Edition 3.0 Measurement Report

Prepared for:

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December 21, 2017 – Revision #1

Revision History

Revision Number	Description	Date
1	Issued test report	December 21, 2017

This report in its entirety, including appendices contains 62 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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Any use of this report is subject to this Statement of Qualifications and Limitations. Any damages arising from improper use of this report or parts thereof shall be borne by the party making such use.

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 08437084 Canada Inc to conduct an acoustic measurement of turbine T2 at the Port Ryerse Wind Power Project ("Port Ryerse"). 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 T2.

2 Wind Turbine Information

2.1 Wind turbine equipment specific information

Wind turbine specific equipment information for turbine T2 was provided by the operator and is summarized in Tables 1 – 5.

Table 1 - Wind Turbine Details

Wind Turbine Details	
Manufacturer	Siemens
Model Number	SWT-3.2-113
Turbine ID	3200536

Table 2 - Operating Details

Operating Details	
Vertical or Horizontal axis wind turbine	Horizontal
Upwind or downwind rotor	Upwind
Hub height	99.5 m
Horizontal distance from rotor centre to tower axis	5.5 m
Diameter of rotor	113 m
Tower type (lattice or tube)	Tube
Passive stall, active stall, or pitch controlled turbine	Hydraulic Pitch Controlled
Constant or variable speed	Variable Speed
Power curve	See Appendix Figure B.01
Rotational speed at each integer standardised wind speed	See Appendix Figure B.02
Rated power output	2.5 MW
Control software version	Control software version 132.3.0.3

Table 3 - Rotor Details

Rotor Details	
Rotor control devices	Pitch regulation with variable speed
Presence of vortex generators, stall strips, serrated trailing edges	Vortex Generators, serrated trailing edges
Blade type	Epoxy, Fibreglass, Balsa wood
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	Siemens
Model number	Synchronous Permanent Magnet Generator
Serial number	N/A

2.2 Wind Turbine Location

Turbine T2 is located South of Gilbert Road, and West of Avalon Line in Norfolk County, Ontario. The specific UTM coordinates for T2 are 561,217m E, 4,735,252m N, Zone 17T. The area surrounding T2 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 T2 is summarized in Table 6.

Table 6 - Acoustic Measurement Equipment

Equipment	Manufacturer Name & Model	Serial Number
Acoustic Data acquisition system	LMS SCADA Mobile	22143211
Microphone	B&K 4189	2625197
Pre-amplifier	B&K 2671	2614901
Acoustic calibrator	B&K 4231	2513183

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 (99.5m high) from turbine T2. 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 156m 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 T2. 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 monitored 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 T2 were taken, the surrounding land was flat and grass-covered. There was a tree line 30m away from the microphone board towards the turbine. 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
November 16, 2017	Background	10:45 AM	11:18 AM
	Turbine ON	11:22 AM	11:43 AM
	Background	11:54 AM	12:12 PM
	Turbine ON	12:32 PM	1:32 PM
	Background	1:33 PM	1:39 PM
	Background	1:56 PM	2:13 PM
	Background	2:13 PM	2:17 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 T2's power curve (as per the standard), while wind direction was provided by T2's nacelle yaw position. Background data was obtained from an anemometer located 10m above ground level near T2.

Temperature and pressure readings during the measurement period were provided by the 10m anemometer, located near turbine T2 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

No deviations.

4.2 Special Notes & Considerations

T03 was parked for the duration of the test.

4.3 Analysis Details

The following section outlines analysis of the measurement data acquired for T2. 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	
7.5	53.0	30	47.2	26	51.7*
8	53.4	25	46.5	28	52.4
8.5	53.5	57	47.1	32	52.3
9	53.3	70	47.1	44	52.2
9.5	53.5	72	46.3	28	52.6
10	53.3	54	47.1	40	52.1
10.5	54.0	17	47.4	42	52.9
11	53.8	33	46.4	29	52.9
11.5	53.7	29	47.4	28	52.6
12	53.8	20	47.2	26	52.8

Values marked with an asterisk * denote 3 to 6 dB difference between Turbine ON and Background

4.6 Sound Power Level of Turbine

The calculated sound power level of the turbine T2 (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)
7.5	102.2*	1.0
8	102.9	0.9
8.5	102.9	0.9
9	102.7	1.0
9.5	103.1	0.9
10	102.7	0.9
10.5	103.5	1.0
11	103.5	0.9
11.5	103.1	1.0
12	103.3	0.9

Values marked with an asterisk * denote 3 to 6 dB difference between Turbine ON and Background

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

Wind Speed (m/s)	Apparent L_{WA}, (dBA)	Uncertainty (dB)
5	102.0*	1.3
6	102.8	0.9
7	102.9	0.8
8	103.3	0.9
9	103.5	1.3

Values marked with an asterisk * denote 3 to 6 dB difference between Turbine ON and Background

4.7 Tonality Analysis

The tonality analysis for Turbine T2 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 were detected						

5 Closure

Measurements and analysis were carried on Turbine T2 of the Port Ryerse Wind Power Project, located in Norfolk County 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".

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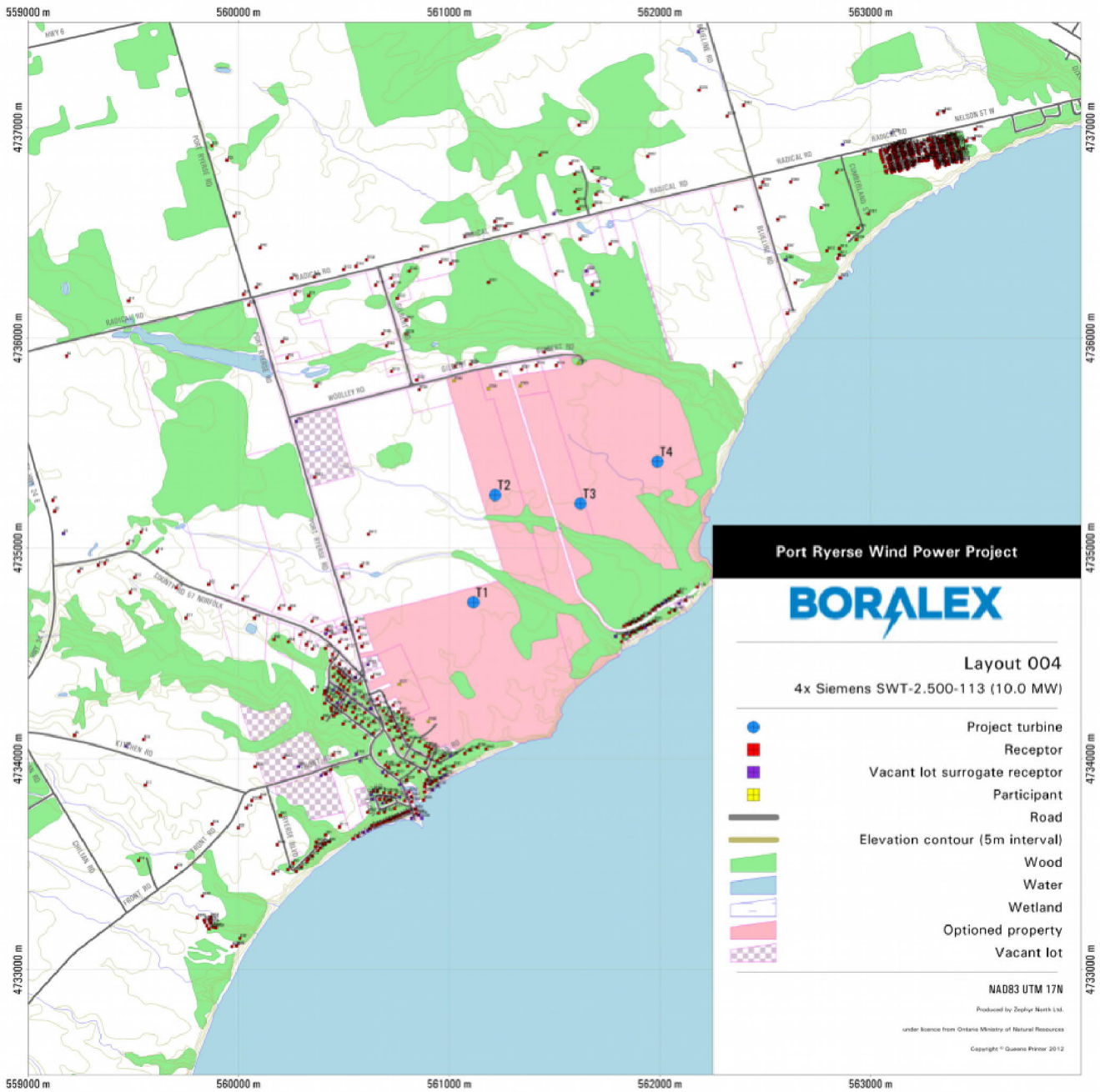
Appendix A
Site Details



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	Scale: NTS Drawn by: SS Reviewed by: AM Date: December 5, 2017 Revision: 1	Port Ryerse Wind Power Project -T2- IEC 61400-11 Ed.3.0	
		Figure Title Site Plan	**Figure A.01**

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Port Ryerse Wind Power Project - T2 - IEC 61400-11 Ed. 3.0

Figure Title

Site Photos

Figure A.02

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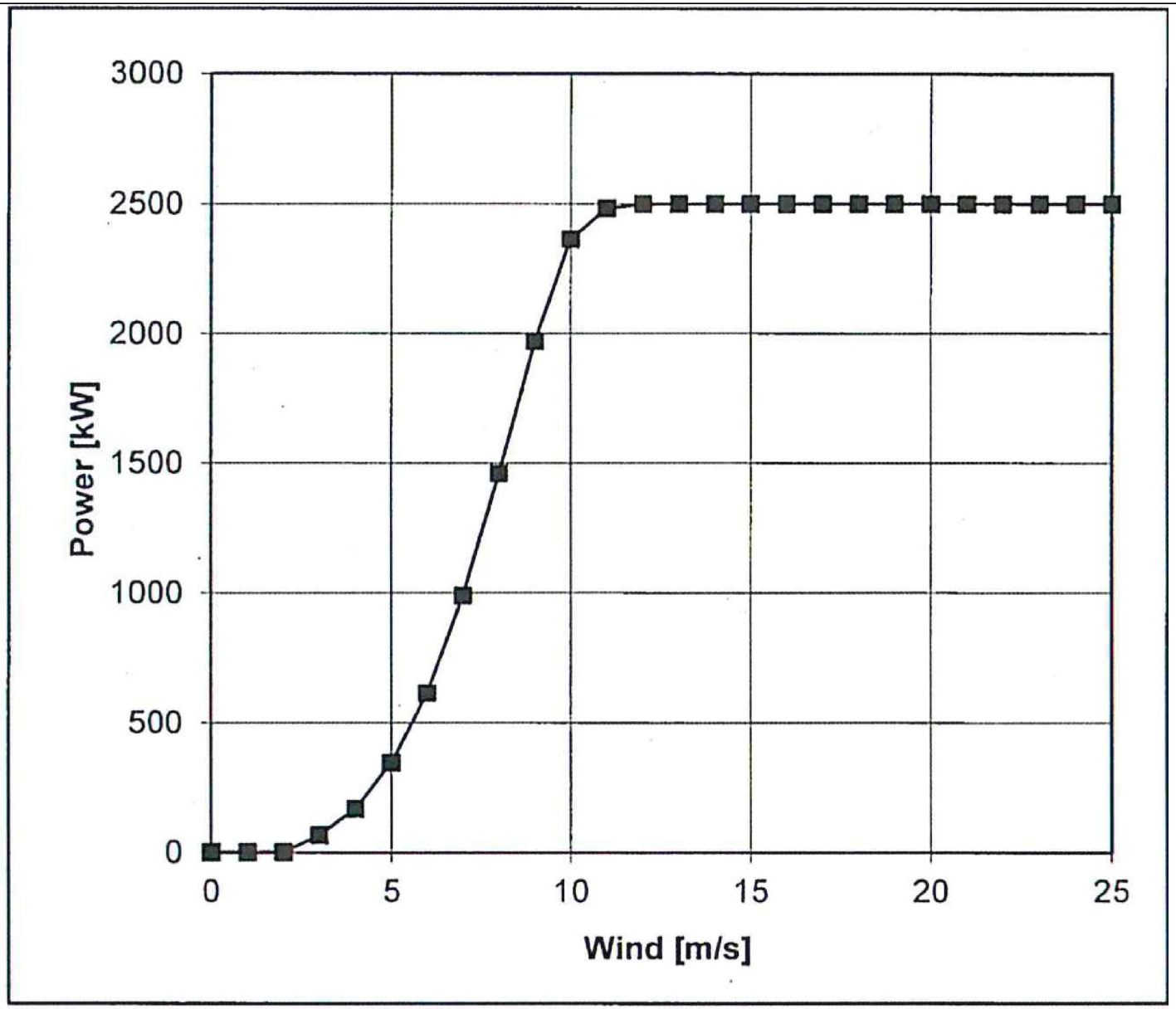
Appendix B
Turbine Information

Wind [m/s]	Power [kW]
0	0
1	0
2	0
3	65
4	169
5	347
6	615
7	989
8	1461
9	1970
10	2364
11	2483
12	2499
13	2500
14	2500
15	2500
16	2500
17	2500
18	2500
19	2500
20	2500
21	2500
22	2500
23	2500
24	2500
25	2500



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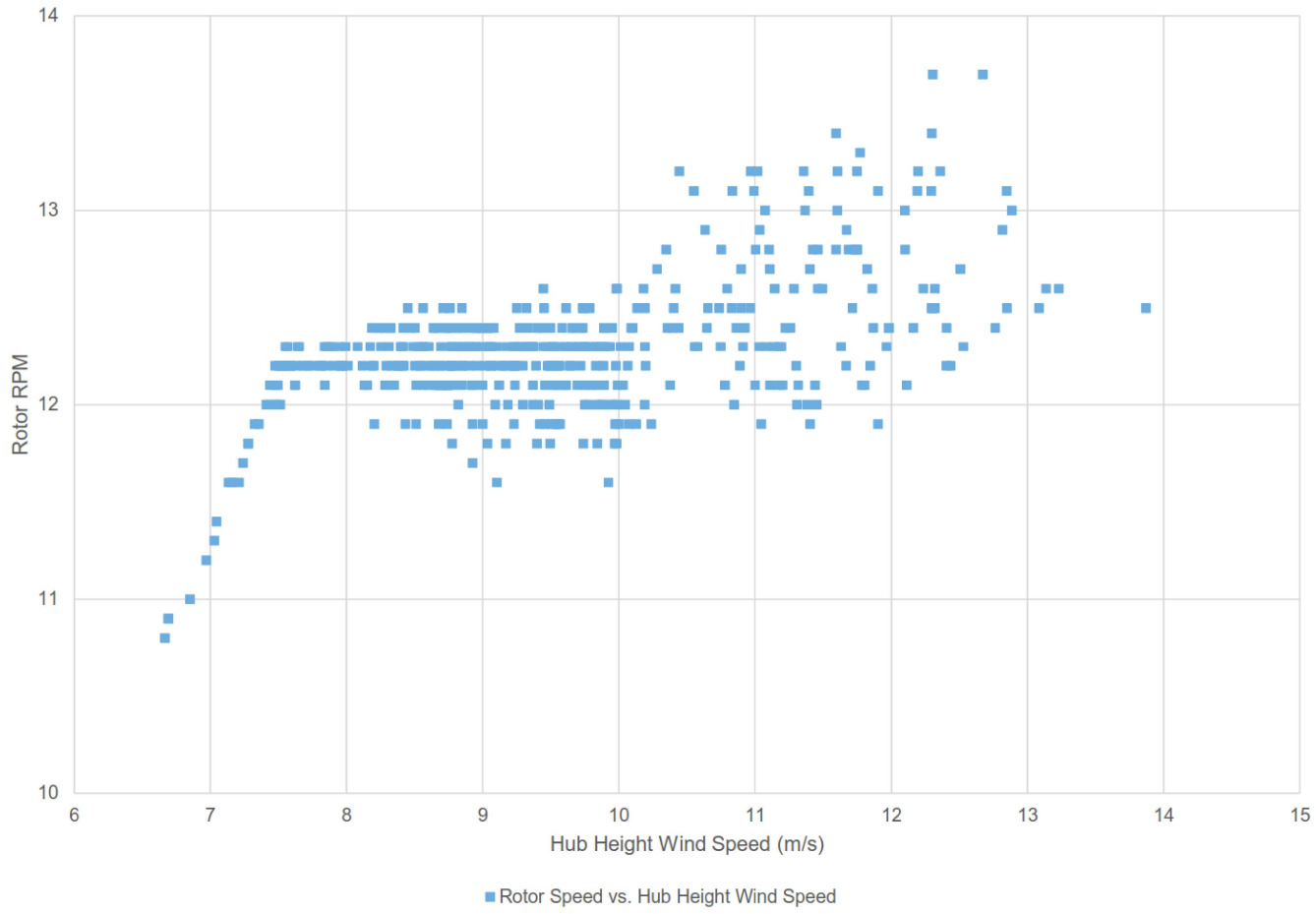
Project Name

Port Ryerse Wind Power Project - T2 - IEC 61400-11 Ed. 3.0

Figure Title

Power Curve

Figure B.01



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Appendix C
Apparent Sound Power Level

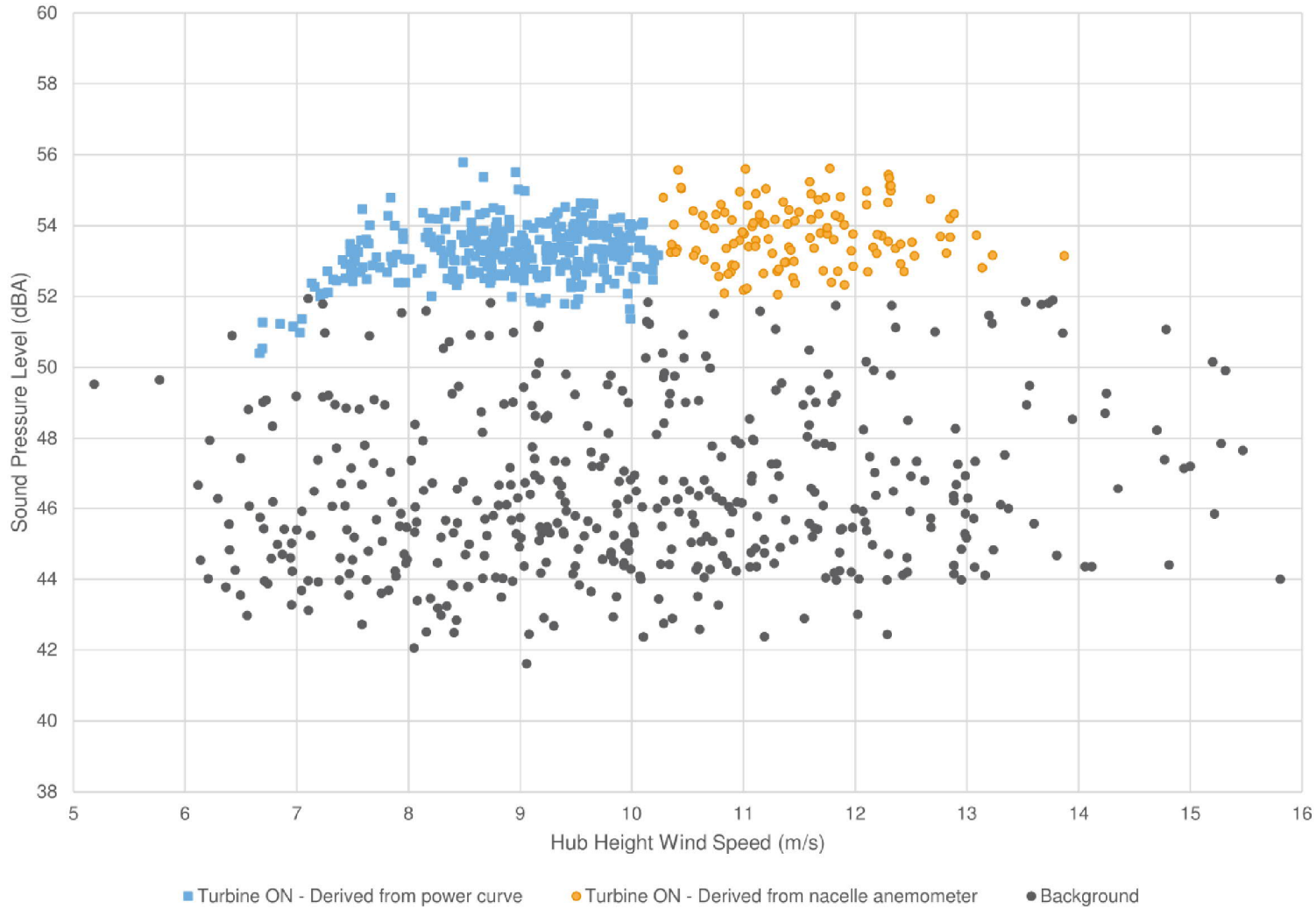

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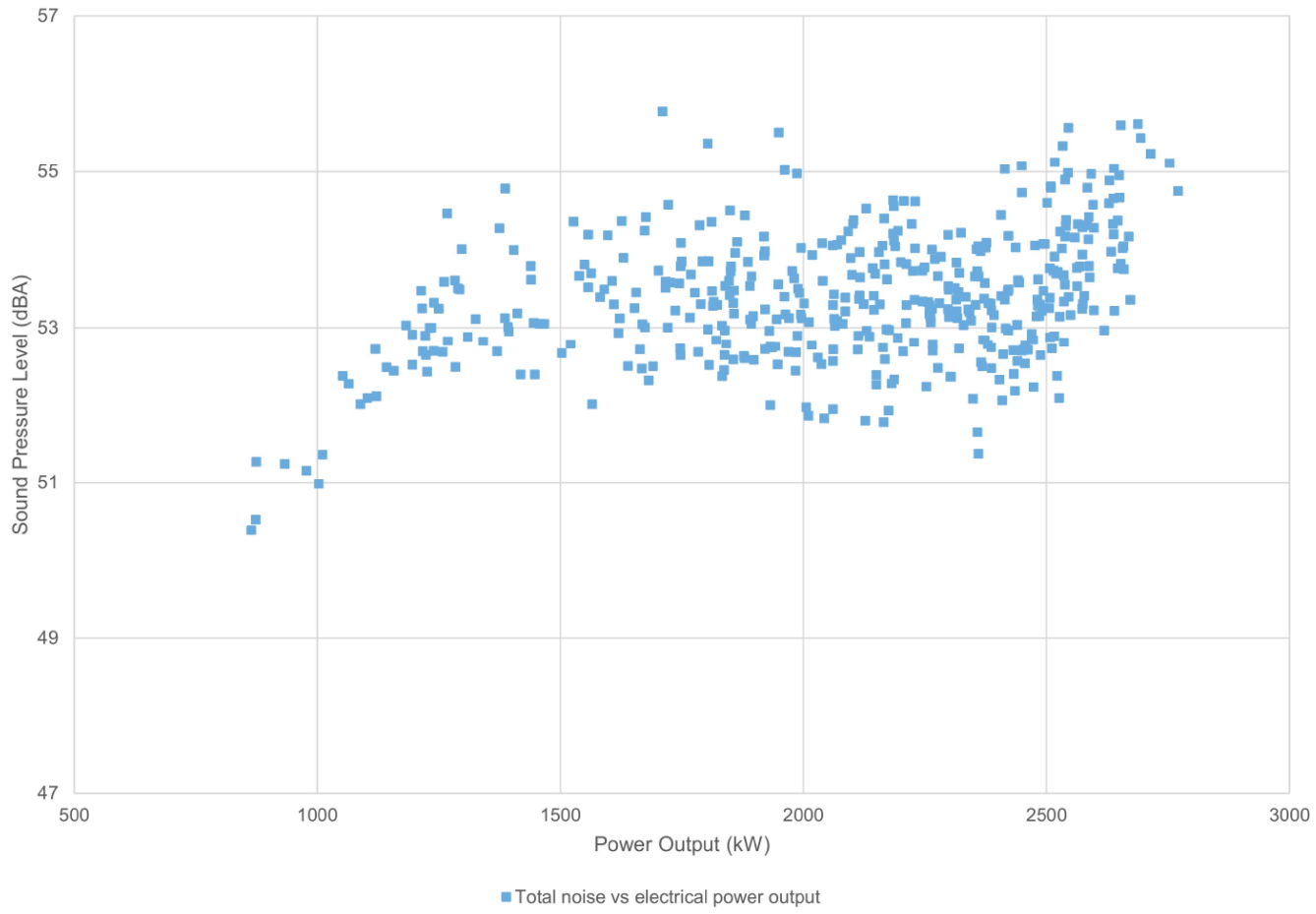
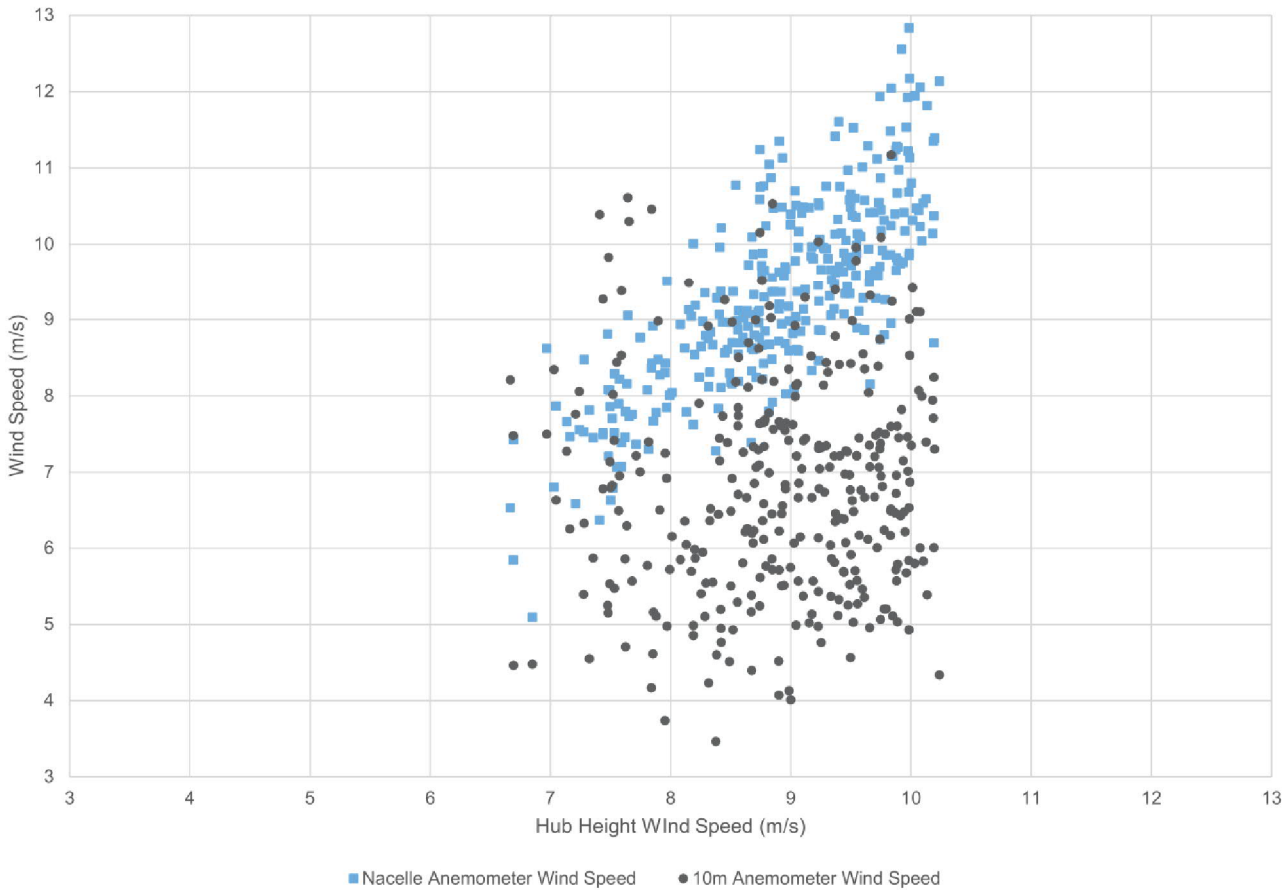
Figure C.01



aercoustics	Project ID: 14355.00.T2.RP1 Scale: NTS Drawn by: SS Reviewed by: AM Date: December 5, 2017 Revision: 1	**Project Name** Port Ryerse Wind Power Project - T2 - IEC 61400-11 Ed. 3.0 **Figure Title** Plot of measured total noise vs electrical power output **Figure C.02**



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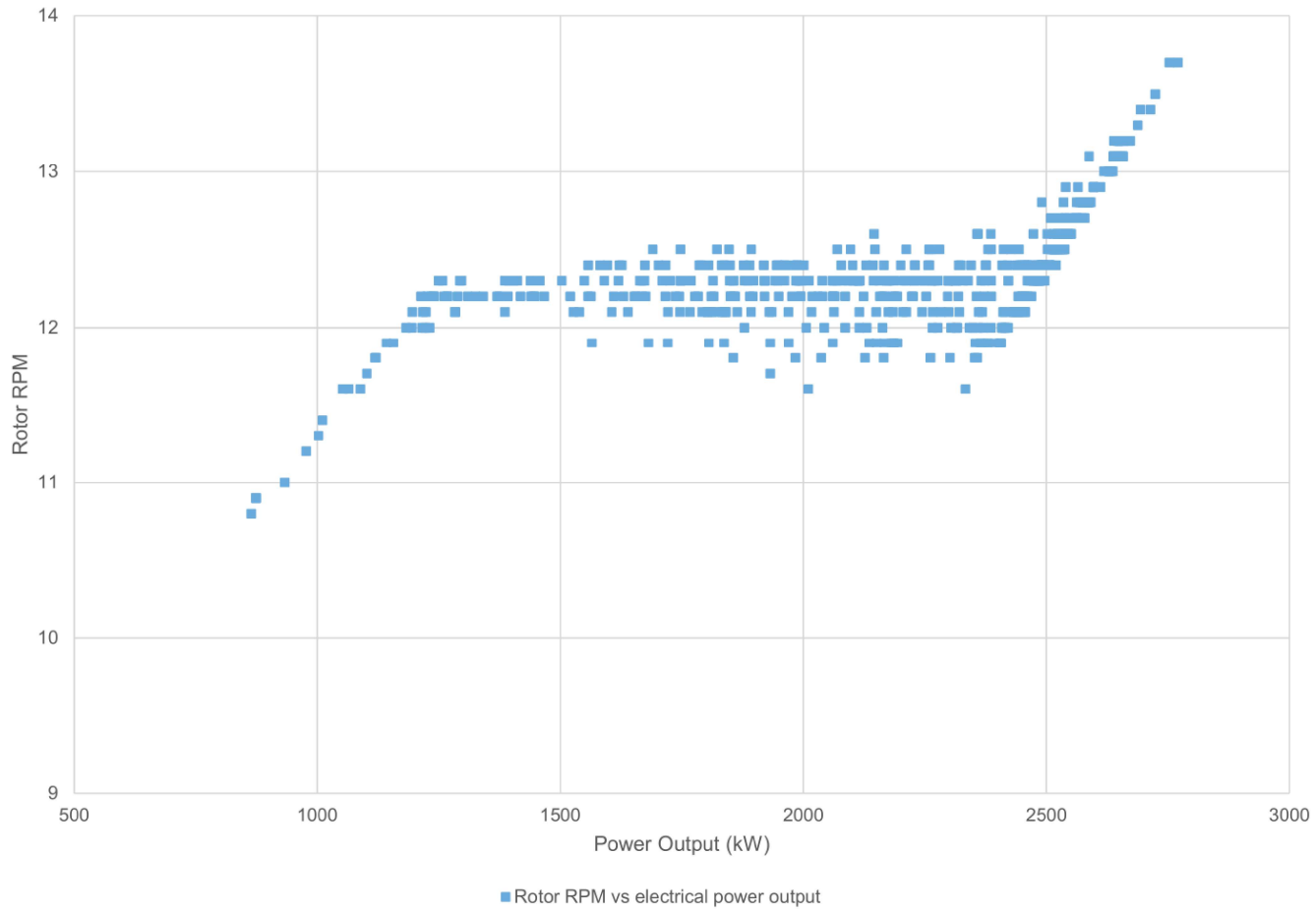
	Scale: NTS Drawn by: SS Reviewed by: AM Date: December 5, 2017 Revision: 1	Port Ryerse Wind Power Project - T2 - IEC 61400-11 Ed. 3.0	
		Figure Title Plot of power curve relative to nacelle anemometer and 10m anemometer	**Figure C.03**



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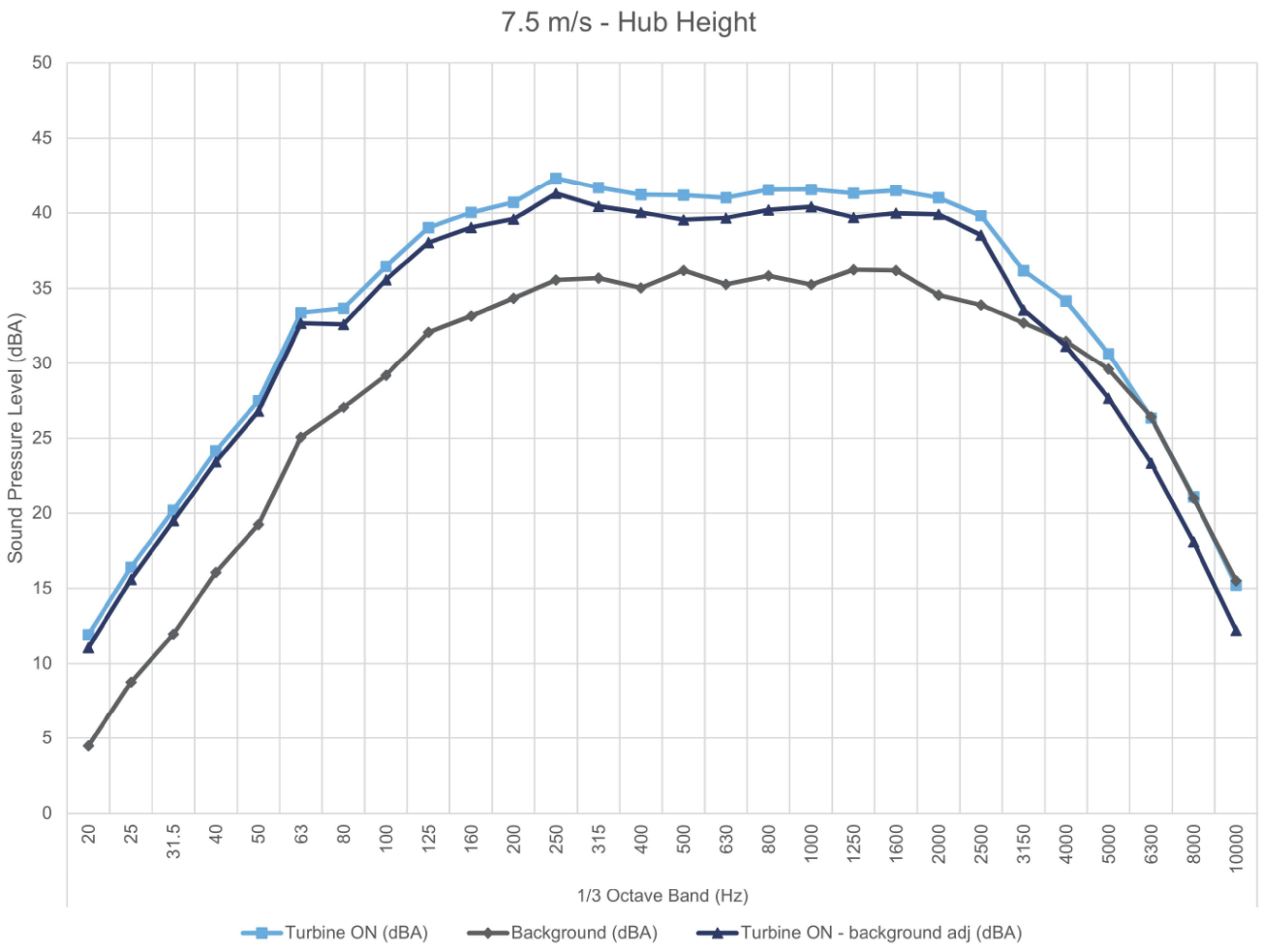
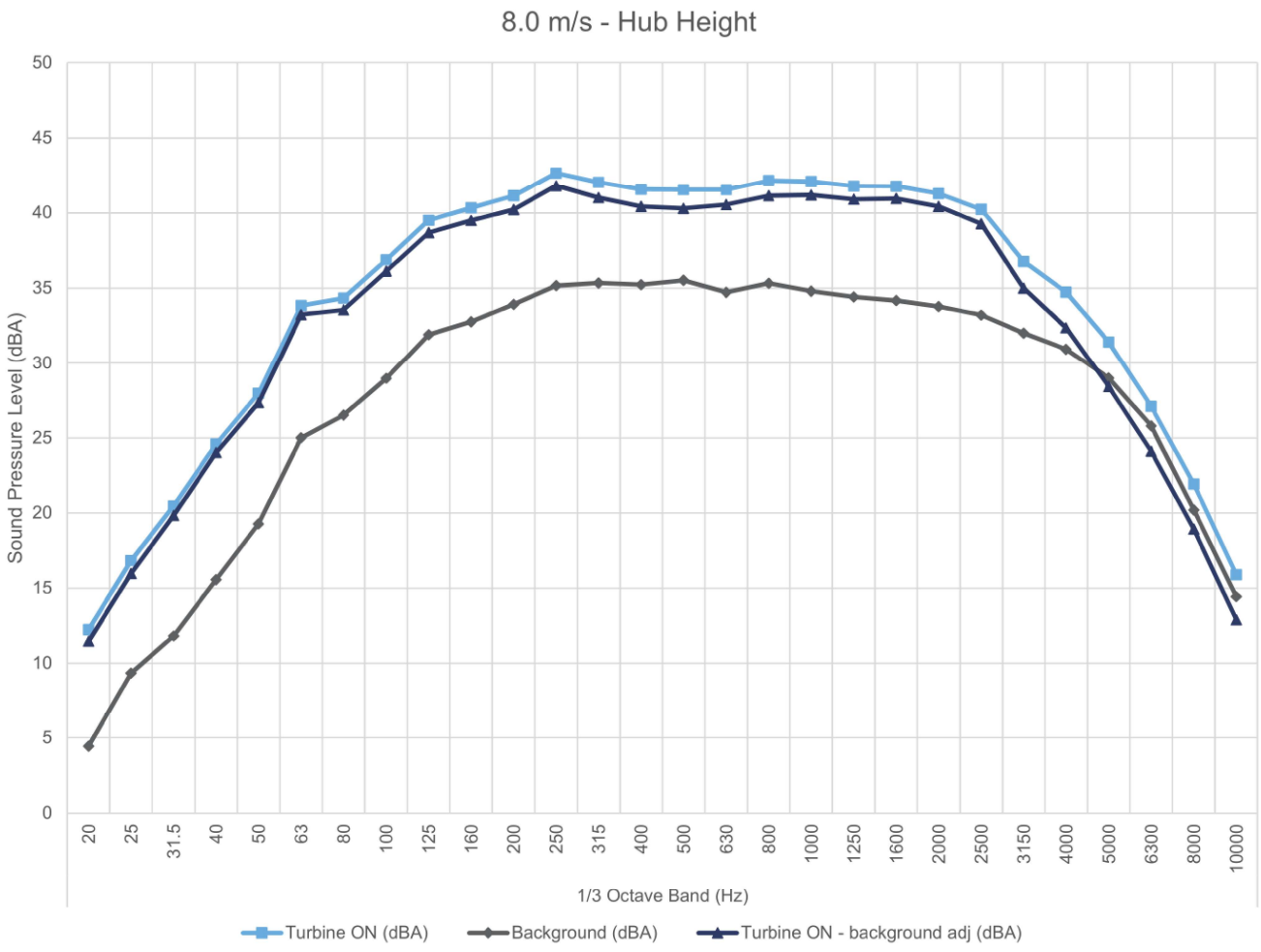


aercoustics	Project ID: 14355.00.T2.RP1 Scale: NTS Drawn by: SS Reviewed by: AM Date: December 5, 2017 Revision: 1	**Project Name** Port Ryerse Wind Power Project - T2 - IEC 61400-11 Ed. 3.0 **Figure Title** Plot of sound pressure spectrum in 1/3 Octave at 7.5 m/s	**Figure C.05**



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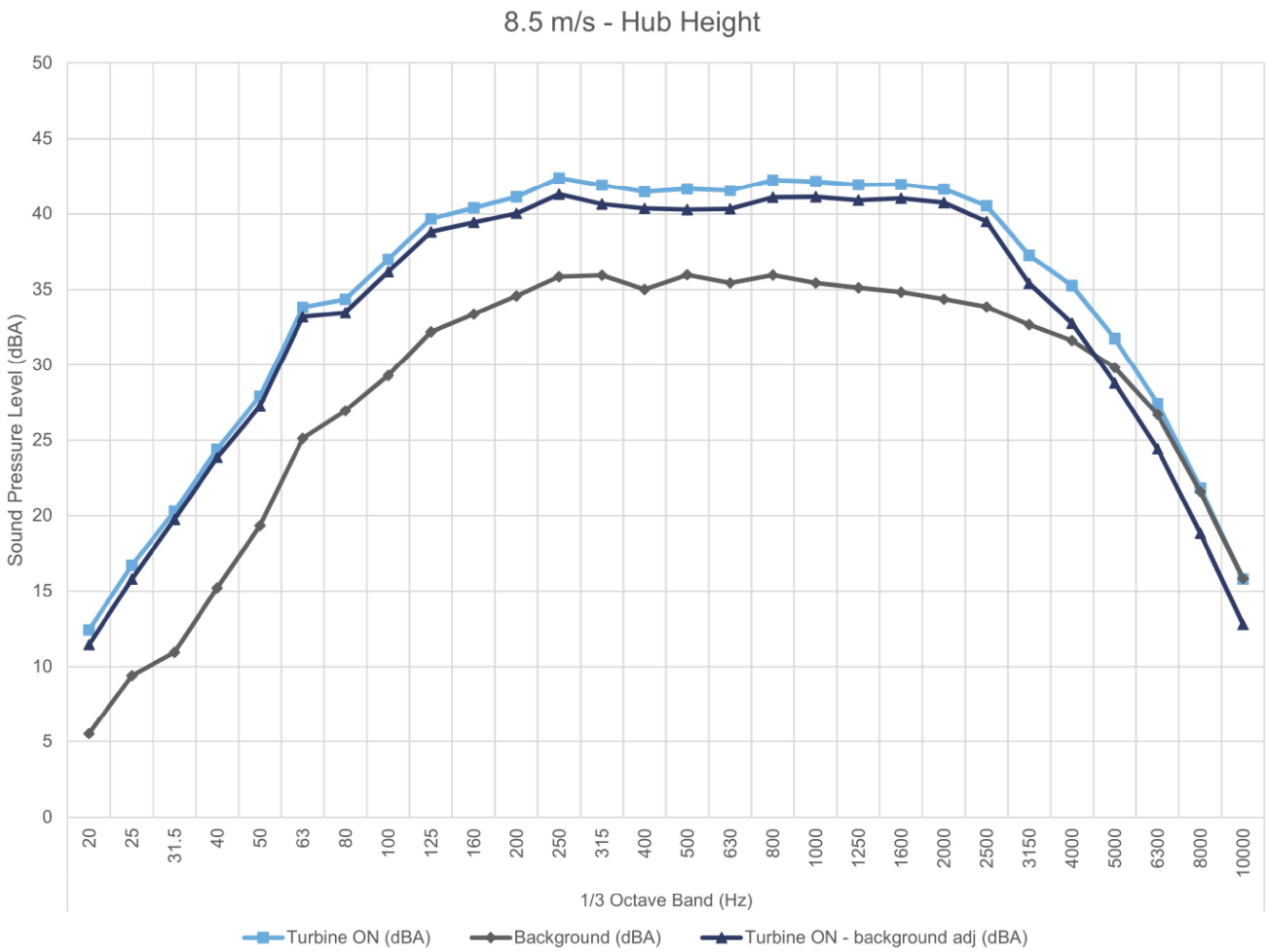

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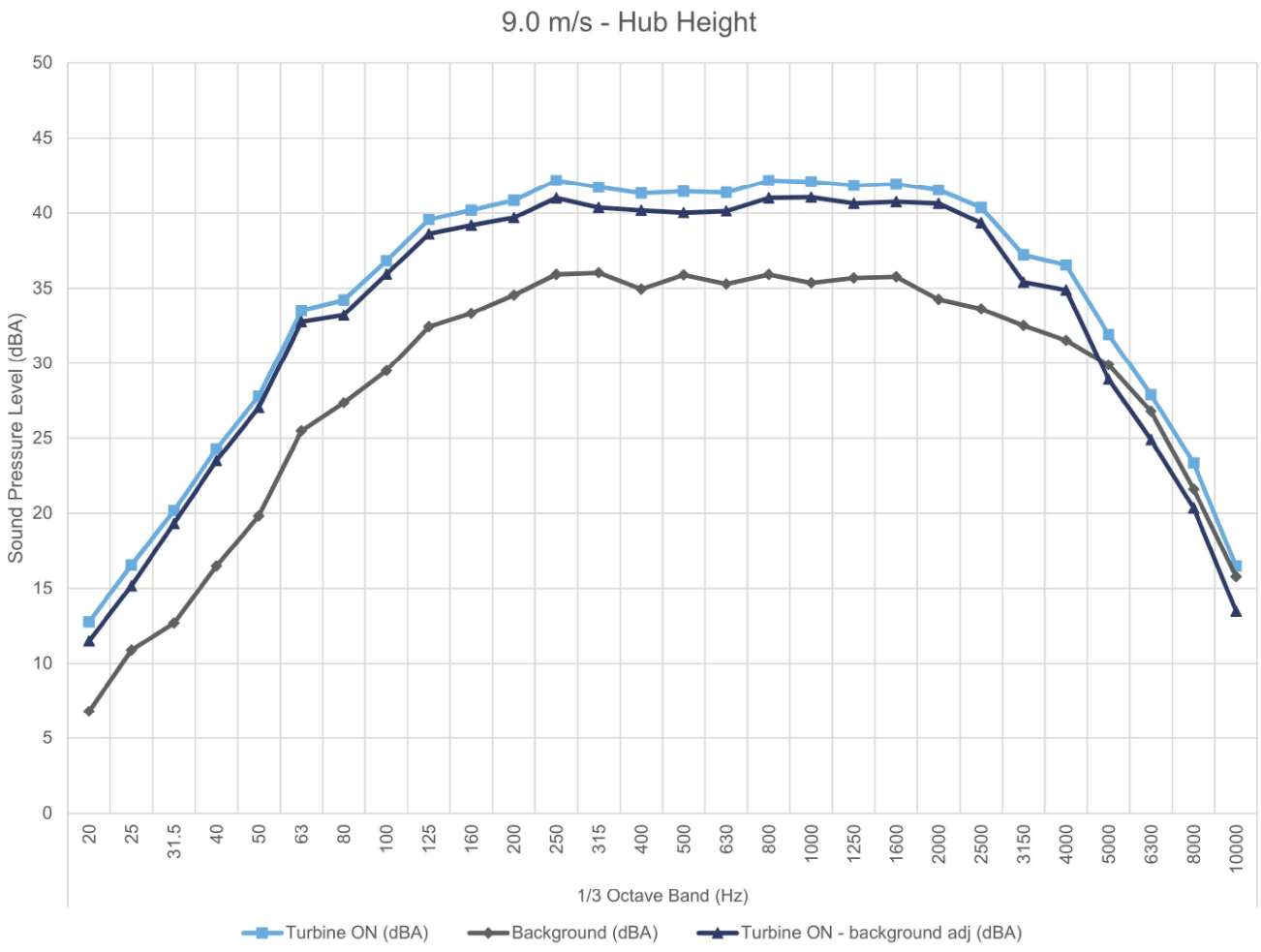

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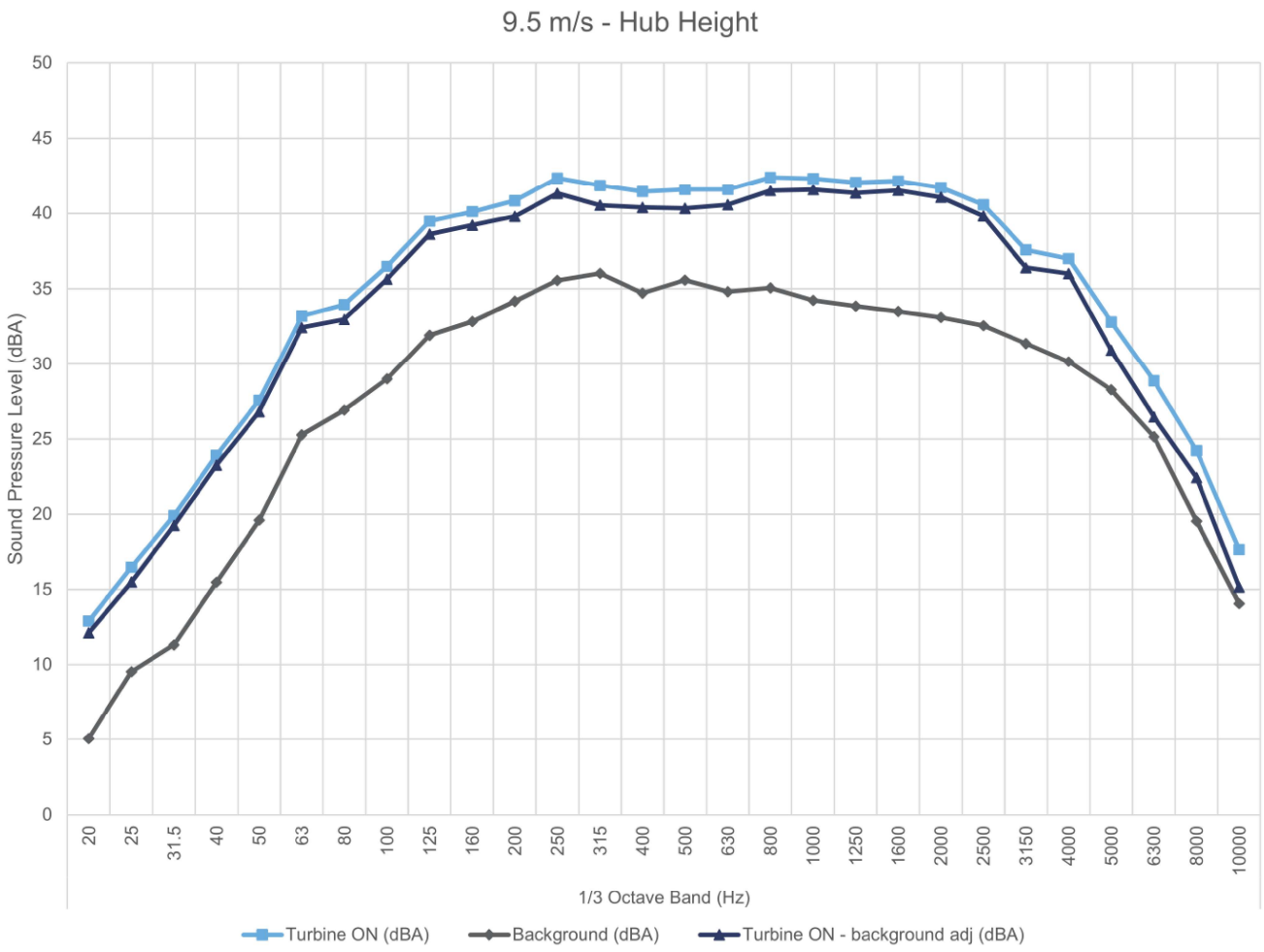

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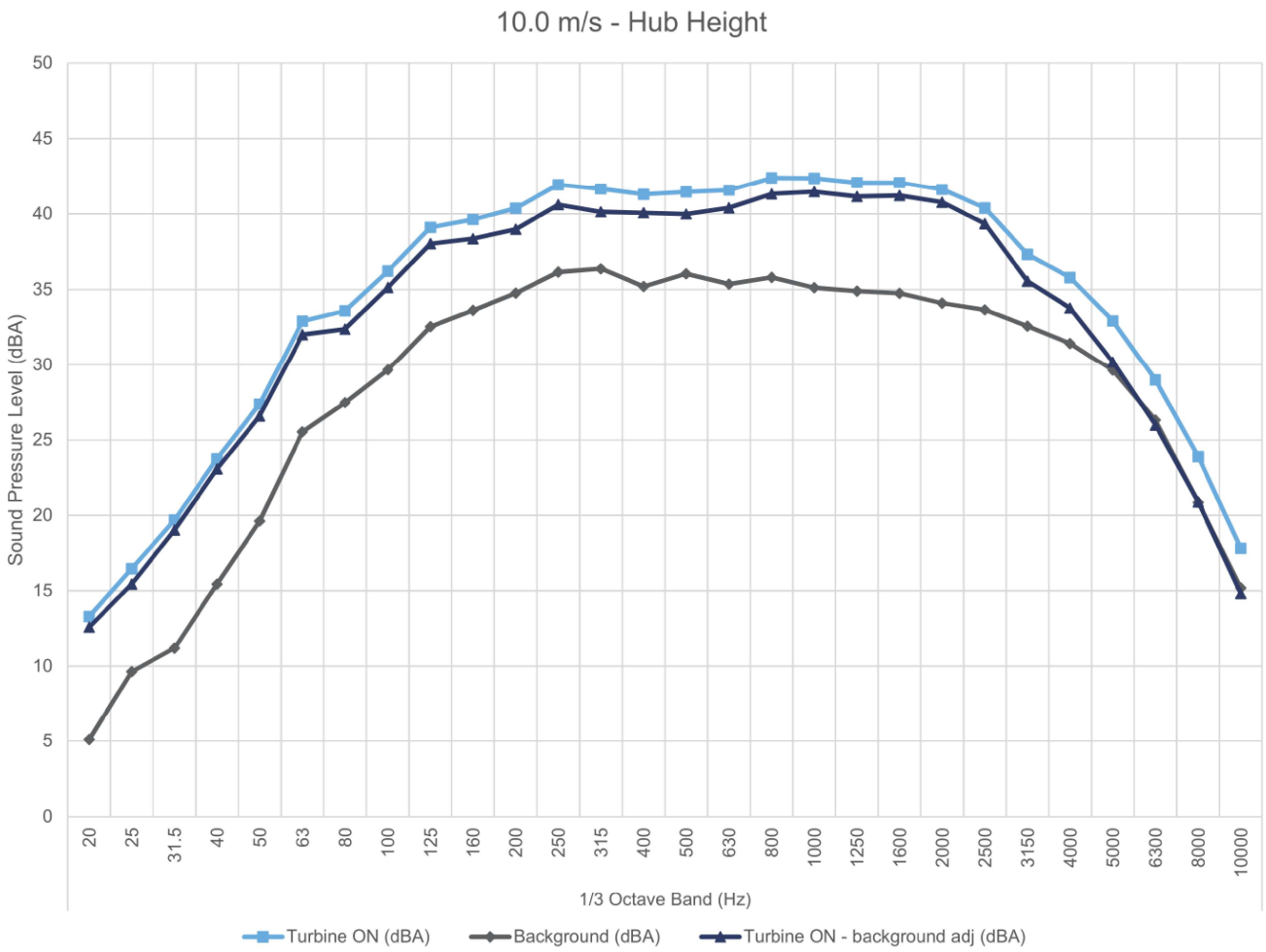

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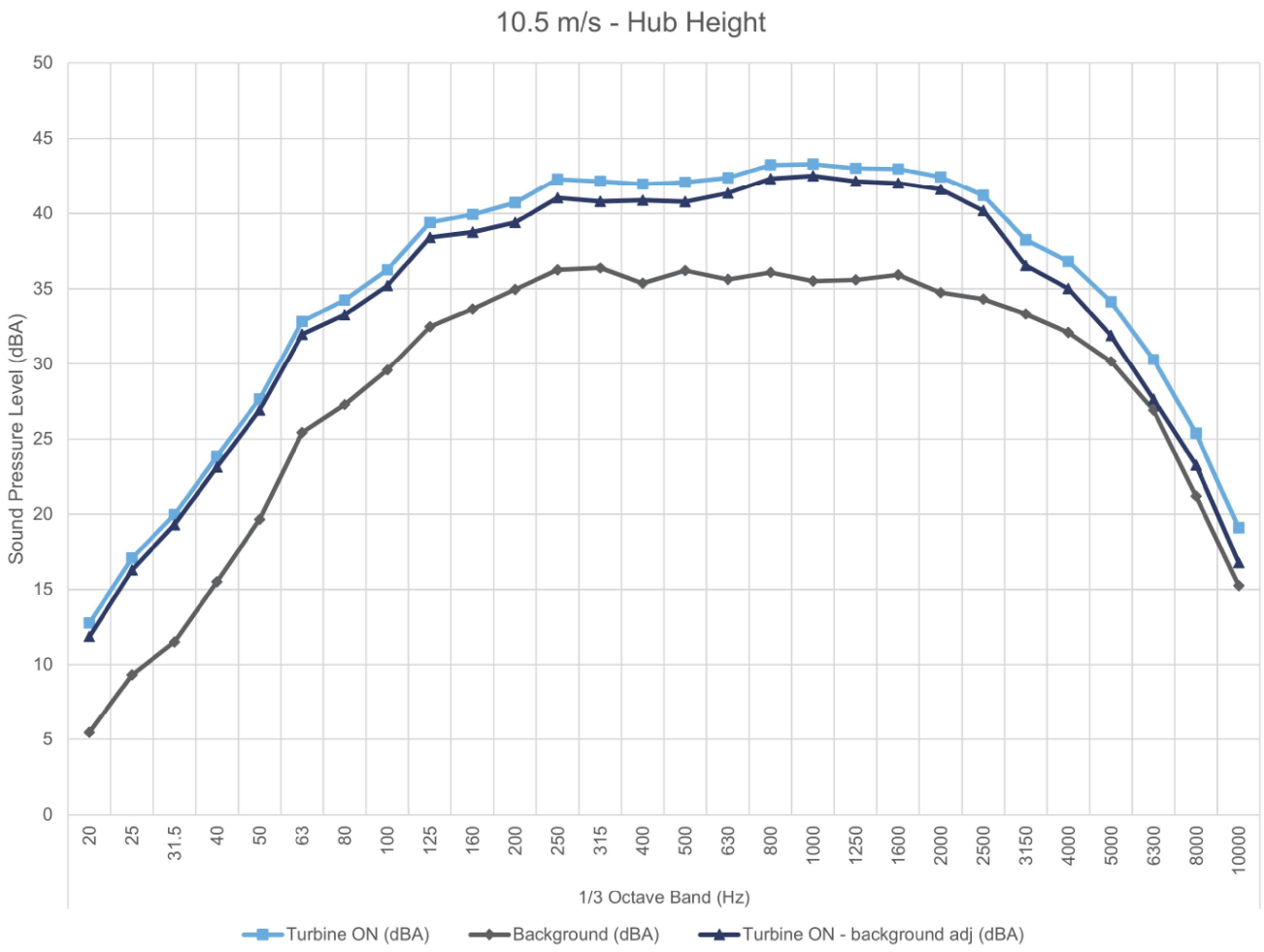

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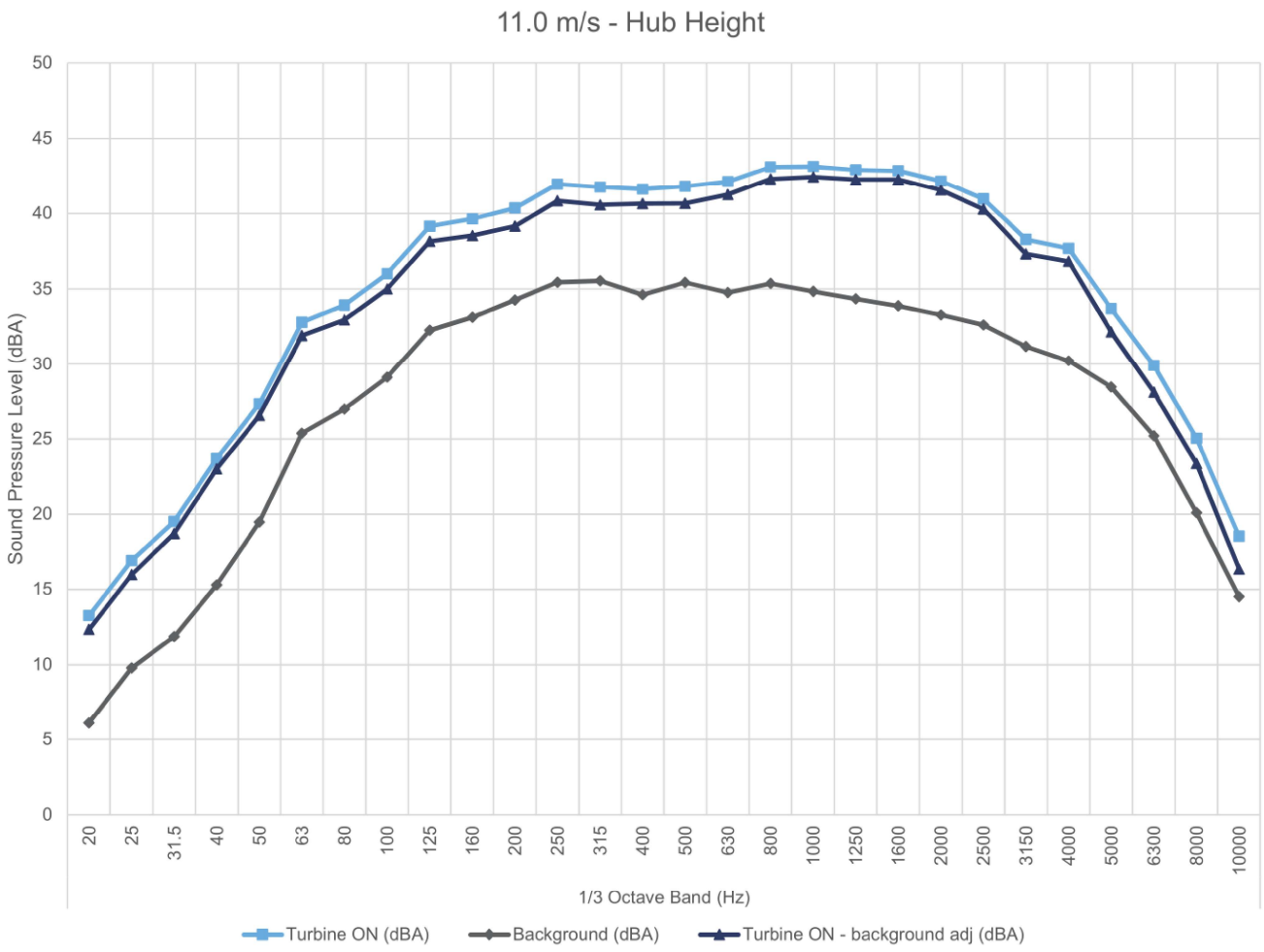

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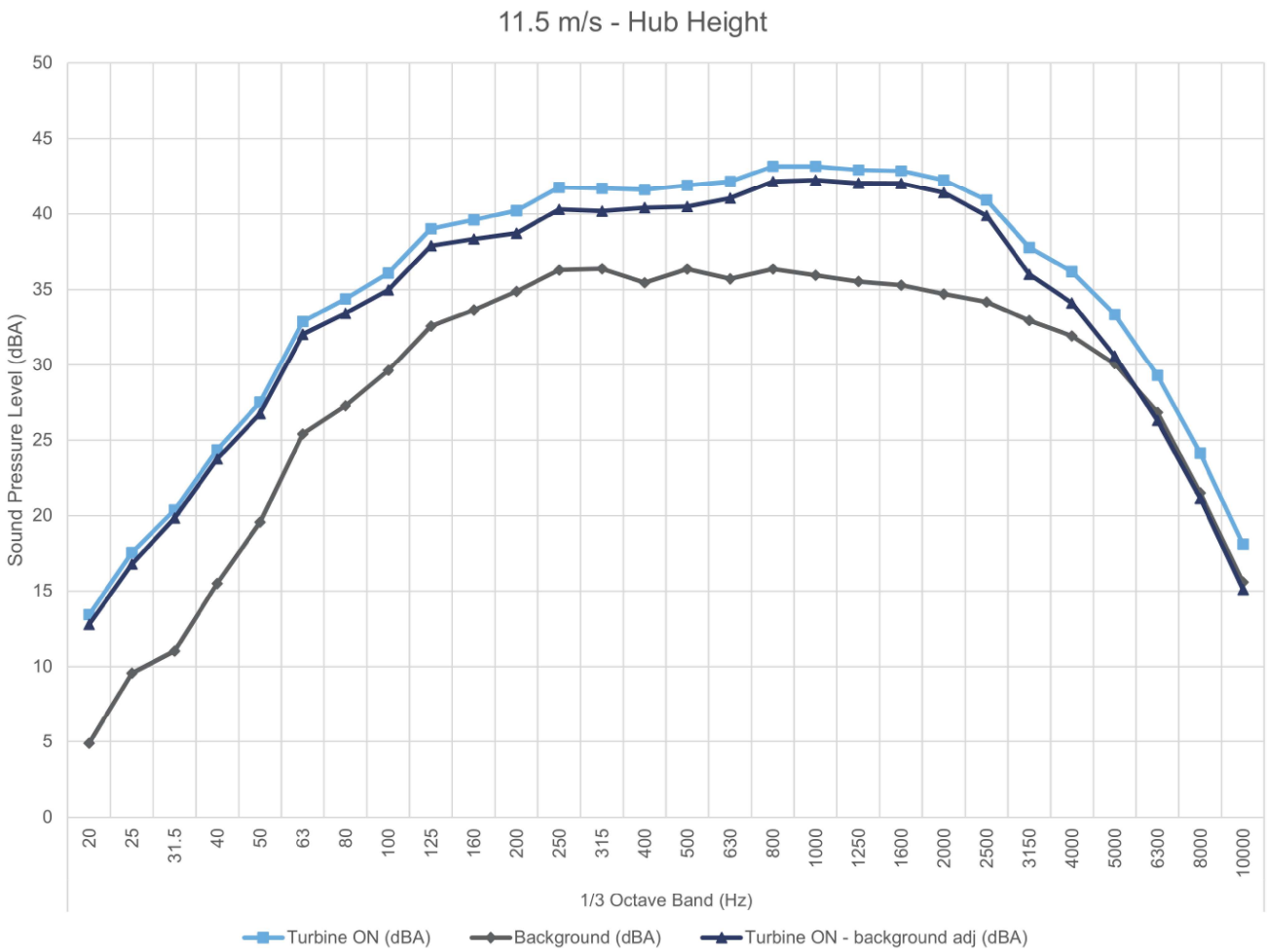

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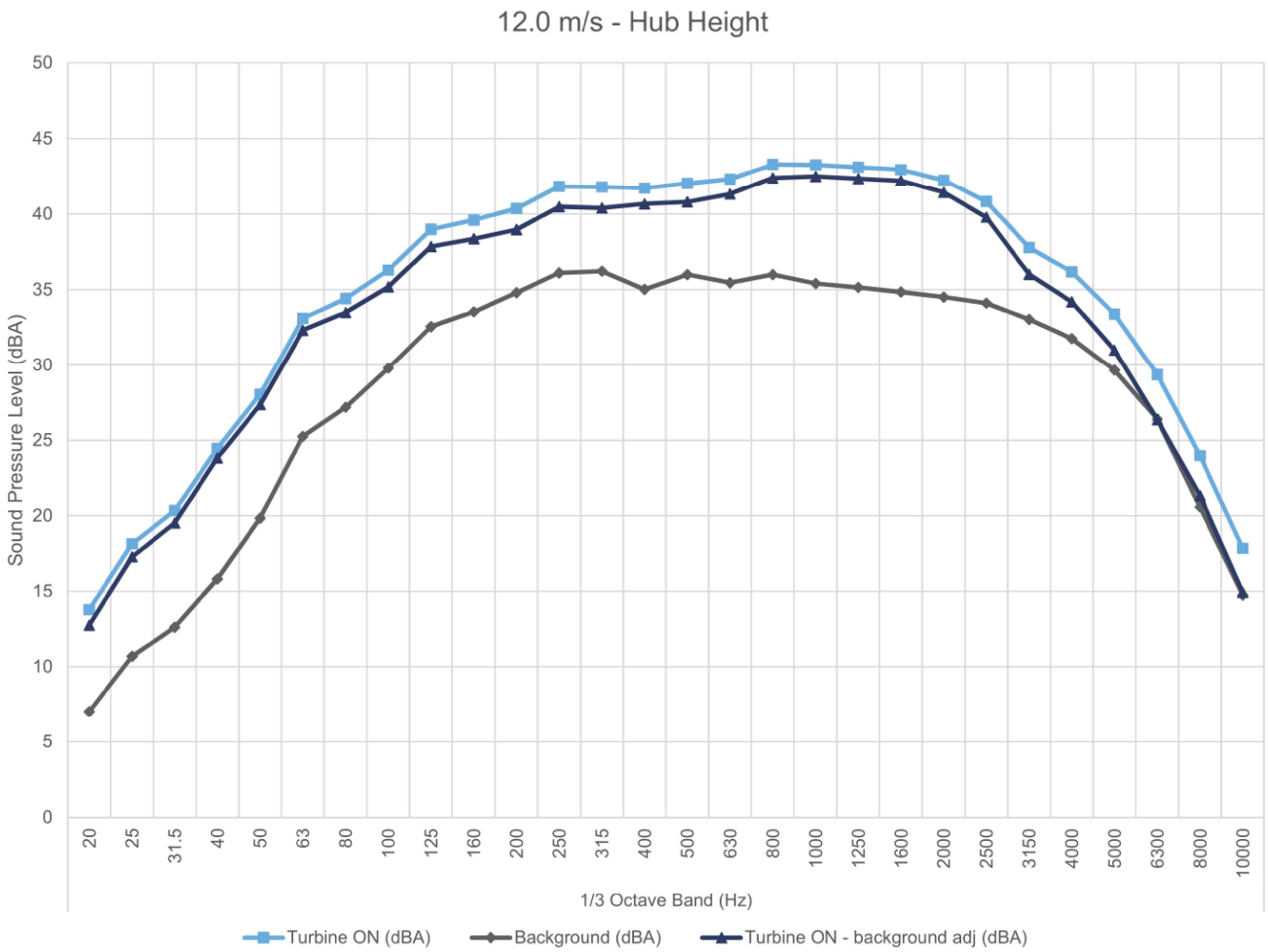

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Table C.01 Detailed apparent sound power level data at hub height

Project: Port Ryerse Wind Farm - Turbine T2 - IEC 61400-11 Measurement

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Created on: 12/6/2017

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	6300	8000	10000		
7.5	Turbine ON (dBA)	11.9	16.4	20.2	24.2	27.5	33.4	33.7	36.5	39.0	40.0	40.7	42.3	41.7	41.2	41.2	41.0	41.6	41.6	41.3	41.5	41.0	39.8	36.2	34.2	30.7	26.3	21.1	15.2		53.0
	Background (dBA)	4.5	8.8	11.9	16.1	19.3	25.1	27.1	29.2	32.1	33.2	34.3	35.6	35.7	35.0	36.2	35.3	35.9	35.3	36.2	36.2	34.6	33.9	32.7	31.5	29.6	26.4	21.0	15.5		47.2
	Turbine ON - background adj (dBA)	11.1	15.6	19.5	23.4	26.8	32.7	32.6	35.6	38.0	39.0	39.6	41.3	40.5	40.0	39.5	39.7	40.2	40.4	39.7	40.0	39.9	38.5	33.6	[31.2]	[27.7]	[23.3]	[18.1]	[12.2]		51.7*
	Signal to noise (dB)	7.5	7.7	8.3	8.1	8.2	8.3	6.6	7.3	6.9	6.9	6.4	6.8	6.0	6.2	5.0	5.7	5.7	6.3	5.1	5.3	6.5	5.9	3.5	2.7	1.1	-0.1	0.1	-0.3		5.8
	Uncertainty (dB)	1.2	1.2	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	1.0	0.9	1.0	0.9	1.1	1.0	0.9	1.1	1.7	1.9	2.0	2.0	2.0	3.2		1.0
	PWL (dBA)	61.6	66.2	70.1	74.0	77.3	83.3	83.2	86.1	88.6	89.6	90.1	91.9	91.0	90.6	90.1	90.2	90.8	91.0	90.3	90.5	90.5	89.1	84.1	[81.7]	[78.2]	[73.9]	[68.6]	[62.8]		102.2*
8.0	Turbine ON (dBA)	12.3	16.8	20.5	24.6	28.0	33.9	34.3	36.9	39.5	40.3	41.1	42.7	42.1	41.6	41.5	41.6	42.2	42.1	41.8	41.8	41.3	40.2	36.8	34.7	31.4	27.1	21.9	15.9		53.4
	Background (dBA)	4.4	9.3	11.8	15.6	19.3	25.0	26.5	29.0	31.9	32.8	33.9	35.2	35.4	35.2	35.5	34.7	35.3	34.8	34.4	34.2	33.8	33.2	32.0	31.0	29.0	25.8	20.2	14.4		46.5
	Turbine ON - background adj (dBA)	11.5	16.0	19.8	24.0	27.3	33.2	33.6	36.1	38.7	39.5	40.2	41.8	41.0	40.4	40.3	40.5	41.1	41.2	40.9	41.0	40.4	39.3	35.0	32.4	[28.4]	[24.1]	[18.9]	[12.9]		52.4
	Signal to noise (dB)	7.8	7.5	8.6	9.0	8.7	8.8	7.8	7.9	7.6	7.5	7.2	7.5	6.7	6.3	6.0	6.8	6.8	7.3	7.4	7.6	7.5	7.0	4.8	3.8	2.4	1.3	1.7	1.5		6.9
	Uncertainty (dB)	1.3	1.3	1.0	1.0	0.9	0.9	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.4	1.6	2.1	2.1	2.2	3.4		0.9
	PWL (dBA)	62.0	66.5	70.4	74.6	77.9	83.8	84.1	86.7	89.2	90.0	90.8	92.4	91.6	91.0	90.9	91.1	91.7	91.8	91.5	91.5	91.0	89.8	85.6	82.9	[79]	[74.7]	[69.5]	[63.5]		102.9
8.5	Turbine ON (dBA)	12.4	16.7	20.3	24.4	27.9	33.8	34.4	37.0	39.7	40.4	41.1	42.4	41.9	41.5	41.7	41.5	42.3	42.2	41.9	42.0	41.6	40.5	37.3	35.3	31.8	27.4	21.8	15.8		53.5
	Background (dBA)	5.5	9.4	10.9	15.2	19.4	25.1	26.9	29.3	32.2	33.4	34.6	35.9	36.0	35.0	36.0	35.4	36.0	35.4	35.1	34.8	34.4	33.9	32.7	31.6	29.8	26.7	21.6	15.8		47.1
	Turbine ON - background adj (dBA)	11.5	15.8	19.8	23.9	27.3	33.2	33.5	36.2	38.8	39.4	40.0	41.3	40.6	40.4	40.3	40.3	41.1	41.1	40.9	41.0	40.7	39.5	35.4	32.8	[28.8]	[24.4]	[18.8]	[12.8]		52.3
	Signal to noise (dB)	6.9	7.3	9.3	9.2	8.6	8.7	7.4	7.7	7.5	7.0	6.5	6.5	6.0	6.5	5.7	6.1	6.3	6.7	6.8	7.1	7.3	6.7	4.6	3.6	2.0	0.7	0.3	0.0		6.4
	Uncertainty (dB)	1.2	1.2	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	1.0	1.3	1.6	1.9	1.9	1.9	3.1		0.9
	PWL (dBA)	62.0	66.4	70.3	74.4	77.8	83.8	84.0	86.7	89.4	90.0	90.6	91.9	91.2	90.9	90.8	90.9	91.6	91.7	91.5	91.6	91.3	90.0	86.0	83.3	[79.3]	[75]	[69.4]	[63.4]		102.9
9.0	Turbine ON (dBA)	12.8	16.5	20.2	24.3	27.8	33.5	34.2	36.8	39.6	40.2	40.8	42.2	41.7	41.3	41.4	41.4	42.2	42.1	41.8	41.9	41.5	40.4	37.2	36.5	31.9	27.9	23.3	16.5		53.3
	Background (dBA)	6.8	10.9	12.7	16.5	19.8	25.5	27.3	29.5	32.5	33.4	34.6	35.9	36.0	34.9	35.9	35.3	35.9	35.4	35.7	35.8	34.3	33.6	32.5	31.6	29.9	26.8	21.6	15.8		47.1
	Turbine ON - background adj (dBA)	11.5	15.2	19.3	23.5	27.0	32.8	33.2	35.9	38.6	39.2	39.7	41.0	40.4	40.2	40.0	40.1	41.0	41.0	40.6	40.7	40.6	39.3	35.4	34.9	[28.9]	[24.9]	[20.3]	[13.5]		52.2
	Signal to noise (dB)	6.0	5.7	7.5	7.8	8.0	8.0	6.9	7.3	7.1	6.8	6.3	6.3	5.7	6.4	5.5	6.1	6.3	6.7	6.2	6.2	7.3	6.7	4.7	5.0	2.0	1.1	1.7	0.7		6.2
	Uncertainty (dB)	1.4	1.4	1.0	1.0	0.9	0.9	1.0	1.0	1.0	1.0	0.9	0.9	1.0	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.3	1.3	1.8	1.9	2.0	3.2		1.0
	PWL (dBA)	62.1	65.7	69.9	74.0	77.6	83.3	83.8	86.5	89.2	89.7	90.2	91.6	90.9	90.7	90.6	90.7	91.5	91.6	91.2	91.3	91.2	89.9	86.0	85.4	[79.5]	[75.4]	[70.9]	[64]		102.7
9.5	Turbine ON (dBA)	12.9	16.5	19.9	23.9	27.6	33.2	33.9	36.5	39.5	40.1	40.8	42.3	41.9	41.4	41.6	41.6	42.4	42.3	42.1	42.2	41.7	40.6	37.6	37.0	32.8	28.9	24.2	17.6		53.5
	Background (dBA)	5.1	9.5	11.3	15.5	19.6	25.3	26.9	29.0	31.9	32.8	34.2	35.6	36.0	34.7	35.6	34.8	35.1	34.2	33.9	33.5	33.1	32.6	31.4	30.2	28.3	25.1	19.5	14.1		46.3
	Turbine ON - background adj (dBA)	12.1	15.5	19.3	23.3	26.8	32.4	33.0	35.6	38.6	39.2	39.8	41.3	40.5	40.4	40.3	40.6	41.5	41.6	41.3	41.5	41.1	39.8	36.4	36.0	30.9	26.5	22.4	15.2		52.6
	Signal to noise (dB)	7.9	6.9	8.6	8.4	8.0	7.9	7.0	7.5	7.5	7.3	6.7	6.8	5.8	6.7	6.0	6.8	7.3	8.1	8.2	8.7	8.6	8.0	6.2	6.8	4.5	3.7	4.7	3.6		7.2
	Uncertainty (dB)	1.2	1.3	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	1.0	1.1	1.1	1.4	1.6	1.4	2.8		0.9
	PWL (dBA)	62.7	66.0	69.8	73.8	77.4	83.0	83.5	86.2	89.2	89.8	90.4	91.9	91.1	91.0	90.9	91.1	92.1	92.1	91.9	92.1	91.6	90.4	86.9	86.6	81.5	77.0	73.0	65.7		103.1
10.0	Turbine ON (dBA)	13.3	16.5	19.7	23.8	27.4	32.9	33.6	36.2	39.1	39.6	40.4	41.9	41.7	41.3	41.5	41.6	42.4	42.4	42.1	42.1	41.6	40.4	37.3	35.8	32.9	29.0	23.9	17.8		53.3
	Background (dBA)	5.1	9.6	11.2	15.5	19.6	25.5	27.5	29.7	32.5	33.6	34.8	36.1	36.4	35.2	36.0	35.4	35.8	35.1	34.9	34.8	34.1	33.7	32.6	31.4	29.6	26.3	20.9	15.2		47.1
	Turbine ON - background adj (dBA)	12.6	15.5	19.0	23.1	26.6	32.0	32.4	35.1	38.0	38.4	39.0	40.6	40.1	40.1	40.0	40.4	41.3	41.5	41.2	41.2	40.8	39.3	35.6	33.8	30.2	[26]	20.9	[14.8]		52.1
	Signal to noise (dB)	8.2	6.8	8.5	8.3	7.8	7.4	6.1	6.6	6.6	6.0	5.6	5.8	5.3	6.1	5.4	6.2	6.6	7.2	7.2	7.3	7.5	6.7	4.7	4.3	3.3	2.7	3.0	2.6		6.2
	Uncertainty (dB)	1.1	1.2	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	0.9	0.9	1.0	0.9	1.0	0.9	0.9	0.8	0.8	0.8	0.8	1.0	1.2	1.3	1.7	1.9	1.9	3.1		0.9
	PWL (dBA)	63.1	66.0	69.6	73.6	77.1	82.6	82.9	85.7	88.6	88.9	89.5	91.2	90.7	90.6	90.5	91.0	91.9	92.0	91.7	91.8	91.3	89.9	86.1	84.3	80.8	[76.5]	71.4	[65.4]		102.7
10.5	Turbine ON (dBA)	12.8	17.1	20.0	23.8	27.7	32.9	34.3	36.3	39.4	39.9	40.7	42.3	42.1	42.0	42.1	42.4	43.2	43.3	43.0	43.0	42.4	41.2	38.2	36.8	34.1	30.3	25.4	19.1		54.0
	Background (dBA)	5.5	9.3	11.5	15.5	19.6	25.4	27.3	29.6	32.5	33.7	35.0	36.3	36.4	35.4	36.2	35.6	36.1	35.5	35.6	35.9	34.8	34.3	33.3	32.1	30.2	26.9	21.2	15.3		47.4
	Turbine ON - background adj (dBA)	11.9	16.3	19.3	23.1	26.9	32.0	33.3	35.2	38.4	38.8	39.4	41.0	40.8	40.9	40.8	41.3	42.3	42.5	42.1	42.0	41.6	40.2	36.5	35.0	31.9	27.6	23.3	16.8		52.9
	Signal to noise (dB)	7.3	7.8	8.5	8.3	8.0	7.4	7.0	6.7	6.9	6.3	5.8	6.0	5.7	6.6	5.9	6.8	7.2	7.8	7.4	7.0	7.7	6.9	4.9	4.7	4.0	3.4	4.2	3.8		6.6
	Uncertainty (dB)	1.4	1.3	1.1	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	1.1	1.4	1.5	1.7	2.1	2.0	3.0		1.0
	PWL (dBA)	62.4	66.8	69.9	73.7	77.5	82.5	83.8	85.8	88.9	89.3	89.9	91.6	91.3	91.4	91.3	91.9	92.9	93.1	92.7	92.6	92.2	90.7	87.1	85.6	82.5	78.2	73.8	67.3		103.5

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

Project: Port Ryerse Wind Farm - Turbine T2 - IEC 61400-11 Measurement

Report ID: 14355.00.T2.RP1

Created on: 12/6/2017

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	6300	8000	10000	
11.0	Turbine ON (dBA)	13.3	16.9	19.5	23.7	27.3	32.8	33.9	36.0	39.1	39.6	40.4	41.9	41.8	41.6	41.8	42.1	43.1	43.1	42.9	42.8	42.2	41.0	38.3	37.7	33.7	29.9	25.0	18.5	53.8
	Background (dBA)	6.1	9.8	11.9	15.3	19.5	25.4	27.0	29.1	32.3	33.1	34.3	35.4	35.5	34.6	35.4	34.8	35.4	34.8	34.3	33.9	33.3	32.6	31.2	30.2	28.5	25.2	20.1	14.5	46.4
	Turbine ON - background adj (dBA)	12.3	16.0	18.7	23.0	26.5	31.9	32.9	35.0	38.1	38.5	39.1	40.8	40.6	40.6	40.7	41.3	42.3	42.4	42.3	42.3	41.6	40.3	37.3	36.8	32.1	28.1	23.4	16.3	52.9
	Signal to noise (dB)	7.2	7.1	7.7	8.4	7.9	7.4	6.9	6.9	6.9	6.5	6.1	6.5	6.2	7.0	6.4	7.4	7.7	8.3	8.6	9.0	8.9	8.4	7.1	7.5	5.2	4.7	5.0	4.0	7.4
	Uncertainty (dB)	1.4	1.3	1.0	1.0	1.0	1.0	1.1	1.1	1.0	1.1	1.0	0.9	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	1.0	1.1	1.2	1.3	1.5	1.5	2.7	0.9
	PWL (dBA)	62.9	66.5	69.3	73.6	77.1	82.5	83.5	85.5	88.7	89.1	89.7	91.4	91.1	91.2	91.2	91.8	92.9	93.0	92.8	92.8	92.1	90.8	87.9	87.4	82.7	78.7	73.9	66.9	103.5
11.5	Turbine ON (dBA)	13.5	17.6	20.4	24.4	27.5	32.9	34.4	36.1	39.0	39.6	40.2	41.8	41.7	41.6	41.9	42.2	43.2	43.2	42.9	42.9	42.3	40.9	37.8	36.2	33.4	29.3	24.1	18.1	53.7
	Background (dBA)	4.9	9.6	11.0	15.5	19.6	25.4	27.3	29.6	32.6	33.7	34.9	36.3	36.4	35.5	36.4	35.7	36.4	35.9	35.5	35.3	34.7	34.2	33.0	31.9	30.1	26.8	21.5	15.6	47.4
	Turbine ON - background adj (dBA)	12.8	16.8	19.8	23.8	26.8	32.1	33.4	35.0	37.9	38.3	38.7	40.3	40.2	40.4	40.5	41.0	42.2	42.3	42.1	42.0	41.4	39.9	36.0	34.1	30.6	[26.3]	[21.1]	[15.1]	52.6
	Signal to noise (dB)	8.6	8.0	9.4	8.9	7.9	7.5	7.1	6.5	6.4	5.9	5.3	5.5	5.3	6.2	5.5	6.5	6.8	7.2	7.4	7.6	7.5	6.7	4.8	4.2	3.3	2.5	2.6	2.5	6.3
	Uncertainty (dB)	1.3	1.3	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.0	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	1.1	1.4	1.5	1.9	2.1	2.2	3.4	1.0
	PWL (dBA)	63.4	67.4	70.4	74.3	77.3	82.6	84.0	85.5	88.4	88.9	89.3	90.9	90.7	91.0	91.0	91.6	92.7	92.8	92.6	92.6	92.0	90.4	86.6	84.7	81.2	[76.9]	[71.7]	[65.7]	103.1
12.0	Turbine ON (dBA)	13.8	18.1	20.3	24.5	28.1	33.1	34.4	36.3	39.0	39.6	40.4	41.8	41.8	41.7	42.0	42.3	43.3	43.3	43.1	42.9	42.2	40.8	37.8	36.2	33.4	29.4	24.0	17.8	53.8
	Background (dBA)	7.0	10.7	12.6	15.8	19.8	25.3	27.2	29.8	32.6	33.5	34.8	36.1	36.2	35.0	36.0	35.5	36.0	35.4	35.2	34.9	34.5	34.1	33.0	31.8	29.7	26.4	20.6	14.7	47.2
	Turbine ON - background adj (dBA)	12.8	17.3	19.5	23.8	27.4	32.3	33.5	35.2	37.8	38.4	39.0	40.5	40.4	40.7	40.8	41.3	42.4	42.5	42.4	42.2	41.4	39.8	36.0	34.2	31.0	[26.4]	21.3	14.9	52.8
	Signal to noise (dB)	6.8	7.4	7.7	8.6	8.2	7.9	7.2	6.5	6.4	6.0	5.6	5.7	5.6	6.7	6.0	6.9	7.3	7.9	8.0	8.1	7.7	6.7	4.7	4.4	3.7	3.0	3.4	3.1	6.7
	Uncertainty (dB)	1.4	1.3	1.0	1.0	1.0	0.9	1.0	1.1	1.0	1.1	1.0	0.9	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	1.0	1.3	1.4	1.6	2.0	1.8	3.1	0.9
	PWL (dBA)	63.3	67.8	70.1	74.4	77.9	82.9	84.1	85.7	88.4	88.9	89.5	91.0	91.0	91.2	91.3	91.9	93.0	93.1	92.9	92.8	92.0	90.3	86.6	84.8	81.6	[76.9]	71.9	65.5	103.3

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

Project: Port Ryerse Wind Farm - Turbine T2 - IEC 61400-11 Measurement

Report ID: 14355.00.T2.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	6300	8000	10000	
5.0	Turbine ON (dBA)	11.5	16.1	19.8	23.9	27.2	33.4	33.5	36.2	38.8	39.8	40.5	42.1	41.5	41.0	40.9	40.7	41.3	41.3	41.1	41.2	40.7	39.5	35.8	33.5	30.3	25.9	20.6	14.9	52.7
	Background (dBA)	6.8	9.7	12.2	16.4	19.6	25.2	27.0	29.1	32.1	33.0	34.3	35.6	35.7	35.1	35.9	35.0	35.5	34.9	35.8	35.1	34.0	33.4	32.3	31.0	29.1	25.9	20.2	14.7	46.8
	Turbine ON - background adj (dBA)	9.7	15.0	19.0	23.0	26.4	32.7	32.4	35.3	37.7	38.8	39.3	41.1	40.1	39.7	39.3	39.4	39.9	40.2	39.6	40.0	39.7	38.3	33.3	[30.5]	[27.3]	[22.9]	[17.6]	[11.9]	51.4*
	Signal to noise (dB)	4.7	6.4	7.7	7.5	7.6	8.2	6.5	7.2	6.7	6.8	6.2	6.6	5.8	5.9	5.0	5.7	5.8	6.4	5.3	6.1	6.7	6.1	3.5	2.5	1.2	0.0	0.4	0.2	5.9
	Uncertainty (dB)	2.0	1.7	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.2	1.1	1.2	1.2	1.3	1.2	1.2	1.2	1.3	1.2	1.1	1.4	2.0	2.3	2.3	2.3	2.3	4.0	1.3
	PWL (dBA)	60.2	65.5	69.5	73.6	76.9	83.2	82.9	85.9	88.3	89.4	89.8	91.6	90.7	90.2	89.8	90.0	90.5	90.8	90.1	90.6	90.2	88.9	83.8	[81]	[77.8]	[73.4]	[68.2]	[62.5]	102*
6.0	Turbine ON (dBA)	12.5	16.6	20.2	24.3	27.8	33.6	34.2	36.8	39.5	40.2	40.9	42.3	41.8	41.4	41.5	41.4	42.1	42.0	41.8	41.9	41.5	40.4	37.2	36.3	31.8	27.7	23.0	16.3	53.3
	Background (dBA)	6.0	10.1	12.1	15.8	19.5	25.2	27.0	29.3	32.3	33.2	34.4	35.7	35.8	34.8	35.8	35.2	35.8	35.3	35.3	35.2	34.2	33.7	32.5	31.5	29.7	26.6	21.3	15.6	47.0
	Turbine ON - background adj (dBA)	11.4	15.5	19.5	23.7	27.1	33.0	33.3	36.0	38.6	39.3	39.8	41.2	40.5	40.3	40.1	40.2	40.9	41.0	40.7	40.8	40.6	39.3	35.4	34.5	[28.8]	[24.7]	[20]	[13.3]	52.2
	Signal to noise (dB)	6.6	6.5	8.2	8.6	8.3	8.4	7.2	7.5	7.3	7.0	6.5	6.6	6.0	6.5	5.7	6.2	6.3	6.7	6.5	6.7	7.2	6.7	4.7	4.8	2.1	1.1	1.6	0.8	6.4
	Uncertainty (dB)	1.2	1.2	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.9	0.8	0.9	0.9	0.9	0.8	0.8	0.8	0.8	1.0	1.2	1.2	1.7	1.7	1.8	3.0	0.9
	PWL (dBA)	62.0	66.1	70.1	74.2	77.7	83.5	83.8	86.5	89.2	89.8	90.4	91.8	91.1	90.8	90.7	90.7	91.5	91.5	91.2	91.4	91.1	89.9	85.9	85.0	[79.3]	[75.2]	[70.5]	[63.9]	102.8
7.0	Turbine ON (dBA)	13.1	16.6	19.8	23.8	27.5	33.0	33.9	36.3	39.3	39.9	40.6	42.1	41.8	41.5	41.6	41.8	42.6	42.6	42.3	42.3	41.8	40.6	37.5	36.0	33.0	29.0	23.9	17.8	53.5
	Background (dBA)	5.2	9.5	11.4	15.5	19.7	25.5	27.3	29.5	32.4	33.5	34.7	36.1	36.3	35.2	36.0	35.4	35.8	35.1	35.0	35.0	34.2	33.7	32.7	31.5	29.6	26.3	20.8	15.0	47.1
	Turbine ON - background adj (dBA)	12.4	15.7	19.2	23.2	26.7	32.2	32.8	35.3	38.3	38.7	39.3	40.9	40.4	40.3	40.2	40.6	41.6	41.7	41.4	41.4	41.0	39.6	35.8	34.1	30.4	[26]	21.1	[14.8]	52.4
	Signal to noise (dB)	7.9	7.1	8.5	8.3	7.8	7.6	6.6	6.8	6.9	6.4	5.9	6.0	5.5	6.3	5.6	6.4	6.8	7.5	7.3	7.3	7.6	6.9	4.8	4.5	3.4	2.7	3.2	2.8	6.4
	Uncertainty (dB)	1.1	1.1	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.1	1.2	1.5	1.7	1.6	2.9	0.8
	PWL (dBA)	62.9	66.2	69.7	73.7	77.3	82.8	83.3	85.9	88.8	89.3	89.9	91.4	90.9	90.8	90.8	91.2	92.1	92.3	92.0	92.0	91.6	90.1	86.4	84.7	81.0	[76.6]	71.6	[65.3]	102.9
8.0	Turbine ON (dBA)	13.4	17.4	20.0	24.1	27.5	32.9	34.2	36.1	39.1	39.6	40.3	41.9	41.8	41.7	41.9	42.2	43.2	43.2	43.0	42.9	42.2	40.9	38.0	36.8	33.5	29.6	24.5	18.2	53.8
	Background (dBA)	6.1	10.0	11.9	15.5	19.6	25.3	27.1	29.5	32.5	33.4	34.6	35.9	36.0	35.0	35.9	35.3	35.9	35.4	35.0	34.7	34.2	33.7	32.5	31.4	29.4	26.2	20.7	15.0	47.0
	Turbine ON - background adj (dBA)	12.5	16.5	19.3	23.4	26.8	32.1	33.2	35.0	38.0	38.4	39.0	40.6	40.4	40.6	40.7	41.2	42.3	42.4	42.2	42.2	41.5	40.0	36.6	35.4	31.4	26.9	22.1	15.5	52.8
	Signal to noise (dB)	7.3	7.4	8.1	8.6	7.9	7.6	7.1	6.6	6.6	6.2	5.7	5.9	5.7	6.6	6.0	6.9	7.3	7.8	7.9	8.2	8.0	7.2	5.5	5.5	4.1	3.4	3.8	3.3	6.8
	Uncertainty (dB)	1.2	1.2	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.1	1.1	1.4	1.6	1.5	2.9	0.9
	PWL (dBA)	63.1	67.1	69.8	74.0	77.3	82.6	83.8	85.6	88.5	89.0	89.5	91.1	91.0	91.1	91.2	91.8	92.8	93.0	92.8	92.7	92.0	90.6	87.1	86.0	81.9	77.5	72.7	66.0	103.3
9.0	Turbine ON (dBA)	12.7	18.5	20.7	24.7	28.2	33.1	34.9	36.3	39.1	39.6	40.4	41.8	41.9	41.8	42.3	42.6	43.7	43.6	43.6	43.3	42.5	40.9	37.9	36.2	33.6	29.5	24.2	18.2	54.0
	Background (dBA)	5.6	9.7	11.5	15.9	19.9	25.2	27.3	29.8	32.6	33.8	35.0	36.4	36.6	35.5	36.3	35.6	36.2	35.7	35.3	35.0	34.6	34.1	33.0	32.0	30.2	27.0	21.6	15.7	47.4
	Turbine ON - background adj (dBA)	11.7	17.9	20.1	24.1	27.6	32.3	34.1	35.2	38.0	38.3	38.9	40.4	40.3	40.6	41.1	41.7	42.8	42.9	42.9	42.6	41.7	39.9	36.2	34.1	30.9	[26.5]	[21.2]	[15.2]	53.0
	Signal to noise (dB)	7.0	8.8	9.1	8.8	8.4	7.9	7.6	6.5	6.6	5.8	5.4	5.5	5.3	6.2	6.1	7.0	7.5	8.0	8.3	8.3	7.9	6.8	4.9	4.2	3.4	2.6	2.6	2.6	6.7
	Uncertainty (dB)	1.8	1.7	1.3	1.3	1.4	1.3	1.4	1.5	1.4	1.5	1.4	1.4	1.4	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.2	1.4	1.7	2.0	2.4	2.7	2.9	4.5	1.3
	PWL (dBA)	62.3	68.5	70.6	74.6	78.1	82.8	84.6	85.7	88.6	88.8	89.4	90.9	90.9	91.2	91.7	92.2	93.4	93.4	93.4	93.1	92.3	90.5	86.7	84.7	81.5	[77.1]	[71.8]	[65.8]	103.5

Table C.03 Type B measurement uncertainty summary

Project: Port Ryerse Wind Farm - Turbine T2 - IEC 61400-11 Measurement
Report ID: 14355.00.T2.RP1

Created on: 12/6/2017

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 measruement uncertainty at hub height

Project: Port Ryerse Wind Farm - Turbine T2 - IEC 61400-11 Measurement

Report ID: 14355.00.T2.RP1

Created on: 12/6/2017

Wind Bin (m/s)	Parameter	Average Wind Speed (m/s)	# of data points	Parameter	1/3 Octave Band (Hz) 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	6300	8000	10000	Overall
7.5	Turbine ON	7.53	30	Average (dBA)	12.0	16.5	20.3	24.2	27.6	33.4	33.8	36.5	39.1	40.1	40.8	42.4	41.8	41.3	41.3	41.1	41.6	41.7	41.4	41.6	41.1	39.9	36.3	34.3	30.8	26.4	21.2	15.3	53.0
				Uncertainty A (dB)	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.4	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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (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	0.8	0.8	0.8	0.8	0.9	0.9	1.5	
	Background	7.49	26	Average (dBA)	4.5	8.8	11.9	16.1	19.3	25.1	27.1	29.2	32.1	33.2	34.4	35.6	35.7	35.0	36.2	35.3	35.9	35.3	36.3	36.2	34.6	33.9	32.7	31.5	29.6	26.4	21.0	15.5	47.2
				Uncertainty A (dB)	0.3	0.4	0.5	0.4	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.8	0.9	0.7	0.7	0.8	0.9	0.9	0.9	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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.1	1.1	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.1	1.1	1.0	1.1	1.2	1.2	1.2	1.2	1.2	1.6	
8.0	Turbine ON	7.99	25	Average (dBA)	12.3	16.8	20.5	24.6	28.0	33.9	34.4	36.9	39.5	40.3	41.1	42.7	42.1	41.6	41.6	41.6	42.2	42.1	41.8	41.8	41.3	40.2	36.8	34.7	31.4	27.1	21.9	15.9	53.4
				Uncertainty A (dB)	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.5	
				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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.1	1.1	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	0.9	0.9	0.9	1.5	
	Background	7.99	28	Average (dBA)	4.4	9.3	11.8	15.6	19.3	25.0	26.5	29.0	31.9	32.8	33.9	35.2	35.3	35.2	35.5	34.7	35.3	34.8	34.4	34.2	33.8	33.2	32.0	30.9	29.0	25.8	20.2	14.4	46.5
				Uncertainty A (dB)	0.4	0.6	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.6	0.5	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.1	1.2	0.9	0.9	0.8	0.8	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.1	1.2	1.2	1.2	1.2	1.2	1.6	
8.5	Turbine ON	8.51	57	Average (dBA)	12.5	16.7	20.3	24.4	27.9	33.8	34.4	37.0	39.7	40.4	41.1	42.4	41.9	41.5	41.7	41.5	42.3	42.2	41.9	42.0	41.7	40.6	37.3	35.3	31.8	27.4	21.8	15.8	53.5
				Uncertainty A (dB)	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (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	0.8	0.8	0.8	0.8	0.8	0.9	1.5	
	Background	8.48	32	Average (dBA)	5.5	9.4	10.9	15.2	19.3	25.1	26.9	29.3	32.2	33.4	34.6	35.9	36.0	35.0	36.0	35.4	36.0	35.4	35.1	34.8	34.4	33.9	32.7	31.7	29.8	26.7	21.6	15.8	47.1
				Uncertainty A (dB)	0.6	0.5	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.8	0.8	0.8	0.8	0.8	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	0.7	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	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.2	1.1	0.9	0.9	0.8	0.8	0.9	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.9	0.9	1.0	1.1	1.2	1.2	1.1	1.1	1.1	1.6	
9.0	Turbine ON	8.99	70	Average (dBA)	12.8	16.5	20.2	24.3	27.8	33.5	34.2	36.8	39.6	40.2	40.8	42.2	41.7	41.3	41.4	41.4	42.2	42.1	41.8	41.9	41.5	40.4	37.2	36.5	31.9	27.9	23.3	16.4	53.3
				Uncertainty A (dB)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.2	0.4	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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (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	0.8	0.8	0.9	0.8	0.8	0.9	1.5	
	Background	9.04	44	Average (dBA)	6.9	11.0	12.8	16.6	19.9	25.5	27.4	29.5	32.5	33.3	34.5	35.9	36.0	34.9	35.9	35.3	35.9	35.4	35.7	35.8	34.3	33.6	32.5	31.6	29.9	26.8	21.6	15.8	47.1
				Uncertainty A (dB)	0.6	0.6	0.5	0.4	0.3	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.7	0.7	0.6	0.6	0.6	0.5	
				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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.2	1.2	1.0	0.9	0.9	0.8	0.9	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.5	
9.5	Turbine ON	9.48	72	Average (dBA)	12.9	16.5	19.9	23.9	27.6	33.2	33.9	36.5	39.5	40.1	40.8	42.3	41.9	41.4	41.6	41.6	42.4	42.3	42.1	42.2	41.7	40.6	37.6	37.0	32.8	28.9	24.2	17.7	53.5
				Uncertainty A (dB)	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.3	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	0.7	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	0.8	0.8	1.4	
				Combined Uncertainty (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	0.8	0.8	0.9	0.8	0.9	0.9	1.5	
	Background	9.48	28	Average (dBA)	5.1	9.5	11.3	15.5	19.6	25.3	26.9	29.0	31.9	32.8	34.1	35.5	36.0	34.7	35.6	34.8	35.0	34.2	33.8	33.5	33.1	32.5	31.3	30.1	28.2	25.1	19.5	14.0	46.3
				Uncertainty A (dB)	0.4	0.5	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.5	0.5	0.5	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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.1	1.1	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	0.8	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.0	0.9	0.9	1.5	
10.0	Turbine ON	9.97	54	Average (dBA)	13.3	16.4	19.7	23.8	27.4	32.9	33.5	36.2	39.1	39.6	40.3	41.9	41.6	41.2	41.4	41.5	42.3	42.3	42.0	42.0	41.6	40.3	37.2	35.7	32.8	28.9	23.8	17.7	53.3
				Uncertainty A (dB)	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	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	0.7	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	0.8	0.8	1.4	
				Combined Uncertainty (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	0.8	0.8	0.8	0.8	0.9	0.9	1.5	
	Background	9.97	40	Average (dBA)	5.1	9.7	11.2	15.4	19.6	25.5	27.5	29.7	32.6	33.6	34.8	36.1	36.4	35.2	36.0	35.3	35.8	35.1	34.9	34.7	34.1	33.6	32.5	31.4	29.6	26.3	20.8	15.2	47.1
				Uncertainty A (dB)	0.3	0.4	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.5	
				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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.1	1.1	0.9	0.8	0.8	0.8	0.9	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	1.0	1.1	1.1	1.1	1.1	1.0	1.5	
10.5	Turbine ON	10.46	17	Average (dBA)	12.8	17.1	20.0	23.8	27.7	32.9	34.3	36.3	39.4	39.9	40.7	42.3	42.1	42.0	42.1	42.4	43.2	43.3	43.0	43.0	42.4	41.2	38.2	36.8	34.2	30.3	25.4	19.1	54.0
				Uncertainty A (dB)	0.5	0.4	0.4	0.3	0.3	0.2	0.4	0.3	0.2	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	0.3	0.4	0.5	0.7	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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.1	1.1	0.9	0.9	0.9	0.8	0.9	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	0.9	0.9	1.0	1.0	1.2	1.7	
	Background	10.49	42	Average (dBA)	5.5	9.3	11.5	15.5	19.6	25.4	27.3	29.6	32.5	33.7	35.0	36.3	36.4	35.4	36.2	35.6	36.1	35.5	35.6	36.0	34.8	34.3	33.4	32.2	30.2	26.9	21.2	15.3	47.5
				Uncertainty A (dB)	0.4	0.4	0.3	0.3	0.3	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.7	0.7	0.7	0.7	0.6	0.6	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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.1	1.1	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.1	1.1	1.1	1.0	1.0	1.5	

Table C.04 Detailed measruement uncertainty at hub height

Project: Port Ryerse Wind Farm - Turbine T2 - IEC 61400-11 Measurement

Report ID: 14355.00.T2.RP1

Created on: 12/6/2017

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	6300	8000	10000	
11.0	Turbine ON	10.99	33	Average (dBA)	13.3	16.9	19.5	23.7	27.3	32.8	33.9	36.0	39.1	39.6	40.4	41.9	41.8	41.6	41.8	42.1	43.1	43.1	42.9	42.8	42.2	41.0	38.3	37.7	33.7	29.9	25.0	18.5	53.8
				Uncertainty A (dB)	0.4	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	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.4	0.5	0.6	0.5	
				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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.1	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	0.8	0.9	0.9	0.9	0.9	1.0	1.5	
	Background	10.99	29	Average (dBA)	6.1	9.8	11.9	15.3	19.5	25.4	27.0	29.1	32.2	33.1	34.2	35.4	35.5	34.6	35.4	34.7	35.3	34.8	34.3	33.8	33.2	32.6	31.1	30.2	28.4	25.2	20.0	14.5	46.4
				Uncertainty A (dB)	0.6	0.6	0.4	0.3	0.3	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.6	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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.2	1.2	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.5	
11.5	Turbine ON	11.46	29	Average (dBA)	13.5	17.6	20.4	24.4	27.5	32.9	34.4	36.1	39.0	39.6	40.2	41.8	41.7	41.6	41.9	42.2	43.2	43.2	42.9	42.9	42.3	40.9	37.8	36.2	33.4	29.3	24.1	18.1	53.7
				Uncertainty A (dB)	0.5	0.4	0.4	0.3	0.2	0.2	0.3	0.2	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	0.3	0.3	0.4	0.4	0.6	0.5	
				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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.1	1.1	0.9	0.9	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	0.9	0.9	1.0	1.5	
	Background	11.51	28	Average (dBA)	4.9	9.6	11.0	15.5	19.6	25.4	27.3	29.6	32.6	33.7	34.9	36.3	36.4	35.5	36.4	35.7	36.4	36.0	35.6	35.3	34.7	34.2	33.0	32.0	30.1	26.9	21.5	15.6	47.4
				Uncertainty A (dB)	0.4	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.7	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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.1	1.1	0.9	0.9	0.8	0.8	0.9	0.9	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	1.0	1.1	1.1	1.0	1.0	1.1	1.6	
12.0	Turbine ON	11.94	20	Average (dBA)	13.9	18.1	20.3	24.5	28.1	33.1	34.4	36.3	38.9	39.6	40.3	41.8	41.8	41.7	42.0	42.3	43.3	43.2	43.1	42.9	42.2	40.8	37.7	36.1	33.3	29.3	23.9	17.7	53.8
				Uncertainty A (dB)	0.5	0.5	0.4	0.4	0.4	0.2	0.4	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.5	
				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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.1	1.1	0.9	0.9	0.9	0.8	0.9	0.9	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	0.9	0.9	1.0	1.5	
	Background	11.98	26	Average (dBA)	7.1	10.7	12.7	15.8	19.8	25.3	27.2	29.8	32.6	33.5	34.8	36.1	36.2	35.0	36.0	35.4	36.0	35.4	35.1	34.8	34.5	34.1	33.0	31.7	29.6	26.4	20.5	14.7	47.2
				Uncertainty A (dB)	0.7	0.7	0.5	0.4	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.8	0.9	0.9	0.8	0.7	0.7	0.5	
				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	0.8	0.8	0.8	0.8	0.8	0.8	1.4	
				Combined Uncertainty (dB)	1.3	1.2	1.0	0.9	0.9	0.8	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	1.0	1.1	1.2	1.2	1.1	1.1	1.0	1.5	

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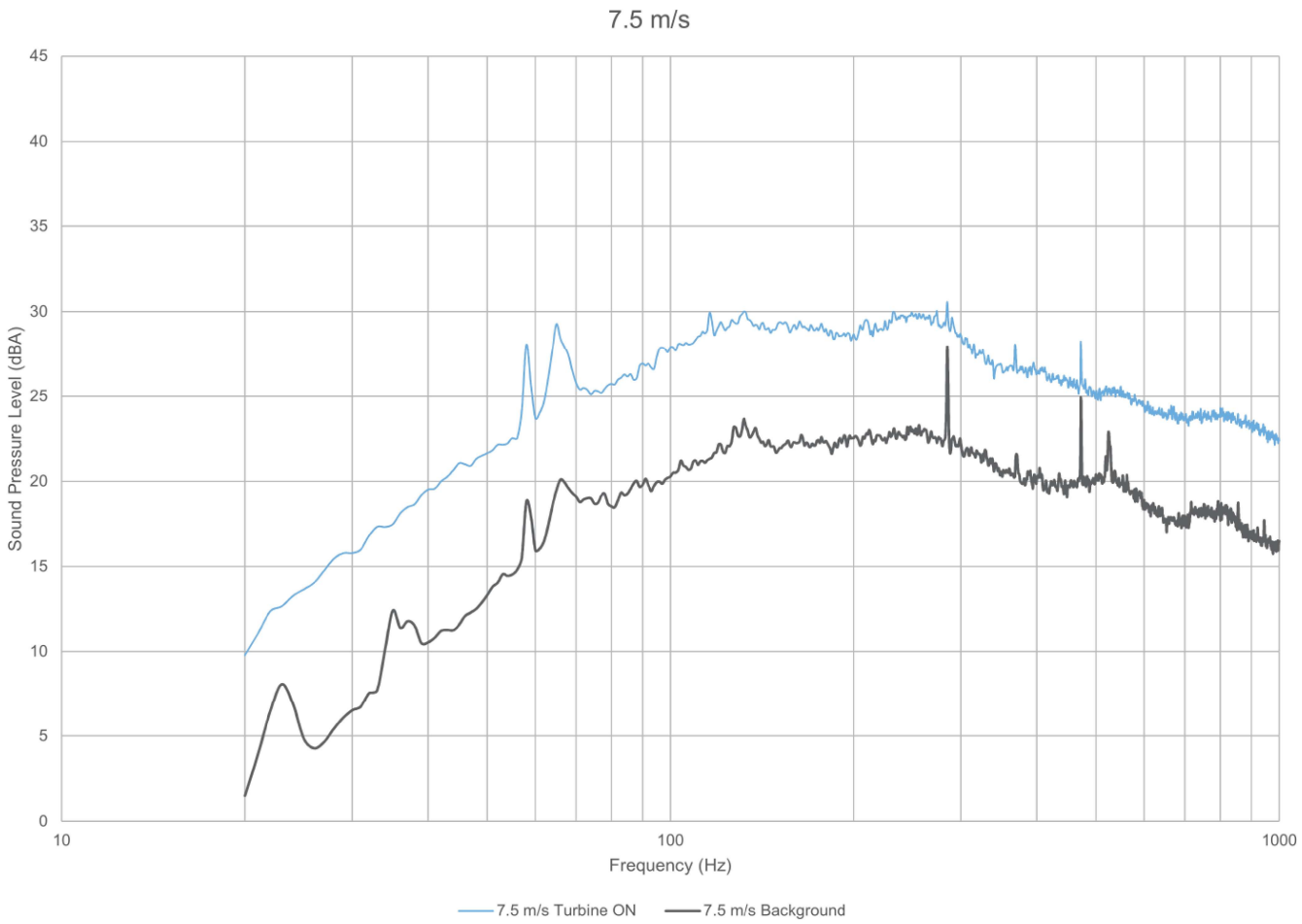
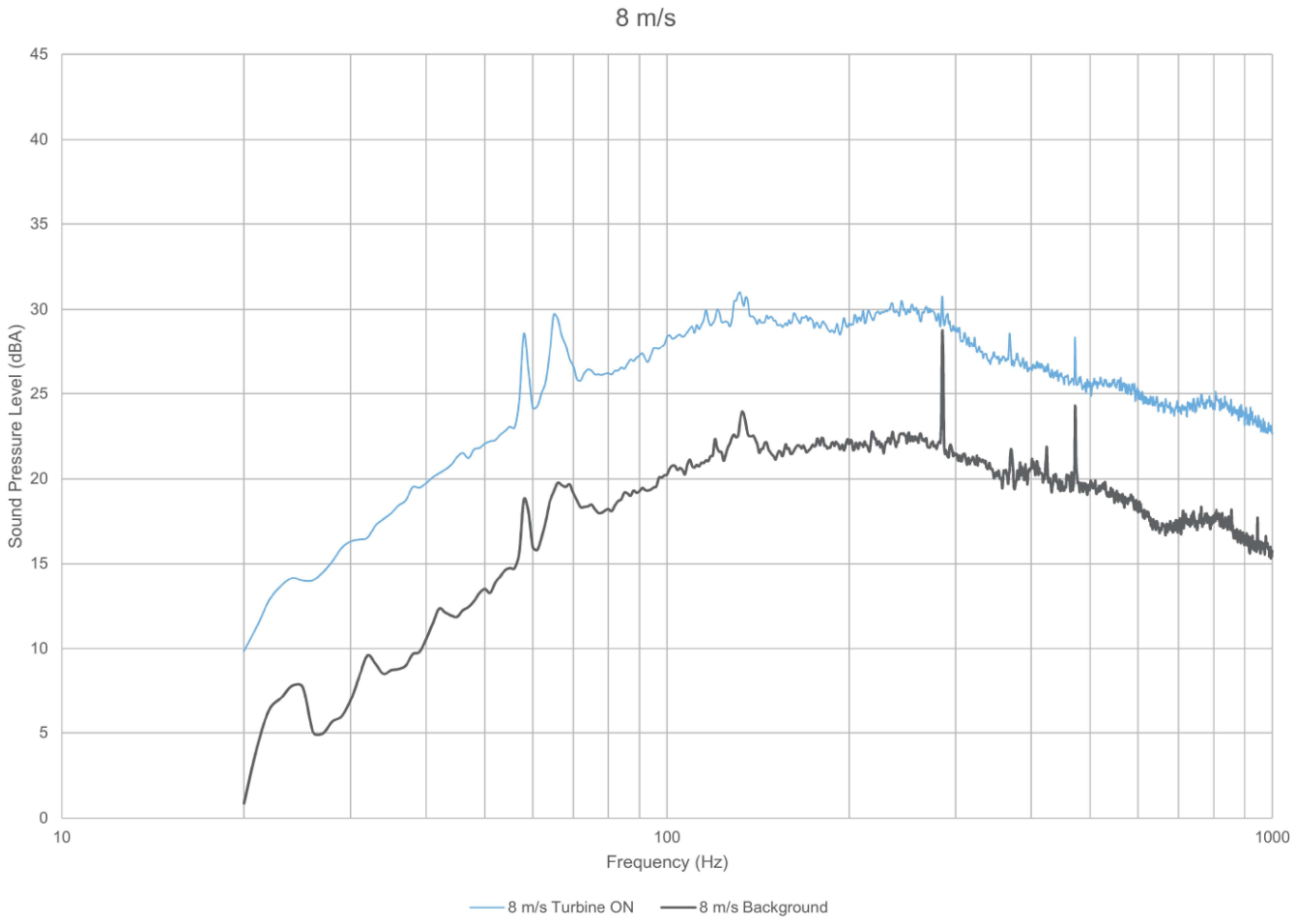
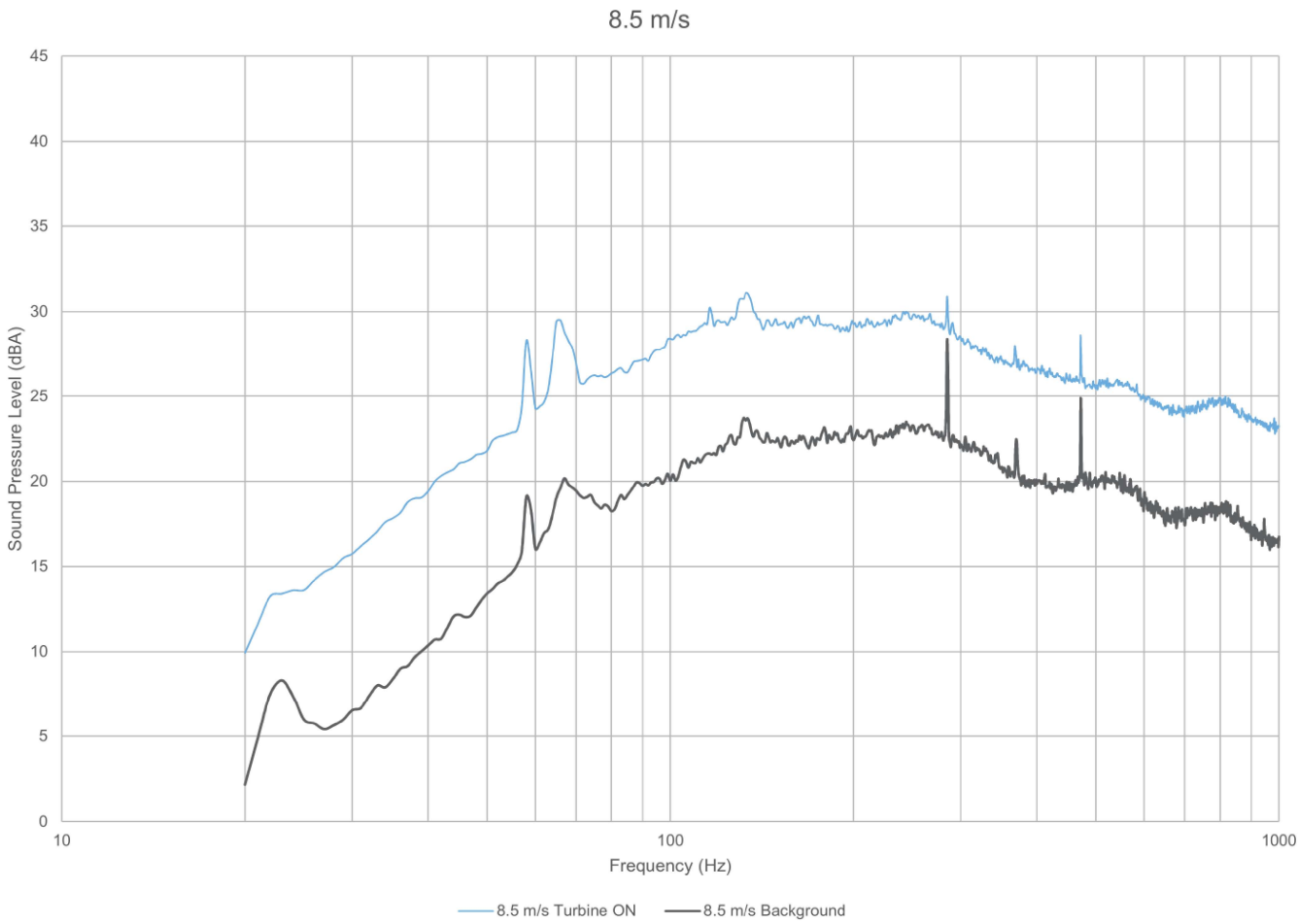
Appendix D
Tonality Assessment



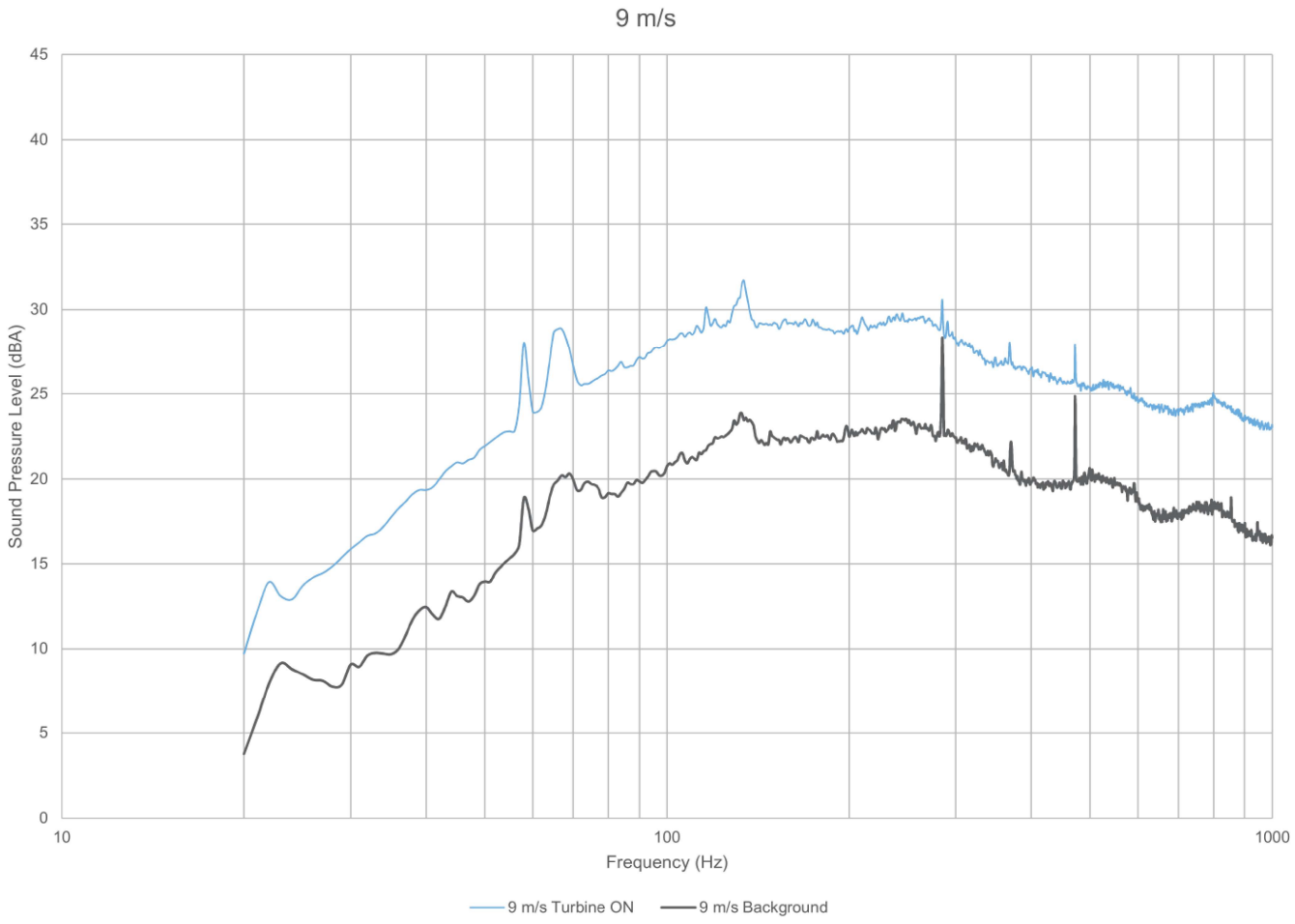
aercoustics	Project ID: 14355.00.T2.RP1 Scale: NTS Drawn by: SS Reviewed by: AM Date: December 6, 2017 Revision: 1	**Project Name** Port Ryerse Wind Power Project - T2 - IEC 61400-11 Ed. 3.0 **Figure Title** Plot of narrow band spectra - Turbine ON vs. Background at 7.5 m/s **Figure D.01**



aercoustics	Project ID: 14355.00.T2.RP1 Scale: NTS Drawn by: SS Reviewed by: AM Date: December 6, 2017 Revision: 1	**Project Name** Port Ryerse Wind Power Project - T2 - IEC 61400-11 Ed. 3.0 **Figure Title** Plot of narrow band spectra - Turbine ON vs. Background at 8 m/s **Figure D.02**



aercoustics	Project ID: 14355.00.T2.RP1 Scale: NTS Drawn by: SS Reviewed by: AM Date: December 6, 2017 Revision: 1	**Project Name** Port Ryerse Wind Power Project - T2 - IEC 61400-11 Ed. 3.0 **Figure Title** Plot of narrow band spectra - Turbine ON vs. Background at 8.5 m/s **Figure D.03**



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Project ID: 14355.00.T2.RP1

Scale: NTS
Drawn by: SS
Reviewed by: AM
Date: December 6, 2017
Revision: 1

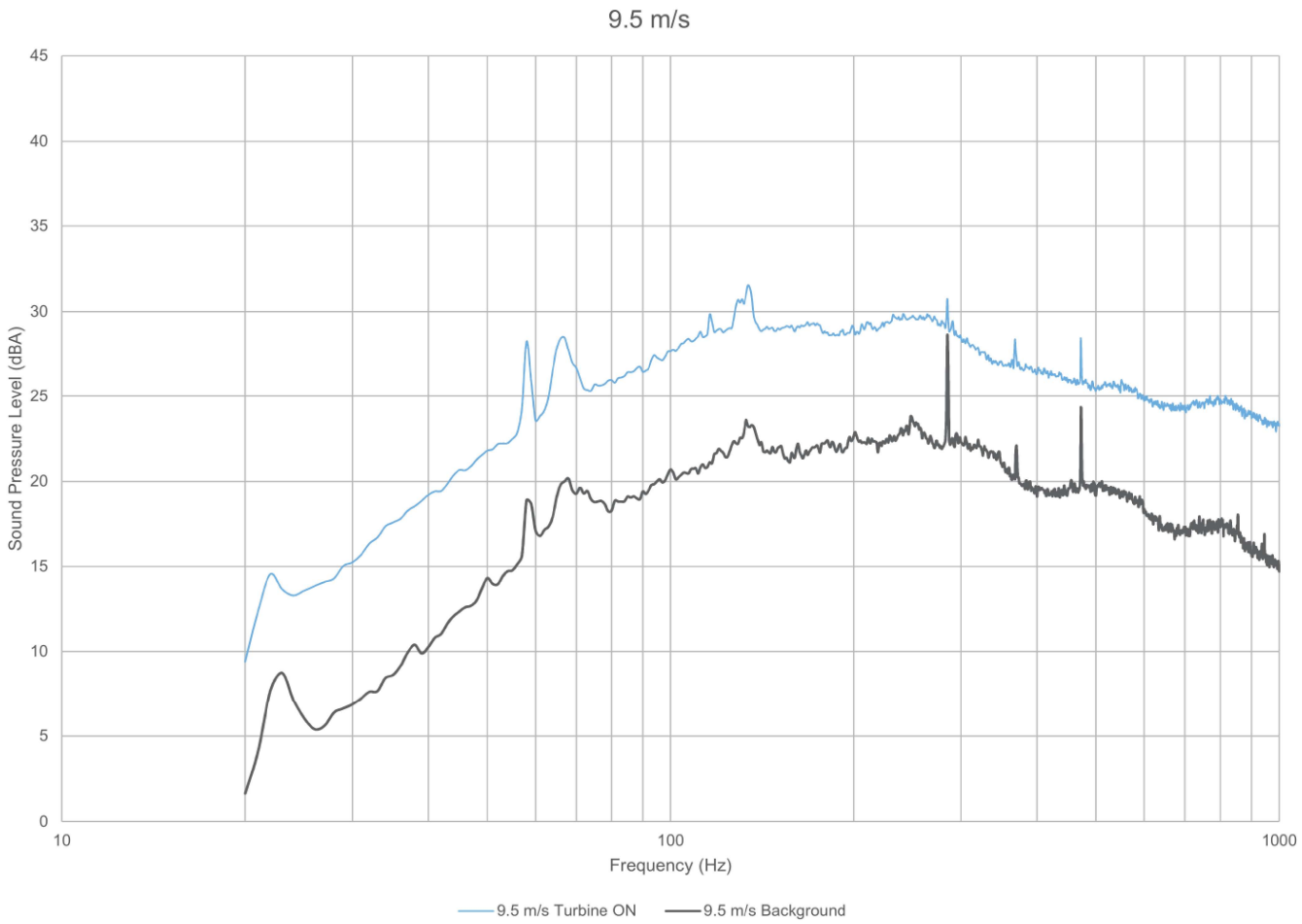
Project Name

Port Ryerse Wind Power Project - T2 - IEC 61400-11 Ed. 3.0

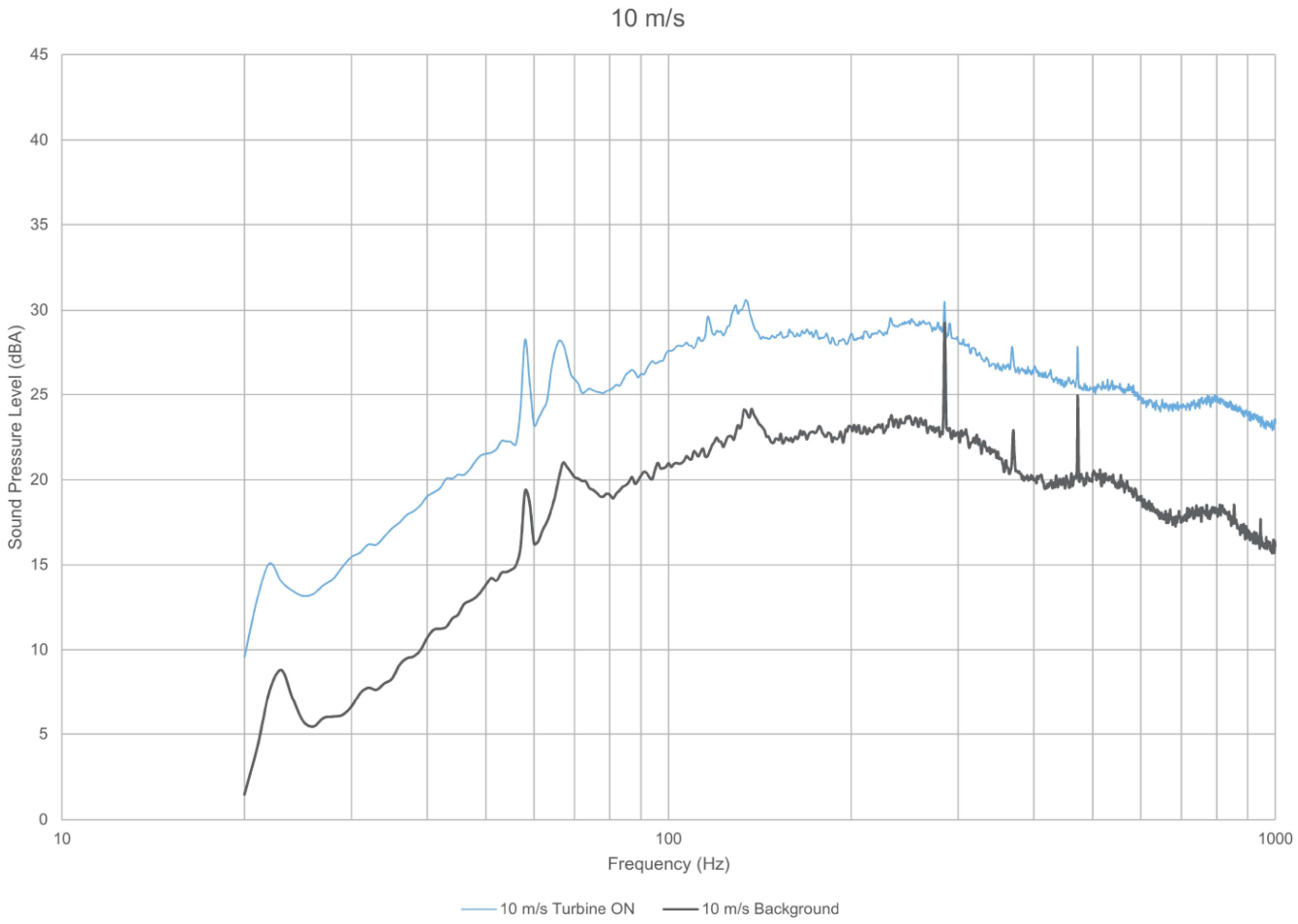
Figure Title

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

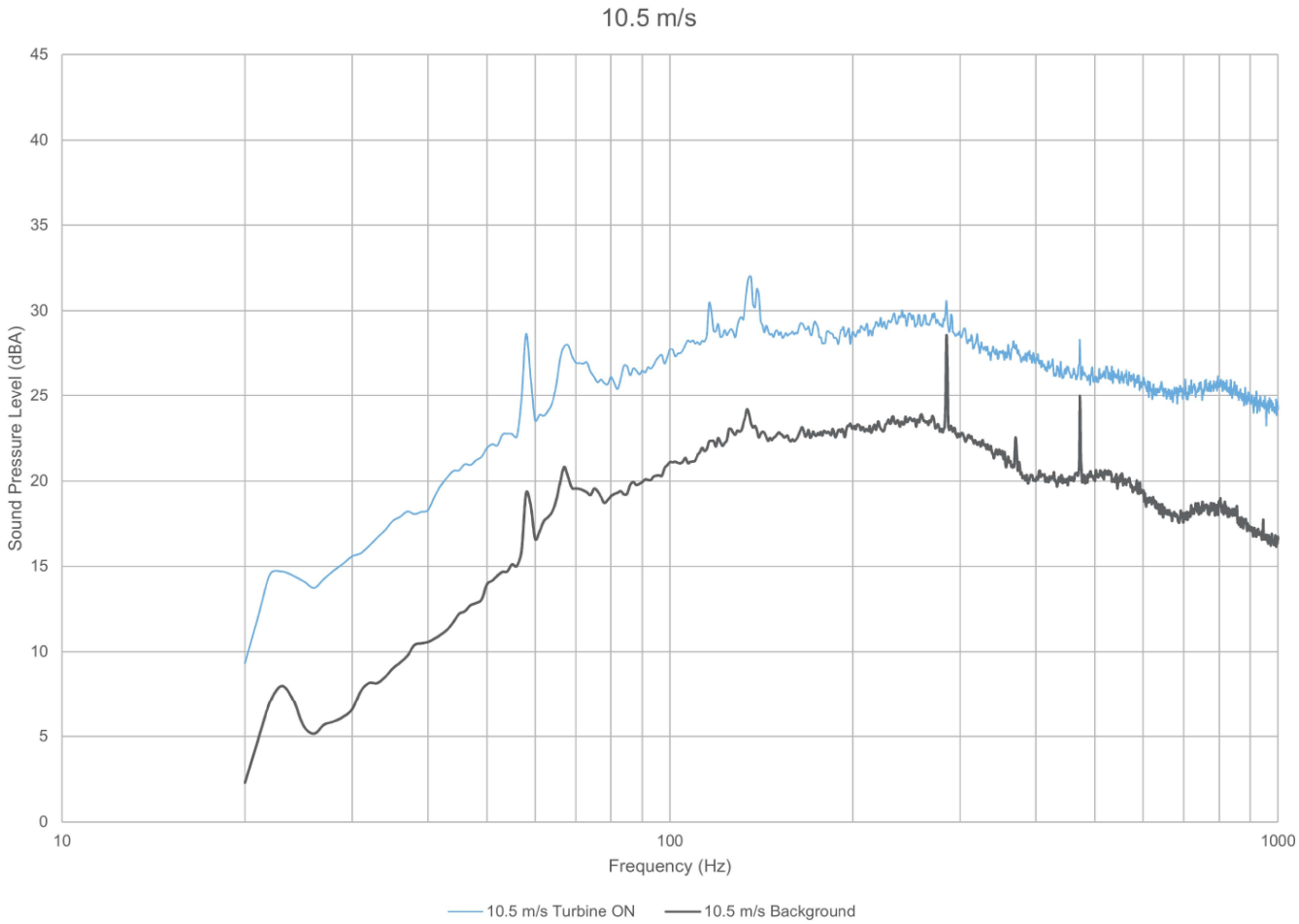
Figure D.04



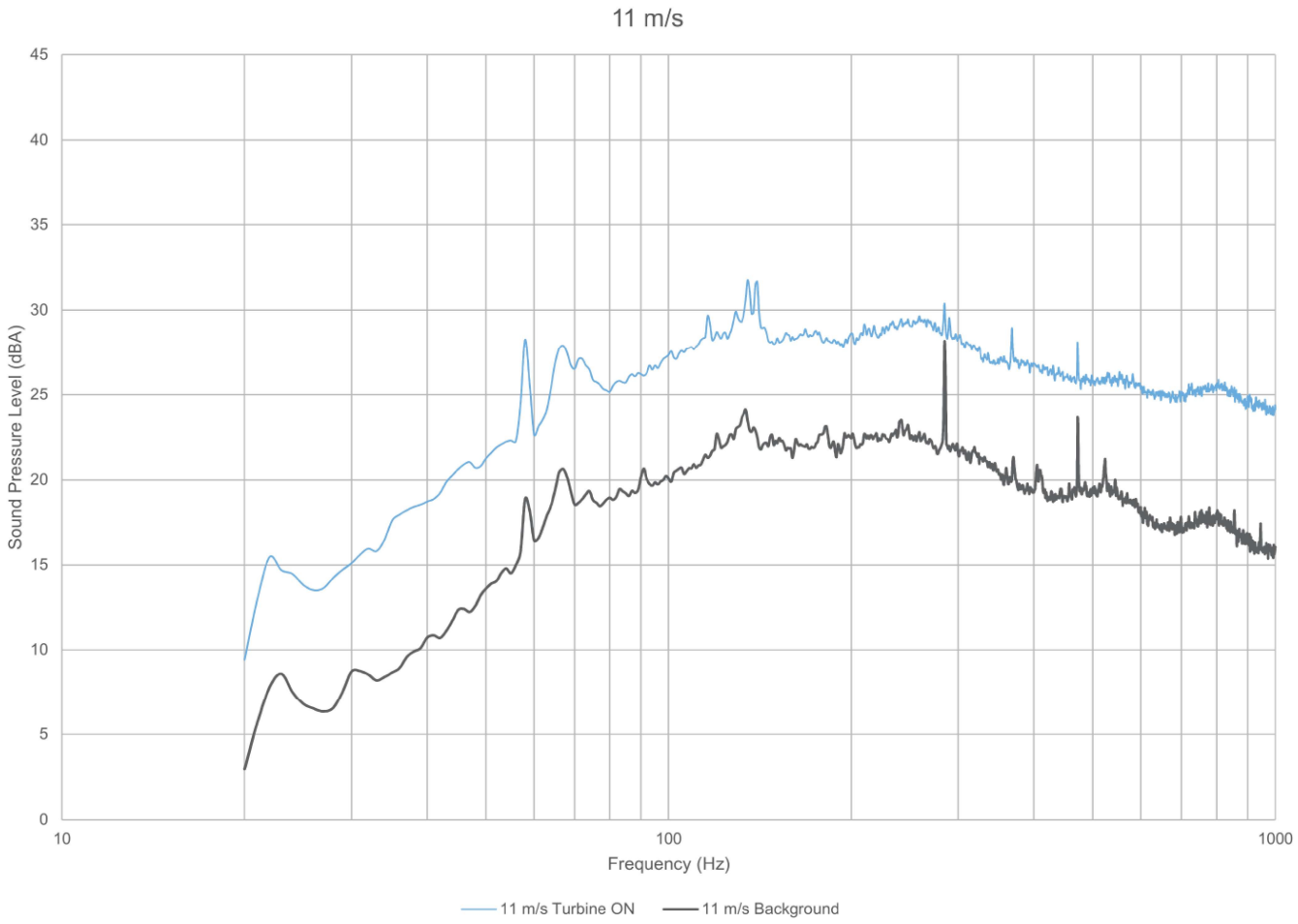
aercoustics	Project ID: 14355.00.T2.RP1 Scale: NTS Drawn by: SS Reviewed by: AM Date: December 6, 2017 Revision: 1	**Project Name** Port Ryerse Wind Power Project - T2 - IEC 61400-11 Ed. 3.0 **Figure Title** Plot of narrow band spectra - Turbine ON vs. Background at 9.5 m/s **Figure D.05**



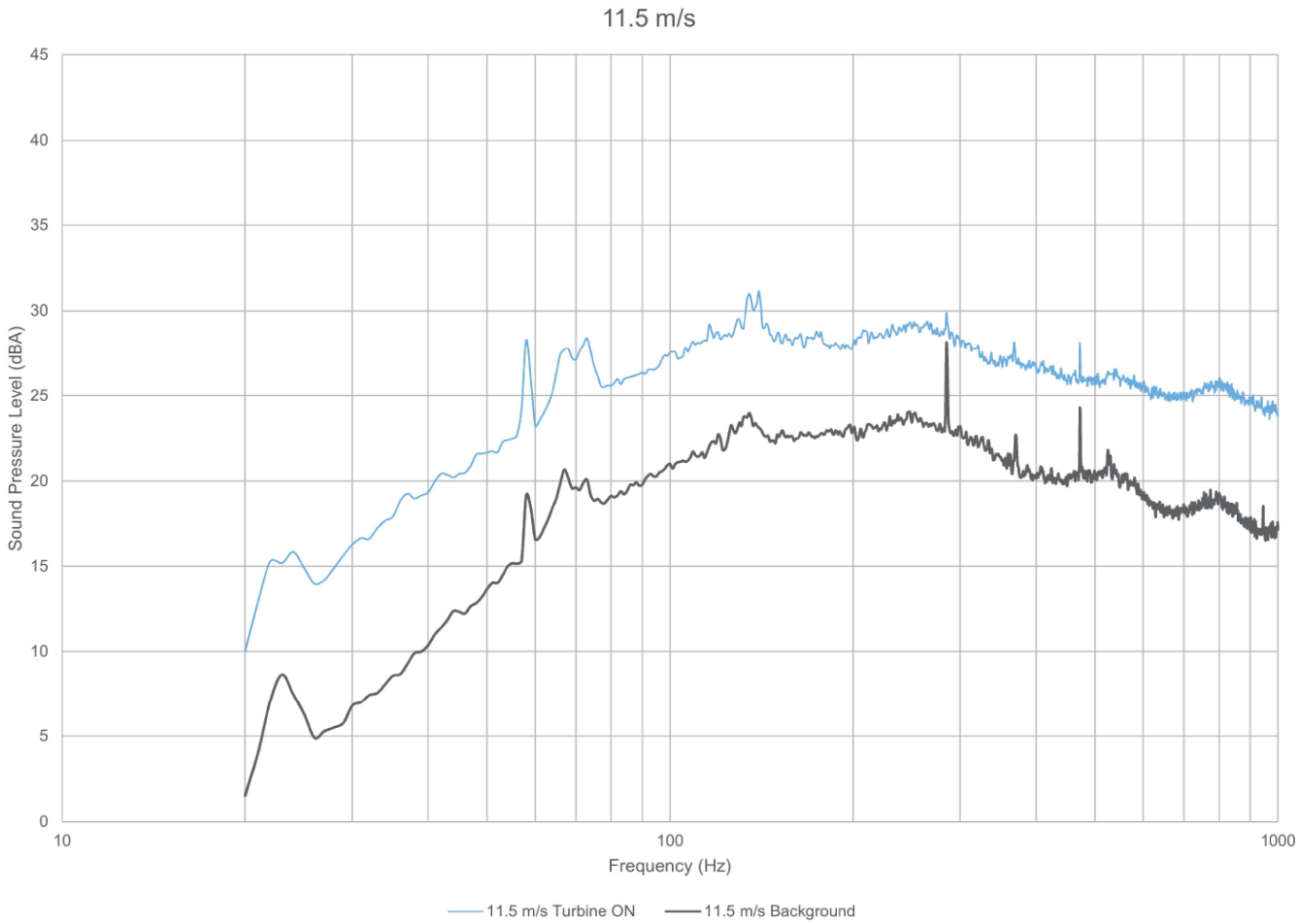
aercoustics	Project ID: 14355.00.T2.RP1	**Project Name**	
	Scale: NTS Drawn by: SS Reviewed by: AM Date: December 6, 2017 Revision: 1	Port Ryerse Wind Power Project - T2 - IEC 61400-11 Ed. 3.0	
		Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 10 m/s	**Figure D.06**



aercoustics	Project ID: 14355.00.T2.RP1 Scale: NTS Drawn by: SS Reviewed by: AM Date: December 6, 2017 Revision: 1	**Project Name** Port Ryerse Wind Power Project - T2 - IEC 61400-11 Ed. 3.0 **Figure Title** Plot of narrow band spectra - Turbine ON vs. Background at 10.5 m/s **Figure D.07**



aercoustics	Project ID: 14355.00.T2.RP1	**Project Name**	
	Scale: NTS Drawn by: SS Reviewed by: AM Date: December 6, 2017 Revision: 1	Port Ryerse Wind Power Project - T2 - IEC 61400-11 Ed. 3.0	
		Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 11 m/s	**Figure D.08**



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Project ID: 14355.00.T2.RP1

Scale: NTS
Drawn by: SS
Reviewed by: AM
Date: December 6, 2017
Revision: 1

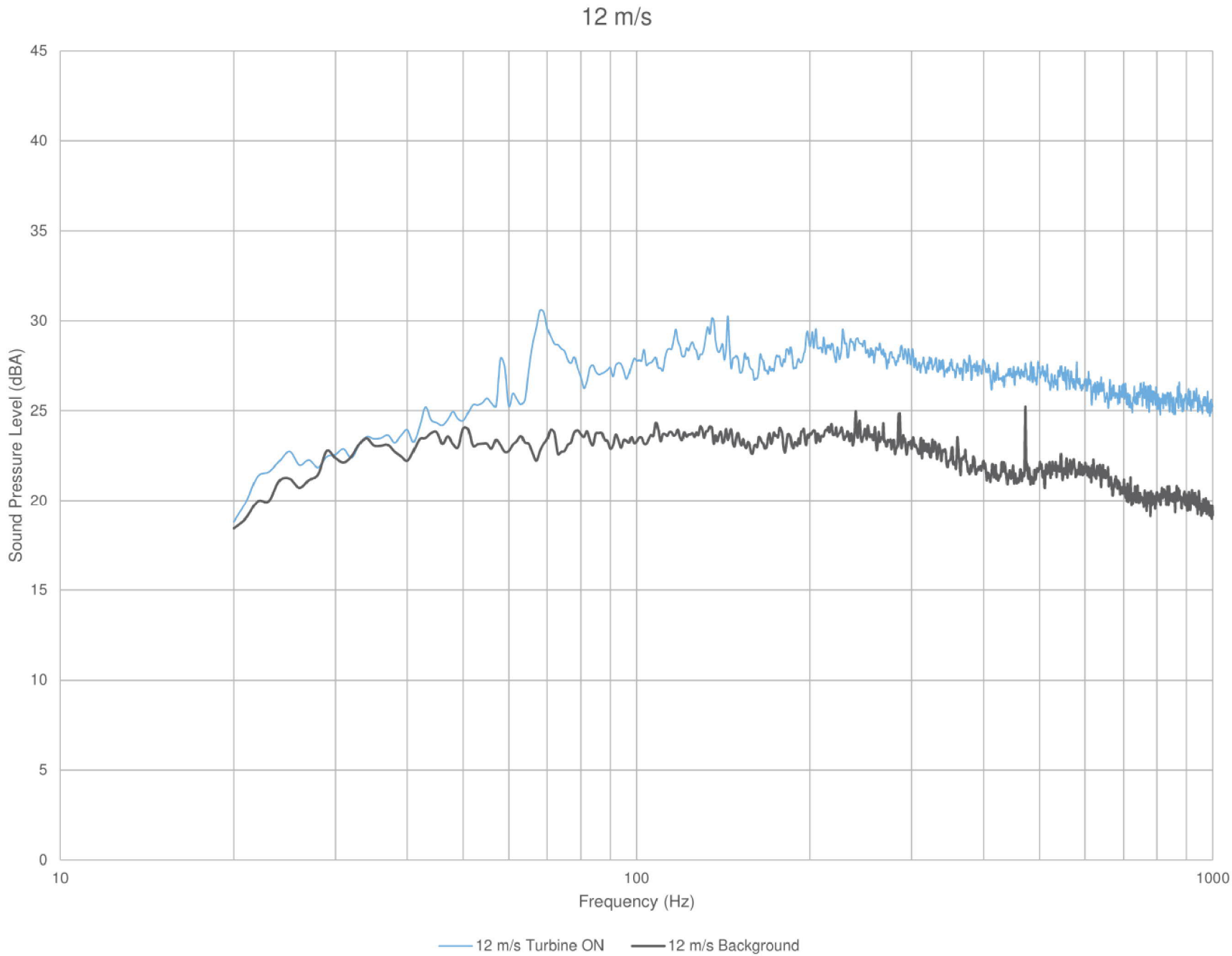
Project Name

Port Ryerse Wind Power Project - T2 - IEC 61400-11 Ed. 3.0

Figure Title

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

Figure D.09



aercoustics

Project ID: 14355.00.T4.RP1

Scale: NTS
Drawn by: KC
Reviewed by: PA
Date: November 10, 2017
Revision: 1

Project Name

Port Ryerse Wind Power Project - T4 - IEC 61400-11 Ed. 3.0

Figure Title

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

Figure D.10

Table D.01 Tonality Assessment Table - 7.5 m/s

Project: Port Ryerse Wind Farm- Turbine T2 - IEC 61400-11 Measurement
Report ID: 14355.00.T2.RP1

Created on: 12/6/2017

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 were detected									

Table D.02 Tonality Assessment Table - 8 m/s

Project: Port Ryerse Wind Farm- Turbine T15 - IEC 61400-11 Measurement
Report ID: 14355.00.T2.RP1

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 were detected									

Table D.03 Tonality Assessment Table - 8.5 m/s

Project: Port Ryerse Wind Farm- Turbine T15 - IEC 61400-11 Measurement
Report ID: 14355.00.T2.RP1

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 were detected									

Table D.04 Tonality Assessment Table - 9 m/s

Project: Port Ryerse Wind Farm- Turbine T15 - IEC 61400-11 Measurement
Report ID: 14355.00.T2.RP1

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 were detected									

Table D.05 Tonality Assessment Table - 9.5 m/s

Project: Port Ryerse Wind Farm- Turbine T15 - IEC 61400-11 Measurement
Report ID: 14355.00.T2.RP1

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 were detected									

Table D.06 Tonality Assessment Table - 10 m/s

Project: Port Ryerse Wind Farm- Turbine T15 - IEC 61400-11 Measurement
Report ID: 14355.00.T2.RP1

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 were detected									

Table D.07 Tonality Assessment Table - 10.5 m/s

Project: Port Ryerse Wind Farm- Turbine T15 - IEC 61400-11 Measurement
Report ID: 14355.00.T2.RP1

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 were detected									

Table D.08 Tonality Assessment Table - 11 m/s

Project: Port Ryerse Wind Farm- Turbine T15 - IEC 61400-11 Measurement
Report ID: 14355.00.T2.RP1

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 were detected									

Table D.09 Tonality Assessment Table - 11.5 m/s

Project: Port Ryerse Wind Farm- Turbine T15 - IEC 61400-11 Measurement
Report ID: 14355.00.T2.RP1

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 were detected									

Table D.10 Tonality Assessment Table - 12 m/s

Project: Port Ryerse Wind Farm- Turbine T15 - IEC 61400-11 Measurement
Report ID: 14355.00.T2.RP1

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 were detected									

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Appendix E
Measurement Data

Table E.01 Measurement data - Turbine ON

Project: Port Ryerse Wind Farm - Turbine T2 - IEC 61400-11 Measurement

Report ID: 14355.00.T2.RP1

Created on: 12/6/2017

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

Data 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 (%)
1	9.1	52.0	2006	282.0	292.4	7.9	12.0	10.4	7.0	5	98644.0	72
2	9.2	51.9	2061	282.0	292.5	6.1	11.9	10.5	5.4	5	98644.2	72
3	9.8	52.4	2304	282.0	292.5	5.0	12.0	11.2	5.1	5	98644.1	72
4	10.8	52.6	2441	282.0	292.5	4.6	12.1	11.2	6.5	5	98643.9	72
5	9.5	52.3	2181	282.0	292.4	2.1	11.9	10.6	5.7	5	98643.6	72
6	8.7	53.0	1838	282.0	292.4	1.2	12.1	10.6	5.2	5	98651.4	73
7	8.4	53.5	1656	282.0	292.5	-0.7	12.2	9.3	4.6	5	98656.1	73
8	8.5	53.6	1726	282.0	292.5	-0.8	12.3	9.4	4.9	5	98655.9	73
9	8.0	53.1	1467	282.0	292.0	-1.3	12.2	8.0	6.2	5	98655.7	73
10	8.6	53.3	1789	282.0	289.1	0.4	12.4	8.9	8.1	5	98655.6	73
11	8.8	53.4	1849	282.0	289.0	0.0	12.3	9.6	8.2	5	98655.5	73
12	8.0	53.1	1445	282.0	289.0	-1.3	12.2	7.8	6.9	5	98648.1	73
13	8.5	53.7	1702	282.0	288.9	-0.2	12.4	8.6	7.4	5	98643.4	73
14	10.6	54.4	2588	282.0	288.9	4.4	13.1	11.0	8.3	5	98643.7	73
15	12.7	54.8	2771	282.0	288.9	9.4	13.7	13.2	7.4	5	98644.5	73
16	11.7	53.8	2588	282.0	287.6	9.8	12.8	12.2	6.6	5	98644.0	73
17	12.2	53.4	2507	282.0	286.5	9.6	12.4	12.7	4.9	5	98644.2	73
18	9.1	51.9	2011	282.0	286.5	5.7	11.6	10.5	5.4	5	98652.9	73
19	8.7	52.8	1821	282.0	286.3	5.7	12.1	9.1	9.0	5	98656.6	73
20	9.8	53.1	2299	282.0	285.6	5.2	12.1	12.0	11.2	5	98656.7	73
21	9.4	53.4	2116	282.0	284.4	3.0	12.0	11.4	8.8	5	98656.7	73
22	9.6	53.8	2212	282.0	284.4	2.7	12.1	10.6	8.4	5	98656.6	73
23	8.7	53.8	1792	282.0	284.4	1.2	12.1	9.7	8.7	5	98656.5	73
24	8.6	53.8	1750	282.0	284.3	-0.2	12.3	8.2	8.5	5	98649.0	73
25			2491	282.0	284.2	3.0	12.8	10.2	10.2	5	98644.2	72
26	10.8	54.4	2646	282.0	284.4	6.4	13.1	11.3	8.4	5	98644.2	72
27	9.8	52.5	2277	282.0	284.3	3.8	12.0	10.3	6.2	5	98644.0	72
28	9.9	53.5	2319	282.0	284.3	3.1	12.2	10.7	7.6	5	98644.3	72
29			2467	282.0	284.1	3.5	12.3	11.4	6.6	5	98644.3	72
30	10.0	54.0	2356	282.0	284.1	3.0	12.2	10.7	5.8	5	98652.0	73
31	9.5	53.3	2158	282.0	284.2	2.2	12.2	11.0	5.3	5	98656.9	73
32	9.2	53.6	2040	282.0	284.1	1.7	12.2	10.0	5.1	5	98657.1	73
33	8.6	53.4	1777	282.0	284.2	0.0	12.2	8.7	6.2	5	98657.0	73
34	9.4	53.8	2143	282.0	284.2	1.1	12.4	9.6	5.7	5	98657.1	73
35	9.8	53.7	2277	282.0	284.3	1.4	12.3	8.8	5.2	5	98657.1	73
36	11.7	54.3	2565	282.0	287.0	3.8	12.9	12.2	5.6	5	98657.1	73
37	12.2	53.7	2523	282.0	288.4	5.0	12.6	12.8	6.5	5	98657.2	73
38	8.7	53.5	1840	282.0	288.4	1.6	12.1	11.2	10.2	5	98657.1	73
39	8.2	53.7	1539	282.0	288.4	-0.5	12.1	9.1	9.5	5	98657.2	73
40	7.4	53.0	1183	282.0	288.4	-1.8	12.0	6.4	10.4	5	98657.2	73
41	7.7	54.0	1297	282.0	285.7	-1.2	12.3	7.7	10.3	5	98657.4	73
42	7.6	54.5	1267	282.0	285.6	-1.6	12.2	7.1	8.5	5	98657.2	73
43	7.6	53.5	1293	282.0	285.7	-1.6	12.3	9.1	10.6	5	98657.1	73
44	8.8	53.7	1893	282.0	285.7	1.0	12.5	7.9	10.5	5	98657.1	73
45			2516	282.0	285.6	2.9	12.6	9.8	9.1	5	98657.3	73
46	11.0	53.6	2444	282.0	285.6	2.6	12.5	11.4	7.2	5	98656.8	73
47	12.3	55.1	2753	282.0	285.7	8.6	13.7	12.8	7.1	5	98656.9	72
48	13.2	53.2	2550	282.0	284.3	8.5	12.6	13.8	8.4	5	98656.7	72
49	11.9	52.3	2403	282.0	282.8	6.1	11.9	12.4	7.5	5	98656.3	72
50	10.1	52.8	2379	282.0	282.8	4.4	11.9	10.6	7.4	5	98641.6	72
51	11.2	52.6	2411	282.0	282.8	3.9	12.1	11.7	6.0	5	98638.3	72
52	9.8	53.9	2283	282.0	282.8	2.9	12.1	9.9	5.2	5	98638.8	72
53	11.1	54.2	2422	282.0	282.8	3.7	12.3	11.6	4.4	5	98638.6	73
54	9.4	53.3	2124	282.0	282.8	2.6	12.2	10.3	5.1	5	98638.7	73
55	8.9	54.0	1921	282.0	282.8	1.0	12.2	11.3	6.2	5	98638.7	73
56	8.4	54.4	1676	282.0	282.8	-0.5	12.0	10.2	4.8	5	98639.0	73
57	8.4	54.2	1673	282.0	282.8	-0.9	12.3	9.4	5.2	5	98639.1	73
58	9.0	53.6	1948	282.0	282.8	0.4	12.4	9.7	6.8	5	98639.1	73
59	8.8	53.5	1857	282.0	282.8	-0.2	12.3	9.3	7.7	5	98639.1	73
60	8.6	54.1	1748	282.0	282.8	-0.2	12.3	9.1	7.7	5	98638.8	73
61	8.6	53.7	1769	282.0	282.8	0.0	12.3	9.0	7.3	5	98638.6	73
62	8.0	53.6	1440	282.0	282.8	-1.3	12.2	8.4	7.2	5	98638.3	73
63	7.9	54.0	1404	282.0	282.8	-1.5	12.3	7.8	5.1	5	98638.4	73
64	8.3	54.4	1627	282.0	282.8	-1.1	12.4	8.3	6.4	5	98638.4	73
65	9.3	53.9	2097	282.0	282.9	1.0	12.5	9.3	7.1	5	98638.9	73
66	9.3	53.7	2100	282.0	282.9	1.0	12.3	9.7	6.0	5	98639.2	73
67	8.3	53.6	1606	282.0	282.9	-1.0	12.1	9.4	5.1	5	98638.9	73
68	8.3	53.5	1591	282.0	282.8	-1.1	12.3	8.6	5.4	5	98638.8	73
69	8.5	53.6	1717	282.0	282.8	-0.8	12.4	8.2	6.5	5	98638.7	73
70	9.5	53.7	2148	282.0	282.8	0.7	12.5	9.3	7.0	5	98638.6	73
71	9.7	53.8	2249	282.0	282.9	1.2	12.3	9.3	7.5	5	98638.8	73
72	9.0	55.5	1949	282.0	282.9	0.2	12.2	8.0	7.6	5	98638.5	73
73	9.0	55.0	1987	282.0	282.9	0.6	12.4	9.0	8.1	5	98638.4	73
74			2612	282.0	282.9	4.1	12.9	10.4	9.2	5	98638.2	73
75	10.1	54.0	2375	282.0	282.9	4.0	12.4	10.0	8.0	5	98637.7	73
76	9.1	53.9	2019	282.0	282.9	2.1	12.2	9.0	7.4	5	98637.6	73
77	9.4	53.6	2117	282.0	282.9	2.2	12.3	9.6	6.5	5	98637.4	73
78	10.1	54.1	2376	282.0	281.1	2.9	12.4	10.5	5.8	5	98637.3	73
79	9.6	54.3	2223	282.0	280.7	2.3	12.2	11.3	6.1	5	98639.2	73
80	8.7	53.5	1812	282.0	280.7	0.1	12.1	9.9	7.3	5	98651.6	73
81	9.3	54.3	2102	282.0	280.7	1.2	12.4	9.1	5.4	5	98654.8	73
82	9.2	54.1	2039	282.0	280.7	0.6	12.3	8.3	6.7	5	98655.1	73
83			2412	282.0	280.7	1.9	12.5	9.1	5.0	5	98648.8	73
84			2488	282.0	280.7	2.7	12.4	9.6	7.6	5	98650.3	73
85	9.0	53.7	1977	282.0	281.4	0.7	12.2	8.8	7.6	5	98655.7	73
86	9.5	54.0	2156	282.0	283.5	1.2	12.3	9.4	7.3	5	98655.7	73
87	8.7	54.4	1811	282.0	283.5	-0.5	12.2	8.6	6.1	5	98655.2	73
88	9.7	54.0	2230	282.0	283.5	1.6	12.4	10.4	7.1	5	98655.5	73

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

Data 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 (%)
89	11.6	54.9	2630	282.0	283.6	4.5	13.0	12.1	7.4	5	98655.6	73
90	11.8	55.6	2688	282.0	283.6	8.2	13.3	12.3	6.6	5	98656.0	73
91	12.8	53.7	2520	282.0	283.5	7.4	12.4	13.3	6.2	5	98656.4	73
92	12.0	53.3	2482	282.0	283.6	7.0	12.3	12.5	6.4	5	98656.6	73
93	11.4	53.0	2422	282.0	283.6	5.4	12.0	11.9	5.6	5	98656.9	73
94	11.6	53.4	2481	282.0	285.1	5.4	12.3	12.1	5.4	5	98656.6	73
95	12.3	53.6	2538	282.0	286.2	6.8	12.5	12.8	6.0	5	98656.8	73
96	12.0	53.8	2507	282.0	286.2	6.6	12.4	12.5	6.2	5	98657.0	73
97	11.6	53.6	2589	282.0	286.2	8.6	12.8	12.1	5.1	5	98657.2	73
98	12.5	53.5	2563	282.0	286.2	9.6	12.7	13.1	4.8	5	98657.3	73
99	13.9	53.1	2527	282.0	286.2	9.7	12.5	14.5	5.3	5	98657.2	73
100	12.8	53.7	2535	282.0	286.2	10.7	12.5	13.4	7.5	5	98657.2	73
101	12.1	52.7	2432	282.0	286.2	9.0	12.1	12.6	7.1	5	98657.1	74
102	13.1	53.7	2515	282.0	286.2	10.1	12.5	13.7	6.9	5	98657.1	74
103	11.8	53.6	2441	282.0	286.2	9.3	12.1	12.3	7.7	5	98657.1	74
104	8.8	53.3	1856	282.0	286.2	6.4	11.8	10.8	6.1	5	98656.9	74
105	12.4	52.9	2469	282.0	286.2	7.0	12.2	12.9	5.9	5	98656.8	74
106	12.4	52.7	2462	282.0	286.2	6.5	12.2	13.0	9.1	5	98656.6	73
107			2452	282.0	288.0	6.1	12.1	10.5	8.8	5	98656.2	73
108	11.4	52.5	2456	282.0	288.4	5.2	12.1	11.9	9.9	5	98655.6	73
109	10.0	52.8	2370	282.0	288.4	4.0	12.0	10.5	9.1	5	98655.1	73
110	9.4	53.0	2131	282.0	288.4	2.5	12.0	10.8	7.2	5	98654.9	73
111	9.1	53.2	1995	282.0	288.4	1.9	12.2	10.0	6.7	5	98654.9	73
112	8.8	53.8	1851	282.0	288.4	0.9	12.2	9.9	6.4	5	98654.7	73
113	9.0	53.6	1981	282.0	288.4	-0.1	12.4	8.1	6.1	5	98655.0	73
114	11.0	54.6	2596	282.0	288.4	4.2	12.9	11.5	7.8	5	98655.0	73
115	11.1	54.0	2633	282.0	288.4	6.7	13.0	11.6	6.9	5	98657.3	73
116	9.6	52.7	2205	282.0	288.4	4.6	12.1	11.0	5.5	5	98658.4	73
117	8.7	52.8	1841	282.0	288.4	2.2	12.1	10.7	5.6	5	98658.3	73
118	8.8	53.1	1893	282.0	288.4	1.8	12.1	9.6	5.7	5	98658.4	73
119	8.9	53.2	1921	282.0	288.4	1.6	12.3	9.6	5.7	5	98658.4	73
120	9.3	54.1	2069	282.0	288.4	1.8	12.3	9.7	4.8	5	98658.4	73
121	11.3	54.2	2539	282.0	288.4	3.4	12.6	11.8	5.1	5	98658.5	73
122	11.4	54.0	2658	282.0	288.4	6.9	13.1	11.9	5.7	5	98658.6	73
123	10.4	53.3	2536	282.0	288.4	6.7	12.5	10.9	5.0	5	98658.4	73
124	10.6	53.3	2487	282.0	288.4	6.1	12.3	11.0	5.5	5	98658.4	73
125	8.6	54.3	1786	282.0	290.1	-0.7	12.4	9.1	6.3	5	98658.6	73
126	9.0	55.0	1961	282.0	290.1	-0.3	12.4	8.6	7.4	5	98658.3	73
127	9.4	54.5	2130	282.0	290.1	0.9	12.4	9.7	8.4	5	98658.2	73
128	8.9	53.1	1897	282.0	290.1	-0.1	12.2	10.5	7.6	5	98658.1	73
129	8.3	53.9	1630	282.0	290.1	-1.0	12.2	8.8	6.5	5	98658.0	73
130	8.9	54.2	1919	282.0	290.1	0.4	12.4	8.7	4.5	5	98658.3	73
131	10.4	55.0	2639	282.0	289.6	5.0	13.2	10.9	5.1	5	98669.7	73
132	10.0	53.3	2354	291.0	288.3	4.9	11.9	11.2	7.0	4	98709.9	76
133	11.0	53.4	2407	291.0	287.4	3.4	11.9	11.5	5.9	4	98710.1	76
134	9.5	54.1	2163	291.0	287.4	2.1	12.0	10.6	7.0	4	98710.0	76
135	9.6	54.0	2189	291.0	287.4	2.2	12.2	10.1	5.3	4	98710.0	76
136	8.7	55.4	1803	291.0	287.4	0.7	12.1	7.4	5.2	4	98709.7	76
137	8.5	55.8	1711	291.0	287.4	0.0	12.3	8.3	4.5	4	98716.0	76
138	9.5	54.4	2166	291.0	287.4	1.4	12.4	10.5	4.6	4	98722.6	76
139	9.3	54.4	2104	291.0	287.4	0.8	12.3	9.5	5.9	4	98722.5	76
140	9.7	54.6	2230	291.0	287.3	1.0	12.4	8.2	9.3	4	98722.2	76
141	10.8	54.6	2502	291.0	285.4	2.3	12.6	11.3	10.9	4	98722.3	76
142	12.1	55.0	2592	291.0	285.2	4.7	12.8	12.6	9.5	4	98722.2	76
143	11.7	54.8	2584	291.0	285.2	6.2	12.8	12.2	8.8	4	98716.7	75
144	11.2	54.1	2493	291.0	285.2	5.7	12.3	11.7	7.0	5	98708.5	74
145	9.5	54.1	2186	291.0	285.2	3.2	11.9	9.9	7.2	5	98708.5	74
146	8.8	54.1	1864	291.0	285.2	1.7	12.1	10.2	5.8	5	98708.5	74
147	9.2	54.1	2060	291.0	285.2	2.1	12.3	9.5	5.0	5	98708.6	74
148	10.3	54.8	2509	291.0	285.2	3.9	12.7	10.7	6.9	5	98708.6	74
149			2579	291.0	285.2	5.6	12.7	10.3	8.2	5	98708.7	75
150	12.3	55.4	2694	291.0	285.2	9.3	13.4	12.8	6.8	4	98708.8	76
151	12.3	55.0	2544	291.0	285.2	9.3	12.6	12.9	6.5	4	98708.8	76
152	11.8	52.7	2452	291.0	285.2	8.4	12.2	12.4	6.0	4	98708.9	76
153	11.1	53.6	2443	291.0	285.2	7.9	12.1	11.6	7.8	4	98708.9	76
154	10.0	53.7	2353	291.0	285.2	5.1	11.8	11.9	7.5	4	98708.8	76
155	10.0	53.7	2361	291.0	287.2	5.0	12.1	11.1	6.9	4	98715.7	75
156	9.6	54.2	2194	291.0	287.8	2.8	11.9	10.1	6.2	4	98722.4	75
157			2489	291.0	287.8	3.7	12.4	11.4	7.7	4	98722.5	75
158			2583	291.0	287.8	6.1	12.8	12.0	7.0	4	98722.4	75
159	11.2	54.1	2476	291.0	287.8	5.5	12.3	11.7	5.5	4	98722.6	75
160	9.9	53.1	2317	291.0	287.8	3.5	12.0	11.3	5.6	4	98722.5	75
161	9.7	53.7	2244	291.0	287.8	3.1	12.1	10.4	6.7	4	98722.6	75
162	9.7	54.0	2264	291.0	287.8	2.8	12.3	10.9	5.1	5	98722.5	75
163	11.1	54.3	2540	291.0	287.8	4.5	12.6	11.6	5.5	5	98722.5	75
164	12.1	54.6	2628	291.0	287.8	7.5	13.0	12.6	6.3	5	98722.6	75
165	9.9	53.4	2315	291.0	287.8	5.2	12.0	11.2	5.7	5	98722.5	75
166	8.5	53.0	1722	291.0	287.8	1.8	11.9	8.2	6.9	5	98722.5	75
167	9.9	53.8	2315	291.0	287.8	3.0	12.3	9.7	6.7	5	98722.6	75
168	9.8	53.5	2299	291.0	287.8	2.7	12.3	9.0	6.5	5	98722.4	76
169	9.9	53.5	2312	291.0	287.8	2.8	12.3	10.4	6.5	5	98722.6	76
170	9.1	54.0	1995	291.0	287.8	1.5	12.2	8.6	5.6	5	98722.7	76
171	8.9	53.9	1920	291.0	287.8	0.1	12.3	9.1	4.1	5	98722.7	76
172			2724	291.0	287.8	9.4	13.5	13.0	4.8	5	98722.8	76
173	12.3	55.3	2533	291.0	287.8	8.7	12.5	12.8	5.1	5	98722.9	76
174	9.4	51.8	2127	291.0	287.8	5.6	11.8	11.6	5.3	5	98722.9	76
175	8.7	52.5	1806	291.0	287.8	4.3	11.9	10.1	6.2	5	98722.9	76
176	8.9	52.8	1932	291.0	287.8	2.5	11.9	8.9	6.5	5	98723.2	76

Table E.01 Measurement data - Turbine ON

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

Data 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 (%)
177	9.9	53.0	2329	291.0	287.8	3.0	12.3	9.7	6.4	5	98723.1	76
178	12.2	53.7	2659	291.0	287.8	6.8	13.2	12.7	5.4	4	98723.2	76
179	11.9	54.0	2657	291.0	287.8	9.6	13.1	12.4	7.0	4	98722.9	76
180	9.8	52.4	2302	291.0	287.8	6.2	11.8	11.2	9.2	4	98722.9	76
181	9.5	53.8	2167	291.0	287.8	4.4	11.9	10.7	8.4	4	98722.8	76
182	9.5	54.6	2186	291.0	287.8	2.5	11.9	10.0	7.2	4	98722.9	76
183	9.8	53.2	2297	291.0	287.8	2.4	12.2	11.5	6.2	4	98723.0	76
184	9.2	52.6	2061	291.0	287.8	1.6	12.2	10.0	6.1	4	98722.8	76
185	8.4	52.5	1639	291.0	287.8	-0.8	12.1	8.7	5.6	4	98723.0	76
186	7.8	52.7	1370	291.0	287.8	-1.5	12.2	8.1	5.8	4	98723.1	76
187	8.0	53.1	1458	291.0	287.8	-1.3	12.3	8.0	5.7	4	98723.1	76
188	8.1	52.7	1503	291.0	287.8	-1.3	12.3	8.9	5.8	4	98723.1	76
189	7.7	52.9	1310	291.0	287.8	-1.6	12.2	7.8	5.6	4	98723.1	76
190	7.5	53.3	1241	291.0	287.8	-1.7	12.2	8.3	5.5	5	98723.2	76
191	7.4	52.4	1157	291.0	287.8	-1.8	11.9	7.4	5.9	5	98723.2	76
192	7.5	52.9	1223	291.0	287.8	-1.2	12.0	8.1	5.5	5	98723.4	76
193	10.0	53.7	2357	291.0	287.8	2.7	12.6	9.8	4.9	5	98722.9	76
194	10.7	53.9	2517	291.0	287.8	3.4	12.5	11.2	5.3	5	98723.3	76
195	9.0	52.7	1969	291.0	287.8	1.0	12.1	10.3	5.7	5	98723.1	76
196	8.9	52.8	1942	291.0	287.8	0.1	12.3	9.6	5.5	5	98730.9	76
197	9.9	52.7	2320	291.0	287.8	1.4	12.4	9.8	5.0	5	98736.4	76
198	9.5	53.0	2176	291.0	287.8	0.7	12.3	9.8	6.5	5	98736.5	76
199			2503	291.0	287.8	2.0	12.5	10.2	6.9	5	98736.5	76
200			2545	291.0	287.8	3.4	12.6	10.5	8.5	5	98736.5	76
201			2540	291.0	287.8	4.8	12.9	10.6	7.3	5	98736.6	76
202	11.0	55.6	2653	291.0	287.8	8.2	13.2	11.5	6.1	5	98736.5	76
203	11.2	55.0	2415	291.0	287.8	6.4	12.1	11.7	6.3	5	98736.4	76
204	10.0	52.1	2349	291.0	287.8	4.6	12.0	11.5	5.7	5	98736.5	76
205	11.2	53.6	2483	291.0	287.8	5.6	12.4	11.7	5.8	5	98736.5	76
206	9.5	52.4	2150	291.0	287.8	3.1	11.9	10.0	7.3	5	98736.6	76
207	9.8	52.7	2266	291.0	287.8	2.5	12.1	10.2	10.1	5	98736.7	76
208	10.0	52.5	2366	291.0	287.8	3.1	12.3	10.3	9.4	5	98728.7	75
209	8.7	52.4	1833	291.0	287.8	0.8	12.1	9.0	8.6	5	98723.3	75
210	8.9	52.6	1898	291.0	287.8	0.2	12.3	9.4	8.2	5	98723.3	75
211	9.0	52.7	1985	291.0	287.8	0.6	12.3	9.8	8.0	5	98723.3	75
212	9.1	53.3	2002	291.0	287.8	-0.1	12.4	8.8	6.1	5	98723.5	75
213	10.2	52.5	2387	291.0	287.8	1.9	12.5	10.4	6.0	5	98730.0	75
214	10.3	53.2	2573	291.0	287.8	4.1	12.8	10.8	7.2	5	98736.8	76
215	11.4	53.0	2619	291.0	287.8	6.7	13.0	11.9	6.3	5	98736.7	76
216	10.8	52.1	2526	291.0	287.8	6.9	12.5	11.3	6.2	5	98736.8	76
217	11.0	52.2	2435	291.0	287.8	5.6	12.1	11.5	6.0	5	98736.8	76
218	10.0	52.5	2368	291.0	287.8	4.2	12.1	11.9	5.8	5	98736.8	76
219	11.5	52.4	2522	291.0	287.8	6.0	12.6	12.0	5.1	5	98736.9	76
220			2484	291.0	287.8	5.9	12.3	10.5	8.2	5	98736.6	76
221	10.0	54.0	2364	291.0	287.8	3.7	11.9	10.8	7.3	5	98736.7	76
222	9.9	53.7	2321	291.0	287.8	2.6	12.1	11.3	5.8	5	98736.7	76
223	9.2	53.1	2063	291.0	287.8	1.9	12.1	10.5	6.8	5	98736.6	76
224	8.8	53.2	1857	291.0	287.9	0.5	12.2	9.7	7.3	5	98736.4	76
225	8.4	53.0	1669	291.0	287.8	-0.8	12.2	10.0	7.1	5	98736.7	76
226	8.4	52.7	1664	291.0	287.8	-1.0	12.3	7.8	6.4	5	98736.4	75
227	8.6	52.6	1747	291.0	287.8	-0.5	12.3	8.5	6.7	5	98737.1	75
228	8.4	52.5	1668	291.0	287.8	-1.0	12.3	9.1	7.4	5	98736.7	75
229	7.9	52.4	1419	291.0	287.8	-1.4	12.2	8.3	6.5	5	98736.6	75
230	7.4	52.5	1196	291.0	287.8	-1.8	12.1	7.5	6.8	5	98736.5	75
231	7.5	52.7	1218	291.0	287.8	-1.8	12.1	7.2	9.8	5	98729.9	75
232	7.5	53.0	1235	291.0	287.8	-1.7	12.2	6.8	8.0	5	98723.3	75
233	9.4	53.2	2145	291.0	287.8	1.7	12.6	9.1	6.4	5	98723.2	75
234	11.4	53.4	2546	291.0	287.8	3.4	12.7	11.9	6.9	5	98723.2	75
235	11.4	53.3	2575	291.0	287.8	5.4	12.8	11.9	6.3	5	98723.3	75
236	9.5	51.9	2175	291.0	287.8	2.8	12.1	11.5	5.0	5	98723.3	75
237	9.5	52.3	2150	291.0	287.9	2.2	12.1	9.8	6.1	5	98729.9	76
238	9.2	52.7	2061	291.0	287.8	1.8	12.2	8.9	7.3	5	98736.4	76
239	8.8	53.7	1851	291.0	287.8	0.7	12.2	8.2	9.5	5	98736.7	76
240	7.8	54.8	1386	291.0	287.8	-1.4	12.1	8.4	10.5	5	98737.4	76
241	7.9	53.2	1412	291.0	287.8	-1.4	12.3	8.5	9.0	5	98737.4	76
242	7.5	52.7	1240	291.0	287.8	-1.7	12.2	7.5	7.4	5	98736.9	76
243	7.6	52.8	1269	291.0	287.8	-1.6	12.2	7.4	9.4	5	98730.7	76
244	8.5	52.5	1691	291.0	287.8	-0.4	12.5	8.6	9.3	5	98723.9	75
245	9.7	53.1	2262	291.0	287.8	1.8	12.5	9.7	7.3	5	98724.1	75
246	9.8	54.2	2298	291.0	285.2	1.7	12.3	9.9	6.5	5	98723.9	75
247	9.4	53.4	2145	291.0	284.5	1.0	12.3	9.9	5.7	5	98723.8	75
248	9.7	53.4	2229	291.0	284.6	1.0	12.3	9.6	5.0	5	98723.8	75
249	9.6	53.1	2212	291.0	283.7	1.0	12.3	8.9	5.4	5	98730.0	75
250			2410	291.0	282.3	1.6	12.4	10.4	5.7	5	98736.9	76
251			2522	291.0	282.3	2.8	12.5	11.0	6.6	5	98736.6	76
252	10.4	55.6	2545	291.0	282.3	6.6	12.6	10.9	5.0	5	98736.6	76
253	10.2	53.2	2392	291.0	282.3	3.7	11.9	12.1	4.3	5	98736.7	76
254	9.0	53.1	1970	291.0	282.4	1.8	11.9	10.4	4.0	5	98736.9	76
255	8.6	53.6	1745	291.0	282.3	1.4	12.2	9.0	5.3	5	98736.9	76
256	8.3	53.3	1611	291.0	282.3	-0.4	12.2	8.8	5.5	5	98737.2	76
257	9.0	52.9	1987	291.0	282.3	0.7	12.4	10.5	5.0	5	98737.2	76
258	8.2	54.2	1558	291.0	282.3	-1.1	12.2	10.0	5.0	5	98737.3	76
259	7.9	53.0	1393	291.0	282.4	-1.4	12.2	8.9	4.6	5	98737.1	76
260	7.8	53.1	1386	291.0	282.6	-1.5	12.3	8.4	4.2	5	98737.0	76
261	8.3	53.1	1622	291.0	285.2	-0.9	12.4	8.1	4.2	5	98737.2	76
262	9.0	53.2	1963	291.0	285.4	0.1	12.4	9.0	4.1	5	98736.8	76
263	8.4	53.2	1653	291.0	285.4	-0.8	12.2	7.3	3.5	5	98736.9	76
264	8.0	53.8	1439	291.0	285.4	-1.4	12.3	8.3	3.7	5	98736.8	76

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

Data 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 (%)
265	8.2	53.8	1550	291.0	285.4	-1.2	12.3	9.0	5.7	5	98736.8	76
266	7.5	53.2	1216	291.0	285.4	-1.7	12.0	8.1	5.1	5	98736.8	76
267	6.9	51.2	933	291.0	285.4	-1.8	11.0	5.1	4.5	5	98736.7	76
268	6.7	51.3	875	291.0	285.4	-1.8	10.9	7.4	4.5	5	98737.2	76
269	7.5	53.0	1232	291.0	287.3	-1.0	12.0	7.7	6.8	5	98737.0	76
270	8.8	52.6	1877	291.0	287.6	1.4	12.4	7.8	7.8	5	98736.7	76
271	8.7	52.6	1838	291.0	287.6	0.0	12.4	8.8	7.6	5	98736.8	76
272	9.7	53.2	2259	291.0	287.7	1.5	12.5	10.5	7.1	5	98736.7	76
273	10.0	53.1	2345	291.0	287.8	1.6	12.4	10.2	6.2	5	98736.9	76
274	9.2	52.6	2030	291.0	287.8	0.3	12.2	10.5	5.0	5	98736.9	76
275	8.5	53.5	1717	291.0	287.8	-0.8	12.2	9.0	5.5	5	98737.0	76
276	7.6	53.6	1283	291.0	289.0	-1.5	12.1	7.5	5.9	5	98737.0	76
277	7.9	53.0	1394	291.0	290.5	-1.2	12.3	7.7	5.2	5	98736.9	76
278	8.4	53.0	1674	291.0	290.5	-0.2	12.4	8.1	4.9	5	98737.6	76
279	8.8	53.1	1890	291.0	290.5	0.2	12.4	8.5	5.9	5	98737.4	76
280	10.1	53.3	2380	291.0	290.6	1.6	12.5	11.8	5.4	5	98737.2	76
281			2458	291.0	290.8	1.9	12.4	10.5	5.3	5	98737.3	76
282	9.7	53.2	2264	291.0	290.7	1.3	12.3	8.7	7.4	5	98737.2	76
283	9.6	52.3	2187	291.0	290.7	1.1	12.3	8.9	5.6	5	98737.0	76
284	9.4	52.9	2114	291.0	290.7	0.6	12.3	9.5	5.8	5	98737.0	75
285	9.4	52.7	2112	291.0	289.3	0.3	12.3	9.1	7.2	5	98737.2	75
286	9.3	53.1	2081	291.0	288.0	0.1	12.3	9.9	6.7	5	98737.6	75
287	9.6	53.8	2200	291.0	288.0	0.6	12.4	10.1	6.8	5	98737.7	75
288	11.4	54.7	2650	291.0	288.0	5.2	13.2	11.9	7.1	5	98737.3	75
289	12.3	54.7	2638	291.0	288.0	7.8	13.1	12.8	6.6	5	98737.2	75
290	10.9	52.9	2516	291.0	288.0	7.6	12.5	11.4	6.2	5	98743.9	75
291	12.5	53.1	2479	291.0	288.0	7.3	12.3	13.1	5.4	5	98750.9	76
292	11.9	54.2	2529	291.0	288.0	7.8	12.6	12.4	8.0	5	98750.8	76
293	12.3	55.1	2517	291.0	288.0	8.3	12.5	12.9	7.0	5	98750.7	76
294	11.4	54.4	2407	291.0	288.0	6.6	11.9	11.9	4.7	5	98750.7	76
295	9.2	52.5	2037	291.0	288.0	4.0	11.8	9.8	8.5	5	98742.5	75
296	8.4	52.3	1681	291.0	288.0	2.0	11.9	9.0	7.7	5	98736.9	75
297	7.6	53.6	1261	291.0	288.0	-0.9	12.2	8.2	6.9	5	98736.9	75
298	8.7	53.0	1833	291.0	286.6	0.8	12.4	9.1	7.3	5	98736.8	75
299	8.3	52.9	1620	291.0	285.3	-0.9	12.3	8.8	8.9	5	98736.9	75
300	7.4	52.9	1196	291.0	285.2	-1.7	12.0	7.5	9.3	5	98736.7	75
301	7.2	52.0	1089	291.0	285.2	-1.8	11.6	6.6	7.8	5	98744.9	75
302	7.1	52.4	1053	291.0	285.7	-1.8	11.6	7.7	7.3	5	98750.3	75
303	7.6	53.5	1289	291.0	287.8	-1.2	12.2	8.2	6.3	5	98750.2	75
304	8.7	53.3	1823	291.0	287.9	0.5	12.5	8.2	7.1	5	98750.0	75
305	9.8	53.3	2280	291.0	287.9	1.9	12.5	9.3	7.5	5	98750.1	75
306			2462	291.0	287.9	2.2	12.4	10.3	7.5	5	98750.0	75
307			2492	291.0	287.9	2.3	12.4	10.3	7.5	5	98750.1	75
308			2510	291.0	287.9	3.1	12.5	10.6	8.5	5	98749.9	75
309	9.6	53.7	2226	291.0	287.9	2.2	12.2	9.9	8.0	5	98749.7	75
310	8.5	54.6	1722	291.0	287.9	-0.5	12.1	8.7	9.0	5	98749.6	75
311	7.8	54.3	1375	291.0	287.9	-1.5	12.2	7.3	7.4	5	98749.3	75
312	7.7	53.1	1326	291.0	287.8	-1.5	12.2	7.4	7.2	5	98749.1	75
313	7.6	53.2	1250	291.0	287.8	-1.7	12.3	7.1	8.4	5	98749.1	75
314	8.6	53.8	1748	291.0	287.8	0.5	12.5	8.7	7.8	5	98749.1	75
315	10.0	54.0	2359	291.0	287.9	2.2	12.6	9.9	9.0	5	98749.1	75
316	10.1	53.6	2373	291.0	287.9	2.0	12.3	10.2	9.1	5	98748.9	75
317	10.6	53.0	2440	291.0	287.9	2.3	12.4	11.1	7.7	5	98748.4	75
318	10.9	54.2	2558	291.0	287.9	4.3	12.7	11.4	8.3	5	98747.4	75
319			2551	291.0	287.9	5.6	12.6	10.5	7.2	5	98753.3	75
320	10.2	52.7	2386	291.0	287.9	3.3	12.0	11.3	7.7	5	98752.7	75
321	9.4	53.4	2115	291.0	287.8	1.9	12.1	10.1	6.3	5	98736.2	75
322	9.5	53.6	2172	291.0	288.1	2.2	12.3	9.8	6.6	5	97914.5	75
323			2464	291.0	290.2	3.1	12.4	9.7	6.1	5	97883.1	75
324	9.5	52.6	2167	291.0	290.3	1.8	12.2	9.7	5.9	5	98579.5	75
325	9.5	52.7	2163	291.0	290.3	1.7	12.2	9.3	5.5	5	98712.3	76
326	8.8	53.5	1890	291.0	289.4	0.2	12.2	9.4	6.4	5	98730.7	76
327	8.2	53.7	1563	291.0	287.0	-1.1	12.2	8.5	6.0	5	98737.9	76
328	7.5	52.6	1224	291.0	287.0	-1.7	12.1	7.9	7.1	5	98738.2	76
329	8.2	53.4	1582	291.0	287.0	-0.3	12.4	8.2	7.9	5	98751.5	76
330	9.6	53.3	2212	291.0	288.2	2.0	12.5	8.9	6.7	5	98761.0	76
331	10.4	53.5	2421	291.0	289.4	2.3	12.4	10.8	6.5	5	98761.7	76
332	8.6	53.1	1767	291.0	289.3	-0.4	12.1	8.8	5.8	5	98762.2	76
333	7.7	52.8	1342	291.0	289.3	-1.4	12.2	8.8	7.0	5	98762.5	76
334	9.3	53.1	2070	291.0	289.3	1.6	12.5	8.9	7.3	5	98762.9	76
335	9.7	53.3	2257	291.0	289.7	2.0	12.4	9.6	8.4	5	98762.9	76
336	9.8	53.9	2271	291.0	291.6	2.0	12.3	9.9	6.8	5	98763.1	75
337	9.7	53.3	2245	291.0	291.7	1.9	12.3	9.6	7.2	5	98763.2	75
338	9.9	53.2	2316	291.0	291.7	2.1	12.3	9.8	7.0	5	98763.4	75
339	9.3	53.2	2086	291.0	291.7	1.1	12.2	10.8	8.4	5	98763.3	75
340	8.8	54.4	1879	291.0	291.7	-0.5	12.3	8.7	9.2	5	98763.4	75
341	8.8	53.8	1886	291.0	291.9	-0.5	12.3	10.9	9.0	5	98763.5	75
342	8.5	53.2	1737	291.0	294.2	-0.8	12.2	10.8	8.2	5	98763.5	75
343	8.8	54.5	1849	291.0	294.3	-0.4	12.4	8.7	7.6	5	98763.6	75
344	9.3	54.1	2078	291.0	294.1	0.3	12.4	10.0	8.1	5	98763.8	75
345	9.3	54.2	2092	291.0	294.2	0.4	12.3	9.8	8.3	5	98763.9	75
346	8.8	54.0	1860	291.0	294.1	-0.6	12.2	8.8	7.7	5	98764.1	75
347			2473	291.0	294.0	2.4	12.6	10.7	7.3	5	98764.1	75
348	11.0	55.0	2650	291.0	294.1	6.1	13.2	11.4	7.8	5	98764.2	75
349	12.8	54.2	2638	291.0	294.2	8.4	13.1	13.4	7.8	5	98764.2	75
350	11.0	52.2	2473	291.0	294.3	7.4	12.3	11.5	7.7	5	98764.2	75
351	10.0	51.6	2358	291.0	294.2	4.7	11.8	12.8	6.5	5	98764.2	75
352	10.7	52.8	2472	291.0	294.2	5.0	12.3	11.2	7.2	5	98764.3	75

Table E.01 Measurement data - Turbine ON

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

Data 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	9.9	53.2	2342	291.0	294.3	3.9	12.0	10.4	6.5	5	98764.3	75
354			2445	291.0	293.9	4.1	12.4	8.9	6.2	5	98764.2	75
355	10.7	54.0	2532	291.0	292.1	5.7	12.5	11.1	5.8	5	98764.2	75
356	9.4	52.9	2136	291.0	292.0	2.6	11.9	10.1	6.4	5	98764.3	75
357	8.9	53.0	1930	291.0	292.0	1.7	12.1	9.4	7.6	5	98764.2	75
358	9.5	53.0	2171	291.0	291.9	2.1	12.3	10.4	9.0	5	98764.3	75
359			2455	291.0	291.9	2.8	12.4	9.1	8.5	5	98764.3	75
360	9.2	53.0	2065	291.0	291.9	1.4	12.2	10.1	7.0	5	98773.3	75
361	9.9	54.2	2324	291.0	292.0	2.1	12.4	11.0	7.4	5	98777.3	75
362	11.7	53.8	2569	291.0	292.0	4.3	12.8	12.3	8.4	5	98777.3	75
363			2461	291.0	292.0	4.1	12.3	9.9	9.7	5	98777.2	75
364	9.5	54.6	2184	291.0	292.0	2.6	12.1	10.4	10.0	5	98777.2	75
365	9.5	54.2	2184	291.0	292.0	2.1	12.2	9.6	9.8	5	98777.2	75
366	9.6	54.6	2207	291.0	292.0	2.1	12.3	9.3	8.5	5	98776.9	75
367	10.4	55.1	2449	291.0	292.0	2.8	12.4	10.9	7.4	5	98776.9	75
368	11.1	54.9	2539	291.0	292.0	4.2	12.7	11.6	7.6	5	98776.8	75
369	11.5	54.1	2586	291.0	291.9	6.5	12.8	12.0	7.0	5	98776.8	75
370	11.3	52.1	2409	291.0	292.0	4.0	12.0	11.8	7.4	5	98776.9	75
371	10.2	53.0	2387	291.0	292.0	3.4	12.2	11.4	7.3	5	98777.0	75
372	9.6	52.9	2194	291.0	292.0	2.4	12.2	9.1	7.4	5	98777.0	75
373			2518	291.0	292.0	4.0	12.5	9.2	9.1	5	98776.9	75
374	10.8	54.3	2583	291.0	292.0	6.2	12.8	11.2	8.4	5	98777.2	75
375			2495	291.0	292.0	5.9	12.4	10.1	8.2	5	98776.9	75
376	11.0	53.8	2563	291.0	292.0	7.4	12.8	11.5	7.1	5	98776.9	75
377			2519	291.0	292.0	7.9	12.5	11.3	8.5	5	98769.6	75
378	11.9	54.8	2509	291.0	292.0	8.4	12.4	12.4	8.1	5	98764.4	75
379	11.5	53.0	2416	291.0	291.9	6.7	12.0	12.0	6.6	5	98758.8	75
380	10.1	52.8	2373	291.0	292.0	5.5	11.9	12.1	6.0	5	98745.7	75
381			2440	291.0	292.0	4.9	12.1	10.6	6.3	5	98746.6	75
382	11.5	54.4	2541	291.0	292.0	6.6	12.6	12.0	7.4	5	98746.7	75
383	10.9	52.7	2449	291.0	292.0	5.7	12.2	11.4	7.1	5	98754.3	75
384	11.8	52.4	2433	291.0	292.0	4.3	12.1	12.3	7.4	5	98759.4	75
385	9.8	52.8	2266	291.0	292.0	2.9	12.0	10.5	6.9	5	98759.3	75
386	8.6	52.7	1747	291.0	292.0	1.3	12.1	8.9	7.6	5	98759.3	75
387	8.7	53.3	1815	291.0	292.5	1.3	12.3	9.3	6.2	5	98759.4	75
388			2427	291.0	294.1	2.7	12.5	9.1	6.2	5	98759.5	75
389	11.7	53.8	2646	291.0	294.1	6.0	13.2	12.3	6.8	5	98767.4	75
390	12.4	53.4	2672	291.0	294.3	8.9	13.2	12.9	7.7	5	98772.6	75
391	12.2	53.2	2640	291.0	294.3	10.7	13.1	12.7	7.6	5	98772.6	75
392	10.9	52.6	2488	291.0	294.3	10.1	12.4	11.3	6.2	5	98772.6	75
393	11.7	54.7	2450	291.0	294.3	9.5	12.2	12.2	6.5	5	98772.8	75
394	9.9	53.4	2334	291.0	292.8	6.4	11.6	12.6	7.8	5	98772.4	75
395	9.0	52.4	1984	291.0	291.8	4.1	11.8	10.7	8.9	5	98764.8	74
396	8.7	52.4	1837	291.0	291.8	2.4	11.9	9.1	7.1	5	98759.2	74
397	8.7	53.0	1804	291.0	291.7	1.4	12.1	8.6	5.4	5	98758.8	74
398	8.8	52.6	1855	291.0	290.2	1.5	12.3	8.4	6.6	5	98759.0	74
399	9.0	52.5	1947	291.0	288.5	1.5	12.3	8.7	6.8	5	98759.0	74
400	10.2	53.3	2386	291.0	288.5	3.0	12.6	10.1	7.9	5	98758.9	74
401	11.0	53.8	2653	291.0	288.6	6.5	13.1	11.5	7.6	5	98766.6	74
402	11.8	53.9	2574	291.0	288.6	7.3	12.8	12.3	5.8	5	98771.5	74
403	10.4	53.3	2506	291.0	288.6	7.3	12.4	10.8	5.7	5	98771.0	74
404	11.3	52.7	2456	291.0	288.6	6.2	12.2	11.8	7.4	5	98771.1	74
405	12.8	53.2	2598	291.0	288.6	9.0	12.9	13.4	7.8	5	98771.3	74
406	11.7	52.7	2512	291.0	288.6	8.9	12.5	12.2	8.5	5	98772.0	74
407	12.4	53.5	2494	291.0	288.6	9.0	12.4	12.9	8.2	5	98772.2	74
408	10.4	54.0	2437	291.0	288.6	8.0	12.1	10.8	7.5	5	98772.4	74
409	11.3	52.8	2457	291.0	288.6	7.7	12.1	11.8	7.2	5	98772.5	74
410	10.8	53.4	2415	291.0	288.6	6.3	12.0	11.3	6.5	5	98773.0	74
411			2409	291.0	288.6	5.3	12.0	9.7	6.7	5	98773.1	74
412	9.3	53.4	2086	291.0	288.6	2.0	12.0	9.9	7.3	5	98773.4	74
413	8.7	53.3	1816	291.0	288.6	1.3	12.2	8.8	6.8	5	98773.4	74
414	9.2	53.4	2063	291.0	288.6	1.8	12.3	9.2	7.3	5	98773.6	74
415	8.1	54.4	1528	291.0	288.6	-0.6	12.1	7.8	6.0	5	98773.6	74
416	7.3	52.7	1120	291.0	288.6	-1.8	11.8	7.5	5.4	5	98773.8	74
417	7.3	52.5	1143	291.0	288.6	-1.8	11.9	7.8	4.5	5	98773.8	74
418	7.3	52.1	1122	291.0	288.6	-1.8	11.8	8.5	6.3	5	98774.1	74
419	7.0	51.0	1003	291.0	286.1	-1.8	11.3	6.8	8.3	5	98774.2	75
420	7.0	51.2	978	291.0	285.4	-1.8	11.2	8.6	7.5	5	98774.3	75
421	7.2	52.3	1065	291.0	285.4	-1.8	11.6	7.5	6.3	5	98774.3	75
422	8.2	53.5	1558	291.0	285.4	0.5	12.4	7.6	4.9	5	98774.2	75
423	8.7	53.8	1805	291.0	285.4	0.1	12.4	8.3	4.4	5	98774.6	75
424			2527	291.0	285.4	3.0	12.7	9.8	6.8	5	98774.5	75
425	9.9	53.2	2339	291.0	285.4	2.6	12.3	9.8	7.1	5	98774.8	75
426	9.8	53.5	2298	291.0	285.4	2.2	12.3	10.2	7.6	5	98774.8	75
427	10.2	53.2	2387	291.0	285.4	2.5	12.3	8.7	8.2	5	98774.8	75
428	9.2	53.3	2061	291.0	285.4	0.8	12.2	8.5	10.0	5	98775.0	75
429	9.4	54.0	2116	291.0	285.4	0.7	12.3	9.7	9.4	5	98775.0	75
430			2535	291.0	285.4	3.1	12.8	10.1	9.1	5	98775.0	75
431	11.6	55.2	2715	291.0	285.4	7.7	13.4	12.1	10.1	5	98775.3	74
432	11.1	54.1	2497	291.0	285.4	6.5	12.3	11.6	9.1	5	98775.1	74
433	9.7	53.1	2262	291.0	285.4	3.6	11.8	11.9	8.7	5	98775.0	74
434	10.9	53.5	2422	291.0	285.4	3.8	12.3	11.4	7.4	5	98775.1	74
435	12.9	54.3	2637	291.0	286.2	7.4	13.0	13.4	8.6	5	98777.3	74
436	10.9	52.9	2507	291.0	287.8	6.9	12.4	11.4	7.2	5	98786.9	74
437	9.5	51.8	2165	291.0	287.8	3.8	11.8	10.6	6.8	5	98788.8	75
438	9.2	51.8	2043	291.0	287.8	2.4	12.0	9.8	5.6	5	98789.4	75
439	8.9	52.7	1936	291.0	287.8	1.6	12.1	11.1	6.6	5	98789.6	75
440	9.7	52.8	2228	291.0	287.8	2.0	12.3	9.5	7.3	5	98789.9	75

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

Data 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	9.1	53.1	2012	291.0	288.5	1.4	12.3	9.1	7.4	5	98790.0	75
442	9.1	53.1	1996	291.0	291.2	0.9	12.3	10.2	6.9	5	98790.3	75
443	8.9	52.7	1921	291.0	291.3	-0.5	12.3	9.2	7.7	5	98790.3	75
444	9.0	53.5	1989	291.0	291.3	-0.3	12.3	8.6	7.2	5	98790.7	75
445	9.0	53.4	1961	291.0	291.3	0.0	12.3	9.2	8.4	5	98790.6	75
446	9.1	53.4	1992	291.0	291.2	0.0	12.3	9.4	8.2	5	98790.6	75
447	9.7	53.3	2260	291.0	291.3	1.3	12.4	10.5	7.5	5	98790.8	75
448			2537	291.0	291.3	2.8	12.6	10.4	7.5	5	98790.8	75
449			2481	291.0	291.2	3.2	12.4	10.3	5.1	5	98791.0	75
450	11.3	53.2	2491	291.0	291.2	3.0	12.4	11.7	5.8	5	98791.3	75
451	9.7	52.2	2253	291.0	291.3	2.4	12.2	11.1	6.0	5	98791.8	75
452	7.6	52.5	1284	291.0	291.3	-1.6	12.1	7.8	4.7	5	98791.8	75
453	7.6	52.7	1258	291.0	291.2	-1.7	12.3	7.9	6.5	5	98797.1	75
454	7.5	52.4	1226	291.0	291.2	-1.7	12.2	6.6	6.8	5	98805.1	75
455	7.2	52.1	1103	291.0	291.2	-1.8	11.7	7.6	8.1	5	98805.3	75
456	7.0	51.4	1011	291.0	291.3	-1.8	11.4	7.9	6.6	5	98805.3	75
457	6.7	50.5	874	291.0	289.4	-1.8	10.9	5.8	7.5	5	98805.1	75
458	6.7	50.4	865	291.0	288.8	-1.8	10.8	6.5	8.2	5	98805.2	75
459	9.0	53.1	1945	291.0	288.8	3.1	12.4	9.7	7.5	5	98805.1	75
460	12.0	52.9	2469	291.0	288.8	4.2	12.4	12.5	5.9	5	98805.0	75
461	11.8	54.3	2574	291.0	288.8	6.0	12.7	12.3	4.2	5	98805.0	75
462	13.1	52.8	2536	291.0	290.2	7.0	12.6	13.7	5.0	5	98804.9	75
463	10.0	51.4	2360	291.0	291.2	4.8	12.0	12.2	8.5	5	98805.0	75
464			2442	291.0	291.1	4.2	12.2	10.5	9.2	5	98804.6	75
465	8.8	52.6	1879	291.0	291.3	1.8	12.0	11.0	7.0	5	98804.8	75
466	8.6	52.7	1783	291.0	293.5	1.6	12.2	9.1	6.7	5	98804.9	75
467	8.0	52.4	1448	291.0	293.5	-0.1	12.2	9.5	5.0	5	98804.7	75
468	7.5	53.5	1214	291.0	294.4	-1.7	12.2	8.8	5.2	5	98804.7	75
469	8.3	54.2	1598	291.0	296.4	-1.0	12.4	9.0	5.9	5	98804.8	75
470	8.8	53.6	1847	291.0	296.4	-0.4	12.5	9.7	9.5	5	98805.4	75
471			2562	291.0	296.4	3.2	12.7	10.6	8.5	5	98805.3	75
472	10.6	54.3	2597	291.0	296.4	5.2	12.9	11.1	8.4	5	98805.7	76
473	10.1	53.4	2372	291.0	296.4	4.2	12.2	10.4	8.1	5	98805.4	76
474	9.1	52.8	2017	291.0	296.4	2.1	12.1	9.4	9.3	5	98805.3	76
475	11.1	53.4	2578	291.0	296.4	4.8	12.8	11.6	7.0	5	98805.6	76
476	11.6	54.2	2670	291.0	296.4	8.4	13.2	12.1	5.8	5	98805.5	76
477	10.6	53.2	2486	291.0	296.4	7.2	12.3	11.0	5.5	5	98805.3	75
478	8.9	52.0	1932	291.0	296.4	3.6	11.7	10.5	5.5	5	98805.4	75
479	8.2	52.0	1565	291.0	296.4	1.4	11.9	9.2	5.9	5	98805.4	75
480	8.1	52.8	1521	291.0	296.4	1.1	12.2	8.6	6.4	5	98805.4	75
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Table E.02 Measurement data - Background

Project: Port RyerseWind Farm - Turbine T2 - IEC 61400-11 Measurement

Report ID: 14355.00.T2.RP1

Created on: 12/6/2017

***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	7.0	43.3	0.3	5.1	5	98598.6	72
2	7.6	44.0	0.6	5.6	5	98598.4	72
3	6.9	44.7	0.4	5.0	5	98598.3	72
4	6.4	44.8	0.4	4.7	5	98598.6	73
5	6.7	45.7	0.4	4.9	5	98600.4	73
6	6.1	44.5	0.4	4.5	5	98611.3	73
7	6.6	48.8	0.5	4.8	5	98613.8	73
8	7.1	45.2	0.3	5.2	5	98614.7	73
9	11.3	44.4	0.3	8.3	5	98615.0	72
10	12.0	44.2	0.4	8.8	5	98615.4	72
11	12.5	44.6	0.6	9.1	5	98615.6	72
12	9.2	45.1	0.6	6.7	5	98615.5	72
13	10.9	44.2	0.7	8.0	5	98615.1	72
14	11.1	44.4	0.6	8.2	5	98615.2	72
15	7.5	45.2	0.8	5.5	5	98615.5	72
16	7.4	44.0	0.7	5.4	5	98615.1	71
17	9.6	45.6	0.7	7.0	5	98615.5	71
18	11.8	49.8	0.6	8.6	5	98615.6	71
19	6.7	49.0	0.5	4.9	5	98615.5	71
20	6.8	48.3	0.4	5.0	5	98615.6	71
21	7.2	47.4	0.5	5.3	5	98615.3	72
22	8.5	46.8	0.4	6.2	5	98615.2	72
23	11.1	46.9	0.3	8.1	5	98615.3	72
24	11.6	45.6	0.5	8.5	5	98615.2	72
25	8.9	43.9	0.6	6.5	5	98615.3	72
26	7.0	43.7	0.4	5.2	5	98615.6	72
27	6.6	43.0	0.2	4.8	5	98615.6	72
28	6.5	43.5	0.3	4.8	5	98615.7	72
29	7.2	43.9	0.5	5.3	5	98615.5	72
30	8.2	43.5	0.3	6.0	5	98615.6	72
31	8.8	43.5	0.2	6.5	5	98615.4	72
32	10.3	42.8	0.3	7.5	5	98615.8	72
33	9.3	42.7	0.2	6.8	5	98616.2	72
34	8.3	43.2	0.1	6.1	5	98616.2	72
35	8.1	42.1	0.2	5.9	5	98615.9	72
36	7.6	42.7	0.2	5.6	5	98615.9	72
37	7.8	43.6	0.5	5.7	5	98616.2	72
38	11.9	44.2	0.5	8.7	5	98615.9	72
39	9.5	45.8	0.7	7.0	5	98615.7	71
40	8.4	45.3	0.6	6.2	5	98615.5	71
41	7.4	46.1	0.4	5.5	5	98615.6	71
42	7.9	51.5	0.5	5.8	5	98615.6	71
43	11.3	51.1	0.7	8.3	5	98615.4	71
44	10.0	49.0	0.8	7.3	5	98615.5	71
45	8.1	48.4	0.6	5.9	5	98615.6	72
46			0.7	6.1	5	98615.6	72
47			0.6	6.0	5	98615.5	72
48	7.3	49.2	0.2	5.3	5	98615.5	72
49	8.7	48.7	0.4	6.3	5	98615.6	72
50	12.9	48.3	0.4	9.5	5	98615.5	72
51	13.0	46.9	0.4	9.5	5	98615.4	72
52	9.1	46.4	0.3	6.7	5	98615.4	71
53	10.7	45.2	0.4	7.8	5	98615.5	71
54	13.4	46.0	0.2	9.8	5	98615.5	71
55	10.7	45.1	0.3	7.9	5	98615.6	71
56	9.0	46.3	0.5	6.6	5	98615.4	71
57	8.7	45.7	0.5	6.4	5	98615.6	72
58	10.4	45.9	0.6	7.6	5	98615.7	72
59	10.9	48.0	0.6	8.0	5	98615.7	72
60	12.1	50.2	0.6	8.9	5	98616.1	72
61	8.7	51.8	0.7	6.4	5	98616.4	72
62	10.1	51.3	0.8	7.4	5	98616.1	72
63	9.2	51.1	0.5	6.7	5	98617.2	72
64	7.0	49.2	0.5	5.1	5	98615.9	72
65	7.7	47.3	0.4	5.6	5	98616.6	72
66	10.0	46.3	0.3	7.3	5	98616.7	72
67	11.9	45.4	0.4	8.7	5	98616.3	72
68	11.8	44.0	0.4	8.7	5	98616.5	72
69	10.9	44.5	0.6	8.0	5	98616.6	72
70	11.1	44.3	0.7	8.1	5	98616.4	72
71	10.4	44.8	0.8	7.6	5	98616.5	72
72	10.1	46.0	0.6	7.4	5	98616.2	72
73	9.7	47.2	0.5	7.1	5	98616.2	72
74	9.4	46.7	0.3	6.9	5	98616.4	72
75	9.4	46.2	0.4	6.9	5	98615.8	72
76	9.2	44.5	0.4	6.8	5	98616.0	72
77	10.8	44.6	0.3	7.9	5	98616.1	72
78	11.9	44.8	0.3	8.7	5	98616.3	72
79	12.3	44.0	0.6	9.0	5	98616.4	72
80	11.1	44.8	0.6	8.1	5	98616.5	72
81	9.0	49.4	0.4	6.6	5	98616.3	72
82	9.2	48.6	0.5	6.8	5	98616.3	72
83	9.8	47.4	0.4	7.2	5	98616.2	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	10.0	45.5	0.5	7.3	5	98615.8	72
85	9.4	45.3	0.5	6.9	5	98615.5	72
86	11.7	46.1	0.4	8.6	5	98615.4	72
87	10.9	46.2	0.3	8.0	5	98615.4	72
88	8.1	45.3	0.4	5.9	5	98616.1	72
89	6.9	44.6	0.5	5.1	5	98615.8	72
90	9.9	44.5	0.5	7.3	5	98616.2	72
91	9.9	45.9	0.5	7.2	5	98616.0	72
92	9.3	45.6	0.5	6.8	5	98616.1	72
93	11.6	45.2	0.5	8.5	5	98617.3	72
94	12.1	45.6	0.5	8.9	5	98615.8	72
95	9.9	46.1	0.6	7.2	5	98615.7	72
96	11.3	46.9	0.5	8.3	5	98615.8	72
97	10.4	49.8	0.5	7.6	5	98615.9	72
98	10.5	50.3	0.7	7.7	5	98617.1	72
99	10.2	48.1	0.6	7.5	5	98629.4	72
100	13.1	47.3	0.6	9.6	5	98629.4	72
101	13.9	51.0	0.5	10.2	5	98628.8	72
102	12.7	51.0	0.8	9.3	5	98628.9	72
103	13.5	48.9	0.5	9.9	5	98628.7	72
104	14.4	46.6	0.9	10.5	5	98628.7	72
105	13.1	45.7	0.6	9.6	5	98615.5	72
106	12.6	47.3	0.6	9.2	5	98616.3	72
107	10.3	49.7	0.8	7.5	5	98616.3	72
108	9.9	49.3	0.6	7.3	5	98616.1	72
109	13.7	51.8	0.5	10.1	5	98616.4	72
110	11.8	51.7	0.6	8.7	5	98616.4	72
111	14.2	49.3	0.5	10.4	5	98616.3	72
112	12.9	46.7	0.4	9.5	5	98616.2	72
113	9.1	48.6	0.4	6.7	5	98616.4	72
114	9.2	50.1	0.4	6.7	5	98616.0	72
115	10.7	46.5	0.4	7.8	5	98615.8	72
116	10.8	46.3	0.2	7.9	5	98615.9	72
117	9.5	44.9	0.2	7.0	5	98629.0	72
118	8.7	44.7	0.2	6.4	5	98629.6	72
119	8.8	44.0	0.4	6.5	5	98629.4	72
120	9.5	43.8	0.4	7.0	5	98629.3	72
121	10.0	44.3	0.5	7.3	5	98629.2	72
122	9.2	44.2	0.5	6.7	5	98629.1	72
123	8.3	43.2	0.3	6.1	5	98629.0	73
124	8.4	43.8	0.2	6.2	5	98628.9	73
125	8.5	43.8	0.5	6.3	5	98629.4	73
126	7.1	44.0	0.7	5.2	5	98629.5	73
127	6.4	43.8	0.7	4.7	5	98629.4	73
128	6.8	44.6	0.5	5.0	5	98634.9	73
129	7.2	46.5	0.5	5.2	5	98642.9	73
130	8.2	46.7	0.5	6.0	5	98643.0	73
131	8.3	45.2	0.4	6.1	5	98643.1	73
132	7.4	45.4	0.5	5.5	5	98643.1	73
133	9.0	45.2	0.5	6.6	5	98642.9	73
134	9.9	46.8	0.4	7.2	5	98643.1	73
135	9.1	48.9	0.4	6.7	5	98643.1	72
136	9.6	47.2	0.5	7.1	5	98643.0	72
137	10.5	45.8	0.5	7.7	5	98643.1	72
138	10.0	45.0	0.5	7.3	5	98643.0	72
139	7.5	44.5	0.5	5.5	5	98643.1	72
140	10.1	44.0	0.5	7.4	5	98638.9	72
141	10.6	44.3	0.3	7.8	5	98629.4	72
142	10.6	45.1	0.5	7.8	5	98629.6	72
143	9.8	44.8	0.5	7.2	5	98629.4	72
144	9.5	44.4	0.6	7.0	5	98629.6	72
145	9.4	45.3	0.5	6.9	5	98629.5	72
146	7.9	44.2	0.3	5.8	5	98633.8	72
147	6.2	44.0	0.4	4.6	5	98643.3	73
148	6.9	45.4	0.5	5.1	5	98643.4	73
149	8.8	45.8	0.6	6.4	5	98643.4	73
150	8.0	44.7	0.7	5.8	5	98643.1	73
151	9.0	46.7	0.6	6.6	5	98643.4	73
152	7.5	47.2	0.4	5.5	5	98643.2	73
153	6.8	46.2	0.5	5.0	5	98643.4	73
154	8.1	46.5	0.5	6.0	5	98643.4	73
155	11.3	46.3	0.7	8.3	5	98643.0	73
156	11.1	45.8	0.4	8.2	5	98643.2	73
157	10.5	46.8	0.5	7.7	5	98643.1	73
158	11.3	49.4	0.5	8.3	5	98643.2	72
159	9.6	47.6	0.5	7.1	5	98643.4	72
160	13.3	47.5	0.3	9.8	5	98643.4	72
161	15.5	47.7	0.3	11.3	5	98643.1	72
162	15.0	47.2	0.5	11.0	5	98643.1	72
163	12.1	47.5	0.3	8.9	5	98643.3	72
164	11.3	47.3	0.3	8.3	5	98643.0	72
165	12.2	46.4	0.4	8.9	5	98643.2	72
166	12.0	46.0	0.3	8.8	5	98643.1	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 (%)
167	8.8	44.0	0.4	6.4	5	98643.4	72
168	10.3	44.4	0.5	7.5	5	98643.3	72
169	9.8	44.7	0.2	7.2	5	98643.2	72
170	10.6	44.0	0.3	7.8	5	98643.4	72
171	10.0	44.9	0.5	7.3	5	98643.4	73
172	10.2	46.0	0.6	7.5	5	98643.1	73
173	12.9	47.3	0.6	9.5	5	98643.4	73
174	12.1	48.2	0.4	8.9	5	98643.6	73
175	10.7	47.8	0.3	7.9	5	98643.8	73
176	8.9	47.2	0.5	6.5	5	98643.9	73
177	7.3	46.1	0.7	5.4	5	98643.9	73
178	7.4	46.7	0.6	5.4	5	98643.8	73
179	9.1	47.0	0.6	6.7	5	98643.8	73
180	9.4	47.3	0.5	6.9	5	98643.7	73
181	7.8	47.0	0.3	5.7	5	98643.7	73
182	8.1	46.0	0.4	5.9	5	98643.3	73
183	9.2	45.5	0.2	6.7	5	98643.6	73
184	10.3	44.4	0.5	7.6	5	98643.8	73
185	11.8	44.2	0.6	8.7	5	98643.7	73
186	10.9	44.4	0.5	8.0	5	98643.6	73
187	13.2	44.8	0.3	9.7	5	98643.7	73
188	13.0	45.8	0.3	9.5	5	98645.0	73
189	11.4	45.7	0.4	8.3	5	98643.8	72
190	9.3	45.3	0.5	6.8	5	98643.7	72
191	7.5	44.2	0.4	5.5	5	98643.5	72
192	6.4	44.3	0.3	4.7	5	98643.6	72
193	7.1	43.1	0.3	5.2	5	98643.6	72
194	7.8	43.7	0.2	5.7	5	98651.1	73
195	7.9	44.1	0.3	5.8	5	98656.0	73
196	8.7	44.0	0.3	6.4	5	98656.0	73
197	11.1	44.9	0.3	8.1	5	98655.8	73
198	12.7	45.5	0.3	9.3	5	98656.1	73
199	12.3	44.7	0.5	9.0	5	98656.2	73
200	11.2	44.7	0.5	8.2	5	98648.5	73
201			0.7	7.1	5	98658.1	73
202	11.3	49.6	0.7	8.3	5	98658.1	73
203	13.8	51.9	0.6	10.1	5	98658.5	73
204	12.3	51.7	0.6	9.0	5	98658.6	73
205	10.2	51.2	0.7	7.4	5	98658.6	73
206	10.7	51.5	0.4	7.9	5	98658.5	73
207	10.3	49.8	0.5	7.5	5	98658.2	73
208	11.8	47.8	0.6	8.6	5	98658.4	73
209	12.6	46.8	0.8	9.3	5	98658.6	73
210	10.8	46.2	0.7	7.9	5	98658.1	73
211	11.1	46.8	0.7	8.1	5	98658.3	73
212	15.3	49.9	0.6	11.2	5	98658.3	73
213	13.2	51.5	0.6	9.7	5	98658.1	72
214	13.2	51.2	0.6	9.7	5	98658.3	72
215	10.6	49.1	0.6	7.8	5	98658.1	72
216	10.5	49.0	0.7	7.7	5	98658.0	72
217	9.5	49.2	0.8	7.0	5	98658.0	72
218	10.7	50.0	1.0	7.8	4	98658.1	73
219	10.1	51.8	0.9	7.4	4	98658.0	73
220	13.7	51.8	0.7	10.0	4	98658.1	73
221			0.5	8.0	4	98658.1	73
222	8.7	50.9	0.6	6.4	4	98658.1	73
223	10.3	50.4	0.5	7.5	4	98658.2	73
224	12.5	48.5	0.5	9.1	4	98657.9	73
225	11.6	48.0	0.3	8.5	4	98658.2	73
226	11.1	48.5	0.6	8.1	4	98658.0	73
227	10.7	50.3	0.5	7.8	4	98658.0	73
228	9.4	49.8	0.6	6.9	4	98658.2	73
229	8.4	50.7	0.7	6.1	4	98658.1	73
230	8.6	50.9	0.6	6.3	4	98665.9	74
231	9.2	48.6	0.5	6.8	4	98670.8	74
232	7.7	50.9	0.6	5.6	4	98671.0	74
233			0.6	6.3	4	98670.9	74
234			0.4	5.6	4	98671.0	74
235	8.7	48.2	0.2	6.4	4	98671.1	74
236	10.0	46.8	0.6	7.3	4	98665.8	74
237	14.2	48.7	0.5	10.4	4	98658.2	74
238	11.6	48.4	0.4	8.5	4	98658.3	74
239	9.1	47.8	0.5	6.7	4	98658.3	74
240	10.8	47.5	0.5	7.9	4	98658.5	74
241	12.2	47.0	0.6	8.9	4	98658.5	74
242	10.3	48.4	0.5	7.5	4	98659.8	74
243	8.8	46.7	0.5	6.5	4	98658.4	75
244	11.7	47.9	0.7	8.6	4	98658.6	75
245	9.6	48.3	0.6	7.0	4	98658.4	75
246	8.3	50.5	0.5	6.1	4	98658.4	75
247	7.1	51.9	0.5	5.2	4	98658.5	75
248	7.2	51.8	0.6	5.3	4	98661.0	75
249	11.8	49.2	0.5	8.7	4	98658.4	75

Table E.02 Measurement data - Background

Project: Port RyerseWind Farm - Turbine T2 - IEC 61400-11 Measurement

Report ID: 14355.00.T2.RP1

Created on: 12/6/2017

***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	14.7	48.2	0.7	10.8	4	98658.6	75
251	13.5	51.9	0.8	9.9	4	98658.6	75
252			0.7	8.9	4	98658.6	75
253			0.5	8.9	4	98658.4	75
254			0.3	8.0	4	98659.8	75
255			0.5	7.1	4	98658.5	74
256			0.8	6.7	4	98658.4	74
257	8.9	49.0	0.5	6.5	4	98658.3	74
258	9.8	48.1	0.6	7.2	4	98658.4	74
259	13.9	48.5	0.3	10.2	4	98658.3	74
260	15.2	50.2	0.4	11.1	4	98658.6	74
261	12.2	49.9	0.4	8.9	4	98658.6	74
262	11.3	47.3	0.4	8.3	4	98658.4	74
263	10.0	46.5	0.5	7.4	4	98658.6	74
264	10.3	49.0	0.3	7.6	4	98658.8	74
265	10.0	47.0	0.5	7.4	4	98658.8	74
266			0.6	6.9	4	98672.6	75
267	8.9	51.0	0.4	6.6	4	98684.3	75
268			0.6	6.0	4	98684.4	75
269			0.4	5.9	4	98684.4	75
270	7.3	51.0	0.5	5.3	4	98684.2	75
271	6.5	47.4	0.4	4.8	4	98684.2	75
272	6.6	46.1	0.6	4.8	4	98684.5	76
273	9.5	44.1	0.4	6.9	4	98684.5	76
274	9.9	44.4	0.5	7.3	4	98684.2	76
275	10.3	46.8	0.3	7.5	4	98684.3	76
276	7.7	49.1	0.6	5.6	4	98684.4	76
277	9.8	49.8	0.3	7.2	4	98684.2	76
278	11.5	48.9	0.5	8.5	4	98684.2	76
279	11.1	47.9	0.4	8.1	4	98684.5	76
280	9.3	46.8	0.4	6.8	4	98684.2	76
281	12.3	46.5	0.4	9.1	4	98684.6	76
282	9.4	46.4	0.7	6.9	4	98684.4	76
283	9.4	45.9	0.6	6.9	4	98684.3	76
284	10.3	46.2	0.6	7.6	4	98673.8	75
285	15.2	45.8	0.3	11.2	4	98671.0	75
286	13.3	46.1	0.5	9.8	4	98671.1	75
287	13.0	45.3	0.5	9.5	4	98670.8	75
288	10.9	45.3	0.5	8.0	4	98671.3	75
289	8.9	46.1	0.3	6.5	4	98671.2	75
290	8.3	45.7	0.3	6.1	4	98681.6	76
291	9.6	45.2	0.3	7.0	4	98684.1	76
292	13.0	45.2	0.5	9.5	4	98684.1	76
293	11.5	45.1	0.5	8.4	4	98684.1	76
294	10.0	45.3	0.4	7.4	4	98684.6	76
295	9.0	44.9	0.3	6.6	4	98684.5	76
296	7.6	44.8	0.5	5.6	4	98696.4	76
297	7.4	44.6	0.7	5.4	4	98697.6	76
298	8.1	45.6	0.6	5.9	4	98697.4	76
299	12.9	46.2	0.5	9.4	4	98697.5	76
300	11.6	46.6	1.2	8.5	4	98697.5	76
301	11.6	45.4	2.2	8.5	4	98697.5	76
302	10.4	46.3	3.7	7.6	4	98697.4	76
303	7.9	45.5	4.5	5.8	4	98697.6	76
304	7.8	45.1	4.9	5.7	4	98697.4	76
305	6.8	45.0	5.4	5.0	4	98697.6	76
306	7.9	45.8	6.0	5.8	4	98697.6	76
307	7.7	45.7	6.7	5.7	4	98697.7	76
308	7.8	48.9	7.9	5.7	4	98697.7	76
309	8.4	42.8	0.4	6.2	5	98817.7	76
310	8.4	42.5	0.2	6.2	5	98817.7	76
311	9.1	41.6	0.4	6.6	5	98817.6	76
312	10.6	42.6	0.3	7.8	5	98817.5	76
313	11.5	42.9	0.1	8.5	5	98817.4	76
314	9.8	42.9	0.3	7.2	5	98817.4	75
315	9.1	42.4	0.4	6.7	5	98817.4	75
316	11.2	42.4	0.4	8.2	5	98817.4	75
317	10.4	42.9	0.3	7.6	5	98817.4	75
318	10.1	42.4	0.3	7.4	5	98817.8	75
319	9.2	42.9	0.3	6.8	5	98817.8	75
320	6.7	43.9	0.3	4.9	5	98817.8	75
321	6.7	43.9	0.4	4.9	5	98817.8	75
322	10.6	44.4	0.5	7.8	5	98817.8	75
323	10.6	43.5	0.4	7.8	5	98817.8	75
324	9.6	43.6	0.5	7.1	5	98818.0	75
325	10.0	44.8	0.7	7.3	5	98827.2	75
326	8.9	49.0	0.7	6.6	5	98831.3	75
327	10.3	49.3	0.6	7.6	5	98831.1	75
328	13.0	46.3	0.5	9.5	5	98831.3	75
329	12.9	44.1	0.3	9.4	5	98831.1	75
330	12.5	44.2	0.4	9.1	5	98831.2	75
331	12.4	44.1	0.5	9.1	5	98823.3	75
332	10.7	44.3	0.5	7.8	5	98817.9	75

***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	8.5	44.7	0.4	6.2	5	98817.9	75
334	8.4	46.6	0.3	6.2	5	98817.9	75
335	8.3	44.5	0.3	6.1	5	98817.7	75
336	8.4	43.8	0.5	6.1	5	98817.7	75
337	6.4	45.6	0.5	4.7	5	98826.9	75
338	7.0	45.4	0.6	5.1	5	98832.4	75
339	7.9	46.2	0.6	5.8	5	98832.7	75
340	8.5	45.0	0.5	6.3	5	98832.6	75
341	8.7	45.2	0.4	6.4	5	98832.4	75
342	7.0	45.0	0.5	5.1	5	98832.6	75
343	6.1	46.7	0.4	4.5	5	98832.4	76
344	7.4	47.7	0.5	5.4	5	98832.4	77
345	9.2	45.5	0.4	6.8	5	98829.6	78
346	9.2	45.3	0.4	6.7	5	98829.7	78
347	9.9	47.1	0.4	7.3	5	98829.8	78
348	11.6	46.5	0.3	8.5	5	98830.0	78
349	10.6	46.3	0.4	7.8	5	98830.0	78
350	12.0	45.5	0.4	8.8	5	98830.1	77
351	10.6	45.6	0.5	7.7	5	98830.1	77
352	9.0	45.3	0.4	6.6	5	98830.2	77
353	9.9	44.9	0.4	7.3	5	98830.4	77
354	11.7	44.0	0.3	8.6	5	98830.2	77
355	13.2	44.1	0.4	9.7	5	98830.4	77
356	12.0	44.0	0.4	8.8	5	98841.0	76
357	9.9	43.5	0.2	7.2	5	98844.0	76
358	11.3	44.9	0.2	8.3	5	98844.2	76
359	13.6	45.6	0.2	10.0	5	98844.1	76
360	14.8	44.4	0.4	10.9	5	98844.0	76
361	10.5	45.0	0.5	7.7	5	98844.1	76
362	13.1	44.3	0.5	9.6	5	98834.3	76
363	12.5	45.9	0.4	9.2	5	98830.3	76
364	12.2	45.0	0.7	8.9	5	98830.5	76
365	11.0	46.2	0.7	8.1	5	98830.3	76
366	10.6	46.8	0.9	7.8	5	98830.3	76
367	9.3	47.4	0.6	6.8	5	98830.6	76
368	15.3	47.9	0.5	11.2	5	98830.5	77
369	14.9	47.2	0.3	11.0	5	98830.9	77
370	12.9	44.4	0.2	9.4	5	98830.3	77
371	14.1	44.4	0.1	10.3	5	98830.9	77
372	12.9	44.0	0.2	9.5	5	98830.5	77
373	10.2	43.4	0.4	7.5	5	98832.1	77
374	9.7	44.6	0.4	7.1	5	98842.7	76
375	10.9	46.0	0.6	8.0	5	98846.8	76
376	10.3	45.5	0.7	7.5	5	98846.8	76
377	9.7	45.4	0.5	7.1	5	98846.4	76
378	8.0	44.6	0.3	5.9	5	98846.4	76
379	7.5	43.6	0.3	5.5	5	98846.7	76
380	6.7	49.1	0.5	4.9	5	98846.5	77
381	6.7	45.4	0.4	4.9	5	98846.6	77
382	8.9	46.7	0.4	6.5	5	98846.5	77
383	9.0	45.7	0.6	6.6	5	98846.8	77
384	9.8	45.2	0.6	7.2	5	98846.7	77
385	12.5	46.9	0.4	9.2	5	98846.4	77
386	14.8	47.4	0.5	10.8	5	98846.6	75
387	12.9	46.4	0.4	9.4	5	98846.6	75
388	9.8	44.5	0.7	7.2	5	98846.8	75
389	8.5	43.8	0.5	6.3	5	98846.8	75
390	10.8	43.3	0.7	7.9	5	98847.0	75
391	15.8	44.0	0.5	11.6	5	98846.8	75
392	13.8	44.7	0.4	10.1	5	98833.3	74
393	14.1	44.4	0.1	10.4	5	98833.0	74
394	12.3	42.4	0.1	9.0	5	98832.9	74
395	8.2	42.5	0.3	6.0	5	98833.0	74
396	8.1	43.4	0.4	5.9	5	98833.2	74
397	10.1	44.1	0.6	7.4	5	98833.5	74
398	8.9	45.7	0.5	6.5	5	98846.9	76
399	7.6	47.8	0.7	5.6	5	98846.8	76
400	7.0	45.9	0.3	5.2	5	98847.0	76
401	7.0	44.2	0.3	5.1	5	98846.8	76
402	6.3	46.3	0.5	4.6	5	98846.9	76
403	6.2	47.9	0.6	4.6	5	98846.8	76
404	5.8	49.6	0.7	4.2	5	98860.8	76
405	5.2	49.5	0.5	3.8	5	98861.0	76
406	6.4	50.9	0.5	4.7	5	98861.0	76
407	8.2	51.6	0.4	6.0	5	98861.0	76
408	7.4	48.9	0.4	5.5	5	98861.7	76
409	7.6	46.7	0.4	5.6	5	98861.6	76
410	8.0	44.5	0.6	5.8	5	98861.5	76
411	8.6	46.2	0.5	6.3	5	98861.3	76
412	8.8	46.1	0.4	6.5	5	98861.4	76
413	9.0	44.4	0.4	6.6	5	98861.3	76
414	8.3	43.0	0.3	6.1	5	98861.4	76
415	12.0	43.0	0.4	8.8	5	98861.2	76

***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	12.7	45.7	0.6	9.3	5	98847.2	74
417	12.4	47.3	0.6	9.1	5	98847.4	74
418	12.3	49.8	0.3	9.0	5	98847.4	74
419			0.3	7.4	5	98847.5	74
420	9.1	49.8	0.6	6.7	5	98847.7	74
421	9.2	46.8	0.6	6.7	5	98848.8	74
422	8.4	45.6	0.4	6.2	5	98861.3	74
423	8.0	45.5	0.3	5.9	5	98861.6	74
424	13.0	44.8	0.5	9.5	5	98861.7	74
425	12.1	45.4	0.5	8.9	5	98861.6	74
426	11.7	45.4	0.5	8.6	5	98861.8	74
427	12.1	45.9	0.8	8.8	5	98861.8	74
428	11.9	45.4	0.5	8.7	5	98861.8	74
429	11.2	45.1	0.2	8.2	5	98861.6	74
430	10.5	46.5	0.5	7.7	5	98861.6	74
431	11.1	48.0	0.7	8.1	5	98861.6	74
432	8.0	47.4	0.6	5.9	5	98861.7	74
433	8.1	47.9	0.5	6.0	5	98861.6	74
434			1.0	6.1	5	98861.8	75
435			1.0	5.3	5	98861.8	75
436			0.7	4.4	5	98861.8	75
437			0.4	5.3	5	98861.8	75
438			0.4	7.3	5	98861.8	75
439			0.7	7.4	5	98861.5	75
440			0.6	9.0	5	98861.4	75
441			0.5	8.6	5	98861.6	75
442			0.4	9.5	5	98861.9	75
443			0.5	9.4	5	98862.0	75
444	14.8	51.1	0.4	10.8	5	98871.5	75
445	11.6	50.5	0.4	8.5	5	98873.5	75
446	13.6	49.5	0.4	9.9	5	98873.5	75
447	11.8	49.0	0.5	8.6	5	98873.7	75
448	9.1	47.4	0.5	6.7	5	98873.8	75
449	10.9	45.9	0.6	8.0	5	98874.2	75
450	11.6	47.8	0.7	8.5	5	98874.3	75
451	8.4	49.5	0.8	6.2	5	98874.4	75
452	7.2	49.2	0.5	5.3	5	98874.4	75
453	8.4	49.3	0.6	6.2	5	98874.6	75
454	9.8	49.5	0.9	7.2	5	98874.7	75
455	11.0	47.8	0.6	8.0	5	98874.7	75
456	11.6	49.4	0.7	8.5	5	98874.8	75
457	10.5	50.9	0.6	7.7	5	98874.7	75
458			0.5	9.1	5	98874.8	75
459			0.6	7.7	5	98874.9	75
460	11.2	51.6	0.7	8.2	5	98880.8	76
461	12.4	51.1	0.6	9.1	5	98887.2	76
462	11.6	49.0	0.5	8.5	5	98887.3	76
463			0.5	7.3	5	98887.5	76
464	9.2	51.2	0.6	6.7	5	98887.7	76
465	10.1	50.3	0.7	7.4	5	98887.4	76
466	7.6	48.8	0.5	5.5	5	98887.1	76
467	7.3	48.9	0.8	5.4	5	98887.3	77
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