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REPORT ID**: 14355.00.T4.RP1**

Port Ryerse Wind Power Project – Turbine T4
IEC 61400-11 Edition 3.0 Measurement Report

Prepared for:

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Operating as Port Ryerse Wind Farm Limited Partnership
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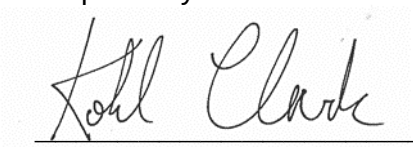

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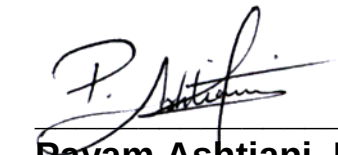

Payam Ashtiani, B.A.Sc., P.Eng.

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 56 pages.

Statement Qualifications and Limitations

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

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

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

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1 Introduction

Aercoustics Engineering Limited (Aercoustics) was retained by 08437084 Canada Inc to conduct an acoustic measurement of turbine T4 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 T4.

2 Wind Turbine Information

2.1 Wind turbine equipment specific information

Wind turbine specific equipment information for turbine T4 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	3200538

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 T4 is located approximately 85 meters NE of Gilbert Road in Norfolk County, Ontario. The specific UTM coordinates for T4 are 561,987 mE, 4,735,411 mN, Zone 17T. The area surrounding T4 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 T4 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	3060528
Pre-amplifier	B&K 2671	2369795
Acoustic calibrator	B&K 4231	3012380

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 T4. 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	K2420011
Serial to Analog Converter	NOKEVAL 7470	A165152

3.2 Measurement Setup

3.2.1 Microphone Placement

The measurement microphone was setup 125m 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 T4. 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 T4 were taken, the surrounding land was flat and barren, the crop having just been harvested. 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
October 31, 2017	Background	11:58 AM	12:17 PM
	Turbine ON	12:24 PM	12:48 PM
	Turbine ON	12:56 PM	1:19 PM
	Background	1:20 PM	2:01 PM
	Turbine ON	2:19 PM	2:48 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 T4's power curve (as per the standard), while wind direction was provided by T4's nacelle anemometer (located at hub height). Background data was obtained from an anemometer located 10m above ground level near T4.

Temperature and pressure readings during the measurement period were provided by the 10m anemometer, located near turbine T4 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 turned off for the duration of testing at Turbine T04.

4.3 Analysis Details

The following section outlines analysis of the measurement data acquired for T4. 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	52.6	41	45.3	15	50.2
8	53.1	27	46.2	18	51.7
8.5	53.4	23	46.4	23	52.1
9	53.5	34	46.8	30	52.5
9.5	53.5	37	46.5	28	52.4
10	53.8	27	46.8	30	52.6
10.5	54.4	15	47.9	36	52.9
11	53.6	10	46.7	26	53.3
11.5	54.2	10	47.5	22	52.6
12	54.3	10	48.5	17	53.2*

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 T4 (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	101.1	0.8
8	101.5	0.9
8.5	101.8	0.9
9	101.8	0.9
9.5	102.0	0.9
10	102.3	0.8
10.5	102.7	1.0
11	102.0	0.9
11.5	102.6	1.0
12	102.4*	1.0

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	100.0	0.8
6	101.6	0.9
7	102.2	0.9
8	102.3	1.0
9	102.4*	1.0

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 T4 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 T4 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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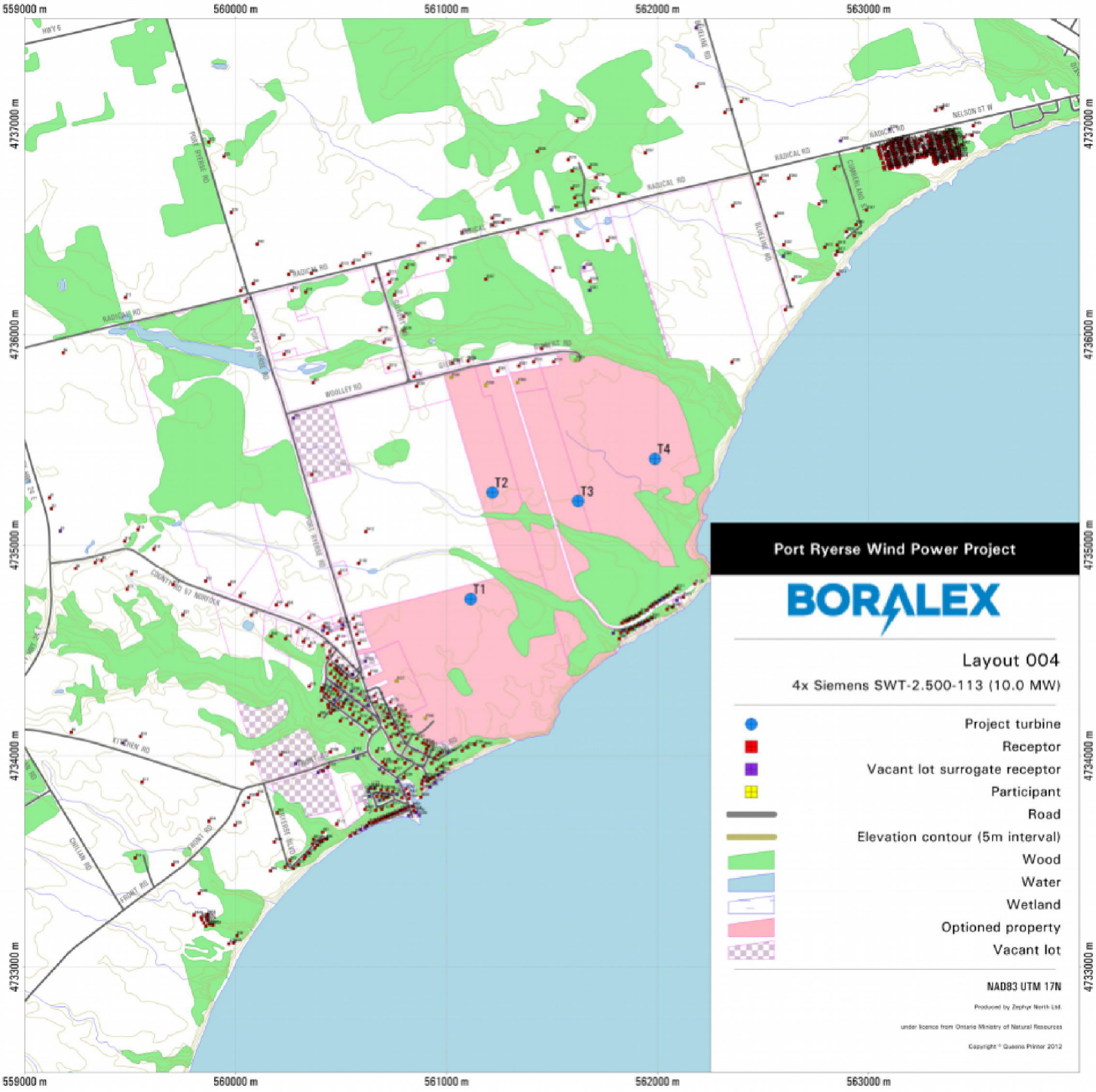
Appendix A
Site Details

North



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** Site Plan **Figure A.01**

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Port Ryerse Wind Power Project - T4 - 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

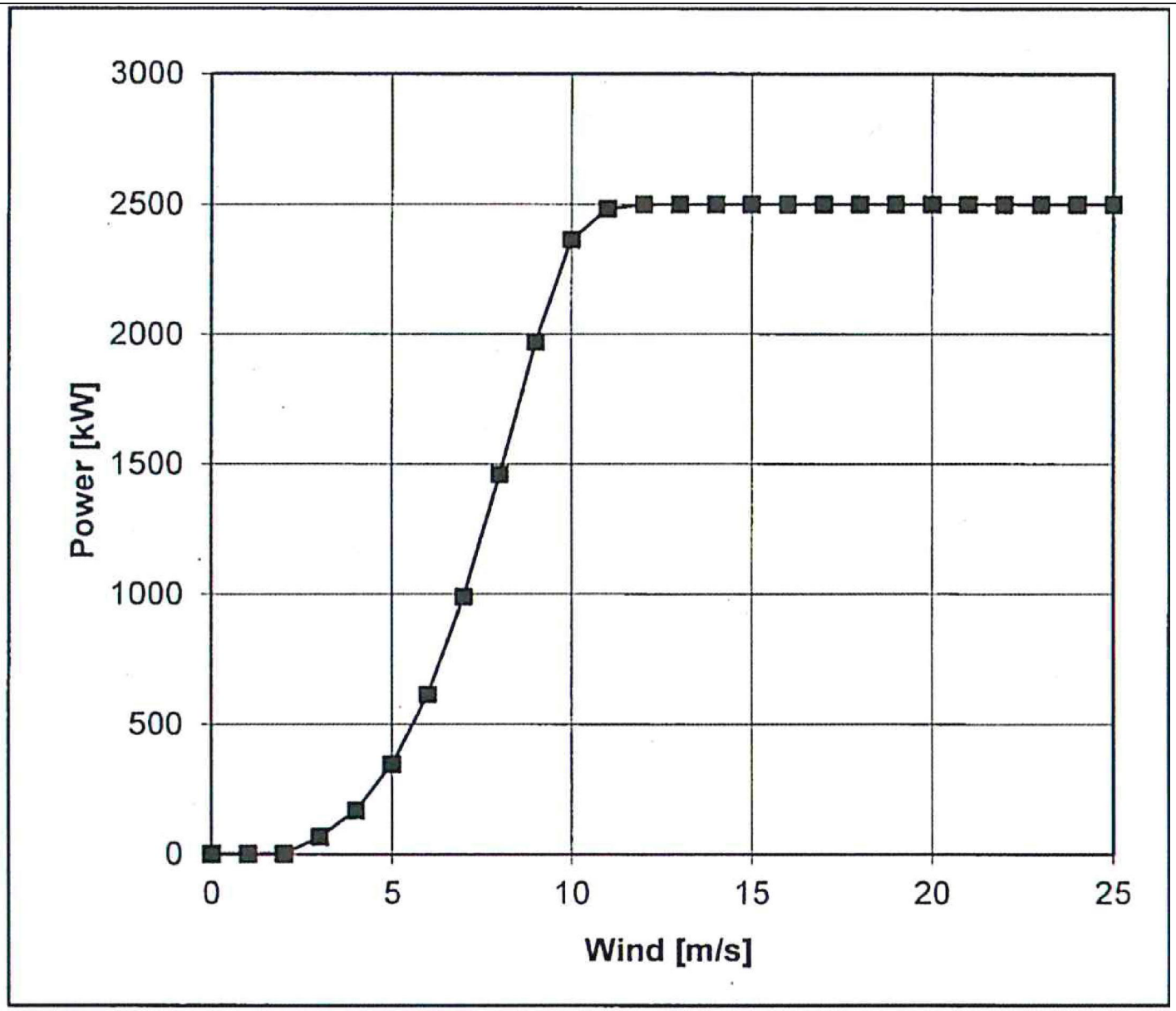

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Figure Title

Power Curve

Figure B.01

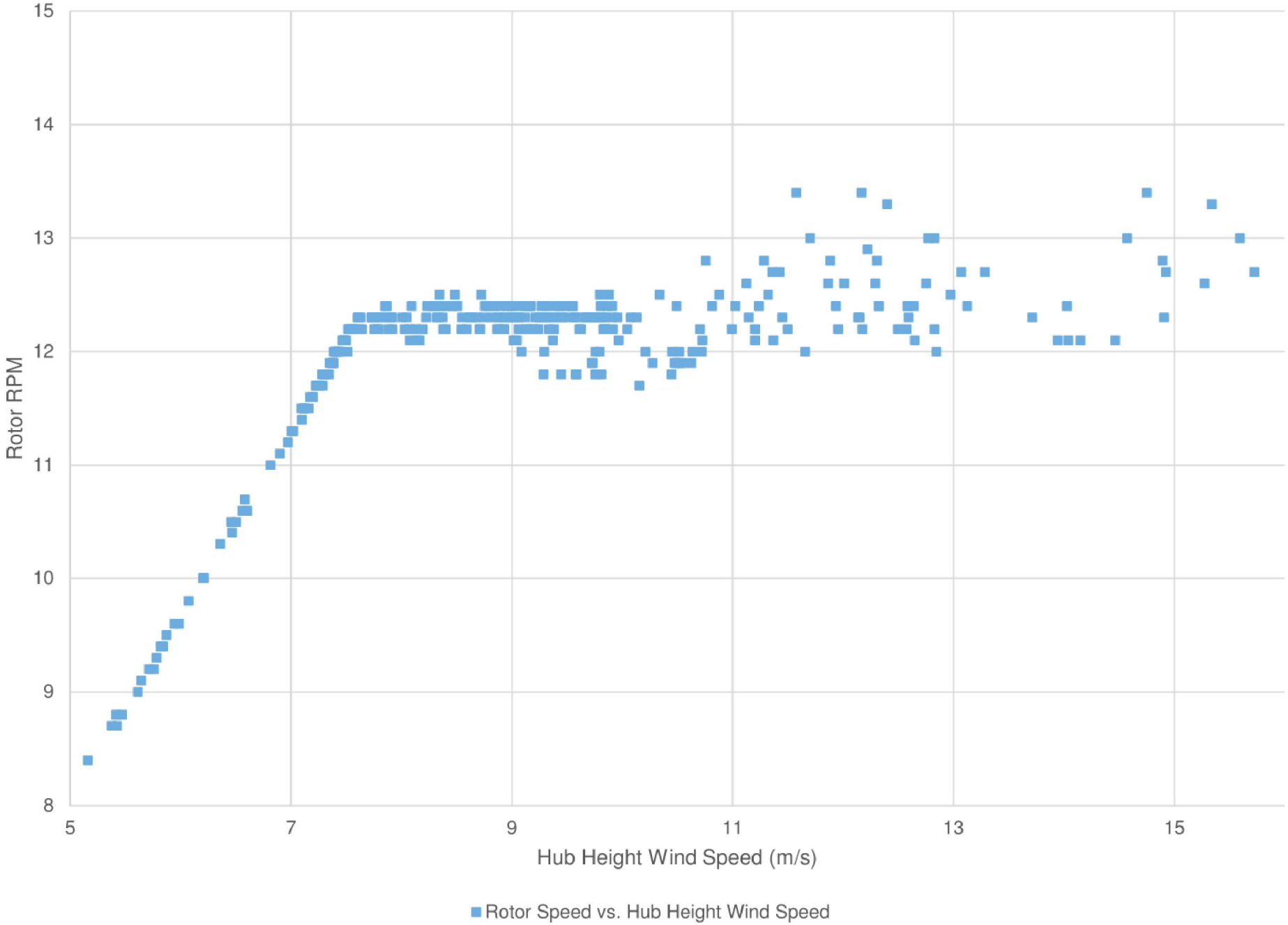

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Figure B.02

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Appendix C
Apparent Sound Power Level

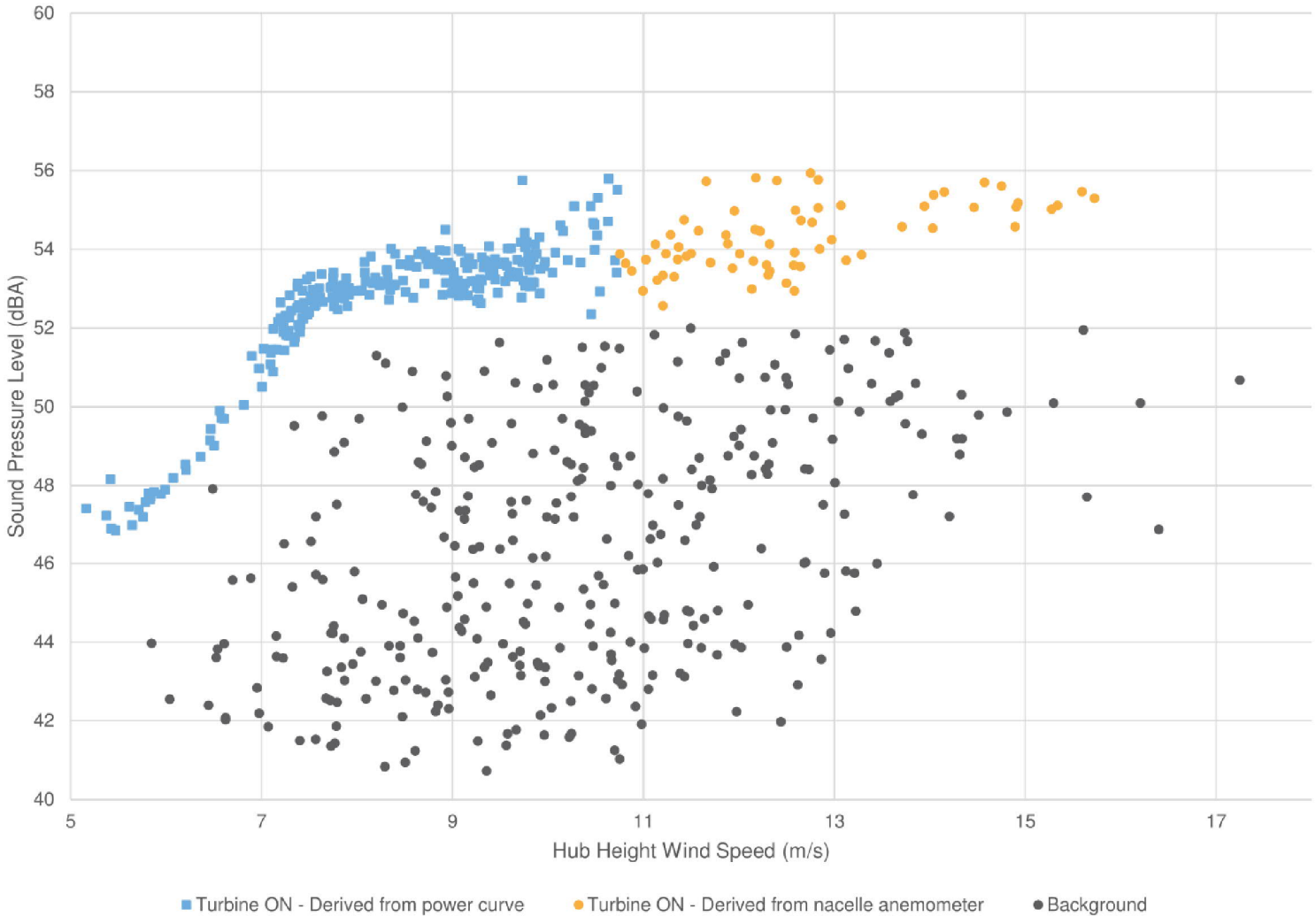

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	Figure Title Plot of overall measurement data pairs at Position 1 (Turbine ON & Background)

Figure C.01

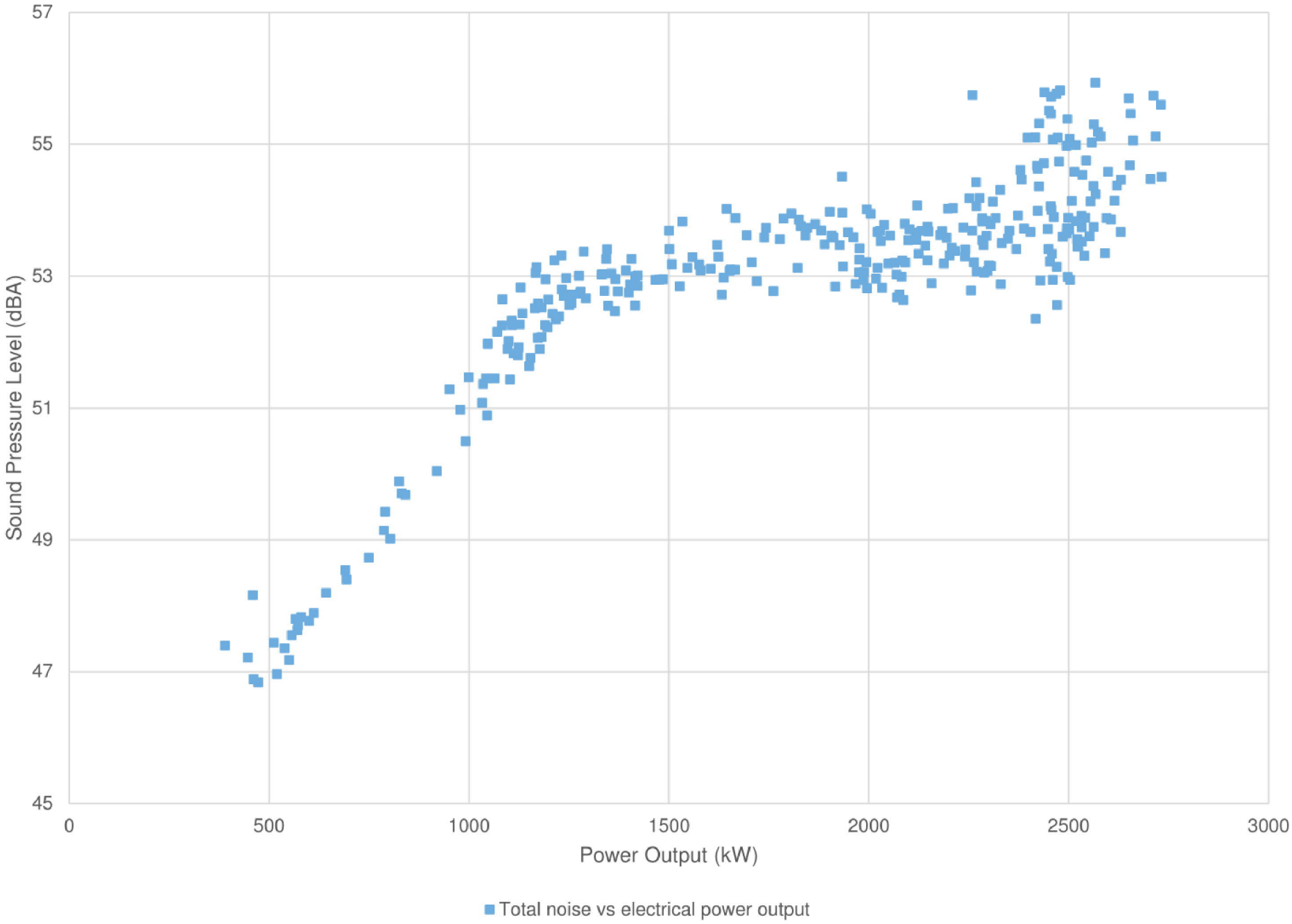

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Figure C.02

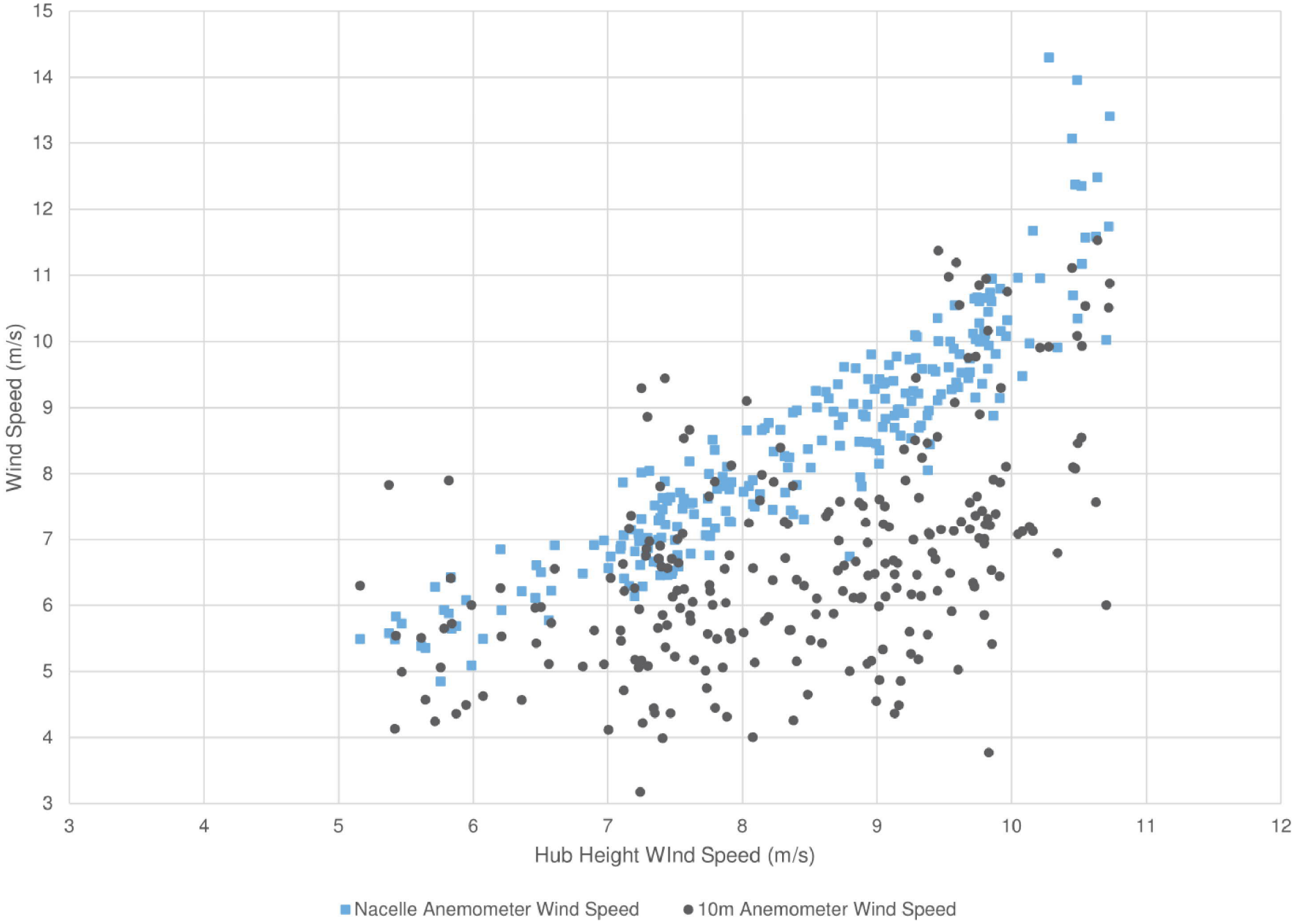

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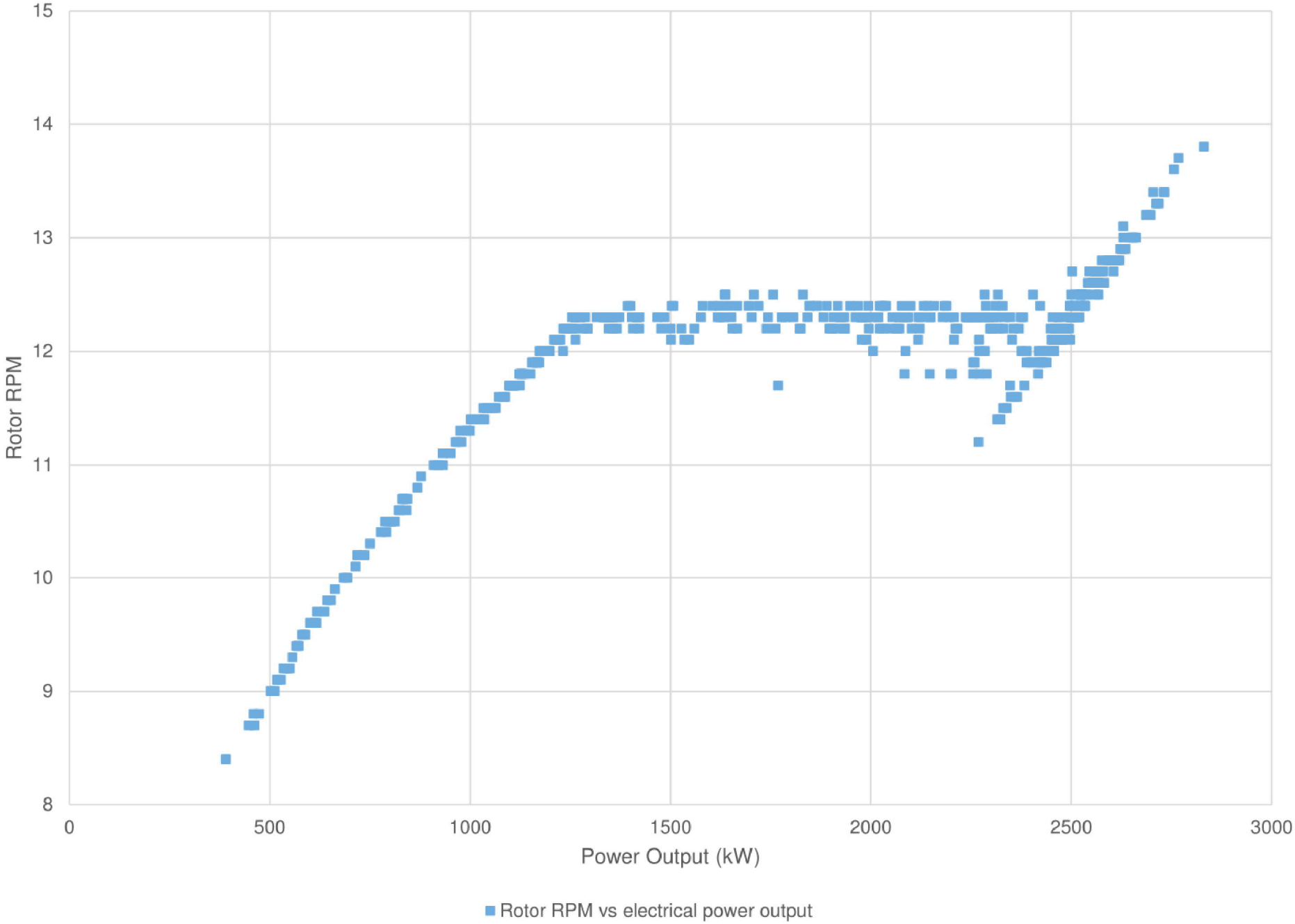
	Figure Title Plot of power curve relative to nacelle anemometer and 10m anemometer

Figure C.03



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Project Name

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

Figure Title

Plot of rotor RPM vs. electrical power output

Figure C.04

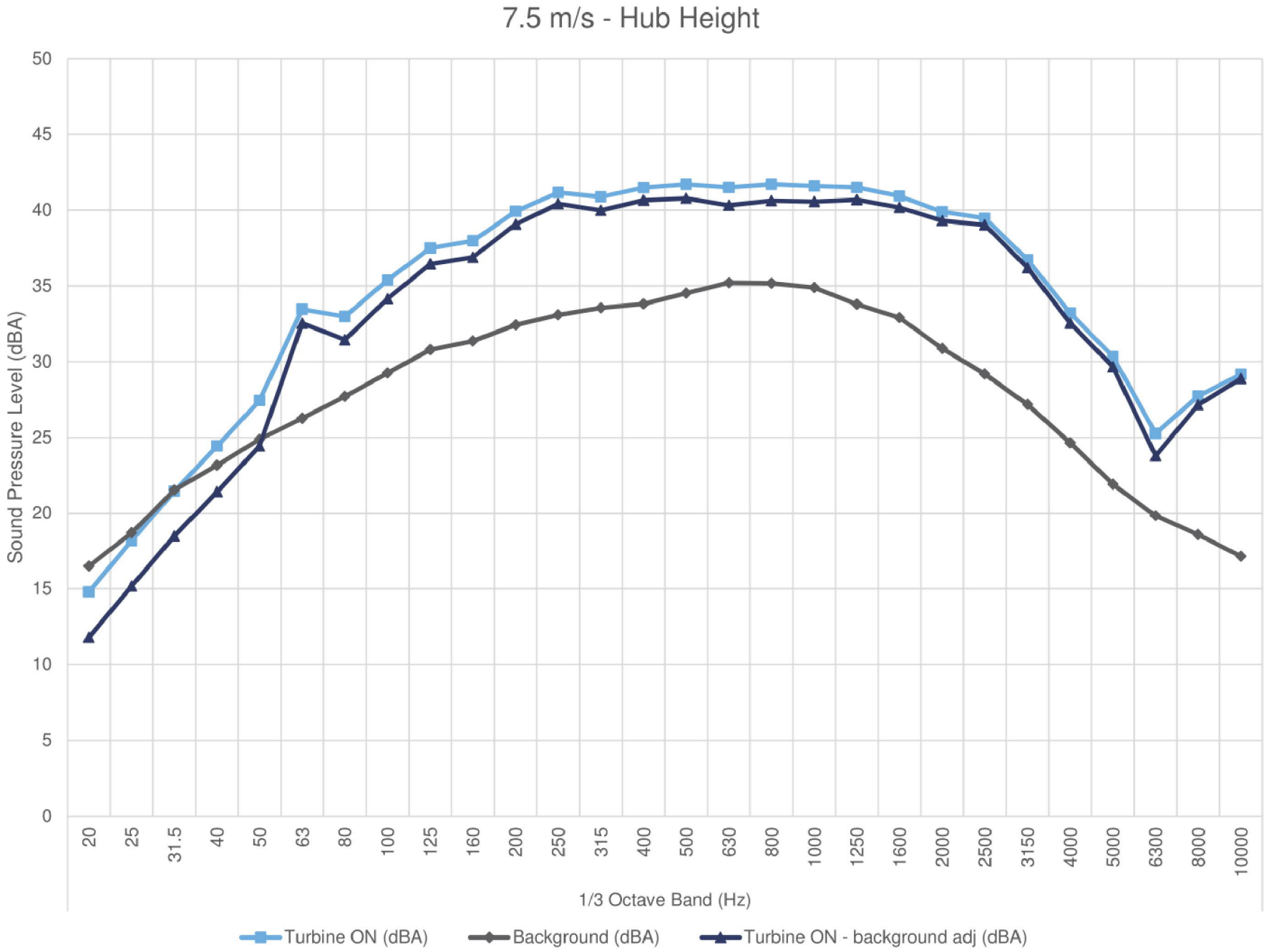

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	Figure Title Plot of sound pressure spectrum in 1/3 Octave at 7.5 m/s

Figure C.05

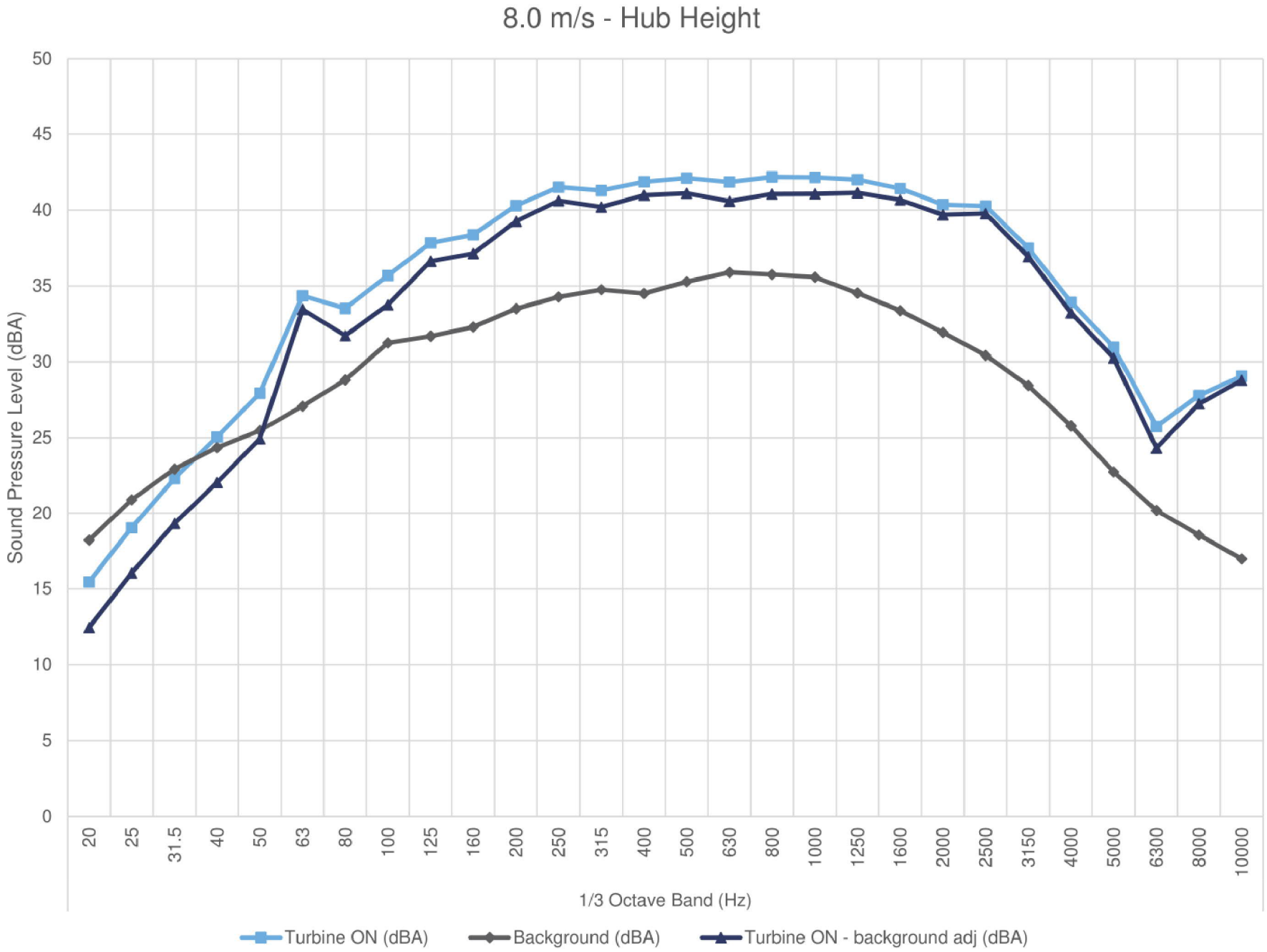

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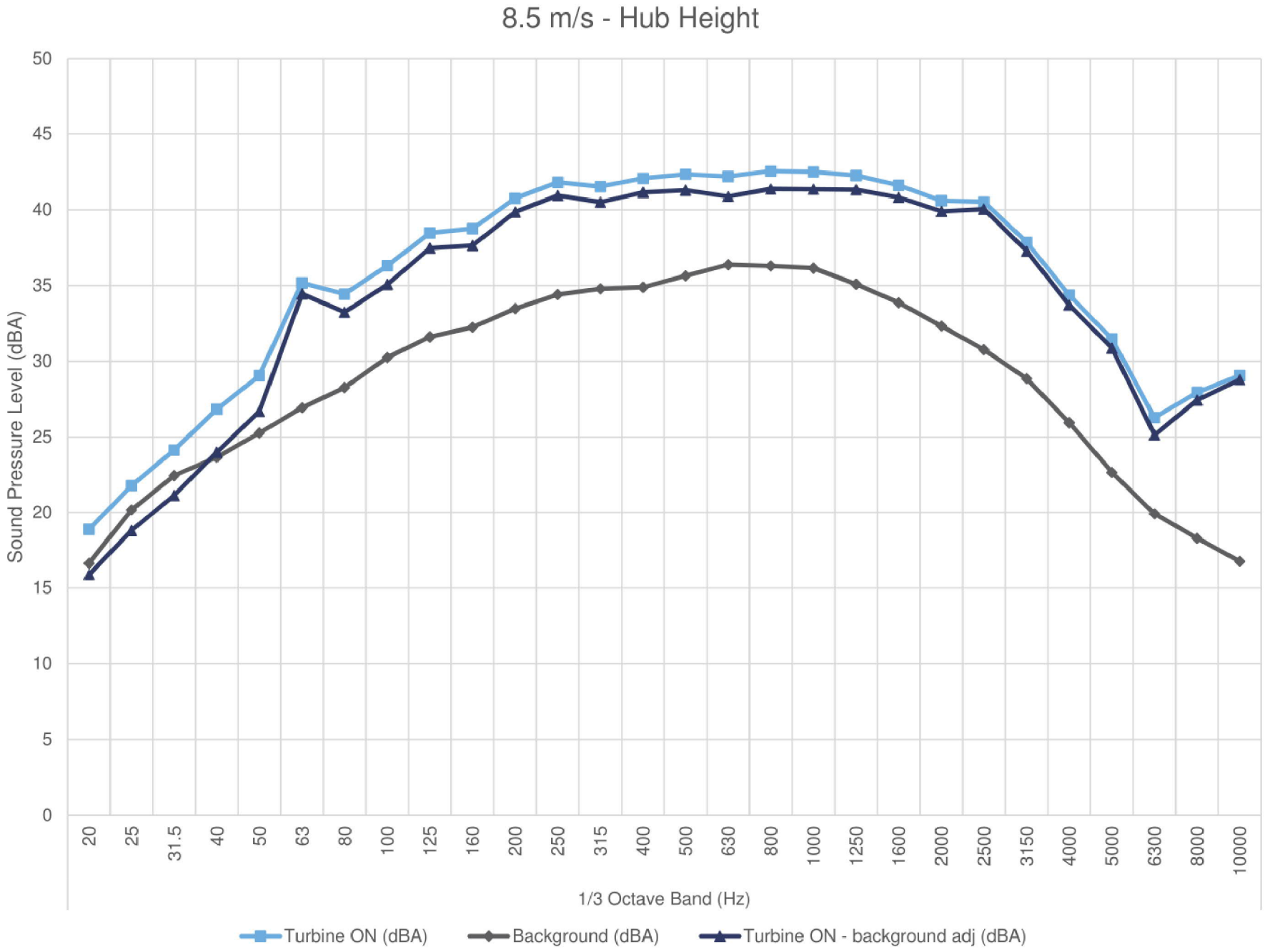
Figure Title

Plot of sound pressure spectrum in 1/3 Octave at 8 m/s

Figure C.06



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Project Name

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

Figure Title

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

Figure C.07

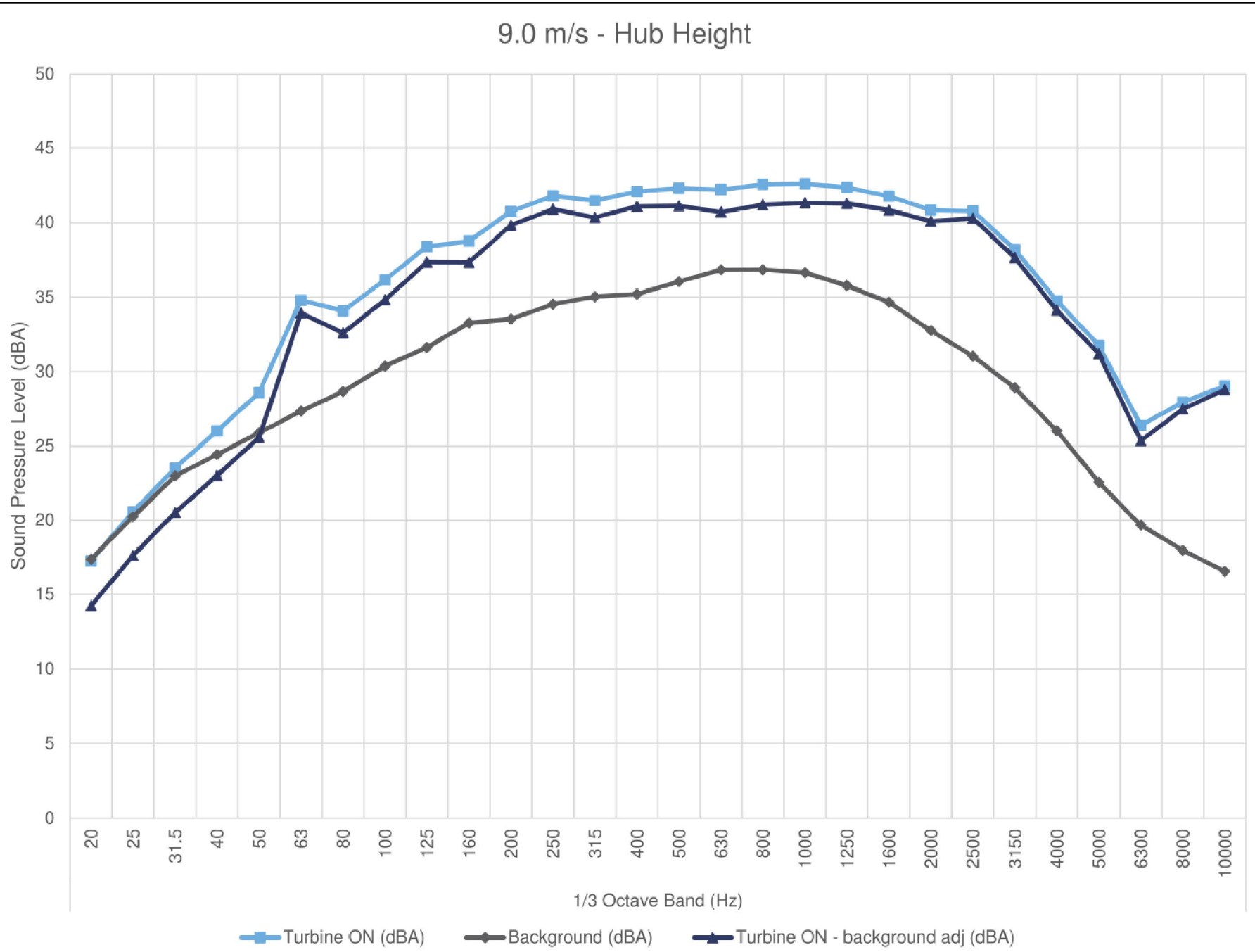

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Figure Title

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

Figure C.08

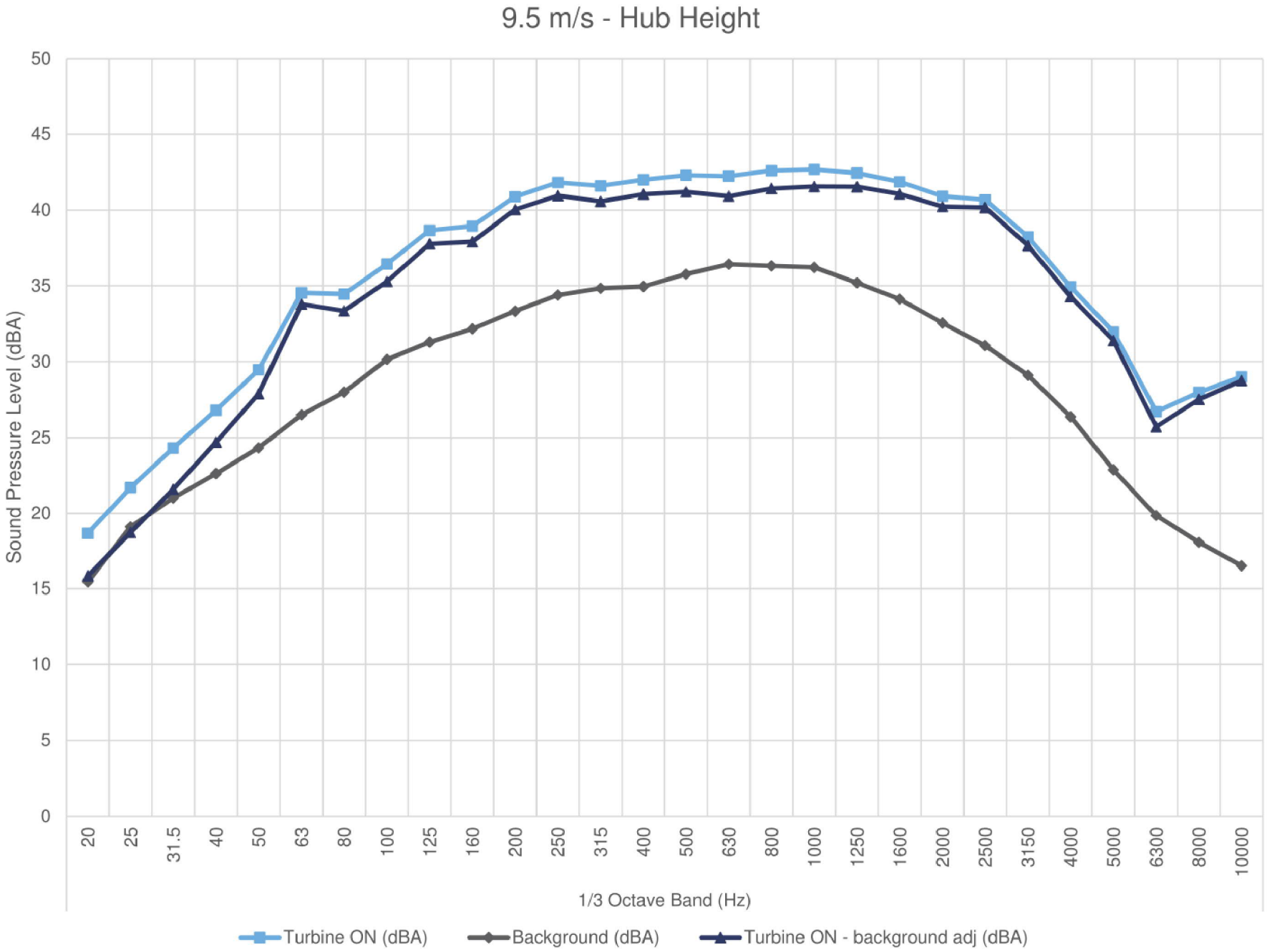

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Figure Title

Plot of sound pressure spectrum in 1/3 Octave at 9.5 m/s

Figure C.09

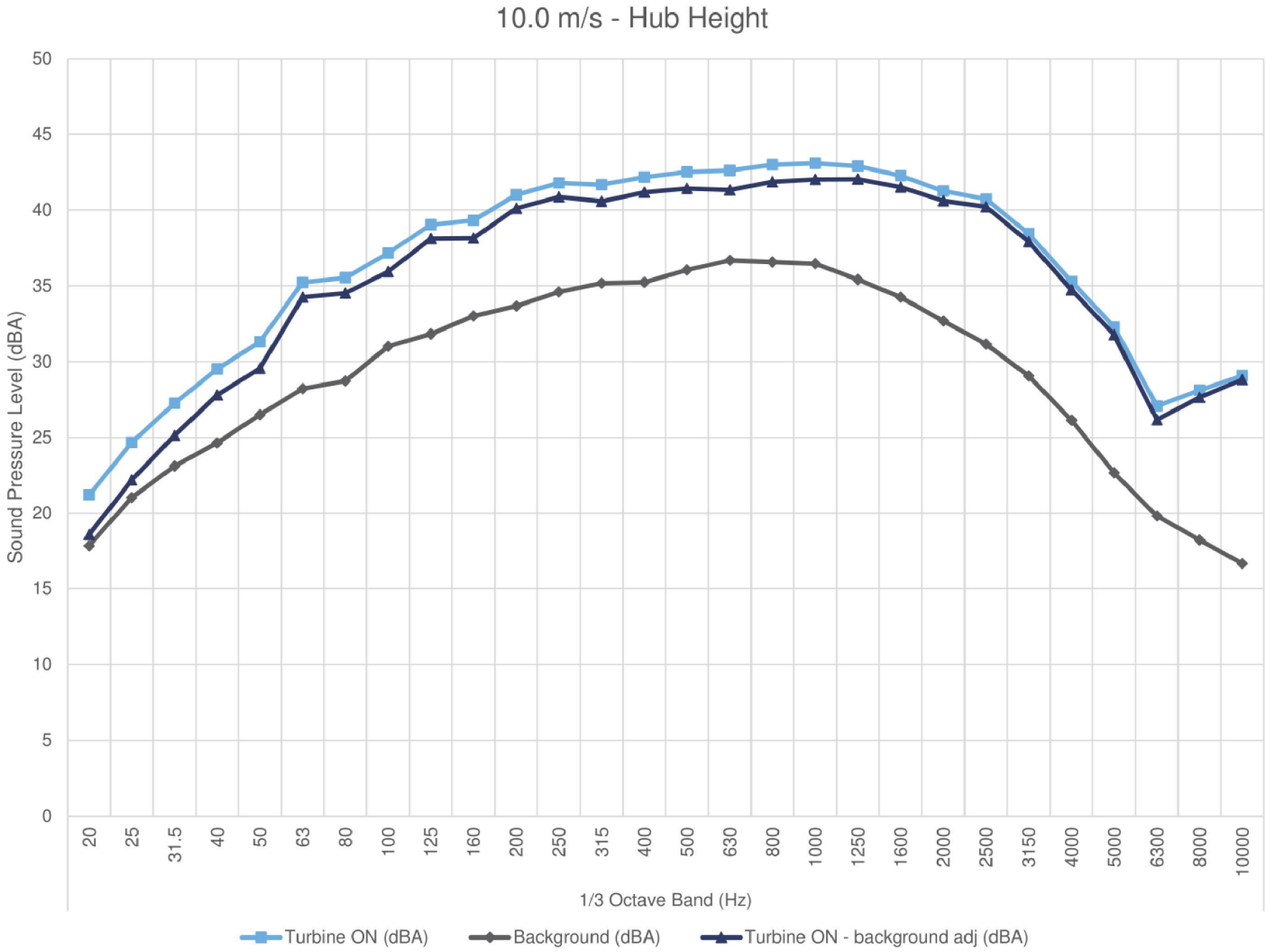

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	Figure Title Plot of sound pressure spectrum in 1/3 Octave at 10 m/s

Figure C.10

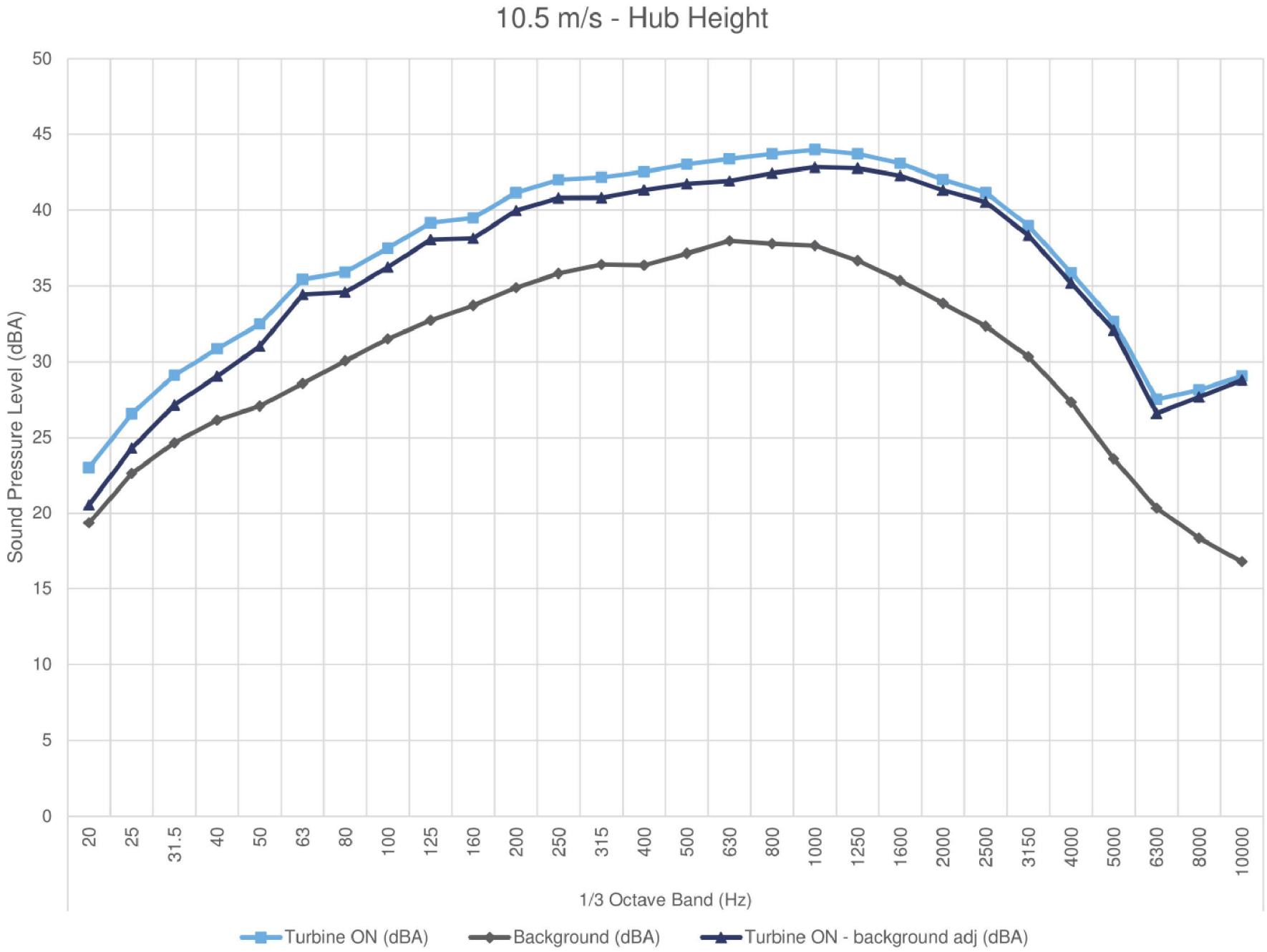

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Figure Title

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

Figure C.11

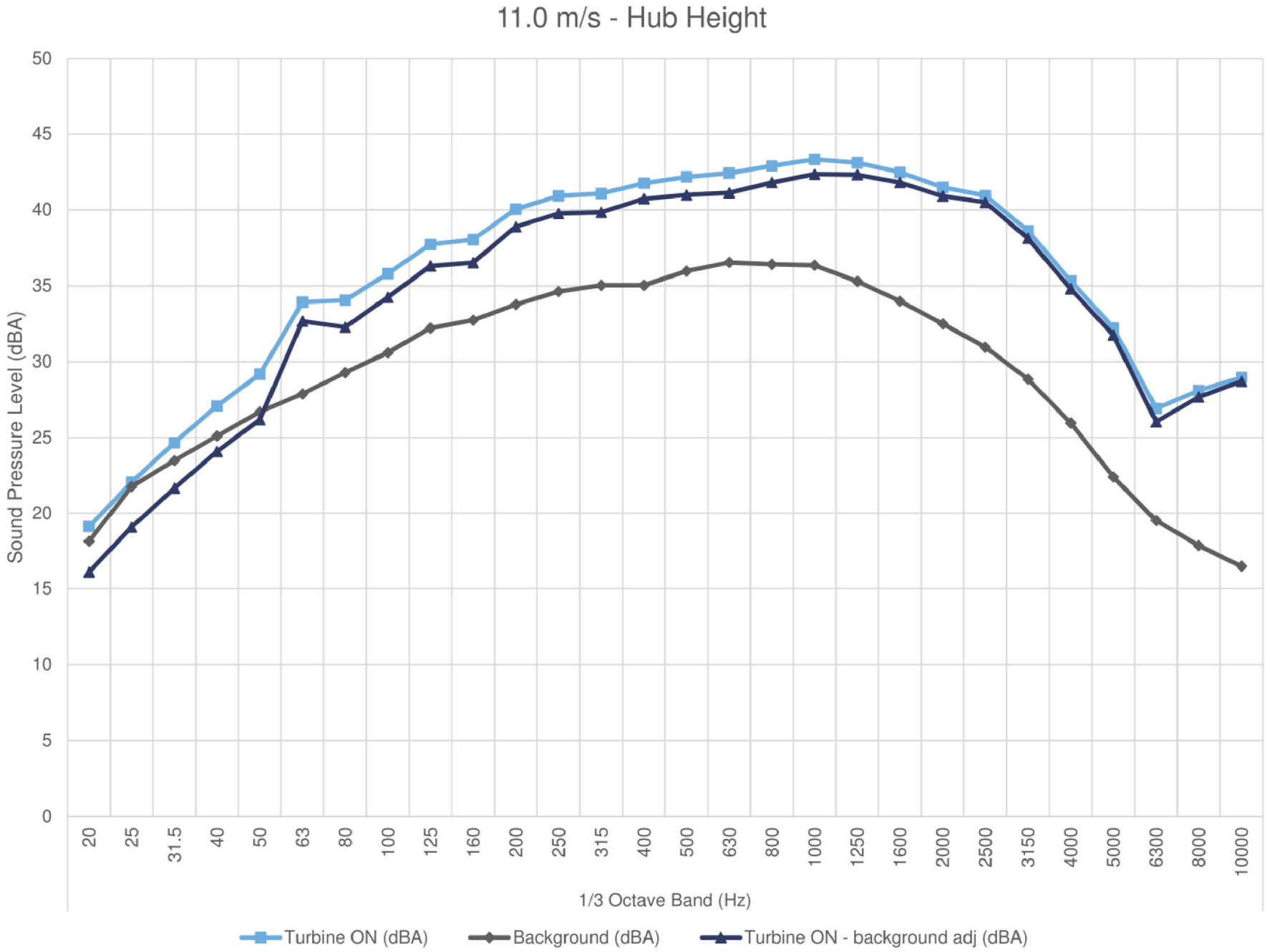

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Figure Title

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

Figure C.12

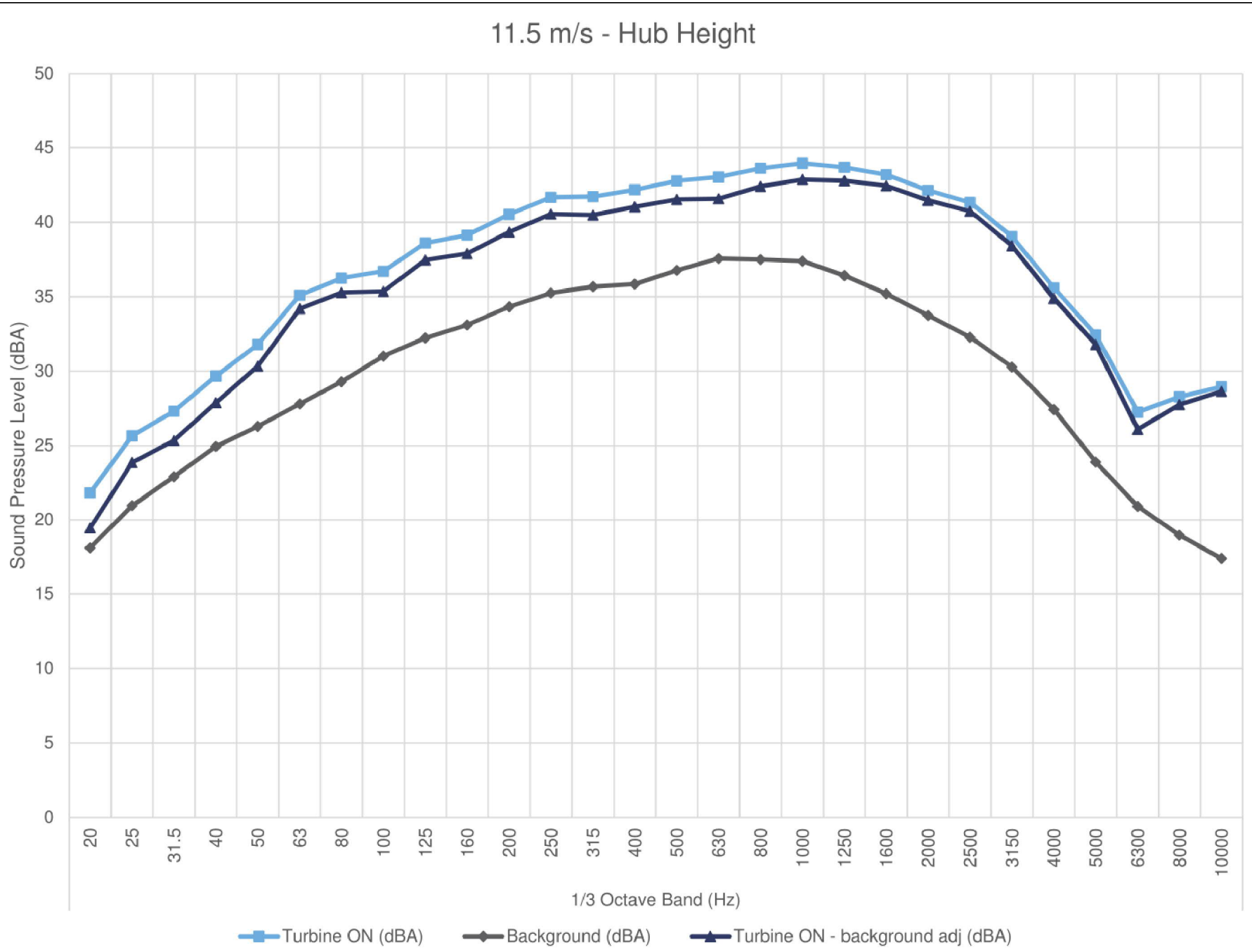

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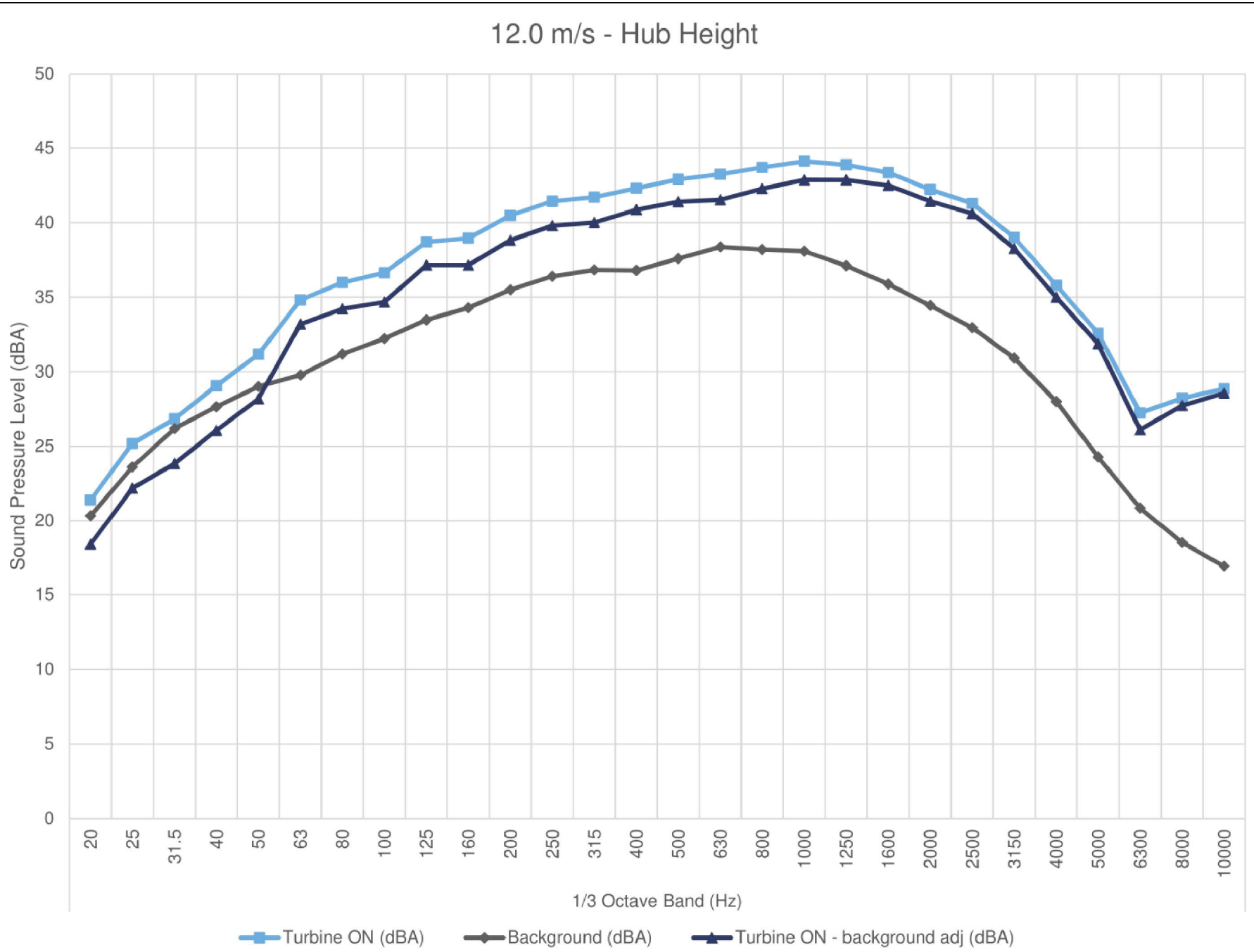
Figure Title

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

Figure C.13



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Project ID: 14355.00.T4.RP1	**Project Name**
Scale: NTS Drawn by: KC Reviewed by: PA Date: November 10, 2017 Revision: 1	Port Ryerse Wind Power Project - T4 - IEC 61400-11 Ed. 3.0
	Figure Title Plot of sound pressure spectrum in 1/3 Octave at 12 m/s

Figure C.14

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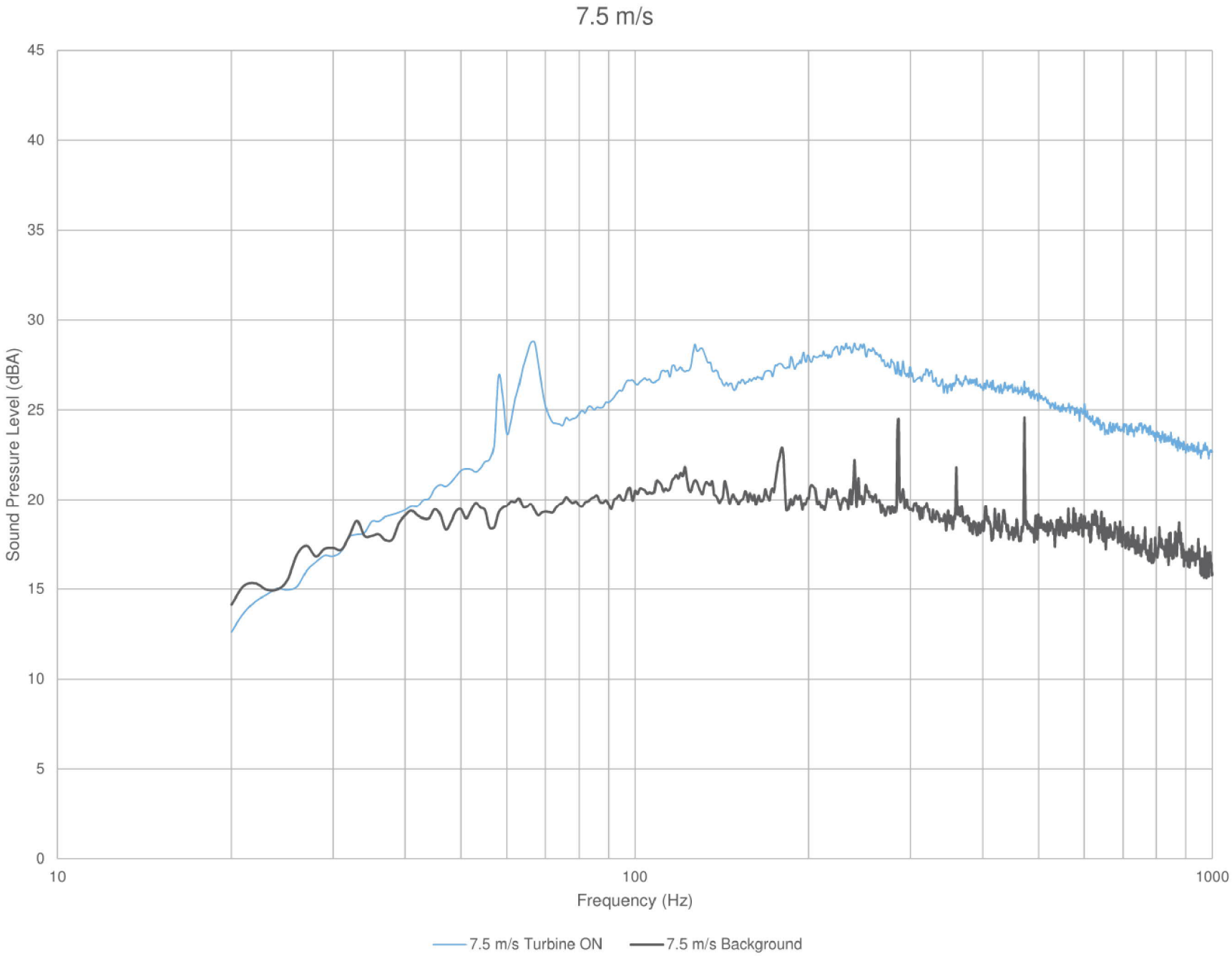
Appendix D
Tonality Assessment



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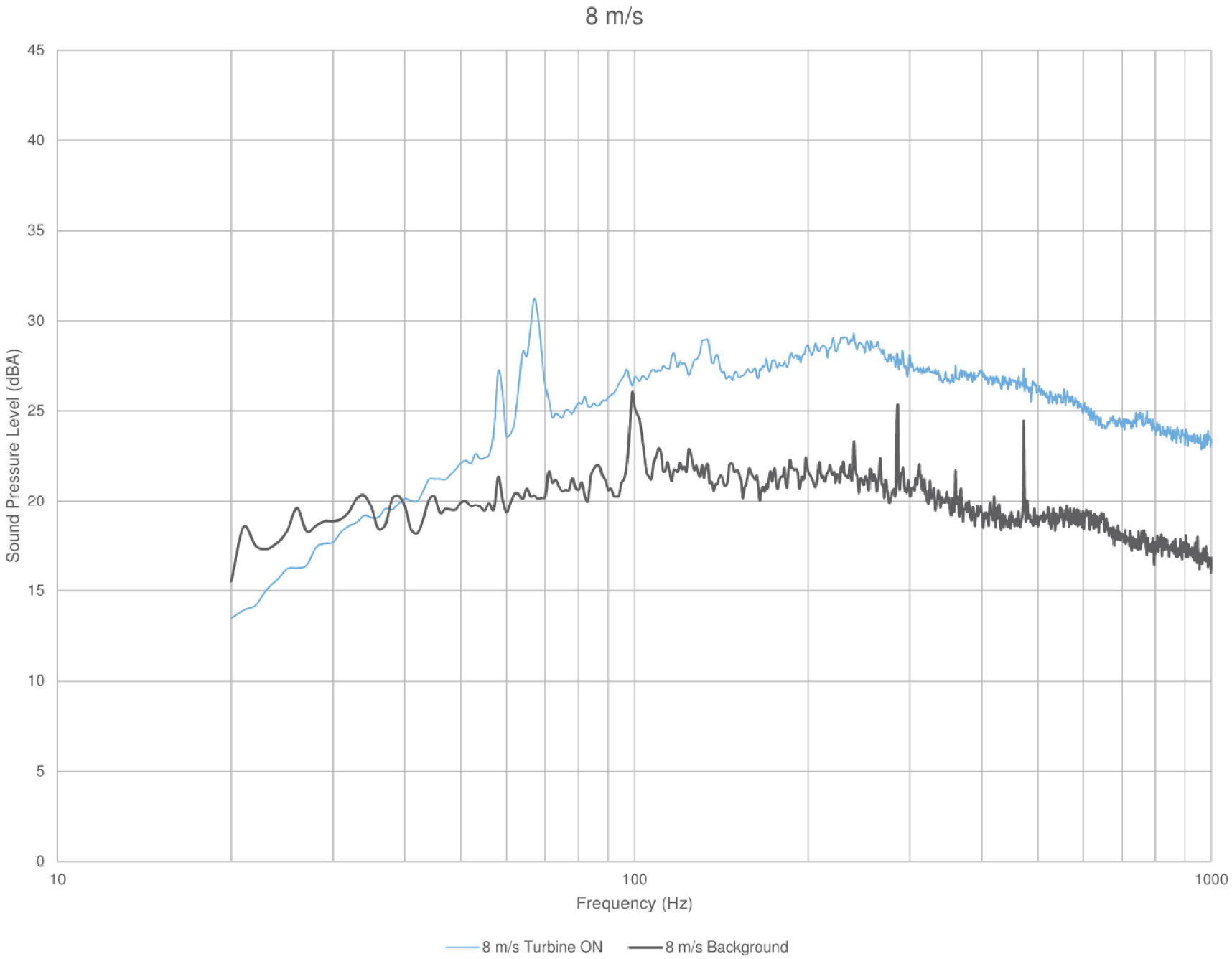
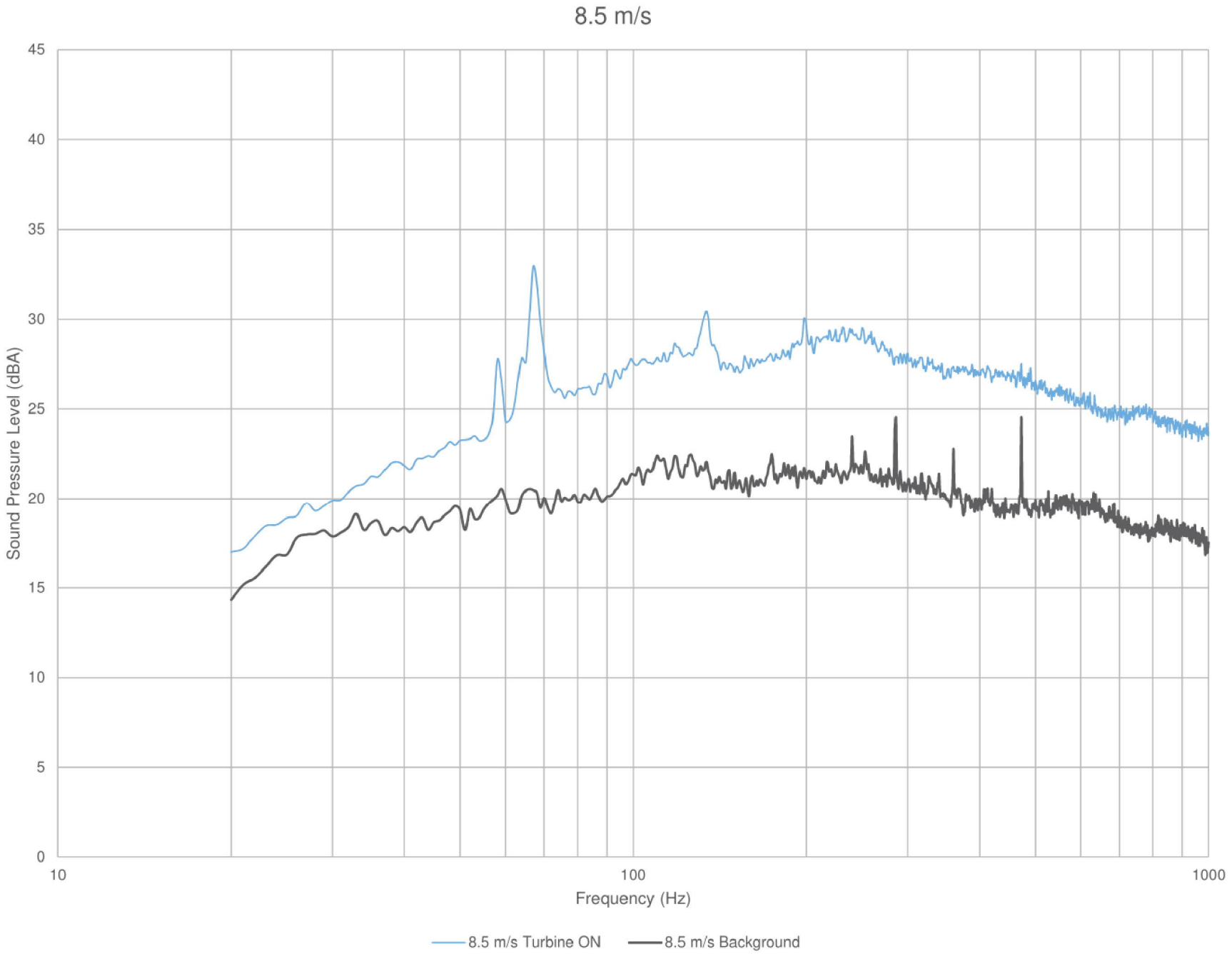
Project ID: 14355.00.T4.RP1	**Project Name**
Scale: NTS Drawn by: KC Reviewed by: PA Date: November 10, 2017 Revision: 1	Port Ryerse Wind Power Project - T4 - IEC 61400-11 Ed. 3.0
	Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 7.5 m/s

Figure D.01



aercoustics	Project ID: 14355.00.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 8 m/s

Figure D.02



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Project ID: 14355.00.T4.RP1

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

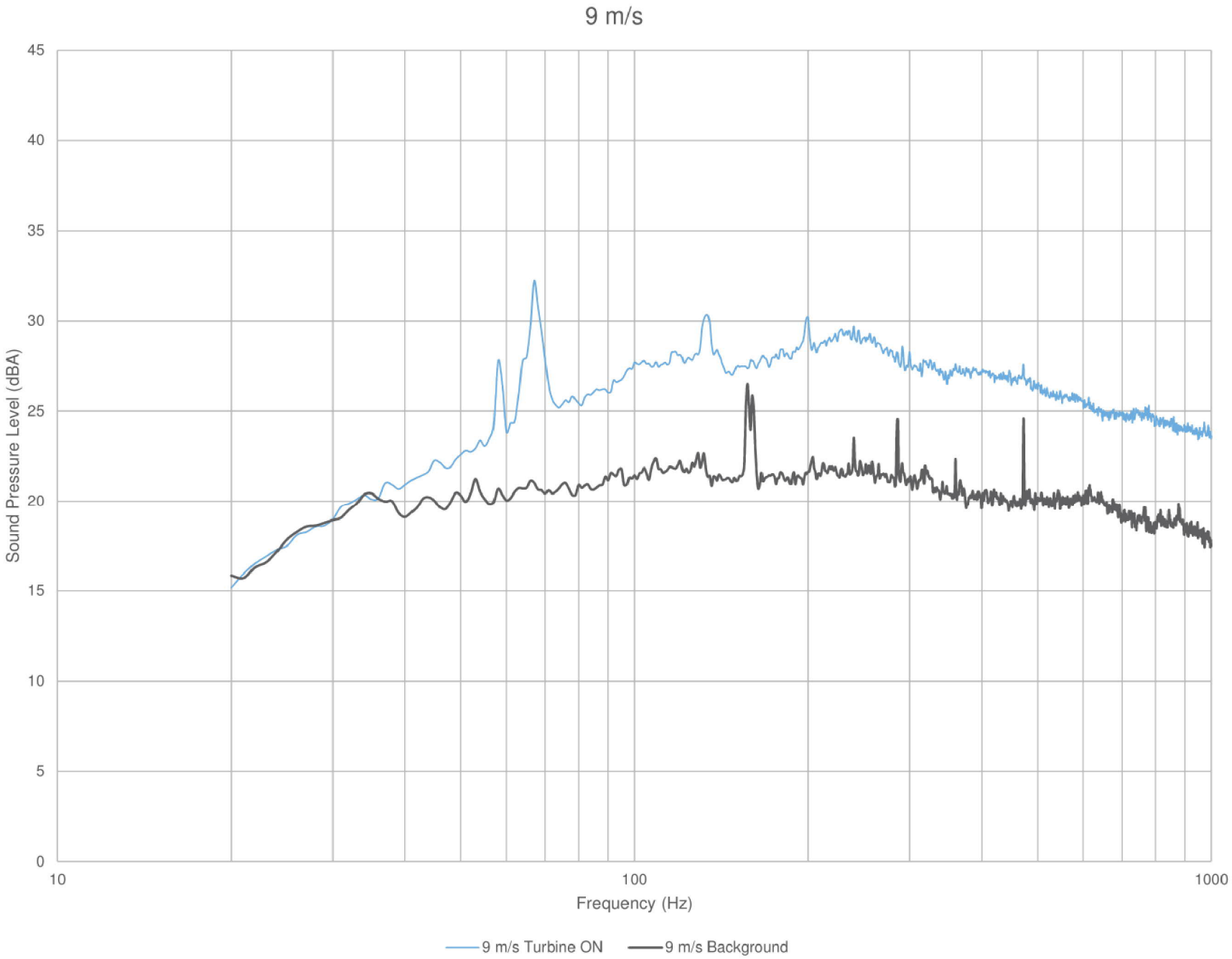
Project Name

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

Figure Title

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

Figure D.03



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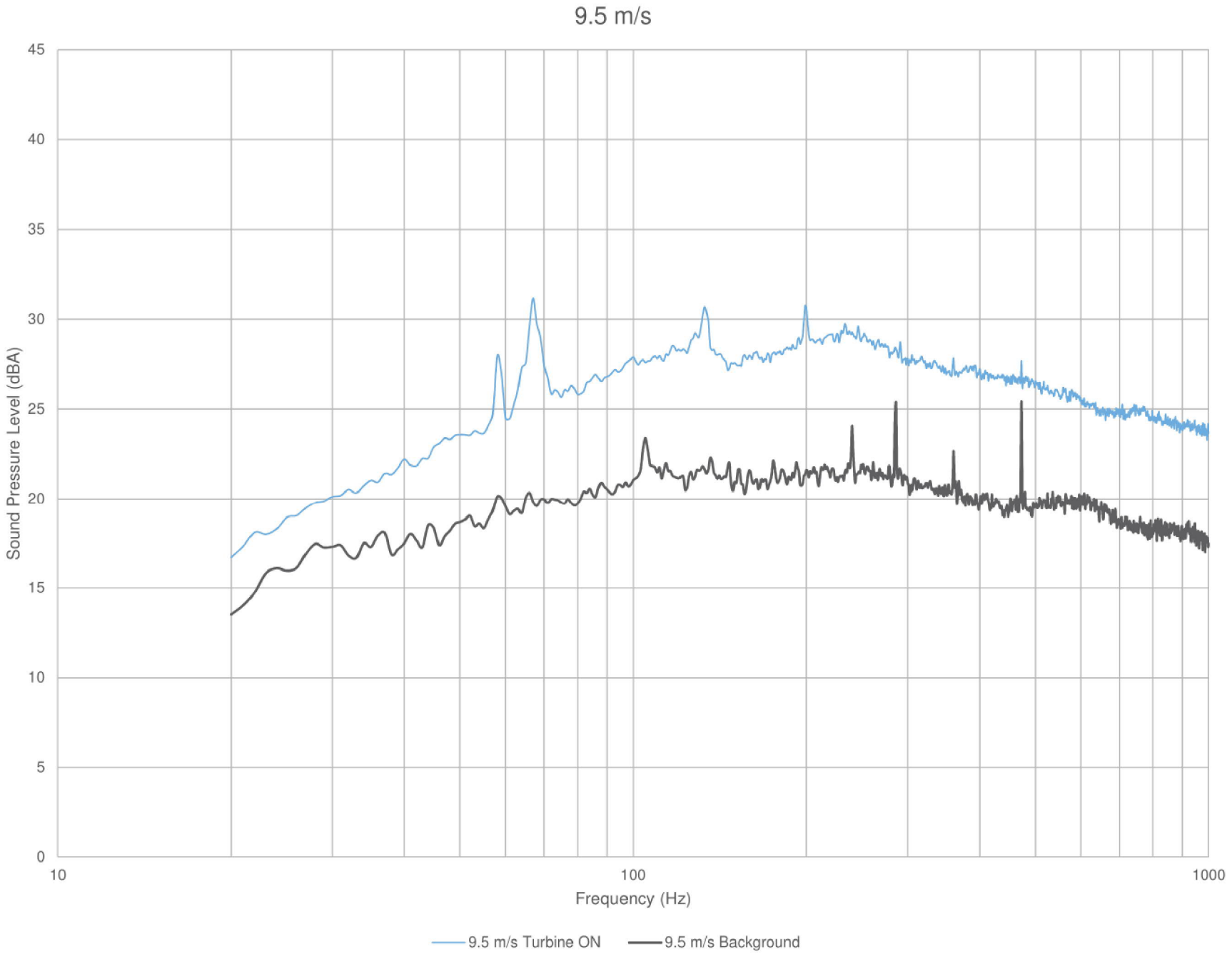
Project ID: 14355.00.T4.RP1	**Project Name**
Scale: NTS Drawn by: KC Reviewed by: PA Date: November 10, 2017 Revision: 1	Port Ryerse Wind Power Project - T4 - IEC 61400-11 Ed. 3.0
	Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 9 m/s

Figure D.04



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Project ID: 14355.00.T4.RP1

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

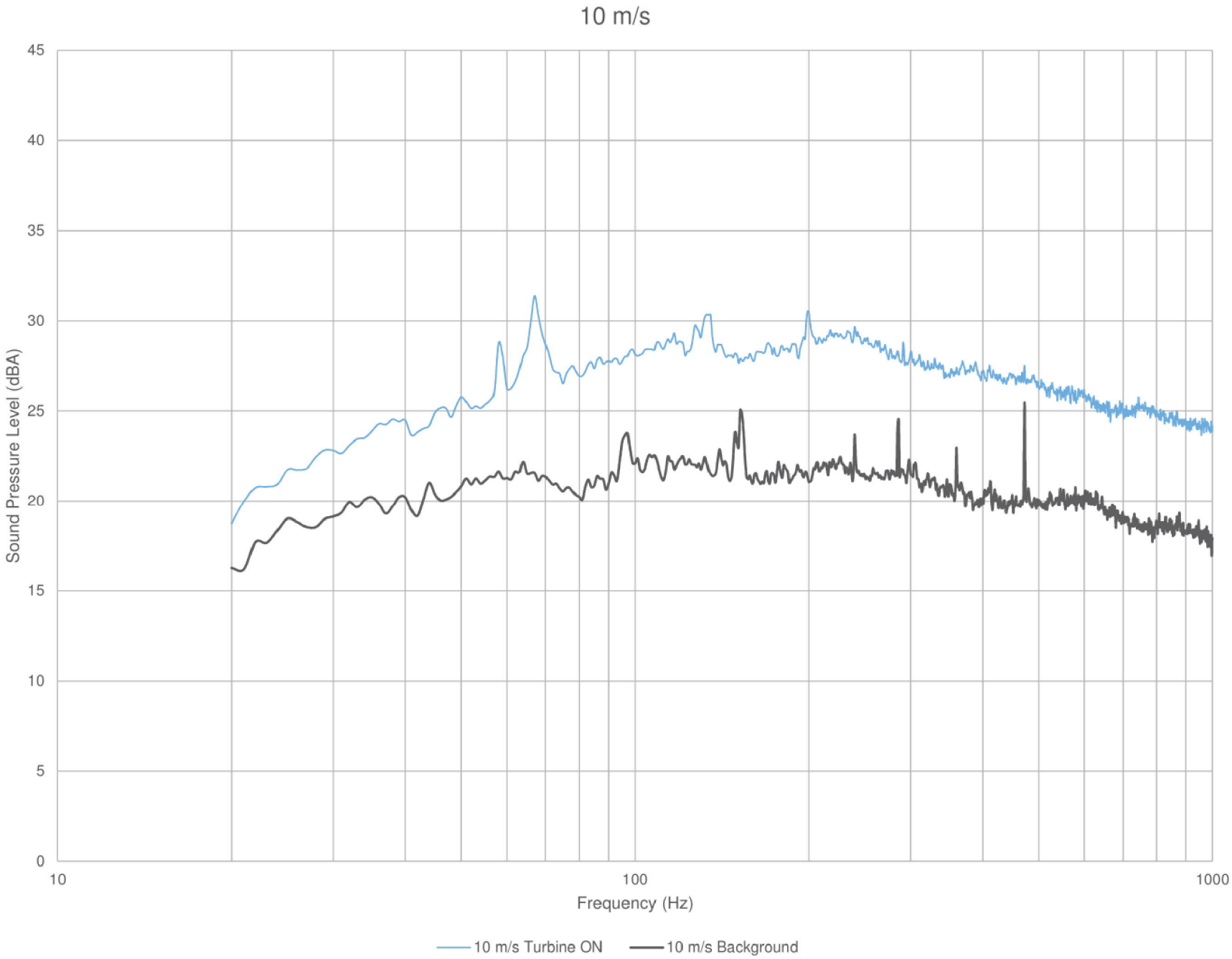
Project Name

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

Figure Title

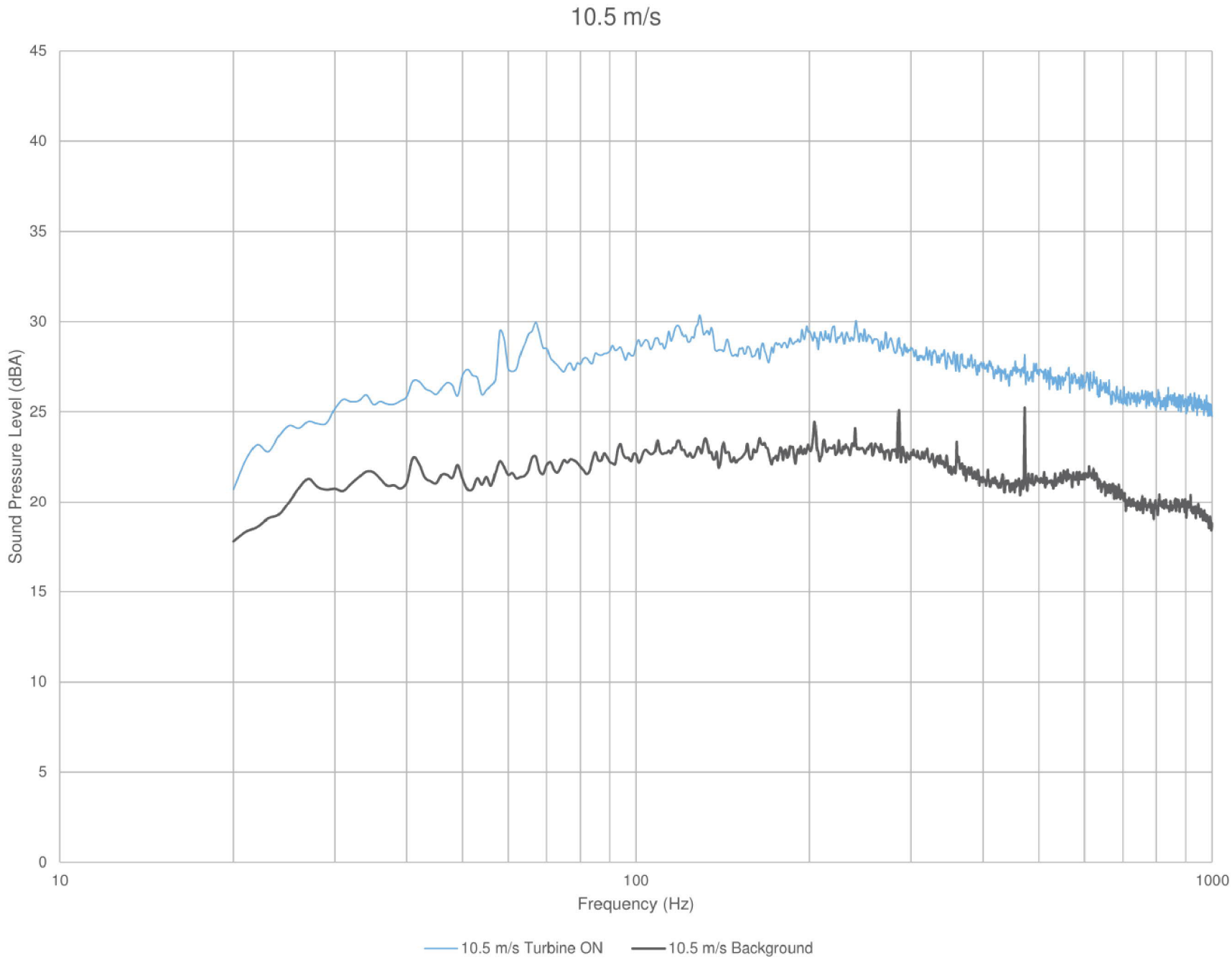
Plot of narrow band spectra - Turbine ON vs. Background at 9.5 m/s

Figure D.05



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 10 m/s

Figure D.06



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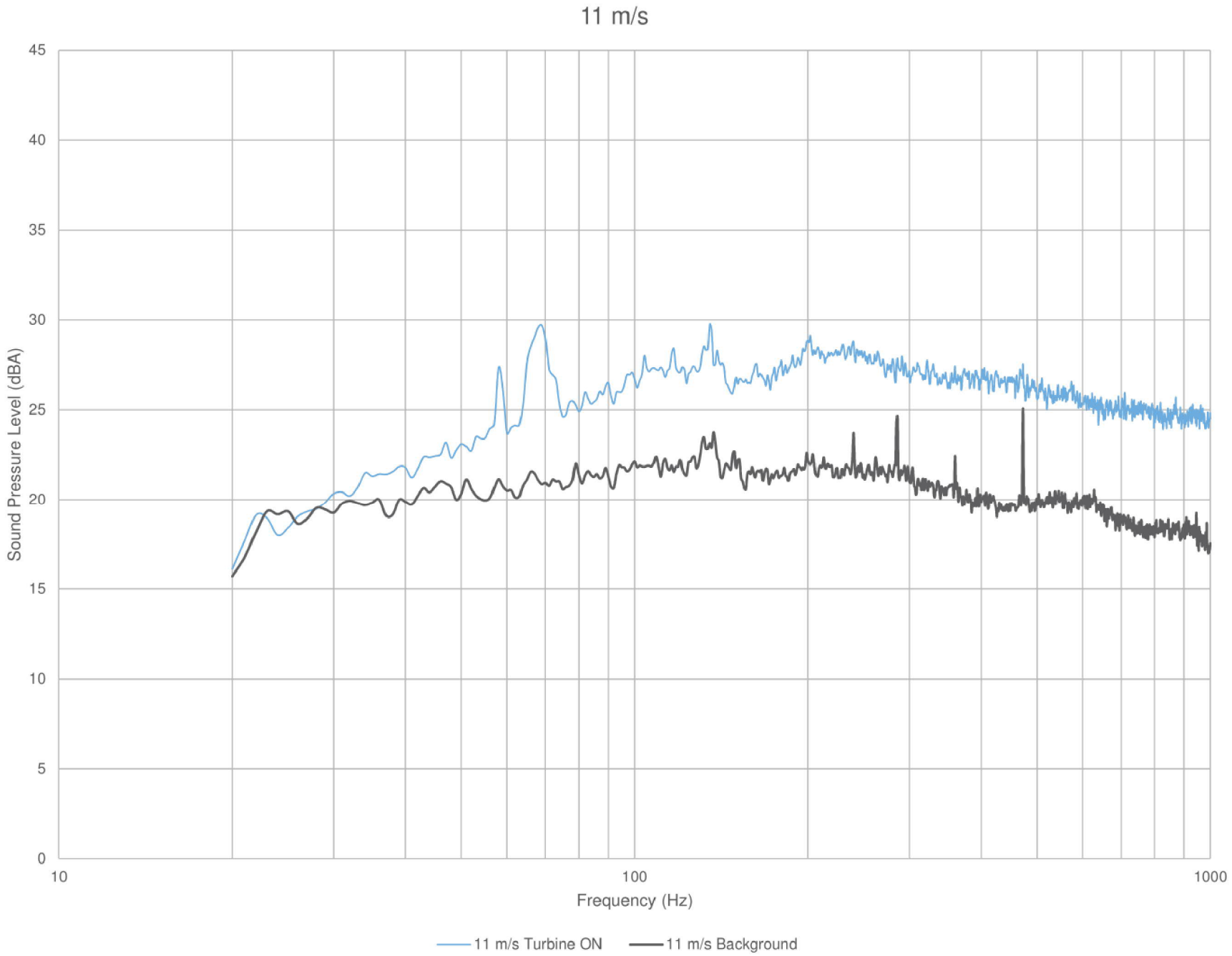
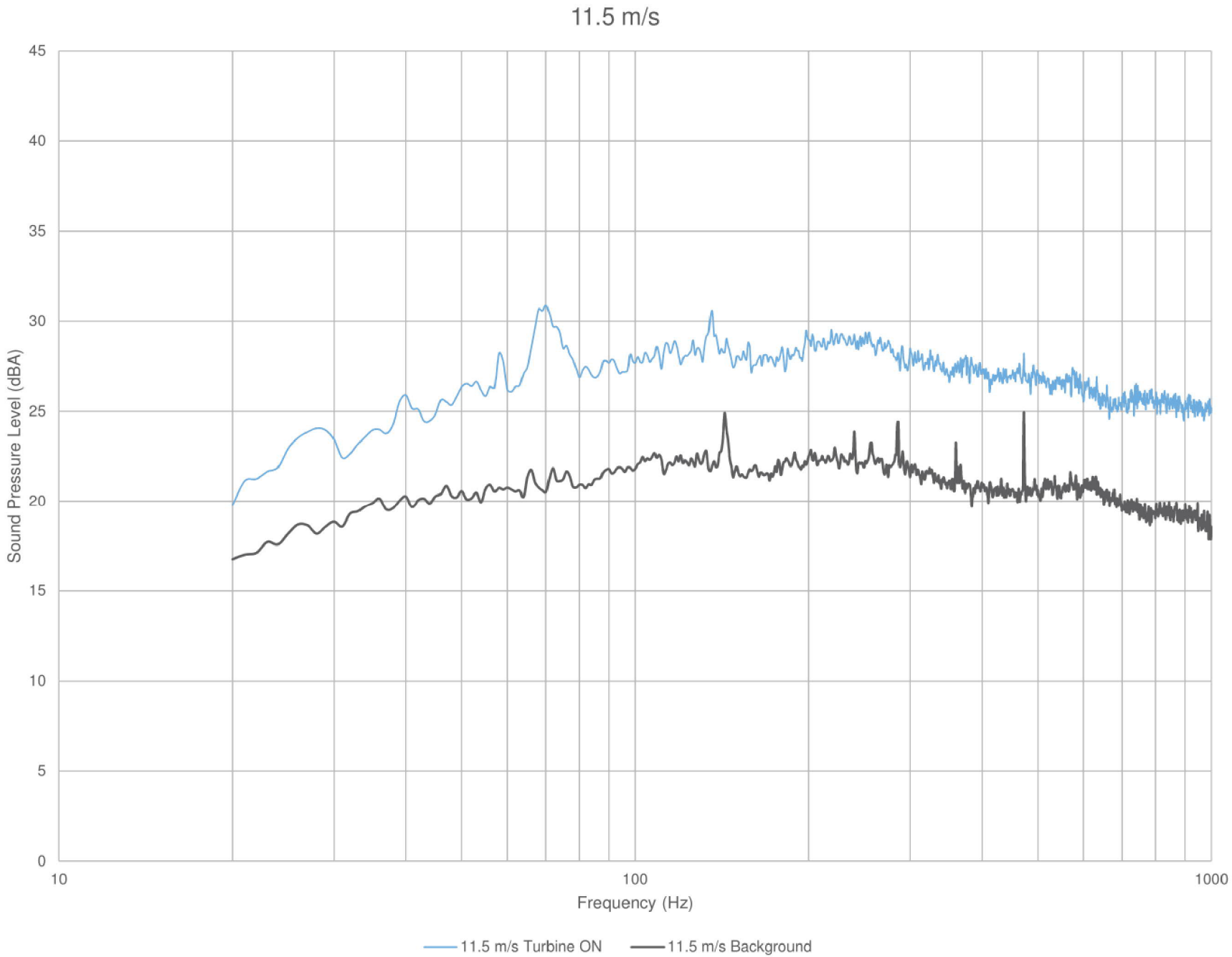
Project ID: 14355.00.T4.RP1	**Project Name**
Scale: NTS Drawn by: KC Reviewed by: PA Date: November 10, 2017 Revision: 1	Port Ryerse Wind Power Project - T4 - IEC 61400-11 Ed. 3.0
	Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 10.5 m/s

Figure D.07



aercoustics	Project ID: 14355.00.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 11 m/s

Figure D.08



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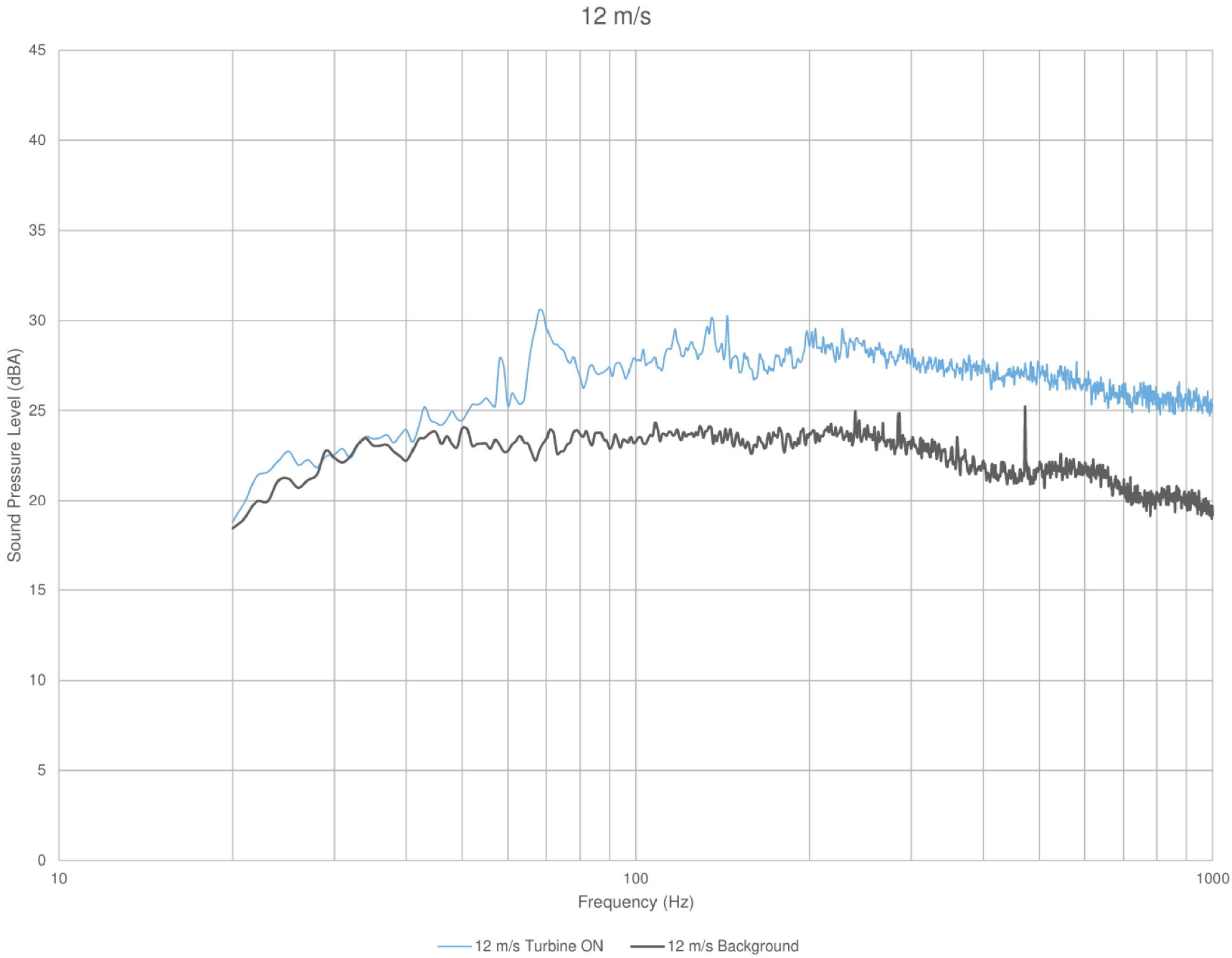
Project ID: 14355.00.T4.RP1	**Project Name**
Scale: NTS Drawn by: KC Reviewed by: PA Date: November 10, 2017 Revision: 1	Port Ryerse Wind Power Project - T4 - IEC 61400-11 Ed. 3.0
	Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 11.5 m/s

Figure D.09



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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 T4 - IEC 61400-11 Measurement
Report ID: 14355.00.T2.RP1

Created on: 12/7/2017

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 T4 - 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 T4 - 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 T4 - 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 T4 - 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 T4 - IEC 61400-11 Measurement
Report ID: 14355.00.T2.RP1

Created on: 12/7/2017

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.07 Tonality Assessment Table - 10.5 m/s

Project: Port Ryerse Wind Farm- Turbine T4 - 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 T4 - 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 T4 - 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 T4 - 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 Power Project - Turbine T4 - IEC 61400-11 Measurement

Report ID: 14355.00.T4.RP1

Created on: 11/9/2017

***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			2557	268.0	278.3	13.5	12.6	14.5	10.5	5	99214.9	60
2	15.7	55.3	2564	268.0	278.3	14.3	12.7	15.6	9.7	5	99215.0	60
3	15.3	55.0	2558	268.0	278.3	15.0	12.6	15.2	7.8	5	99214.8	60
4	10.5	54.6	2422	268.0	278.3	13.7	11.9	14.0	10.1	5	99214.9	60
5	10.3	55.1	2397	268.0	278.3	12.1	11.9	14.3	9.9	5	99215.1	60
6	14.2	55.5	2456	268.0	278.3	12.0	12.1	14.1	8.4	5	99214.9	60
7			2629	268.0	277.2	14.4	13.1	14.3	10.2	5	99214.8	60
8			2603	268.0	275.5	15.7	12.8	15.7	9.7	5	99214.7	60
9			2404	268.0	275.5	13.6	11.9	14.6	11.5	5	99214.9	60
10			2330	268.0	275.5	11.1	11.5	13.9	9.9	5	99215.0	60
11	10.5	54.4	2426	268.0	275.4	10.4	12.0	12.3	8.5	5	99215.2	60
12	10.2	54.5	2383	268.0	275.4	8.7	11.7	11.7	7.1	5	99214.9	60
13			1768	268.0	275.4	5.8	11.7	10.6	6.6	5	99236.6	59
14			2269	268.0	275.4	5.7	12.1	10.0	6.2	5	99240.9	59
15			2769	268.0	275.3	11.1	13.7	14.5	6.5	5	99240.8	59
16	15.3	55.1	2719	268.0	275.3	13.6	13.3	15.2	7.0	5	99240.8	59
17	14.9	54.6	2598	268.0	275.4	13.8	12.8	14.8	5.8	5	99240.7	59
18	14.9	55.2	2573	268.0	275.4	14.6	12.7	14.8	5.9	5	99240.8	59
19	14.5	55.1	2461	268.0	275.4	13.7	12.1	14.4	7.4	5	99240.8	60
20			2360	268.0	275.4	11.4	11.6	13.5	9.0	5	99240.9	60
21			2269	268.0	275.4	6.6	11.2	11.3	8.8	5	99241.0	60
22	12.7	54.7	2476	268.0	275.4	7.7	12.1	12.6	8.1	5	99240.8	60
23	10.6	54.7	2439	268.0	275.3	6.2	11.9	11.6	7.6	5	99240.3	60
24	11.4	54.1	2455	268.0	275.4	5.1	12.1	11.3	8.8	5	99240.5	60
25	13.0	54.2	2568	268.0	275.4	6.9	12.5	12.9	9.3	5	99230.0	59
26	9.6	53.3	2202	268.0	275.3	4.0	11.8	9.4	11.2	5	99227.8	59
27			2319	268.0	275.4	3.4	12.2	10.4	9.2	5	99227.9	59
28	12.4	55.7	2713	268.0	275.4	8.2	13.3	12.3	9.4	5	99227.8	59
29	12.6	53.9	2532	268.0	275.3	7.2	12.4	12.5	9.2	5	99228.0	59
30	12.2	53.7	2501	268.0	275.3	6.9	12.3	12.1	9.5	5	99227.6	59
31			2389	268.0	275.4	5.1	11.9	11.5	10.0	5	99227.4	59
32			2355	268.0	275.3	4.3	12.2	12.2	8.7	5	99227.5	59
33	14.8	55.6	2731	268.0	275.3	9.3	13.4	14.7	8.7	5	99227.5	59
34	12.8	55.0	2662	268.0	275.4	10.6	13.0	12.7	9.2	5	99227.8	59
35	15.6	55.5	2655	268.0	275.4	12.3	13.0	15.5	9.7	5	99227.3	59
36	14.0	54.5	2535	268.0	275.4	12.0	12.4	13.9	9.0	5	99228.0	59
37	13.7	54.6	2515	268.0	275.3	12.0	12.3	13.6	9.3	5	99227.7	59
38	10.5	54.7	2420	268.0	275.3	10.2	11.9	12.4	8.1	5	99227.4	59
39	14.6	55.7	2650	268.0	275.3	13.2	13.0	14.5	8.5	5	99227.4	59
40	14.9	55.1	2503	268.0	275.4	12.5	12.3	14.8	10.0	5	99227.9	59
41			2316	268.0	275.7	8.5	11.4	12.2	9.5	5	99227.3	59
42			2365	268.0	277.7	6.1	11.6	11.8	8.5	5	99228.7	59
43	10.5	55.3	2426	268.0	277.7	5.5	11.9	11.2	9.9	5	99227.6	60
44	9.7	55.8	2260	268.0	277.7	3.3	11.9	10.0	9.8	5	99227.4	60
45			2756	268.0	277.7	8.9	13.6	13.0	11.5	5	99227.6	60
46			2831	268.0	277.7	13.8	13.8	14.9	9.2	5	99227.9	60
47	14.0	55.4	2497	268.0	277.7	11.8	12.1	13.9	10.3	5	99227.6	60
48			2339	268.0	277.7	8.2	11.5	12.7	10.0	5	99227.9	59
49	12.8	54.0	2457	268.0	277.7	7.7	12.0	12.8	11.1	5	99227.4	59
50			2612	268.0	277.7	10.1	12.8	11.6	9.2	5	99227.3	59
51			2698	268.0	277.7	12.4	13.2	13.8	9.9	5	99227.2	59
52			2687	268.0	277.7	14.7	13.2	16.1	10.6	5	99227.1	59
53	10.4	55.1	2417	268.0	277.7	12.2	11.8	13.1	11.1	5	99227.2	59
54			2349	268.0	277.7	9.5	11.6	12.8	12.0	5	99219.0	59
55			2567	268.0	277.7	11.1	12.6	14.0	12.5	5	99214.2	60
56			2636	268.0	277.7	13.2	12.9	14.9	12.8	5	99214.3	60
57			2562	268.0	277.7	13.6	12.5	14.8	12.1	5	99214.2	60
58	10.7	55.5	2451	268.0	277.7	12.3	12.1	13.4	10.9	5	99214.5	60
59			2323	268.0	277.7	9.0	11.4	11.7	9.4	5	99214.6	60
60	12.8	55.8	2470	268.0	277.7	8.9	12.2	12.7	10.0	5	99214.7	60
61	12.8	55.9	2568	268.0	277.7	10.3	12.6	12.7	11.1	5	99214.8	60
62	13.1	55.1	2580	268.0	277.7	11.5	12.7	13.0	11.4	5	99214.8	60
63	13.9	55.1	2472	268.0	277.7	10.4	12.1	13.9	12.1	5	99214.4	60
64	10.6	55.8	2440	268.0	277.7	9.1	12.0	12.5	11.5	5	99214.7	60
65	11.7	55.7	2457	268.0	277.7	8.6	12.0	11.6	10.7	5	99214.6	60
66	12.2	55.8	2478	268.0	277.7	7.9	12.2	12.1	9.2	5	99223.6	60
67			2626	268.0	277.7	10.6	12.9	13.6	10.0	5	99227.4	60
68	12.0	55.0	2495	268.0	277.7	9.5	12.2	11.9	9.4	5	99227.3	60
69	12.6	53.6	2522	268.0	277.7	10.0	12.4	12.6	10.4	5	99227.3	60
70	10.5	52.9	2429	268.0	277.7	8.2	11.9	11.6	10.5	5	99227.8	60
71	10.7	53.4	2450	268.0	277.7	7.4	12.0	11.7	10.5	5	99227.5	60
72	9.8	53.0	2290	268.0	277.7	5.0	11.8	10.7	10.9	5	99236.1	60
73	9.3	53.2	2084	268.0	277.7	2.9	11.8	9.7	9.5	5	99240.7	60
74	9.4	53.7	2118	268.0	277.7	1.9	12.1	8.9	8.5	5	99240.7	60
75	9.8	54.2	2278	268.0	277.7	2.4	12.3	9.4	7.4	5	99240.6	60
76	12.2	54.5	2631	268.0	277.7	5.3	12.9	12.1	6.3	5	99240.9	60
77			2582	268.0	277.7	6.2	12.6	10.6	7.0	5	99240.5	60
78			2488	268.0	277.4	5.2	12.2	10.1	8.2	5	99248.0	61
79	11.0	53.7	2533	268.0	275.1	5.7	12.4	11.0	8.6	5	99252.7	61
80			2478	268.0	275.1	4.8	12.1	10.6	8.1	5	99252.6	61
81	10.0	53.7	2352	268.0	275.1	2.9	12.1	10.3	10.8	5	99253.0	61
82			2314	268.0	275.1	3.0	12.3	12.5	9.5	5	99253.1	61
83	9.3	53.7	2102	268.0	275.1	1.9	12.2	9.6	8.2	5	99253.2	61
84	9.8	53.6	2295	268.0	275.1	2.5	12.3	10.4	10.2	5	99253.2	60
85	9.5	53.7	2149	268.0	275.1	1.7	12.3	10.0	11.4	5	99253.3	60
86	10.5	54.0	2423	268.0	275.1	2.5	12.4	10.3	8.5	5	99253.1	60
87	9.6	54.0	2211	268.0	275.1	1.8	12.2	9.8	10.6	5	99253.3	60
88	9.5	53.6	2179	268.0	275.1	1.7	12.3	9.6	11.0	5	99253.2	60

***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	11.4	54.7	2544	268.0	275.1	3.6	12.7	11.3	9.0	5	99253.4	60
90	12.2	54.5	2733	268.0	275.1	8.0	13.4	12.1	9.3	5	99253.4	60
91	13.3	53.9	2606	268.0	275.1	8.4	12.7	13.2	8.5	5	99253.1	60
92	12.6	53.6	2485	268.0	275.1	7.4	12.2	12.5	7.8	5	99252.6	60
93	10.2	53.7	2389	268.0	276.0	5.5	12.0	11.0	9.9	5	99252.8	60
94	12.8	54.7	2653	268.0	277.8	9.1	13.0	12.7	10.8	5	99252.8	60
95	12.6	55.0	2519	268.0	277.8	8.5	12.3	12.5	9.4	5	99252.6	60
96	9.4	53.7	2147	268.0	277.8	5.3	11.8	10.4	8.6	5	99252.8	59
97	9.6	54.0	2198	268.0	277.8	3.6	11.8	10.6	9.1	5	99253.2	59
98	9.1	53.9	2005	268.0	277.8	2.0	12.0	9.6	7.2	5	99252.9	59
99	8.7	53.9	1825	268.0	279.9	1.1	12.2	8.7	7.0	5	99253.1	59
100	9.9	53.9	2318	268.0	280.6	2.3	12.5	9.8	7.4	5	99253.2	59
101	9.9	53.5	2333	268.0	280.6	2.3	12.3	10.2	9.3	5	99253.3	59
102	9.7	53.7	2237	268.0	280.6	2.0	12.3	9.4	9.8	5	99253.7	58
103	9.8	54.4	2269	268.0	280.6	2.1	12.3	10.6	10.8	5	99253.0	58
104	11.1	54.1	2555	268.0	280.6	3.4	12.6	11.1	7.9	5	99253.4	58
105	11.9	54.1	2616	268.0	280.6	5.7	12.8	11.8	6.5	5	99253.0	58
106	12.3	53.4	2522	268.0	280.6	5.1	12.4	12.2	7.0	5	99253.2	58
107			2519	268.0	280.6	5.2	12.4	10.1	8.9	5	99248.4	59
108	11.5	53.8	2519	268.0	280.7	5.4	12.3	11.4	10.5	5	99241.3	59
109			2461	268.0	280.7	4.1	12.1	9.9	11.2	5	99241.6	59
110	9.8	53.1	2270	268.0	280.7	2.2	12.0	10.0	8.9	5	99241.4	59
111	10.8	53.6	2496	268.0	280.7	3.3	12.4	10.7	8.5	5	99241.6	59
112	11.3	54.4	2621	268.0	280.7	5.9	12.8	11.2	11.4	5	99241.4	59
113	11.9	54.4	2563	268.0	280.6	6.5	12.6	11.8	10.3	5	99241.3	59
114			2376	268.0	280.6	4.2	12.0	11.3	8.9	4	99240.7	58
115	11.2	53.3	2458	268.0	280.6	3.6	12.1	11.1	8.4	4	99241.3	58
116			2459	268.0	280.6	3.0	12.2	10.3	9.5	4	99241.5	58
117	11.9	53.5	2534	268.0	280.6	4.0	12.4	11.9	9.1	4	99241.3	58
118			2208	268.0	280.6	2.2	12.1	11.0	8.8	4	99241.5	58
119	9.8	53.5	2285	268.0	280.6	2.5	12.3	10.1	6.9	4	99246.5	58
120	11.3	53.3	2540	268.0	280.6	3.6	12.5	11.2	7.7	4	99253.4	57
121	9.9	52.9	2330	268.0	280.6	2.7	12.2	10.8	7.9	4	99253.3	57
122	11.1	53.2	2454	268.0	280.7	3.0	12.3	11.1	7.5	4	99253.1	57
123	9.8	53.2	2301	268.0	280.7	2.5	12.2	10.7	7.2	4	99253.6	57
124	9.2	53.2	2049	268.0	280.5	1.5	12.2	8.9	8.4	4	99253.3	57
125	8.9	54.0	1934	268.0	277.6	-0.2	12.3	8.5	7.0	4	99253.0	58
126	8.5	53.6	1740	268.0	277.1	-0.8	12.2	9.3	5.9	4	99253.0	58
127	8.7	53.9	1807	268.0	277.1	-0.8	12.3	8.9	5.9	4	99253.0	58
128	8.6	53.7	1743	268.0	277.0	-0.8	12.3	9.0	6.1	4	99252.7	58
129	7.5	53.3	1232	268.0	275.2	-1.7	12.0	7.2	6.2	4	99252.9	58
130	8.7	53.8	1831	268.0	273.1	0.1	12.5	8.4	7.6	4	99238.1	61
131	9.4	53.7	2132	268.0	270.3	1.0	12.4	9.6	6.8	4	99238.5	61
132	9.6	53.2	2189	268.0	270.2	1.1	12.4	9.3	5.9	4	99238.2	60
133			2511	268.0	270.2	2.0	12.5	9.8	5.2	4	99238.6	60
134	12.3	54.1	2509	268.0	270.2	2.2	12.4	12.2	4.7	4	99238.3	60
135			2499	268.0	270.3	3.4	12.5	10.6	5.9	4	99238.1	60
136	9.0	53.1	1989	268.0	270.3	1.5	12.1	9.4	7.2	4	99238.2	60
137	8.9	53.6	1912	268.0	270.3	0.3	12.2	7.8	6.1	4	99238.6	60
138	8.8	53.7	1881	268.0	270.3	-0.5	12.3	9.1	6.1	4	99246.6	61
139	9.8	53.8	2284	268.0	270.2	1.4	12.5	10.1	5.9	4	99251.2	61
140			2622	268.0	270.2	4.6	12.9	10.0	5.5	4	99253.1	61
141			2564	268.0	270.2	5.4	12.6	10.6	7.6	4	99254.0	61
142			2521	268.0	270.2	5.3	12.5	10.0	7.2	4	99253.2	61
143	11.7	53.7	2631	268.0	270.2	8.0	13.0	11.6	7.0	4	99252.3	61
144	12.3	53.3	2592	268.0	270.3	9.3	12.8	12.2	6.1	4	99252.7	61
145	12.6	52.9	2504	268.0	270.3	8.9	12.4	12.5	7.7	4	99253.2	61
146	13.1	53.7	2496	268.0	270.3	8.9	12.4	13.0	7.5	4	99252.8	61
147	11.5	53.9	2464	268.0	270.3	8.6	12.2	11.4	6.7	4	99252.5	61
148			2347	268.0	270.3	5.6	11.7	11.3	6.8	4	99252.5	61
149	9.8	54.1	2269	268.0	270.3	3.5	11.8	10.3	7.0	4	99252.7	61
150	9.8	53.9	2285	268.0	270.3	2.3	12.0	10.0	7.0	4	99252.9	60
151	11.2	53.9	2499	268.0	270.3	3.5	12.4	11.2	7.4	4	99253.4	60
152			2497	268.0	270.3	3.4	12.3	10.1	7.2	4	99253.3	60
153			2526	268.0	270.3	4.4	12.5	10.4	6.7	4	99252.8	60
154	10.7	53.7	2448	268.0	270.3	3.1	12.2	10.0	6.0	4	99252.7	60
155	12.0	53.9	2542	268.0	270.3	4.7	12.6	11.9	6.1	4	99252.7	60
156			2537	268.0	270.3	5.4	12.5	10.1	5.9	4	99252.6	61
157	11.2	52.6	2471	268.0	270.3	4.7	12.2	11.1	5.6	4	99252.6	61
158	12.5	53.1	2470	268.0	270.3	4.0	12.2	12.4	6.7	4	99252.6	61
159	11.4	53.7	2563	268.0	270.3	6.1	12.7	11.3	7.5	4	99253.0	61
160	12.3	53.6	2552	268.0	270.3	6.9	12.6	12.2	7.3	4	99253.0	61
161	12.1	53.0	2497	268.0	270.3	6.8	12.3	12.1	7.5	4	99252.7	61
162	10.5	52.4	2418	268.0	270.2	5.1	12.0	10.7	8.1	4	99253.0	60
163	9.7	52.8	2256	268.0	270.3	3.2	11.9	10.6	6.3	4	99253.0	60
164	10.0	53.4	2370	268.0	270.3	3.1	12.2	11.0	7.1	4	99252.7	60
165			2492	268.0	270.3	3.5	12.3	10.3	6.1	4	99252.9	60
166			2467	268.0	270.3	3.3	12.3	10.6	6.3	4	99252.9	60
167	9.9	53.8	2305	268.0	270.3	2.8	12.2	10.6	6.5	4	99253.1	60
168			2071	268.0	270.3	1.8	12.2	10.3	6.9	4	99252.9	61
169	9.7	53.2	2263	268.0	270.3	2.3	12.3	10.7	7.7	4	99252.5	61
170	9.0	53.4	1977	268.0	270.3	0.9	12.1	8.4	7.6	4	99252.8	61
171	9.9	54.1	2311	268.0	270.2	1.6	12.4	8.9	7.9	4	99252.9	61
172	10.1	53.9	2374	268.0	270.2	1.9	12.3	9.5	7.1	4	99252.8	61
173	9.7	53.7	2259	268.0	270.2	1.0	12.3	9.2	7.4	4	99253.0	60
174	10.0	53.6	2348	268.0	268.4	1.4	12.3	10.1	8.1	4	99253.2	60
175	9.7	53.3	2242	268.0	267.6	1.1	12.3	9.7	7.2	4	99253.3	60
176	9.4	53.2	2147	268.0	267.6	0.6	12.3	9.1	6.2	4	99253.3	60

Table E.01 Measurement data - Turbine ON

Project: Port Ryerse Wind Power Project - Turbine T4 - IEC 61400-11 Measurement

Report ID: 14355.00.T4.RP1

Created on: 11/9/2017

***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 (%)
177	9.7	53.4	2242	268.0	267.5	1.0	12.3	9.5	7.6	4	99253.2	60
178	8.9	54.0	1903	268.0	267.5	-0.3	12.2	8.5	7.6	4	99253.2	60
179	9.1	53.7	2022	268.0	267.5	0.3	12.4	8.9	6.5	4	99252.9	61
180	10.3	53.7	2405	268.0	267.5	1.5	12.5	9.9	6.8	4	99252.7	61
181	10.8	53.9	2595	268.0	267.5	3.9	12.8	10.7	5.2	4	99253.1	61
182			2559	268.0	267.5	5.1	12.7	9.5	7.6	4	99253.1	61
183			2470	268.0	267.5	4.7	12.3	10.4	8.0	4	99253.3	61
184	9.3	52.6	2087	268.0	267.5	2.0	12.0	10.1	6.5	4	99252.9	61
185	8.1	53.4	1502	268.0	266.9	-0.8	12.1	7.5	6.6	4	99252.7	61
186	7.8	53.4	1345	268.0	263.7	-1.5	12.2	6.8	6.3	4	99252.7	61
187	7.5	53.2	1213	268.0	262.1	-1.8	12.1	6.5	6.7	4	99252.7	61
188	7.3	52.4	1135	268.0	260.7	-1.8	11.8	8.0	7.0	4	99252.8	61
189	7.4	53.0	1167	268.0	260.7	-1.8	11.9	7.3	6.7	4	99252.6	61
190			1757	268.0	260.7	0.5	12.5	9.5	6.5	4	99252.7	61
191			1865	268.0	261.7	0.2	12.4	9.9	5.7	4	99252.7	61
192	8.2	53.3	1560	268.0	264.4	-1.2	12.2	8.8	5.8	4	99252.7	61
193	7.8	53.0	1357	268.0	264.4	-1.5	12.2	8.5	6.0	4	99252.7	61
194			1262	268.0	266.0	-1.7	12.3	8.6	6.7	4	99253.1	61
195	7.6	53.4	1288	268.0	267.6	-1.6	12.3	7.6	6.1	4	99252.8	61
196	8.4	54.0	1644	268.0	267.6	-0.6	12.4	7.4	5.6	4	99252.7	61
197	8.3	53.3	1624	268.0	267.6	-0.8	12.3	7.7	6.7	4	99252.7	61
198	7.4	53.1	1169	268.0	266.3	-1.8	11.9	6.7	6.7	4	99252.9	61
199	7.3	52.3	1108	268.0	263.6	-1.8	11.7	7.3	5.2	4	99252.9	61
200			969	268.0	263.6	-1.8	11.2	7.9	5.4	4	99252.9	61
201	6.9	51.3	952	268.0	263.6	-1.8	11.1	6.9	5.6	4	99253.1	61
202	7.0	51.5	1000	268.0	263.6	-1.8	11.3	6.7	6.4	4	99253.2	61
203	7.1	52.0	1047	268.0	263.6	-1.8	11.5	6.4	6.2	5	99253.0	60
204	7.2	52.3	1083	268.0	263.6	-1.8	11.6	6.1	6.3	5	99252.8	60
205	7.2	52.2	1071	268.0	263.6	-1.8	11.6	7.2	7.4	5	99252.8	60
206	8.2	53.1	1580	268.0	263.6	0.2	12.4	8.3	7.9	5	99253.0	60
207	9.1	53.2	1994	268.0	263.6	1.7	12.4	9.4	7.5	5	99253.1	60
208	8.9	53.5	1928	268.0	263.6	1.0	12.3	8.9	7.3	5	99253.0	60
209	9.1	53.7	2028	268.0	265.5	0.1	12.4	9.8	6.3	5	99264.9	61
210			2524	268.0	266.4	2.4	12.5	9.3	7.5	5	99266.2	61
211	9.6	53.4	2216	268.0	266.3	1.2	12.2	9.5	7.3	5	99266.1	61
212	9.2	53.5	2030	268.0	266.4	-0.2	12.2	9.0	6.6	5	99266.3	61
213	8.9	53.6	1907	268.0	266.4	-0.4	12.3	7.9	6.1	5	99266.6	61
214			1987	268.0	267.6	-0.3	12.3	10.3	6.0	5	99259.7	61
215	8.7	53.6	1841	268.0	268.9	-0.7	12.3	8.9	6.2	5	99253.4	61
216	9.0	53.7	1948	268.0	268.9	0.0	12.4	9.8	5.2	5	99253.1	61
217	9.0	53.6	1962	268.0	268.9	0.4	12.3	9.3	6.5	5	99253.0	61
218	8.1	53.8	1535	268.0	268.9	-1.2	12.1	8.7	8.0	5	99253.1	61
219			1354	268.0	268.9	-1.6	12.3	9.2	8.6	5	99253.1	61
220	8.3	53.5	1621	268.0	268.9	-0.8	12.4	8.3	7.3	5	99262.6	61
221	8.8	53.5	1891	268.0	268.9	0.4	12.4	9.6	6.7	5	99266.2	60
222	9.3	53.5	2099	268.0	268.9	0.7	12.4	8.7	6.1	5	99266.3	60
223	9.4	53.5	2119	268.0	268.9	0.5	12.3	8.0	5.6	5	99266.3	60
224	9.9	54.3	2329	268.0	268.6	1.1	12.4	9.1	6.4	5	99266.5	60
225	9.6	53.6	2195	268.0	265.8	0.9	12.3	9.9	7.1	5	99266.6	60
226	9.8	53.8	2294	268.0	265.6	1.2	12.3	9.6	7.3	5	99266.5	61
227	9.4	54.1	2121	268.0	265.5	0.4	12.2	9.0	7.1	5	99266.5	61
228	9.1	54.0	1995	268.0	265.5	-0.1	12.2	9.1	6.6	5	99266.4	61
229			1922	268.0	265.5	-0.1	12.3	10.0	6.0	5	99266.4	61
230	9.3	53.8	2091	268.0	265.5	0.3	12.3	9.2	5.2	5	99266.5	61
231			2018	268.0	265.5	-0.2	12.3	10.7	4.9	5	99266.4	61
232	9.0	53.2	1977	268.0	265.5	0.1	12.3	9.4	4.9	5	99266.5	61
233	9.0	53.1	1976	268.0	265.5	-0.3	12.3	8.2	6.0	5	99266.6	61
234	8.6	53.6	1778	268.0	265.5	-0.8	12.3	9.2	7.4	5	99266.6	61
235	8.6	53.9	1788	268.0	265.5	-0.7	12.3	9.1	7.4	5	99266.6	61
236	8.8	53.7	1846	268.0	265.5	0.0	12.4	9.6	6.6	5	99266.5	61
237	9.4	53.5	2142	268.0	265.5	1.3	12.4	9.5	6.7	5	99266.9	61
238			1979	268.0	265.5	0.2	12.3	10.2	6.8	5	99266.6	61
239	9.5	53.7	2184	268.0	265.5	0.9	12.4	10.0	6.5	5	99266.5	61
240	9.8	53.5	2287	268.0	265.5	1.1	12.4	10.1	7.2	5	99266.5	61
241	10.1	54.6	2380	268.0	265.5	1.2	12.3	10.0	7.2	5	99266.5	61
242	9.7	54.2	2251	268.0	265.5	0.9	12.3	10.1	6.3	5	99266.5	61
243	9.9	53.2	2307	268.0	265.5	1.1	12.3	10.9	5.4	5	99266.6	61
244	9.2	53.2	2065	268.0	265.5	-0.1	12.2	9.7	5.6	5	99268.2	61
245	9.6	53.4	2208	268.0	265.5	0.7	12.3	9.3	5.0	5	99266.8	61
246	9.1	53.1	2022	268.0	265.5	-0.1	12.2	8.7	4.4	5	99266.6	61
247	8.4	53.1	1655	268.0	265.5	-1.0	12.2	7.4	4.3	5	99266.5	61
248	8.1	53.7	1500	268.0	264.6	-1.3	12.2	7.9	4.0	5	99266.6	61
249	7.8	53.0	1366	268.0	263.5	-1.5	12.2	7.2	4.5	5	99266.4	61
250	8.4	53.9	1666	268.0	263.5	-0.6	12.4	7.8	5.2	5	99279.9	61
251	7.9	53.3	1407	268.0	263.5	-1.4	12.2	8.1	4.3	5	99279.7	61
252	7.4	52.9	1191	268.0	263.6	-1.8	12.0	7.2	5.4	5	99279.7	61
253	7.2	52.6	1084	268.0	263.6	-1.8	11.6	6.8	5.2	5	99279.8	61
254			1262	268.0	263.5	-1.1	12.1	8.5	6.2	5	99279.9	61
255	8.5	53.6	1695	268.0	263.5	0.4	12.4	7.3	6.3	5	99280.0	61
256	8.8	53.8	1866	268.0	263.5	-0.1	12.4	6.7	5.0	5	99280.2	60
257	9.2	53.8	2039	268.0	264.0	0.6	12.4	8.6	4.9	5	99279.8	60
258			2576	268.0	266.0	3.5	12.8	10.3	4.9	5	99280.0	60
259			2523	268.0	266.0	3.7	12.5	10.6	4.4	5	99279.9	60
260	9.8	53.1	2297	268.0	266.1	2.5	12.2	9.9	3.8	5	99280.1	60
261	8.9	54.5	1934	268.0	268.6	0.2	12.2	9.0	5.1	5	99280.0	61
262			2502	268.0	269.2	2.8	12.7	10.2	5.8	5	99279.5	61
263	11.6	54.5	2705	268.0	269.2	7.3	13.4	11.5	7.0	5	99279.5	61
264	10.9	53.5	2524	268.0	269.2	6.7	12.5	10.8	6.6	5	99279.6	61

***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	11.0	52.9	2461	268.0	269.2	5.7	12.2	10.9	7.2	5	99279.6	61
266			2256	268.0	269.2	3.2	11.8	11.4	6.2	5	99279.7	61
267	9.3	53.0	2062	268.0	267.3	1.0	12.3	10.1	8.5	5	99332.1	55
268	9.2	53.6	2054	268.0	268.5	-0.2	12.3	9.2	7.9	5	99332.0	55
269	9.3	53.2	2092	268.0	269.7	0.1	12.3	8.7	7.6	5	99332.0	54
270	9.4	53.3	2125	268.0	269.7	0.2	12.3	8.4	7.1	5	99332.0	54
271	8.9	53.1	1936	268.0	269.7	-0.4	12.2	9.4	6.5	5	99332.0	54
272	8.2	53.1	1547	268.0	269.7	-1.2	12.1	8.7	5.8	5	99331.7	54
273	7.6	52.6	1257	268.0	269.7	-1.7	12.2	7.6	6.2	5	99332.0	54
274	7.5	52.8	1233	268.0	269.7	-1.7	12.2	6.8	7.0	5	99332.0	54
275	7.5	53.0	1243	268.0	272.3	-1.7	12.2	7.7	6.0	5	99331.9	54
276	7.8	53.3	1344	268.0	272.9	-1.6	12.3	8.0	7.7	5	99332.2	54
277			1315	268.0	272.9	-1.6	12.3	8.8	8.4	5	99332.0	54
278	7.4	52.3	1190	268.0	272.9	-1.8	12.0	7.9	9.4	5	99332.1	54
279	7.3	52.3	1108	268.0	273.0	-2.0	11.7	8.0	9.3	5	99332.1	54
280	7.3	52.3	1128	268.0	275.2	-2.1	11.8	7.0	8.9	5	99329.5	54
281	7.4	52.1	1173	268.0	275.3	-2.1	11.9	6.5	7.8	5	99319.0	54
282	7.2	51.4	1064	268.0	275.3	-2.1	11.5	6.3	7.2	5	99318.9	54
283	7.1	51.4	1043	268.0	275.3	-2.1	11.5	7.9	6.6	5	99318.8	54
284	7.6	52.6	1252	268.0	275.3	-2.0	12.2	7.5	7.1	5	99318.9	54
285	8.3	53.1	1605	268.0	275.3	-1.2	12.4	8.7	8.4	5	99319.0	54
286	8.0	52.9	1477	268.0	275.3	-1.3	12.2	8.7	9.1	5	99319.2	54
287	7.6	52.7	1256	268.0	275.3	-1.7	12.2	7.6	8.5	5	99319.3	55
288			1636	268.0	275.3	-0.9	12.5	9.3	7.7	5	99319.2	55
289	8.9	52.8	1917	268.0	275.3	-0.1	12.4	8.9	7.5	5	99319.2	55
290	9.3	52.7	2077	268.0	275.3	0.3	12.4	9.2	7.0	5	99319.0	55
291	9.5	52.9	2158	268.0	275.3	0.2	12.4	9.2	7.2	5	99318.7	55
292	9.3	52.7	2071	268.0	275.3	-0.3	12.3	9.1	6.2	5	99321.4	55
293	9.1	53.0	2018	268.0	275.3	-0.4	12.3	9.4	6.7	5	99332.2	55
294	9.3	53.0	2069	268.0	275.3	-0.2	12.3	8.5	5.3	5	99332.2	55
295	9.1	52.8	1996	268.0	275.3	-0.4	12.3	8.8	6.1	5	99331.9	55
296	8.7	53.1	1822	268.0	275.3	-0.7	12.2	9.4	6.5	5	99332.0	55
297	8.4	53.1	1666	268.0	275.3	-1.0	12.2	9.0	6.4	5	99331.9	55
298	8.3	52.7	1633	268.0	275.3	-1.1	12.3	8.1	7.2	5	99332.0	55
299	8.2	53.2	1576	268.0	274.8	-1.1	12.3	7.5	6.4	5	99331.9	54
300	8.4	53.1	1652	268.0	272.4	-1.0	12.3	8.9	7.8	5	99331.8	54
301	8.1	52.8	1527	268.0	272.4	-1.2	12.2	7.7	7.6	5	99332.0	54
302	7.9	53.0	1423	268.0	272.5	-1.4	12.3	7.9	8.1	5	99332.2	54
303	8.0	52.9	1486	268.0	272.5	-1.3	12.3	7.8	7.3	5	99332.1	54
304	7.8	52.5	1348	268.0	272.5	-1.5	12.3	7.0	6.2	5	99332.2	54
305	7.9	52.6	1415	268.0	272.5	-1.5	12.3	7.8	6.8	5	99332.0	55
306	7.8	52.5	1365	268.0	272.4	-1.5	12.3	8.4	7.9	5	99332.3	55
307	7.6	53.0	1276	268.0	272.4	-1.7	12.3	8.2	8.7	5	99331.9	55
308			1262	268.0	272.4	-1.6	12.3	8.5	7.9	5	99332.2	55
309	7.4	52.6	1173	268.0	273.6	-1.5	12.0	7.3	6.9	5	99332.2	55
310	7.3	51.9	1125	268.0	274.8	-1.5	11.7	7.0	6.9	5	99332.0	54
311	6.6	49.7	841	268.0	274.9	-1.5	10.6	6.9	6.6	5	99332.0	54
312			617	268.0	274.9	-1.5	9.6	6.7	6.1	5	99332.1	54
313	5.4	48.2	459	268.0	274.5	-1.5	8.8	5.5	4.1	5	99332.3	54
314	5.2	47.4	390	268.0	271.3	-1.8	8.4	5.5	6.3	5	99332.3	54
315	5.4	47.2	448	268.0	271.1	-2.1	8.7	5.6	7.8	5	99333.4	54
316			546	268.0	271.1	-2.1	9.2	6.7	7.7	5	99345.3	55
317	5.8	47.8	567	268.0	271.1	-2.1	9.4	5.9	7.9	5	99345.5	55
318	5.8	47.6	571	268.0	271.1	-2.1	9.4	6.4	6.4	5	99345.4	55
319	5.8	47.6	557	268.0	271.1	-2.1	9.3	5.9	5.7	5	99345.6	55
320	5.6	47.4	512	268.0	271.1	-1.8	9.0	5.4	5.5	5	99345.5	55
321	5.4	46.9	461	268.0	271.1	-1.5	8.7	5.8	5.5	5	99345.4	55
322	5.5	46.8	473	268.0	271.1	-1.5	8.8	5.7	5.0	5	99345.1	54
323	5.7	47.4	539	268.0	271.1	-1.5	9.2	6.3	4.2	5	99345.1	54
324			588	268.0	271.1	-1.5	9.5	6.8	4.1	5	99345.1	54
325			569	268.0	271.1	-1.5	9.4	6.9	3.8	5	99344.9	54
326	5.9	47.8	601	268.0	271.1	-1.8	9.6	6.1	4.5	5	99345.1	54
327			618	268.0	271.1	-2.1	9.7	7.3	4.1	5	99345.0	54
328			662	268.0	271.1	-2.1	9.9	7.4	4.3	5	99345.2	55
329	6.2	48.4	694	268.0	271.1	-2.1	10.0	5.9	5.5	5	99345.2	55
330	6.6	49.7	833	268.0	271.1	-2.1	10.7	6.2	5.7	5	99345.0	55
331	7.2	51.9	1097	268.0	271.1	-2.1	11.7	7.1	5.1	5	99344.9	55
332	7.9	53.1	1393	268.0	271.1	-1.6	12.4	8.0	5.1	5	99344.9	55
333	7.7	53.0	1336	268.0	271.1	-1.6	12.3	7.3	4.7	5	99344.9	55
334	7.5	52.4	1210	268.0	271.1	-1.8	12.1	7.6	4.4	5	99345.0	56
335	7.3	51.6	1151	268.0	271.1	-1.8	11.8	6.7	4.4	5	99345.1	56
336	7.0	51.0	979	268.0	270.7	-1.8	11.2	7.0	5.1	5	99345.0	56
337	6.5	49.4	791	268.0	268.5	-1.8	10.4	6.6	5.4	5	99345.1	56
338	6.2	48.5	691	268.0	268.4	-1.7	10.0	6.8	6.3	5	99345.1	56
339	6.0	47.9	612	268.0	268.4	-1.5	9.6	5.1	6.0	5	99345.2	55
340	5.8	47.7	573	268.0	268.4	-1.5	9.4	5.6	5.7	5	99345.2	55
341	6.1	48.2	643	268.0	268.4	-1.5	9.8	5.5	4.6	5	99344.9	55
342	6.4	48.7	750	268.0	268.4	-1.5	10.3	6.2	4.6	5	99345.0	55
343	6.5	49.0	804	268.0	268.4	-1.5	10.5	6.5	6.0	5	99345.2	55
344			976	268.0	268.4	-1.8	11.3	8.5	6.3	5	99345.1	55
345	7.4	52.5	1182	268.0	268.4	-2.1	12.0	7.5	5.9	5	99345.2	55
346	8.1	53.2	1508	268.0	268.4	-1.5	12.4	7.5	5.1	5	99345.1	55
347	8.0	52.9	1467	268.0	268.5	-1.6	12.3	7.7	5.6	5	99342.8	55
348	7.8	52.8	1372	268.0	268.4	-1.8	12.3	7.8	5.5	5	99329.9	55
349			1221	268.0	268.4	-2.1	12.1	8.5	5.0	5	99330.2	55
350	7.4	52.2	1197	268.0	268.4	-2.0	12.0	7.6	5.7	5	99330.1	55
351	7.4	52.1	1182	268.0	268.4	-1.8	12.0	7.6	4.0	5	99330.1	55
352	7.4	51.8	1155	268.0	268.4	-1.8	11.9	7.5	4.4	5	99330.2	56

Table E.01 Measurement data - Turbine ON

Project: Port Ryerse Wind Power Project - Turbine T4 - IEC 61400-11 Measurement

Report ID: 14355.00.T4.RP1

Created on: 11/9/2017

***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 (%)
353	7.6	52.7	1293	268.0	268.4	-1.6	12.2	7.4	5.2	5	99330.1	56
354	8.5	53.2	1708	268.0	268.5	-0.5	12.5	8.4	4.7	5	99330.2	56
355	9.0	52.9	1967	268.0	268.4	-0.2	12.4	8.5	4.5	5	99330.2	56
356	9.2	52.8	2034	268.0	268.4	-0.3	12.4	9.0	4.5	5	99330.4	56
357			1897	268.0	268.5	-0.4	12.2	9.4	3.9	5	99332.4	56
358			1703	268.0	268.4	-0.9	12.3	9.5	3.8	5	99342.3	56
359			1847	268.0	268.4	-0.5	12.4	8.8	4.3	5	99342.4	56
360	9.0	52.9	1987	268.0	268.4	-0.2	12.3	8.7	5.3	5	99342.2	56
361	8.6	52.8	1762	268.0	268.4	-0.8	12.2	8.5	5.4	5	99342.2	56
362	7.9	52.9	1422	268.0	268.4	-1.4	12.2	7.3	5.5	5	99342.5	56
363	7.3	52.8	1130	268.0	267.4	-1.8	11.8	6.9	5.1	5	99341.3	56
364	7.1	51.4	1036	268.0	264.7	-1.8	11.4	6.9	5.5	5	99330.5	56
365	7.3	51.8	1123	268.0	264.7	-1.8	11.8	6.8	6.8	5	99330.2	56
366	7.2	52.0	1100	268.0	264.7	-1.8	11.7	7.0	5.9	5	99330.5	56
367			1347	268.0	264.7	-1.3	12.3	8.5	6.0	5	99330.4	56
368			1355	268.0	264.7	-1.5	12.3	8.1	5.9	5	99330.6	56
369	7.6	52.7	1278	268.0	264.7	-1.7	12.3	7.6	5.9	5	99330.3	56
370	7.7	52.8	1339	268.0	264.7	-1.6	12.3	7.6	5.6	5	99330.4	55
371	7.5	52.3	1217	268.0	264.7	-1.8	12.1	6.5	6.1	5	99330.7	55
372			1126	268.0	264.7	-1.8	11.8	7.8	5.8	5	99330.5	55
373	7.4	52.5	1165	268.0	264.7	-1.7	11.9	7.0	5.7	5	99330.7	55
374			1503	268.0	264.7	-0.9	12.4	8.1	6.0	5	99330.7	55
375	7.9	52.9	1404	268.0	264.7	-1.4	12.3	7.4	6.0	5	99330.7	55
376	7.5	52.4	1226	268.0	264.7	-1.8	12.1	7.0	5.2	5	99330.7	55
377			1294	268.0	264.7	-1.5	12.2	7.8	6.1	5	99332.6	55
378	7.9	53.0	1416	268.0	264.7	-1.3	12.3	7.3	5.6	5	99341.5	55
379	7.4	51.9	1178	268.0	264.7	-1.8	12.0	7.0	6.6	5	99343.7	55
380	7.5	52.7	1237	268.0	264.7	-1.7	12.2	6.6	6.6	5	99344.3	55
381	7.4	52.6	1199	268.0	264.7	-1.8	12.0	6.5	6.6	5	99344.5	55
382			1087	268.0	264.7	-1.8	11.6	7.9	6.9	5	99344.8	55
383			1041	268.0	264.7	-1.8	11.5	7.4	6.5	5	99345.1	55
384			1058	268.0	264.7	-1.8	11.5	7.3	7.3	5	99345.4	55
385			1157	268.0	264.7	-1.8	11.9	7.6	7.1	5	99346.0	55
386	7.9	52.7	1400	268.0	264.7	-1.5	12.4	7.8	6.6	5	99345.4	55
387			1255	268.0	264.7	-1.7	12.3	7.6	5.4	5	99345.1	55
388			1262	268.0	264.8	-1.7	12.3	8.7	5.5	5	99345.3	55
389	7.7	53.0	1332	268.0	267.5	-1.6	12.3	7.1	5.0	5	99345.4	55
390	7.6	52.8	1280	268.0	267.8	-1.7	12.2	6.8	5.8	5	99345.2	55
391			1128	268.0	267.8	-1.8	11.8	7.7	5.4	5	99345.2	55
392	7.1	51.1	1034	268.0	268.1	-1.5	11.5	6.8	5.6	5	99345.1	55
393			964	268.0	270.3	-1.5	11.2	7.1	5.4	5	99345.0	55
394			822	268.0	270.3	-1.5	10.6	7.0	5.3	5	99345.2	55
395			795	268.0	270.3	-1.5	10.5	6.8	5.9	5	99345.1	55
396			834	268.0	270.3	-1.5	10.7	8.0	5.2	5	99345.1	55
397			868	268.0	270.3	-1.7	10.8	6.9	5.2	5	99345.2	55
398	6.6	49.9	826	268.0	270.3	-2.1	10.6	5.8	5.1	5	99345.1	55
399			714	268.0	270.3	-2.1	10.1	6.4	5.9	5	99345.4	55
400			654	268.0	270.3	-2.1	9.8	6.5	6.6	5	99345.2	55
401			684	268.0	270.3	-2.1	10.0	6.3	6.4	5	99345.1	55
402			718	268.0	270.3	-2.1	10.2	6.5	5.5	5	99345.0	55
403	6.5	49.1	787	268.0	270.3	-2.0	10.5	6.1	6.0	5	99344.9	55
404			844	268.0	270.3	-1.5	10.7	7.1	4.9	5	99344.9	55
405			777	268.0	270.3	-1.5	10.4	7.5	4.6	5	99346.2	56
406			636	268.0	270.3	-1.5	9.7	6.6	5.3	5	99345.0	56
407	5.8	47.2	551	268.0	270.3	-1.5	9.2	4.8	5.1	5	99345.1	56
408	5.6	47.0	520	268.0	270.3	-1.5	9.1	5.4	4.6	5	99345.1	56
409			534	268.0	270.2	-1.6	9.2	5.9	4.9	5	99345.2	56
410			528	268.0	267.9	-2.1	9.1	5.9	5.1	5	99345.0	56
411			502	268.0	267.7	-2.1	9.0	6.4	5.2	5	99344.7	55
412			518	268.0	267.7	-2.1	9.1	6.5	4.9	5	99345.0	55
413	5.9	47.8	581	268.0	267.7	-2.1	9.5	5.7	4.4	5	99345.1	55
414			736	268.0	267.7	-2.1	10.2	6.8	4.9	5	99345.1	55
415	6.8	50.0	920	268.0	267.7	-2.0	11.0	6.5	5.1	5	99345.1	55
416	7.1	50.9	1046	268.0	267.7	-1.5	11.5	7.1	4.7	5	99345.1	55
417			1099	268.0	267.7	-1.5	11.7	7.6	3.6	5	99355.6	56
418			1084	268.0	267.7	-1.5	11.6	7.4	3.7	5	99357.0	56
419	7.0	50.5	992	268.0	267.7	-1.5	11.3	6.6	4.1	5	99357.1	56
420			910	268.0	267.7	-1.5	11.0	7.9	2.9	5	99357.2	56
421			878	268.0	267.7	-1.6	10.9	7.2	3.1	5	99357.3	56
422			812	268.0	267.7	-2.1	10.5	7.5	3.7	5	99357.1	56
423			839	268.0	267.7	-2.1	10.7	6.6	3.5	5	99357.1	56
424			1023	268.0	267.7	-2.1	11.4	7.3	3.5	5	99357.2	56
425			1166	268.0	267.7	-2.1	11.9	7.6	3.5	5	99357.1	56
426	7.2	51.4	1103	268.0	267.7	-2.1	11.7	6.6	3.2	5	99357.2	56
427			1002	268.0	267.7	-1.6	11.4	7.8	3.4	5	99357.1	56
428	7.3	51.8	1112	268.0	267.7	-1.5	11.7	6.3	4.2	5	99357.2	56
429			933	268.0	267.7	-1.5	11.0	7.1	4.9	5	99356.9	56
430			831	268.0	267.7	-1.5	10.7	8.0	6.0	5	99356.9	56
431			932	268.0	270.1	-1.5	11.1	7.9	6.5	5	99356.9	56
432			1107	268.0	271.0	-1.4	11.7	7.6	6.5	5	99356.9	56
433	8.3	53.0	1638	268.0	270.7	0.7	12.5	8.3	5.6	5	99356.8	56
434	8.5	52.9	1720	268.0	268.1	0.4	12.4	8.1	5.5	5	99357.0	55
435			1617	268.0	268.0	-1.1	12.3	8.3	6.1	5	99357.0	55

Table E.02 Measurement data - Background

Project: Port Ryerse Wind Power Project - Turbine T4 - IEC 61400-11 Measurement

Report ID: 14355.00.T4.RP1

Created on: 11/9/2017

***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	11.6	48.0	0.4	8.9	6	99174.2	62
2	10.1	47.1	0.4	7.7	6	99172.5	62
3	8.7	47.6	0.6	6.7	6	99173.0	62
4	7.6	47.2	0.6	5.8	6	99172.8	62
5	10.1	47.5	0.6	7.7	6	99173.1	62
6	13.1	47.2	0.7	10.1	6	99173.3	62
7	13.8	47.8	0.5	10.6	6	99172.6	62
8	15.6	47.7	0.3	12.0	6	99172.6	62
9	16.4	46.9	0.3	12.6	6	99172.8	62
10	14.3	48.8	0.4	11.0	6	99173.5	62
11	12.8	49.7	0.2	9.8	6	99173.2	61
12	12.9	47.5	0.2	9.9	6	99173.6	61
13	13.0	51.4	0.5	9.9	6	99173.5	61
14	17.2	50.7	0.8	13.2	6	99172.8	61
15	18.5	49.2	0.4	14.2	6	99172.8	61
16	16.2	50.1	0.5	12.4	6	99173.5	61
17	13.4	50.6	0.6	10.3	6	99173.5	62
18	13.1	51.7	0.6	10.1	6	99173.3	62
19			0.6	8.2	6	99173.0	62
20			0.6	9.2	6	99173.4	62
21			0.6	9.9	6	99173.1	62
22			0.5	10.0	6	99173.9	62
23			0.5	11.3	5	99175.0	63
24			0.4	9.7	5	99173.4	63
25			0.6	8.8	5	99173.8	63
26			0.6	12.1	5	99173.2	63
27			0.4	10.3	5	99173.5	63
28			0.6	9.9	5	99171.2	63
29			0.5	11.2	5	99158.4	64
30			0.5	11.2	5	99159.3	64
31			0.5	10.5	5	99159.3	64
32			0.6	9.2	5	99158.8	64
33			0.6	7.4	5	99158.8	64
34	11.1	51.8	0.3	8.5	5	99159.1	64
35	9.7	50.6	0.2	7.4	5	99170.7	63
36	8.5	50.0	0.3	6.5	5	99173.1	63
37	8.9	50.3	0.4	6.9	5	99173.0	63
38	10.4	50.1	0.4	8.0	5	99172.7	63
39	10.9	50.4	0.5	8.4	5	99172.5	63
40	12.3	50.7	0.5	9.4	5	99172.8	63
41			0.4	9.0	5	99172.6	63
42	9.3	50.9	0.4	7.2	5	99173.0	63
43	11.4	51.1	0.4	8.7	5	99173.1	63
44	12.3	49.9	0.6	9.5	5	99173.0	63
45	10.4	48.4	0.5	8.0	5	99172.8	63
46	9.3	48.5	0.7	7.1	5	99172.4	63
47	10.1	50.6	0.7	7.7	5	99186.0	63
48			0.4	7.6	5	99187.1	63
49			0.5	8.6	5	99187.1	63
50	11.5	52.0	0.5	8.8	5	99187.0	63
51	13.7	49.6	0.5	10.5	5	99187.1	63
52	12.7	48.4	0.4	9.8	5	99187.2	63
53	12.3	48.3	0.5	9.4	5	99175.6	62
54	11.1	46.6	0.5	8.5	5	99173.4	62
55	11.1	47.0	0.4	8.5	5	99173.2	62
56	13.0	50.1	0.4	10.0	5	99173.5	62
57	13.6	50.1	0.4	10.4	5	99172.8	62
58	11.9	48.8	0.5	9.1	5	99175.5	62
59	12.4	49.1	0.3	9.5	5	99171.5	62
60	12.2	48.8	0.4	9.3	5	99172.6	62
61	12.0	49.0	0.6	9.2	5	99174.5	62
62	12.3	48.5	0.7	9.4	5	99174.8	62
63	11.7	47.9	0.5	9.0	5	99173.7	62
64	10.4	49.3	0.4	8.0	5	99173.9	62
65	10.7	48.7	0.5	8.2	5	99197.1	62
66	15.3	50.1	0.4	11.7	5	99202.0	62
67	13.3	49.9	0.4	10.2	5	99201.8	62
68	10.7	48.5	0.6	8.2	5	99201.4	62
69	9.1	48.7	0.4	7.0	5	99201.8	62
70	11.7	48.1	0.2	9.0	5	99201.5	62
71	13.0	49.2	0.3	10.0	5	99191.2	62
72	14.3	49.2	0.5	11.0	5	99187.5	62
73	14.3	49.2	0.5	11.0	5	99187.5	62
74	15.6	51.9	0.8	12.0	5	99187.7	62
75	13.8	51.7	0.7	10.6	5	99188.0	62
76	14.3	50.3	0.4	11.0	5	99187.6	62
77	13.7	50.3	0.6	10.5	5	99200.9	61
78	12.3	48.4	0.5	9.4	5	99202.1	61
79	10.3	48.2	0.3	7.9	5	99201.3	61
80	9.2	48.5	0.4	7.1	5	99201.8	61
81	10.4	49.5	0.4	8.0	5	99201.4	61
82	10.1	48.9	0.4	7.7	5	99201.8	61
83	10.9	48.7	0.4	8.3	5	99201.6	62

***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	10.3	49.5	0.5	7.9	5	99201.5	63
85	10.4	50.4	0.5	8.0	5	99201.6	63
86	12.1	48.3	0.5	9.3	5	99201.8	63
87	11.6	47.0	0.4	8.9	5	99201.7	63
88	11.1	47.8	0.4	8.5	5	99201.7	63
89	9.8	46.1	0.3	7.6	5	99212.6	63
90	10.9	48.0	0.3	8.4	5	99214.5	63
91	11.6	48.7	0.5	8.9	5	99214.5	63
92	10.5	49.4	0.4	8.0	5	99214.2	63
93	9.1	47.3	0.3	7.0	5	99214.5	63
94	10.8	46.2	0.4	8.3	5	99214.6	63
95	10.6	45.5	0.4	8.1	5	99205.3	62
96	12.7	46.0	0.4	9.7	5	99201.8	62
97	12.7	46.0	0.5	9.7	5	99201.6	62
98	11.4	46.6	0.3	8.8	5	99202.4	62
99	9.2	46.4	0.3	7.1	5	99202.1	62
100	9.0	46.4	0.1	6.9	5	99202.0	62
101	9.1	47.1	0.5	7.0	5	99203.2	62
102	9.0	49.0	0.6	6.9	5	99201.6	63
103	7.6	49.8	0.6	5.9	5	99201.5	63
104			0.6	4.6	5	99201.9	63
105			0.5	5.1	5	99202.0	63
106			0.7	6.0	5	99201.9	63
107			0.7	5.1	5	99214.0	63
108	9.5	51.6	0.4	7.3	5	99213.9	63
109	8.9	50.8	0.5	6.9	5	99214.0	63
110	8.7	49.1	0.6	6.7	5	99214.1	63
111	8.2	51.3	0.5	6.3	5	99214.4	63
112			0.6	7.1	5	99214.7	63
113	13.4	51.7	0.7	10.3	5	99204.1	62
114	12.6	51.8	0.7	9.7	5	99202.2	62
115	11.8	51.2	0.6	9.1	5	99201.8	62
116	12.0	49.4	0.7	9.2	5	99201.8	62
117	11.2	46.7	0.5	8.6	5	99266.4	59
118	10.0	47.2	0.4	7.7	5	99266.4	59
119	9.3	46.4	0.4	7.1	5	99266.5	59
120	8.3	43.9	0.5	6.4	5	99266.5	59
121	10.5	42.8	0.2	8.0	5	99266.5	59
122	9.9	43.5	0.2	7.6	5	99266.3	59
123	10.3	43.1	0.3	7.9	5	99266.5	59
124	13.2	44.8	0.3	10.1	5	99266.5	59
125	12.9	45.7	0.3	9.9	5	99266.5	59
126	13.2	45.8	0.5	10.1	5	99266.6	59
127	13.4	46.0	0.3	10.3	5	99266.7	59
128	11.2	44.7	0.3	8.6	5	99266.6	58
129	9.9	45.4	0.3	7.6	5	99266.6	57
130	11.1	44.7	0.3	8.5	5	99266.6	57
131	11.6	43.9	0.4	8.9	5	99266.6	57
132	11.5	44.4	0.2	8.8	5	99266.6	57
133	12.1	45.0	0.1	9.3	5	99266.6	57
134	11.8	43.7	0.2	9.0	5	99261.1	57
135	11.5	44.8	0.4	8.8	5	99253.2	58
136	10.1	43.9	0.4	7.8	5	99253.2	58
137	10.4	44.5	0.4	8.0	5	99253.0	58
138	11.6	44.6	0.3	8.9	5	99253.1	58
139	12.6	42.9	0.3	9.7	5	99253.1	58
140	11.0	41.9	0.3	8.4	5	99261.3	58
141	7.8	42.5	0.2	6.0	5	99266.5	58
142	6.0	42.5	0.3	4.6	5	99266.5	58
143	6.6	42.0	0.3	5.1	5	99266.5	58
144	7.8	41.4	0.3	6.0	5	99266.5	58
145	8.8	42.4	0.2	6.8	5	99266.5	58
146	9.6	43.6	0.3	7.4	5	99266.6	57
147	9.7	43.8	0.2	7.4	5	99266.5	56
148	8.8	43.7	0.3	6.7	5	99266.6	56
149	7.2	43.6	0.4	5.5	5	99266.4	56
150	6.6	44.0	0.5	5.1	5	99266.6	56
151	9.2	43.1	0.4	7.1	5	99266.2	56
152	11.1	44.6	0.2	8.5	5	99266.6	57
153	10.4	45.3	0.5	8.0	5	99266.7	57
154	11.8	44.8	0.6	9.0	5	99266.7	57
155	8.5	43.9	0.5	6.5	5	99266.5	57
156	8.0	43.4	0.4	6.1	5	99266.6	57
157	10.0	43.4	0.4	7.7	5	99266.4	57
158	10.7	43.5	0.4	8.2	5	99266.4	57
159	10.7	43.7	0.5	8.2	5	99266.4	56
160	9.7	44.5	0.3	7.5	5	99266.4	56
161	12.0	43.9	0.3	9.2	5	99266.5	56
162	10.5	43.9	0.3	8.0	5	99266.4	56
163	8.5	43.6	0.4	6.5	5	99266.5	56
164	9.7	43.2	0.6	7.5	5	99266.5	56
165	10.7	43.0	0.4	8.2	5	99266.6	56
166	9.9	43.4	0.3	7.6	5	99266.6	56

***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	10.0	43.0	0.6	7.6	5	99266.5	56
168	12.5	43.9	0.5	9.6	5	99266.6	56
169	13.1	45.8	0.4	10.1	5	99266.6	56
170	12.6	44.2	0.3	9.7	5	99259.9	55
171	11.5	44.8	0.4	8.8	5	99253.3	55
172	10.1	44.9	0.5	7.8	5	99253.2	55
173	12.9	43.6	0.5	9.9	5	99253.4	55
174	13.0	44.2	0.5	9.9	5	99253.4	55
175	12.0	42.2	0.4	9.2	5	99253.4	55
176	10.2	42.5	0.2	7.9	5	99268.1	54
177	9.6	41.7	0.2	7.3	5	99279.8	54
178	9.3	41.5	0.3	7.1	5	99279.9	54
179	8.5	43.0	0.2	6.5	5	99279.9	54
180	7.2	43.6	0.2	5.5	5	99280.0	54
181	8.4	42.8	0.4	6.4	5	99280.0	54
182	9.4	43.5	0.3	7.2	5	99280.1	54
183	8.0	43.8	0.2	6.2	5	99280.0	55
184	8.1	42.6	0.4	6.2	5	99280.0	55
185	10.0	41.6	0.4	7.6	5	99280.1	55
186	10.0	42.3	0.3	7.7	5	99280.1	55
187	10.2	41.7	0.3	7.9	5	99280.2	55
188	9.4	42.7	0.3	7.2	5	99281.4	54
189	10.6	42.6	0.4	8.1	8	99280.5	54
190	9.9	42.1	0.3	7.6	5	99279.8	54
191	7.6	41.5	0.3	5.8	5	99280.0	54
192	7.4	41.5	0.2	5.7	5	99279.9	54
193	8.7	42.7	0.4	6.7	5	99280.1	54
194	7.3	45.4	0.5	5.6	5	99288.4	54
195	9.8	45.0	0.4	7.5	5	99293.9	54
196	8.1	45.1	0.4	6.2	5	99293.9	54
197	10.0	46.2	0.4	7.7	5	99293.9	54
198	9.5	46.4	0.5	7.3	5	99293.9	54
199	10.5	45.7	0.5	8.1	5	99293.9	54
200	12.2	46.4	0.4	9.4	5	99286.7	53
201	9.8	48.8	0.5	7.6	5	99280.1	52
202	8.7	48.5	0.3	6.7	5	99280.1	52
203	8.9	46.7	0.4	6.8	5	99280.1	52
204	9.1	47.3	0.3	7.0	5	99280.1	52
205	8.6	47.8	0.4	6.6	5	99280.2	52
206	7.5	46.6	0.3	5.8	5	99288.5	53
207	6.7	45.6	0.6	5.1	5	99293.8	54
208	5.8	44.0	0.7	4.5	5	99293.9	54
209	6.5	47.9	0.6	5.0	5	99293.8	54
210			0.5	5.4	5	99293.7	54
211			0.4	5.4	5	99293.9	54
212	7.3	49.5	0.6	5.6	5	99296.7	54
213	9.2	47.7	0.9	7.0	5	99293.9	54
214	8.8	47.4	1.0	6.7	5	99293.9	54
215	7.8	47.5	0.8	6.0	5	99293.8	54
216	7.9	49.1	0.6	6.0	5	99293.8	54
217	8.6	50.9	0.5	6.6	5	99293.9	54
218			0.4	7.6	5	99295.2	54
219			0.3	9.7	5	99293.8	53
220			0.7	8.5	5	99293.8	53
221	10.6	51.0	0.5	8.1	5	99294.0	53
222	12.0	49.2	0.5	9.2	5	99293.9	53
223	9.9	50.5	0.3	7.6	5	99294.0	53
224	10.5	50.5	0.2	8.0	5	99302.5	53
225	12.4	51.1	0.5	9.5	5	99308.1	53
226			0.3	11.9	5	99307.9	53
227	13.6	50.2	0.5	10.5	5	99308.0	53
228	12.5	49.9	0.5	9.6	5	99307.9	53
229	14.5	49.8	0.5	11.1	5	99308.0	53
230	13.6	51.4	0.5	10.4	5	99293.9	52
231	12.5	50.7	0.5	9.6	5	99280.2	52
232	11.2	50.0	0.6	8.6	5	99280.2	52
233			0.6	7.2	5	99280.2	52
234	12.0	50.7	0.5	9.2	5	99280.2	52
235	11.5	49.6	0.5	8.8	5	99280.2	52
236	11.2	48.2	0.4	8.6	5	99288.5	52
237	10.2	49.7	0.2	7.8	5	99293.9	52
238	8.3	51.1	0.5	6.4	5	99294.0	52
239	7.8	48.9	0.5	6.0	5	99294.0	52
240	10.3	48.1	0.4	7.9	5	99294.0	52
241	10.2	48.6	0.4	7.8	5	99294.0	52
242	11.4	49.7	0.5	8.7	5	99295.2	53
243			0.5	9.2	5	99293.9	53
244			0.6	9.3	5	99293.9	53
245	10.6	51.5	0.6	8.1	5	99294.0	53
246			0.6	9.1	5	99293.9	53
247			0.6	10.8	5	99294.0	53
248	12.5	50.6	0.6	9.6	5	99302.4	53
249	10.0	51.2	0.5	7.7	5	99303.0	53

Table E.02 Measurement data - Background

Project: Port Ryerse Wind Power Project - Turbine T4 - IEC 61400-11 Measurement

Report ID: 14355.00.T4.RP1

Created on: 11/9/2017

***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	13.9	49.3	0.5	10.7	5	99292.4	53
251	13.7	51.9	0.4	10.5	5	99293.3	53
252	13.9	50.6	0.5	10.6	5	99293.3	53
253	14.8	49.9	0.5	11.4	5	99293.2	53
254	13.0	48.1	0.4	10.0	5	99293.1	53
255	12.7	48.4	0.4	9.7	5	99293.3	53
256	10.7	48.0	0.4	8.2	5	99293.3	53
257	11.6	47.2	0.4	8.9	5	99293.2	53
258	9.6	49.6	0.5	7.4	5	99293.3	53
259	8.8	47.8	0.4	6.8	5	99293.3	53
260	8.6	48.6	0.4	6.6	5	99293.4	54
261	9.0	49.6	0.3	6.9	5	99293.3	54
262	9.4	49.1	0.4	7.2	5	99293.4	54
263	9.8	47.6	0.4	7.5	5	99293.4	54
264	9.6	47.3	0.4	7.4	5	99293.5	54
265	11.4	47.5	0.3	8.7	5	99293.4	54
266	10.4	50.6	0.4	8.0	5	99293.5	55
267	10.4	51.5	0.5	7.9	5	99293.6	55
268	10.7	51.5	0.4	8.2	5	99293.5	55
269	9.2	49.7	0.4	7.0	5	99293.5	55
270	10.6	46.6	0.6	8.1	5	99293.4	55
271	10.9	45.8	0.4	8.4	5	99293.5	55
272	14.2	47.2	0.4	10.9	5	99293.8	54
273	11.7	45.9	0.2	9.0	5	99293.4	54
274	11.2	44.6	0.4	8.6	5	99293.3	54
275	9.4	44.9	0.3	7.2	5	99293.6	54
276	9.1	44.6	0.3	7.0	5	99293.5	54
277	8.0	49.7	0.4	6.2	5	99293.7	54
278	9.0	45.6	0.5	6.9	5	99293.4	54
279	9.5	44.0	0.6	7.3	5	99297.3	54
280	11.0	45.9	0.5	8.4	5	99305.0	54
281	10.2	47.7	0.5	7.9	5	99307.1	54
282	9.6	47.6	0.5	7.4	5	99308.0	54
283	12.0	51.6	0.2	9.2	5	99308.5	54
284			0.1	9.4	5	99308.9	54
285	11.9	51.4	0.5	9.1	5	99308.2	54
286	13.1	51.0	0.4	10.1	5	99307.8	54
287	10.2	48.5	0.2	7.9	5	99308.1	54
288	11.5	48.4	0.2	8.8	5	99308.0	54
289	11.1	46.0	0.4	8.6	5	99308.2	54
290	10.3	47.2	0.3	7.9	5	99307.8	55
291	9.6	46.6	0.3	7.4	5	99307.7	55
292	10.4	45.0	0.5	8.0	5	99308.0	55
293	9.1	44.3	0.5	7.0	5	99307.9	55
294	9.1	44.4	0.4	7.0	5	99308.1	55
295	8.9	44.9	0.3	6.9	5	99307.8	55
296	10.7	44.2	0.5	8.2	5	99309.2	55
297	11.5	44.0	0.4	8.8	5	99307.9	55
298	12.0	43.9	0.2	9.2	5	99308.0	55
299	10.9	44.0	0.3	8.3	5	99307.9	55
300	8.9	43.0	0.4	6.9	5	99308.0	55
301	7.9	43.0	0.3	6.0	5	99308.0	55
302	9.3	44.1	0.3	7.1	5	99316.0	55
303	8.6	44.5	0.4	6.6	5	99320.4	55
304	7.8	44.4	0.4	6.0	5	99320.1	55
305	8.2	43.0	0.4	6.3	5	99320.1	55
306	7.9	44.1	0.4	6.0	5	99320.1	55
307	7.2	44.2	0.4	5.5	5	99320.0	55
308	6.5	43.6	0.3	5.0	5	99320.0	56
309	7.7	43.3	0.5	5.9	5	99319.6	57
310	8.6	42.8	0.4	6.6	5	99319.9	57
311	10.7	43.2	0.3	8.2	5	99319.9	57
312	9.2	45.5	0.4	7.1	5	99319.9	57
313	9.8	44.5	0.3	7.5	5	99320.0	57
314	11.4	43.2	0.3	8.7	5	99313.6	56
315	10.9	42.4	0.2	8.4	5	99307.4	56
316	11.1	42.8	0.2	8.5	5	99307.4	56
317	11.4	43.1	0.2	8.8	5	99307.4	56
318	12.4	42.0	0.3	9.5	5	99307.2	56
319	11.1	43.2	0.3	8.5	5	99307.2	56
320	9.0	42.3	0.4	6.9	5	99313.7	56
321	7.7	44.2	0.3	5.9	5	99319.8	56
322	7.7	42.5	0.3	5.9	5	99319.7	56
323	7.7	42.6	0.4	5.9	5	99319.7	56
324	6.4	42.4	0.4	4.9	5	99319.8	56
325	7.8	41.9	0.2	6.0	5	99319.9	56
326	6.6	42.1	0.2	5.1	5	99319.8	56
327	7.2	46.5	0.2	5.6	5	99319.9	57
328	7.6	45.6	0.2	5.9	5	99319.8	57
329	7.8	43.4	0.3	6.0	5	99319.9	57
330	6.9	45.6	0.3	5.3	5	99319.9	57
331	7.7	44.2	0.2	5.9	5	99319.8	57
332	10.8	41.0	0.3	8.2	5	99319.9	56

***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	9.4	40.7	0.4	7.2	5	99319.9	56
334	8.5	40.9	0.5	6.5	5	99319.9	56
335	8.8	42.2	0.3	6.8	5	99319.9	56
336	7.0	42.8	0.4	5.3	5	99319.6	56
337	6.5	43.8	0.4	5.0	5	99319.7	56
338	8.0	45.8	0.5	6.1	5	99319.6	56
339	7.6	45.7	0.6	5.8	5	99319.6	56
340	8.5	44.7	0.3	6.5	5	99319.8	56
341	8.3	44.9	0.4	6.3	5	99319.8	56
342	9.1	45.2	0.4	6.9	5	99319.8	56
343	10.7	45.0	0.4	8.2	5	99319.8	56
344	9.6	45.5	0.4	7.4	5	99313.3	56
345	8.6	44.1	0.3	6.6	5	99306.9	56
346	9.3	43.4	0.3	7.2	5	99307.0	56
347	9.0	42.7	0.4	6.9	5	99307.1	56
348	10.8	42.9	0.4	8.3	5	99307.0	56
349	11.0	43.8	0.4	8.4	5	99306.9	56
350	9.7	43.4	0.5	7.4	5	99306.8	55
351	10.2	41.6	0.5	7.8	5	99306.8	55
352	10.7	41.3	0.4	8.2	5	99306.8	55
353	9.7	41.8	0.3	7.4	5	99306.7	55
354	9.6	41.4	0.3	7.3	5	99306.8	55
355	8.6	41.2	0.3	6.6	5	99306.8	55
356	8.5	42.1	0.5	6.5	5	99313.3	55
357	7.0	42.2	0.5	5.4	5	99319.4	56
358	7.1	41.8	0.4	5.4	5	99319.5	56
359	7.7	41.4	0.3	5.9	5	99319.4	56
360	8.3	40.8	0.3	6.4	5	99319.3	56
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End of Report