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REPORT ID: **13259.00.T38.RP1**

Summerhaven Wind Energy Centre – Turbine T38 IEC 61400-11 Edition 3.0 Measurement Report

Prepared for:

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08 January 2018 – Revision #1

Revision History

Revision Number	Description	Date
1	Issued Edition 3.0 test report	January 8, 2018

This report in its entirety, including appendices contains 72 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 NextEra Energy Canada ("NextEra") to conduct an acoustic measurement of turbine T38 at the Summerhaven Wind Energy Centre. 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 T38.

2 Wind Turbine Information

2.1 Wind turbine equipment specific information

Wind turbine specific equipment information for turbine T38 was provided by Siemens and is summarized in Tables 1 – 5.

Table 1 - Wind Turbine Details

Wind Turbine Details	
Manufacturer	Siemens
Model Number	SWT 2.3-101
Turbine ID	T38 (Serial# 2306913)

Table 2 - Operating Details

Operating Details	
Vertical or Horizontal axis wind turbine	Horizontal
Upwind or downwind rotor	Upwind rotor
Hub height	80 m
Horizontal distance from rotor centre to tower axis	3500 mm
Diameter of rotor	101
Tower type (lattice or tube)	Tube
Passive stall, active stall, or pitch controlled turbine	Pitch Controlled
Constant or variable speed	Variable speed
Power curve	See Figure B.01
Rotational speed at each integer standardised wind speed	See Figure B.02
Rated power output	2.221 MW
Control software version	16.01.28

Table 3 - Rotor Details

Rotor Details	
Rotor control devices	Pitch control
Presence of vortex generators, stall strips, serrated trailing edges	Vortex generators and DinoTails
Blade type	RAL 7035 PC3, B49-01
Serial number	Blade A: 490338401
Number of blades	Blade B: 490437601

Table 4 - Gearbox Details

Gearbox Details	
Manufacturer	Winergy
Model number	PEAB4456.8 cold climate 2.3MW
Serial number	4837930-020-5

Table 5 - Generator Details

Generator Details	
Manufacturer	Siemens
Model number	Geared, 2.3 MW – 690V
Serial number	5477273

2.2 Wind Turbine Location

Turbine T38 is located in the municipality of Nanticoke, in Haldimand County, approximately 700m North of Rainham Road, and 835m East of Fisherville Road. The area surrounding T38 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 T38 is summarized in Table 6.

Table 6 - Acoustic Measurement Equipment

Equipment	Manufacturer Name & Model	Serial Number
Acoustic Data acquisition system	LMS SCADA Mobile	22163146
Microphone	B&K 4189	3060528
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 (80m high) from turbine T38. Data for background measurements was obtained from a 10m high anemometer, which was placed as per guidelines outlined in IEC-61400-11 Edition 3.0.

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 132m 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 T38. The microphone was placed in the centre of a circular, acoustically reflective board.

During the measurement period only data points for which the microphone was within 15 degrees of downwind from the turbine were used. The microphone position relative to downwind of the turbine was monitoring via the yaw angle output provided from the turbine

system (discussed further in Section 3.5). During placement of the microphone the turbine was parked and the reference yaw angle for that measurement logged.

When measurements of T38 were taken, the surrounding land cleared farmland. 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 30, 2017	Turbine ON	11:22am	12:06pm
	Background	12:09pm	12:46pm
	Turbine ON	12:50pm	2:29pm

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 T38's power curve (as per the standard), while wind direction was provided by T38's yaw position. Background data was obtained from an anemometer located 10m above ground level near T38.

Temperature and pressure readings during the measurement period were provided by the 10m anemometer, located near turbine T38 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

Turbines T39 and T37 were parked for the duration of testing at Turbine T38.

4.3 Analysis Details

The following section outlines analysis of the measurement data acquired for T38. The data presented is exclusive of transient events such as vehicle traffic, wildlife, air traffic etc. The site has been assessed to have a roughness length of 0.05m, representative of farmland with some vegetation.

4.3.1 Double Windscreen Adjustment

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

4.3.2 Wind Speed Correction

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

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

4.4 Type B uncertainties

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

Table 9 - Summary of Type B uncertainties

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

4.5 Sound Pressure Level Measurements

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

Table 10 - Summary of Sound Pressure Level Measurements

Wind Speed (m/s)	Turbine ON		Background		Turbine ON, Background adjusted L_{eq}, (dBA)
	L_{eq}, (dBA)	# of data pts	L_{eq}, (dBA)	# of data pts	
8	56.8	6*	41.4	13	56.7
8.5	58.0	17	41.6	11	57.9
9	58.1	37	42.9	18	58.0
9.5	58.4	41	42.5	14	58.3
10	58.5	26	44.0	19	58.3
10.5	58.4	21	46.0	12	58.1
11	58.2	45	46.2	23	58.0
11.5	58.2	77	46.0	24	58.0
12	58.2	58	47.4	13	57.8
12.5	58.1	52	48.5	19	57.6

*less than 10 data points collected in 8m/s wind bin

4.6 Sound Power Level of Turbine

The calculated sound power level of the turbine T38 (as per IEC 61400-11) is summarized in Table 11 (hub height) and Table 12 (10m height). Detailed 1/3 Octave band spectrum data and respective uncertainties are provided in Appendix C.

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

Wind Speed (m/s)	Apparent L_{WA}, (dBA)	Uncertainty (dB)
8	-	-
8.5	106.8	0.8
9	106.9	0.7
9.5	107.3	0.7
10	107.2	0.7
10.5	107.0	0.8
11	106.9	0.7
11.5	106.9	0.8
12	106.8	0.8
12.5	106.6	0.8

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

Wind Speed (m/s)	Apparent L_{WA}, (dBA)	Uncertainty (dB)
6	106.6	1.0
7	107.2	0.7
8	106.9	0.7
9	106.6	0.8
10	106.6	0.8

4.7 Tonality Analysis

The tonality analysis for Turbine T38 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 (%)
8.5	511	-3.0	-0.6	16	17	94%
9	504	-2.1	0.2	25	37	68%
9.5	501	-1.0	1.3	24	41	59%
10	515	-1.1	1.2	18	26	69%
10.5	506	-0.9	1.4	14	21	67%
11	515	0.4	2.7	43	45	96%
11.5	515	0.1	2.4	75	77	97%
12	515	0.3	2.6	55	58	95%
12.5	513	0.9	3.2	51	52	98%

5 Closure

Measurements and analysis were carried on Turbine T38 of the Summerhaven Wind Energy Centre 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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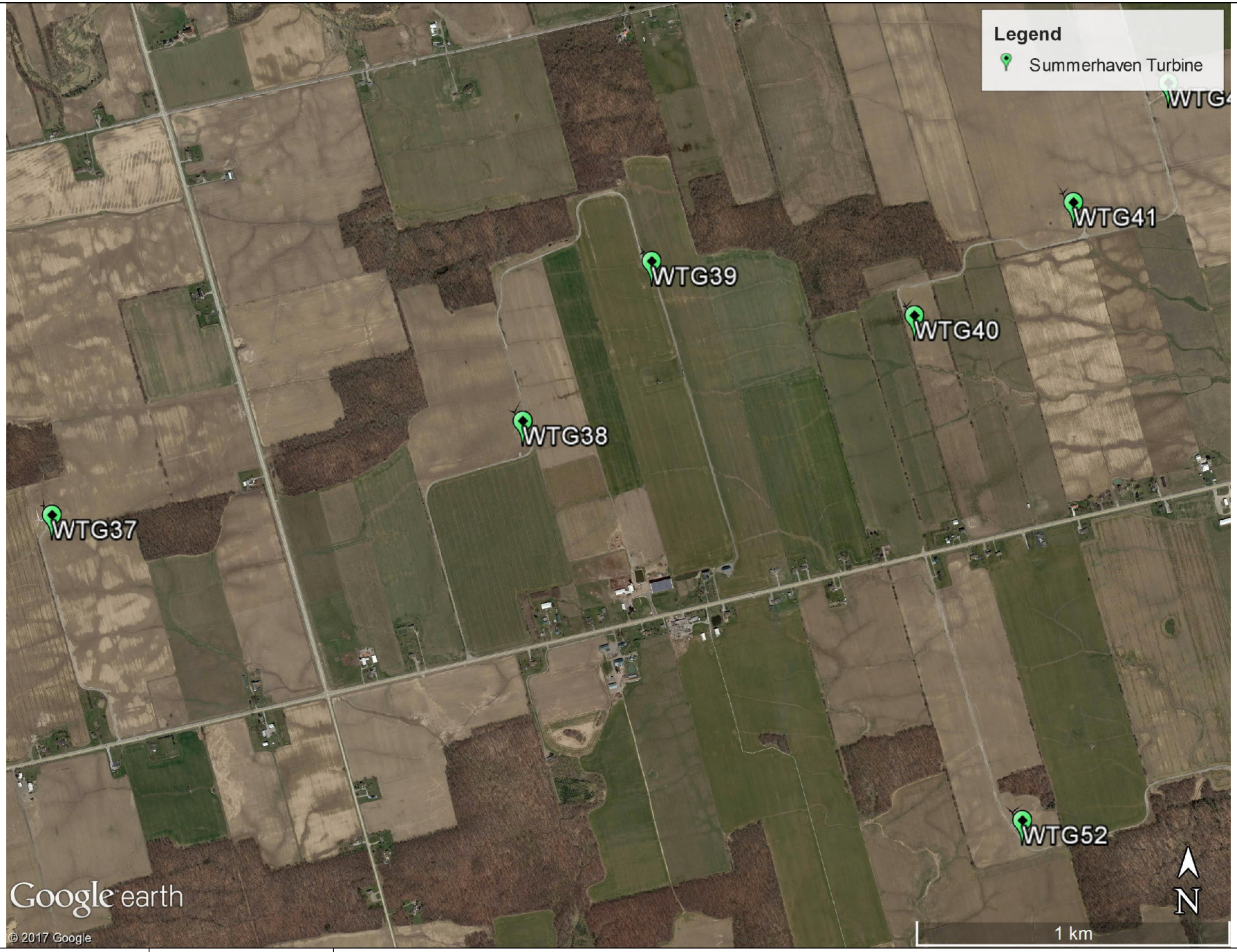
Appendix A
Site Details



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Date: Jan 05, 2018
Revision: 1

Project Name

Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0

Figure Title

Site Plan

Figure A.01

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	Figure Title Site Photos

Figure A.02

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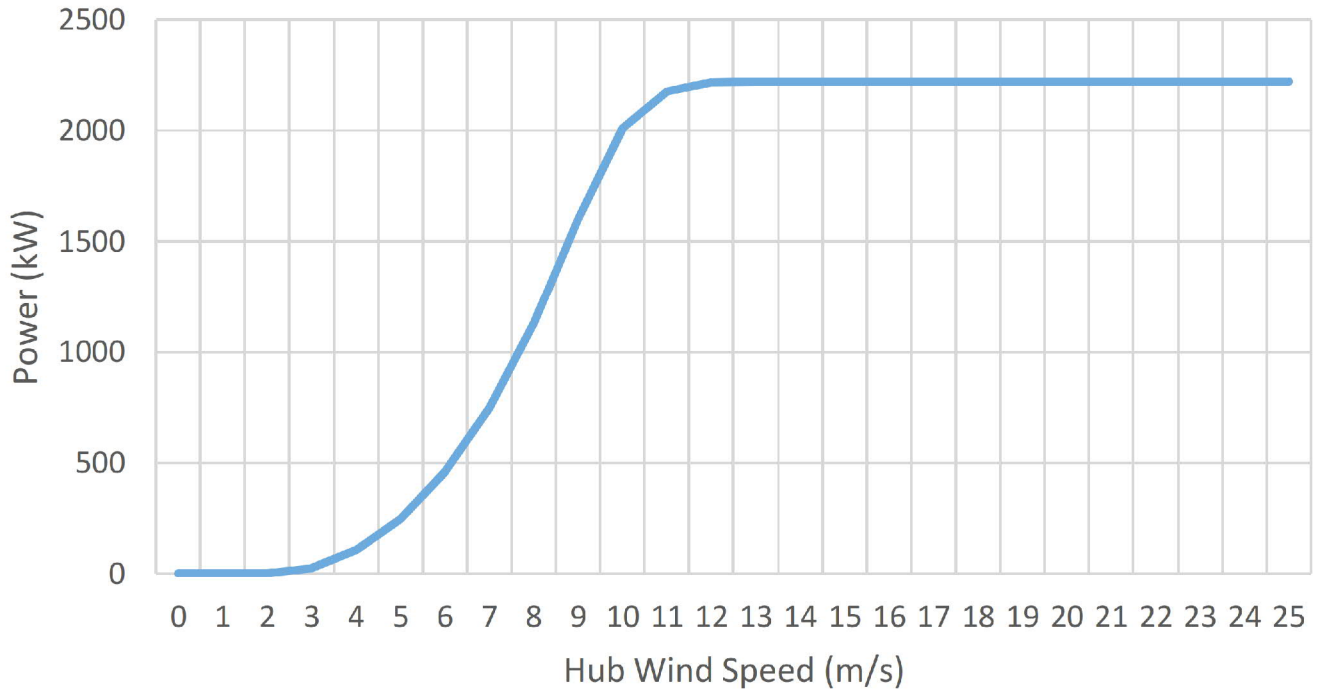
Appendix B
Turbine Information



Power Curve	
Hub Wind Speed (m/s)	Power [kW]
0	0
1	0
2	0
3	23
4	107
5	248
6	457
7	748
8	1131
9	1601
10	2008
11	2177
12	2215
13	2220
14	2221
15	2221
16	2221
17	2221
18	2221
19	2221
20	2221
21	2221
22	2221
23	2221
24	2221
25	2221

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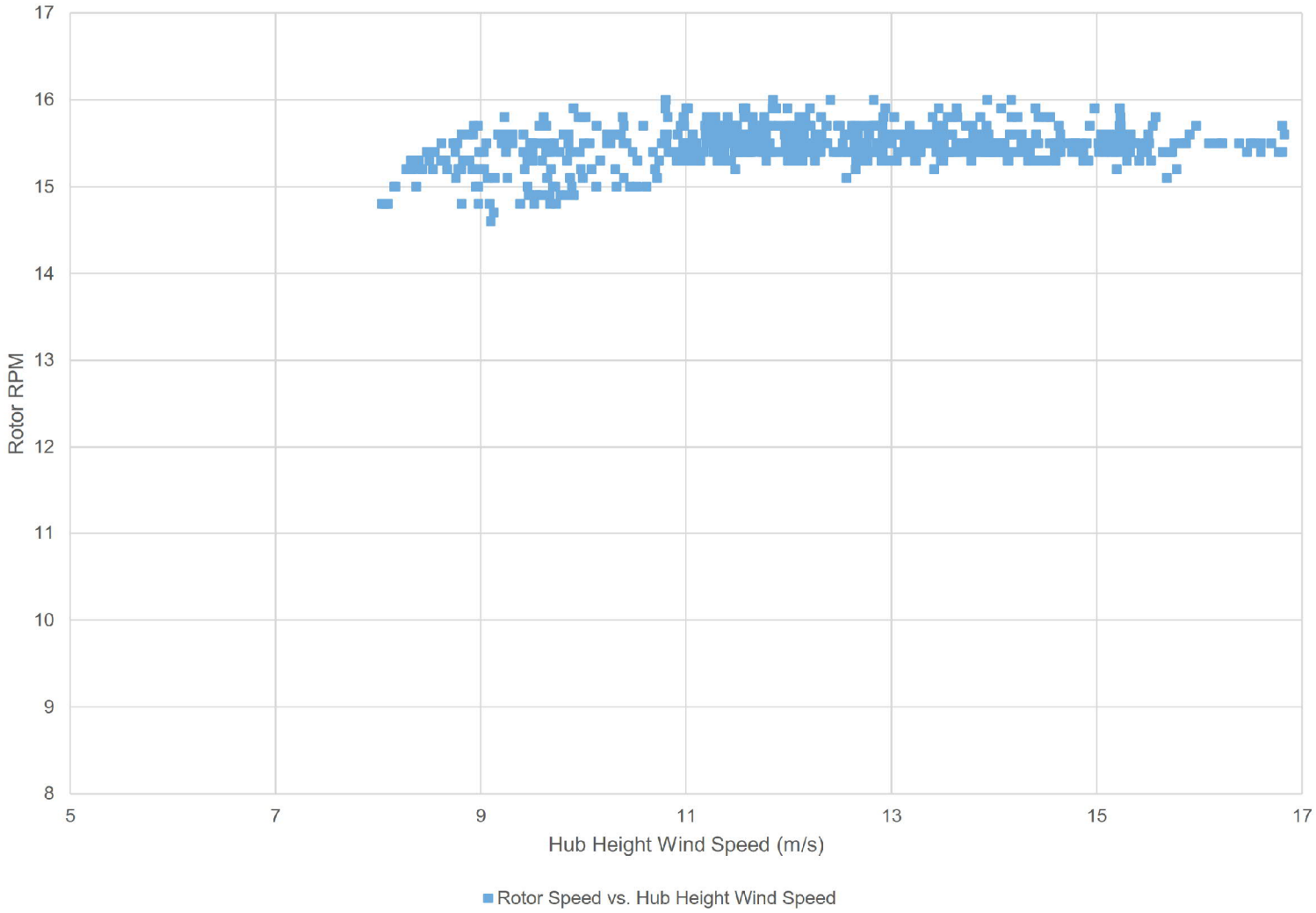
Figure Title

Power Curve

Figure B.01



aercoustics	13259.00.T38.RP1 Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	**Project Name** Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0 **Figure Title** Rotor RPM vs. wind speed

Figure B.02

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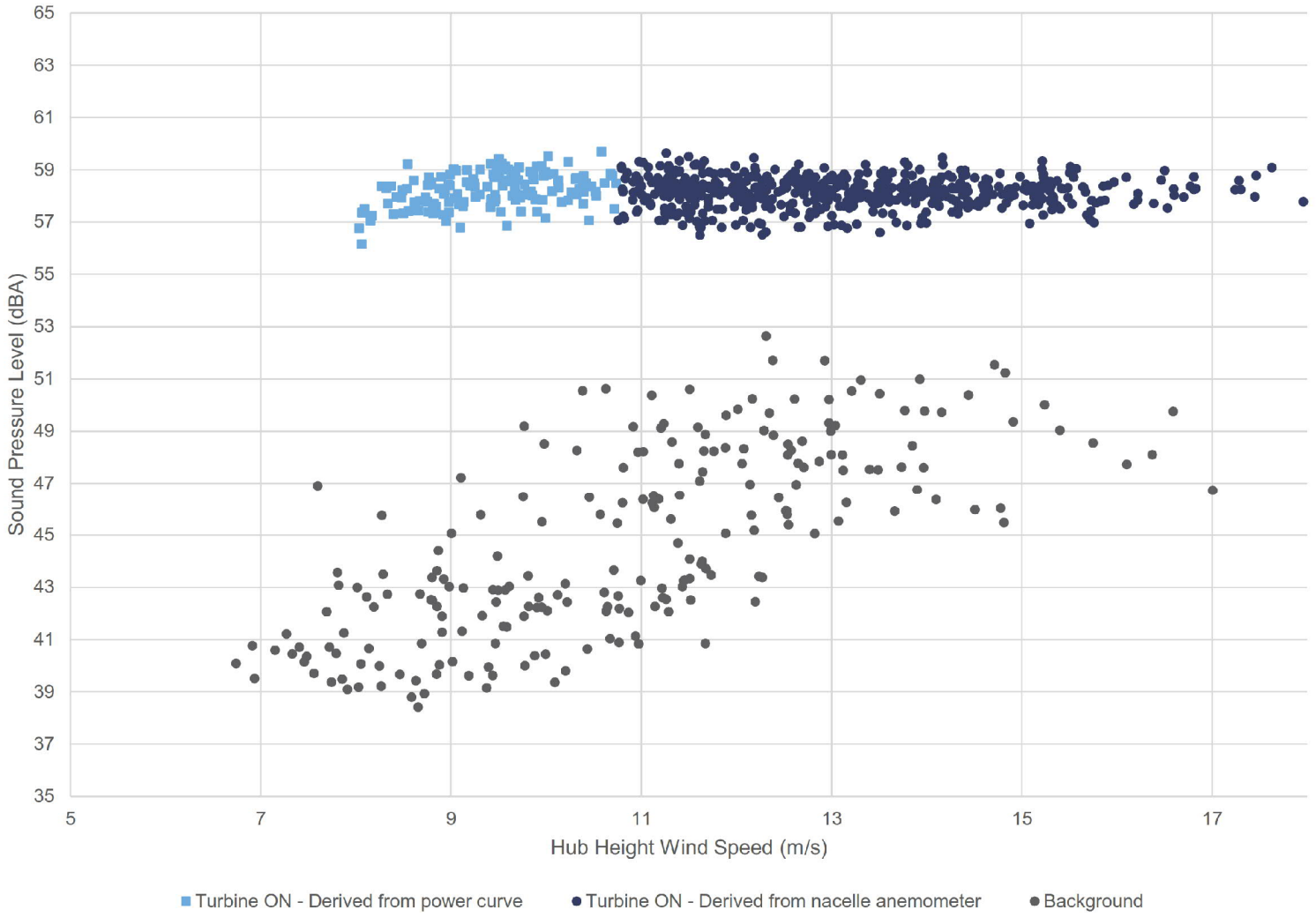
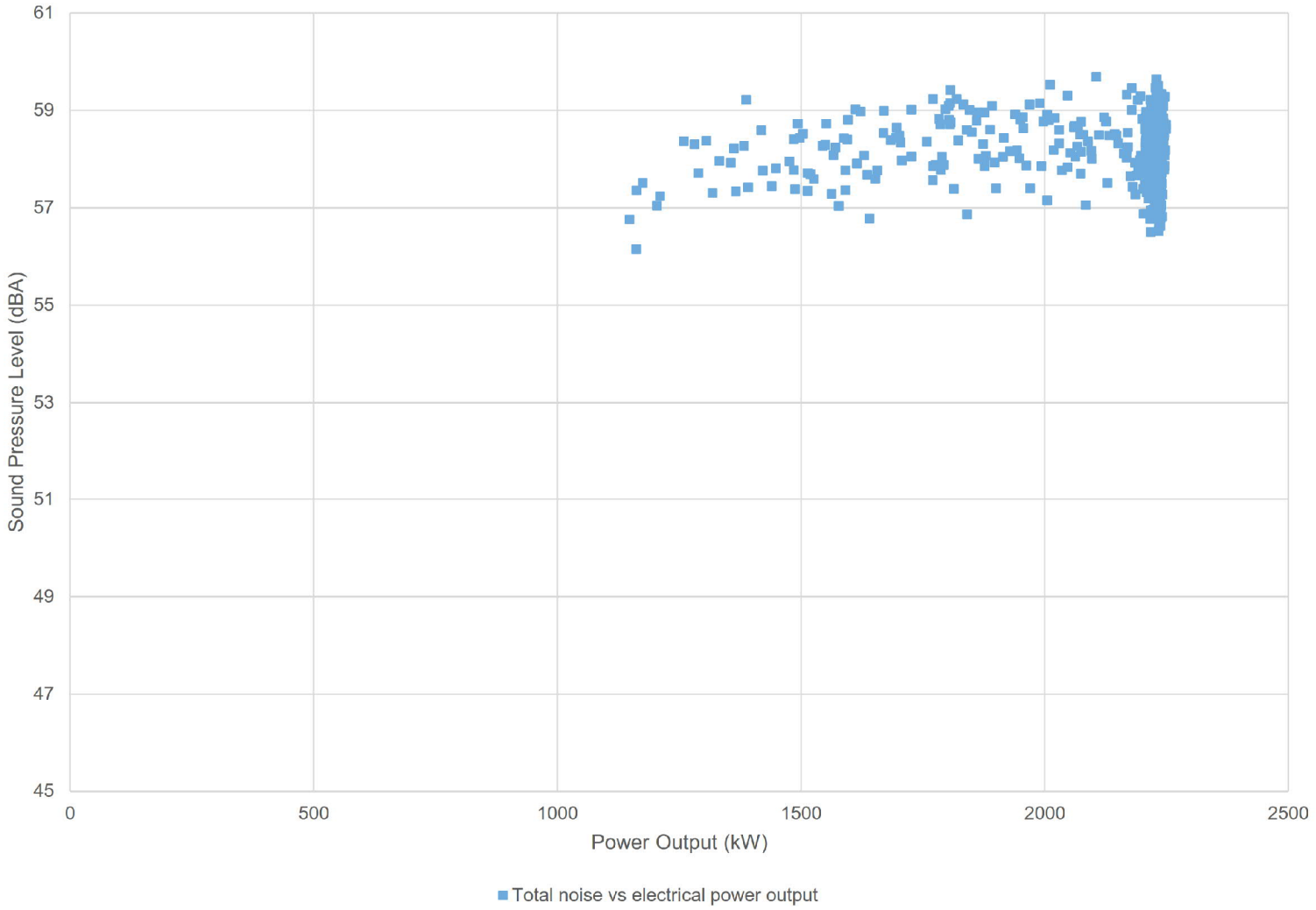
Appendix C
Apparent Sound Power Level



aercoustics	13259.00.T38.RP1 Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	**Project Name** Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0 **Figure Title** Plot of overall measurement data pairs at Position 1 (Turbine ON & Background)

Figure C.01



aercoustics	13259.00.T38.RP1 Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	**Project Name** Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0 **Figure Title** Plot of measured total noise vs electrical power output

Figure C.02

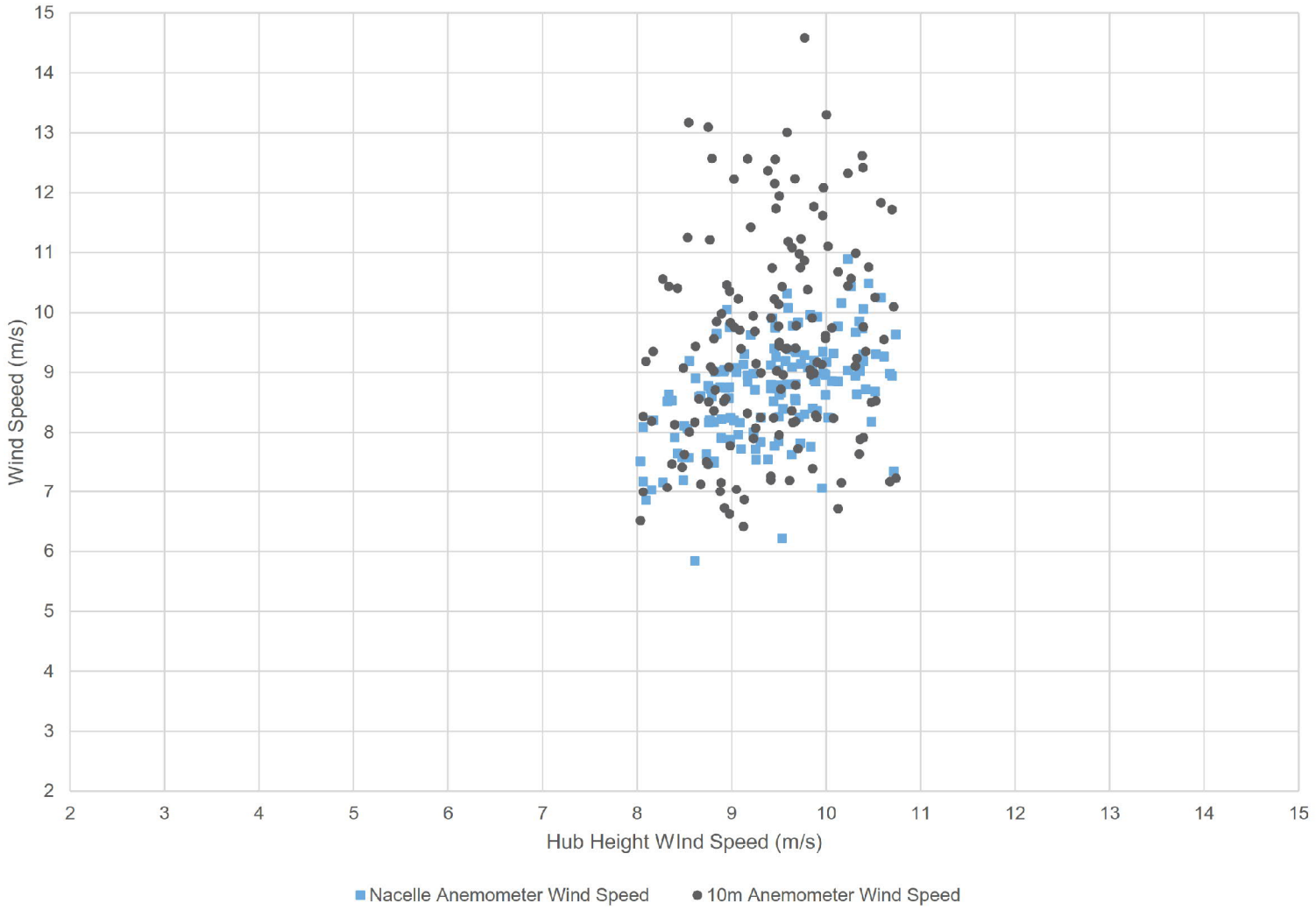


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Figure C.03

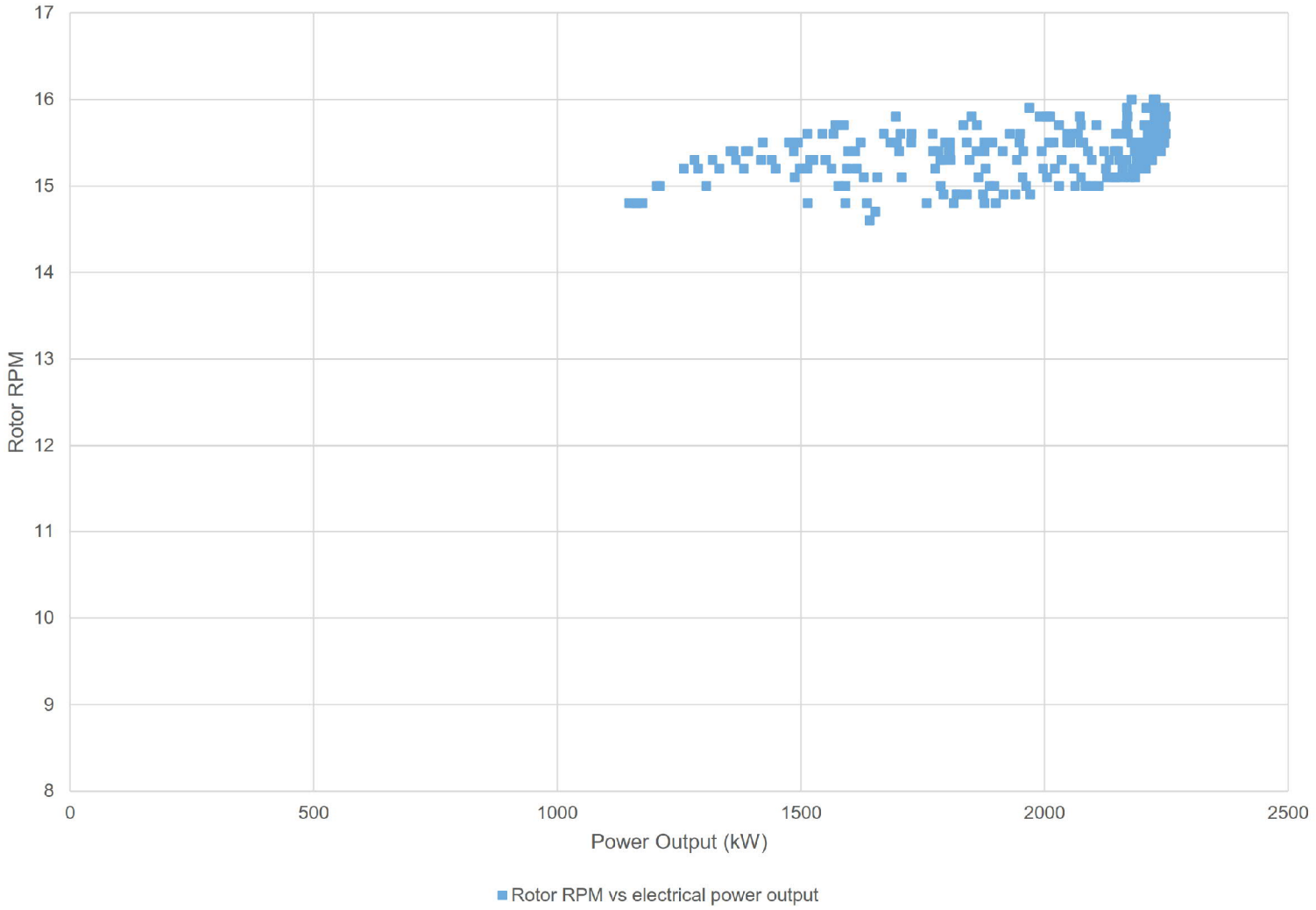

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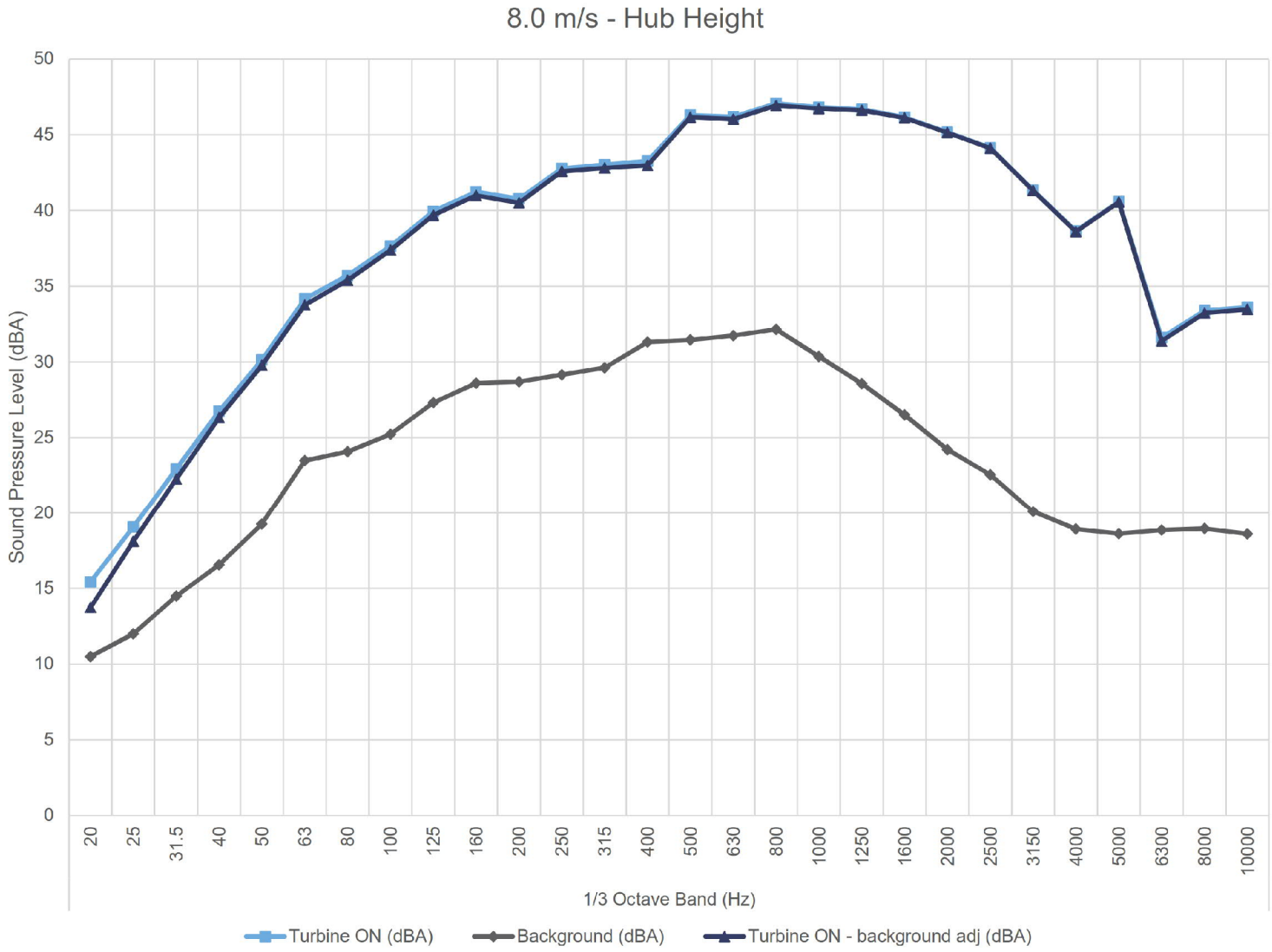
Figure C.04



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Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0
	Figure Title Plot of sound pressure spectrum in 1/3 Octave at 8 m/s

Figure C.05

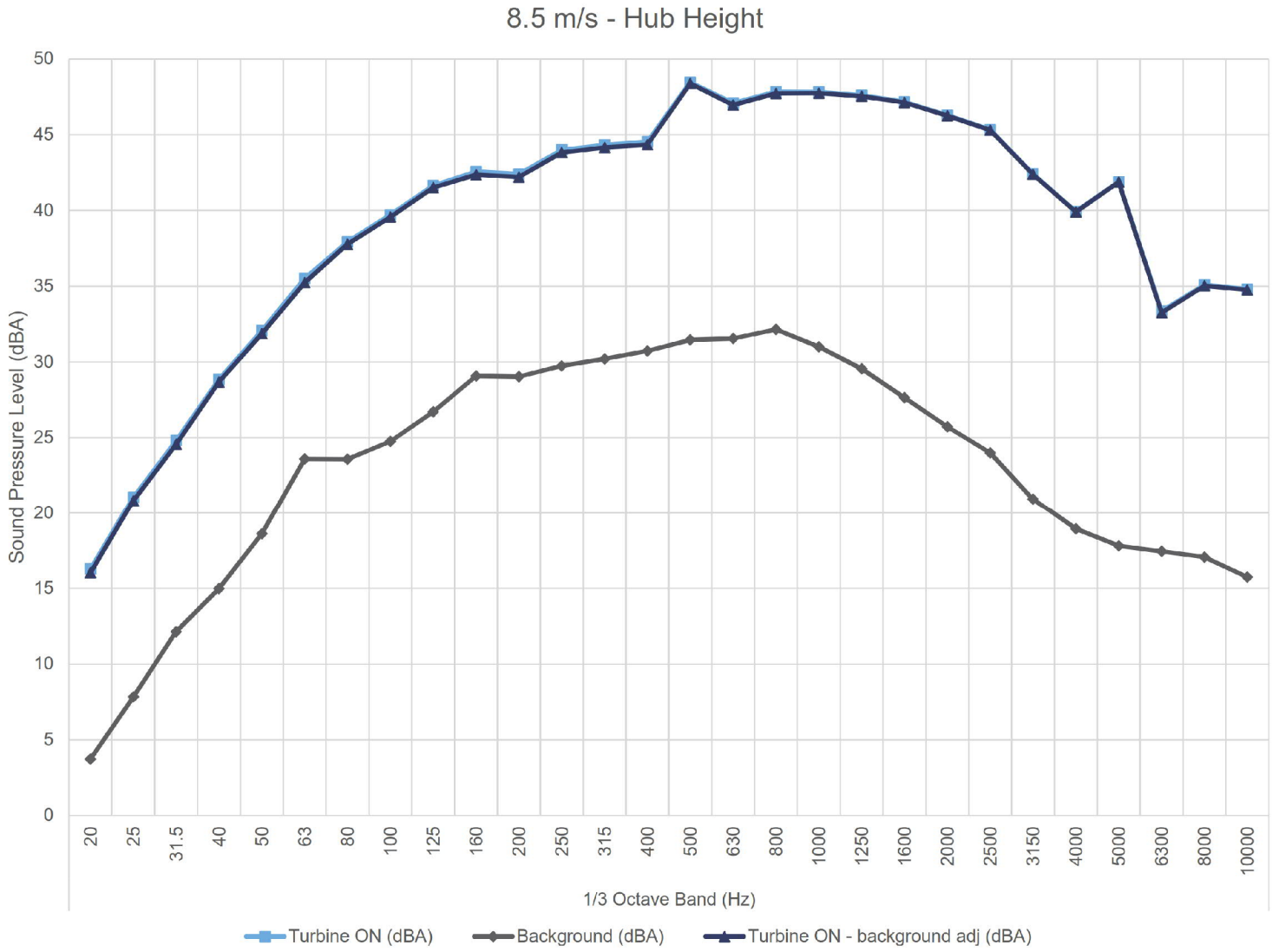

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Figure C.06

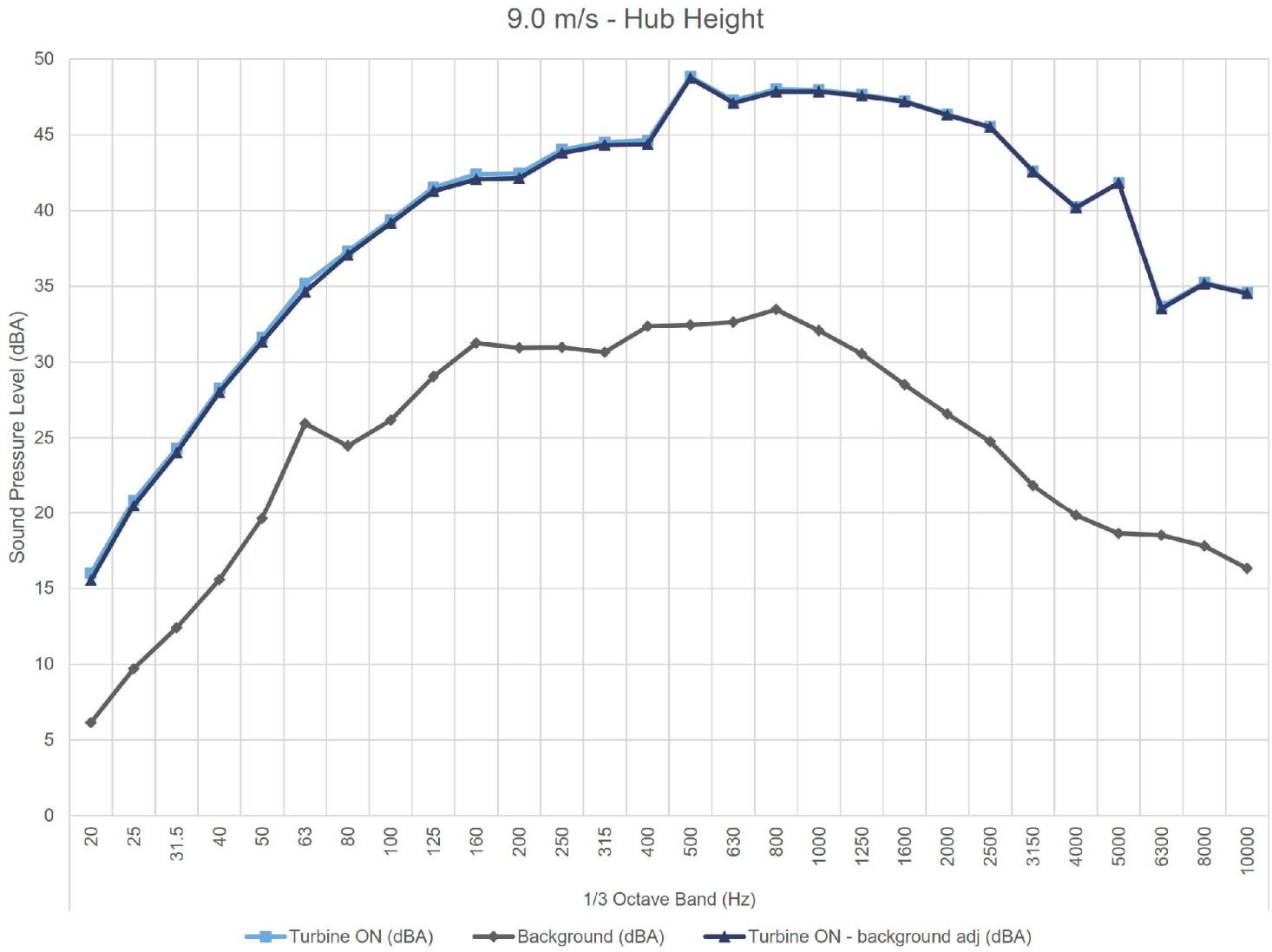

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Figure C.07

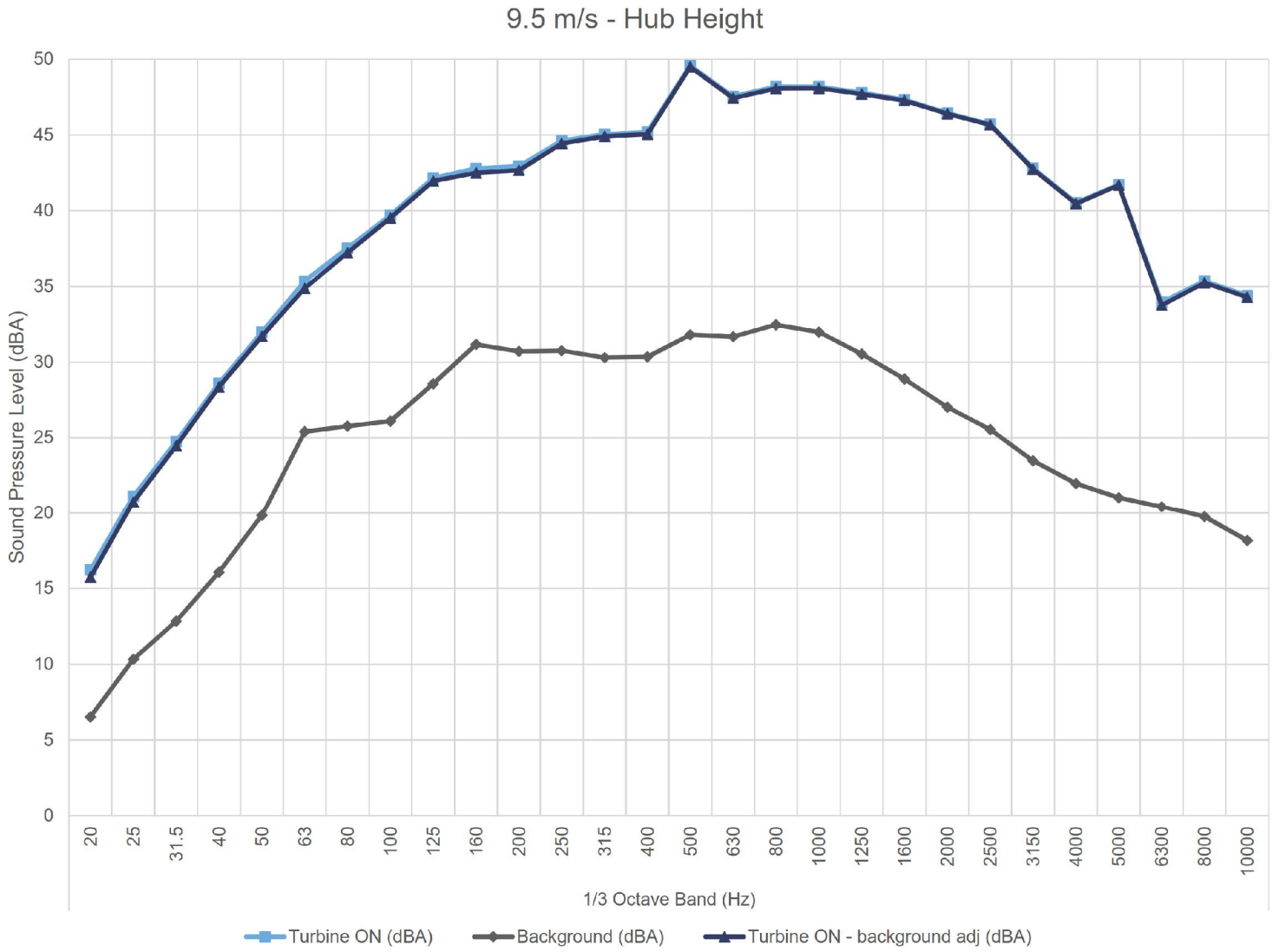

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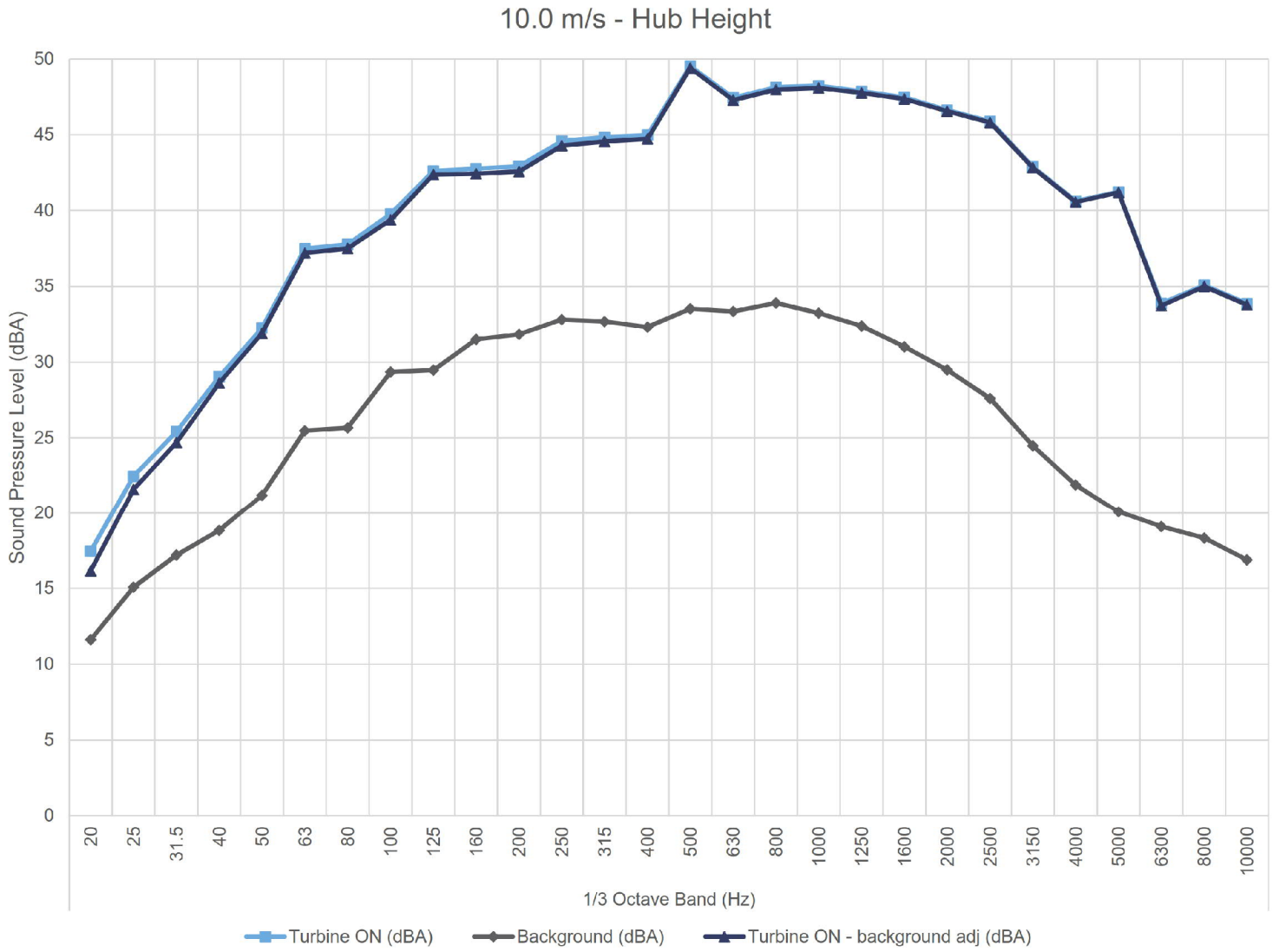
Figure C.08



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Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0
	Figure Title Plot of sound pressure spectrum in 1/3 Octave at 10 m/s

Figure C.09

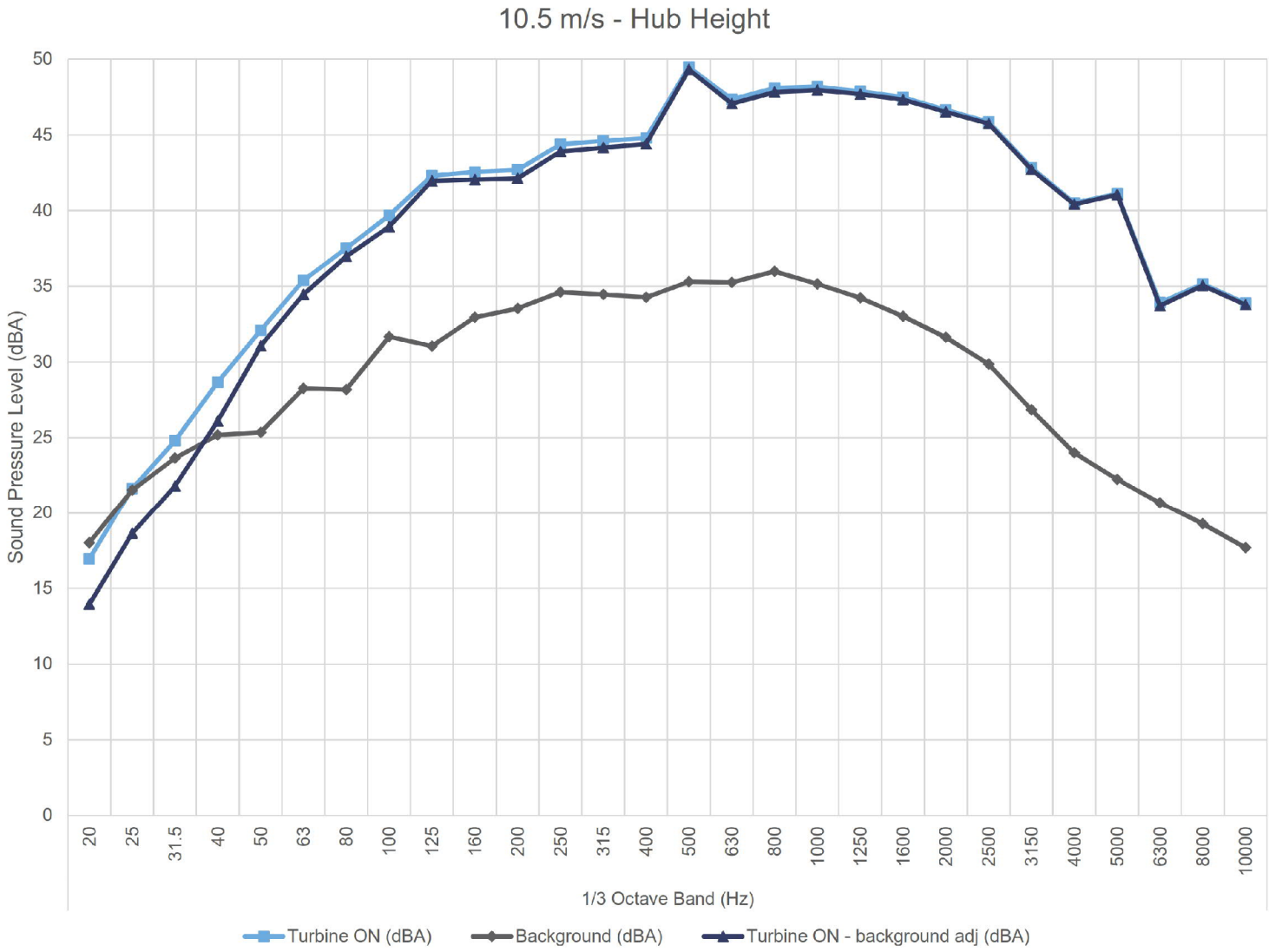

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Figure C.10

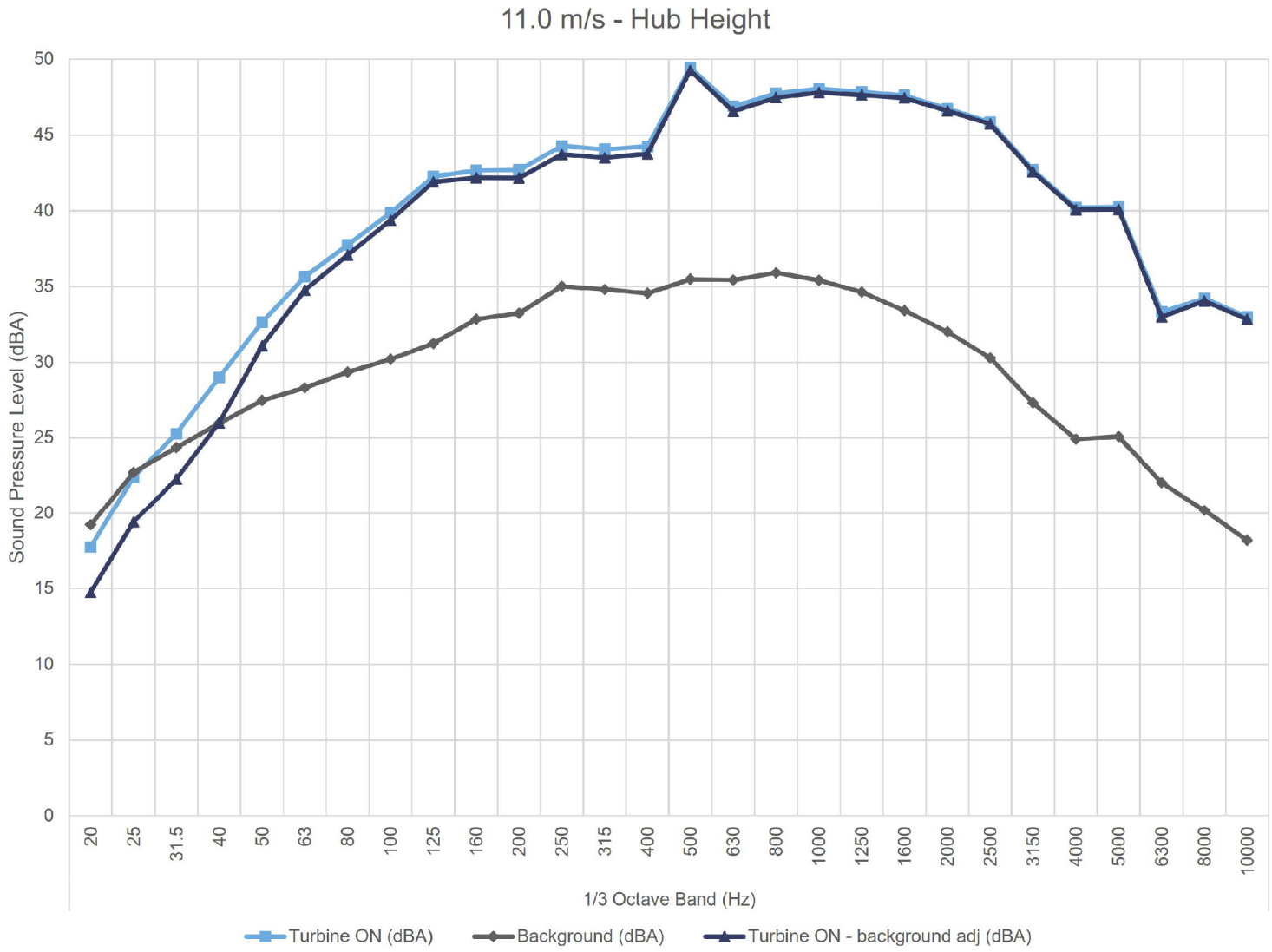

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Figure C.11

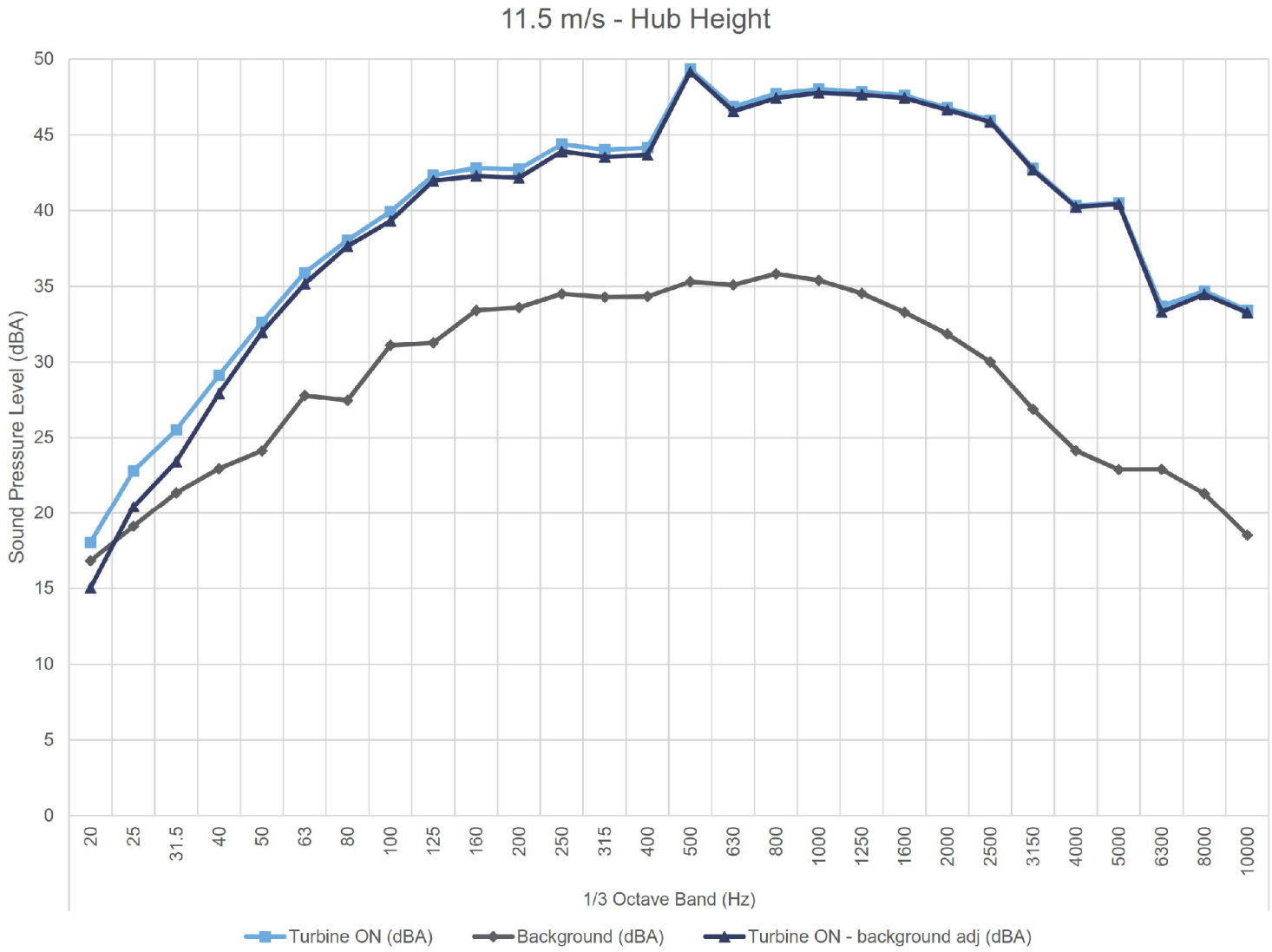

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Figure C.12

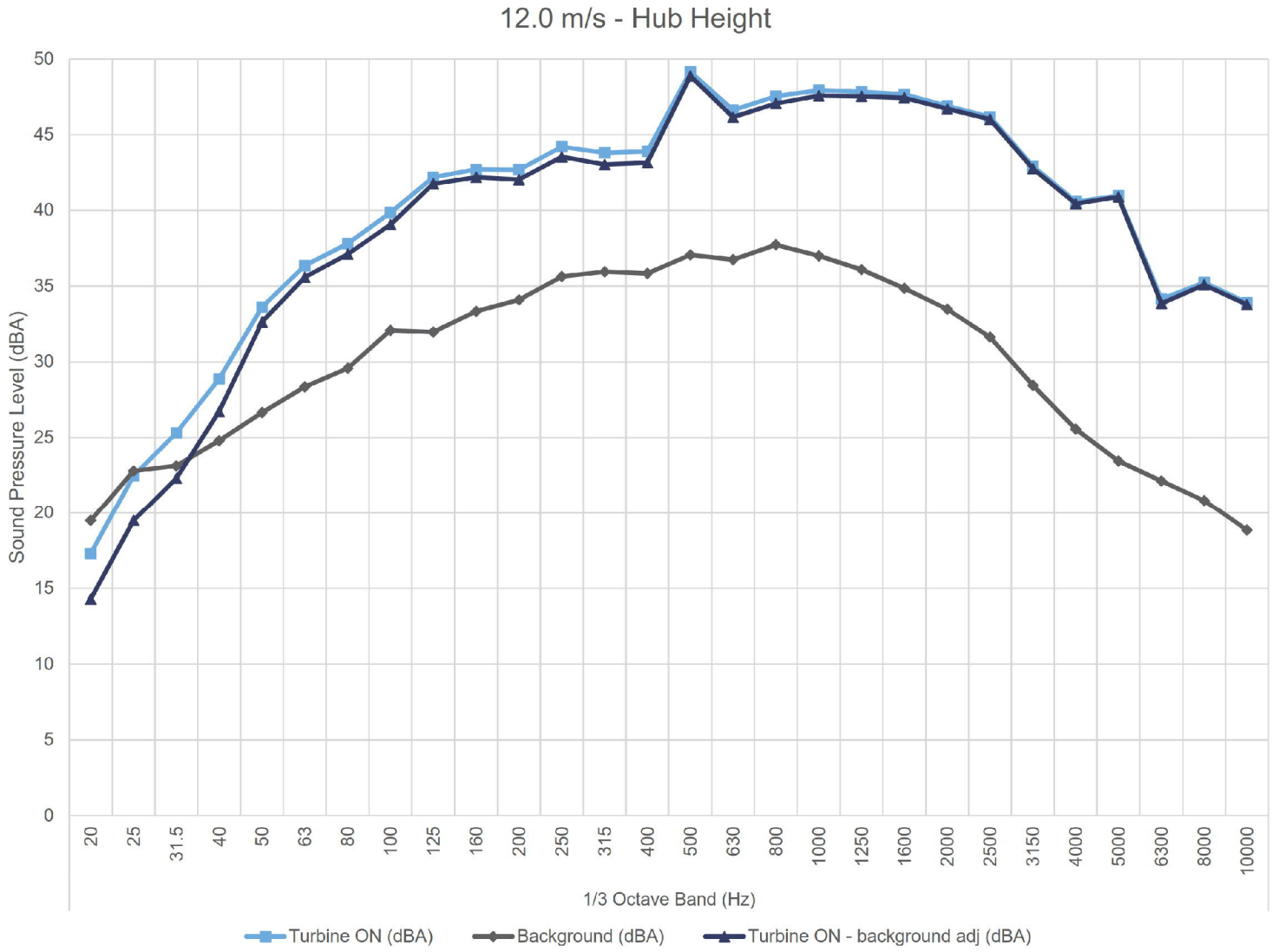

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Figure C.13

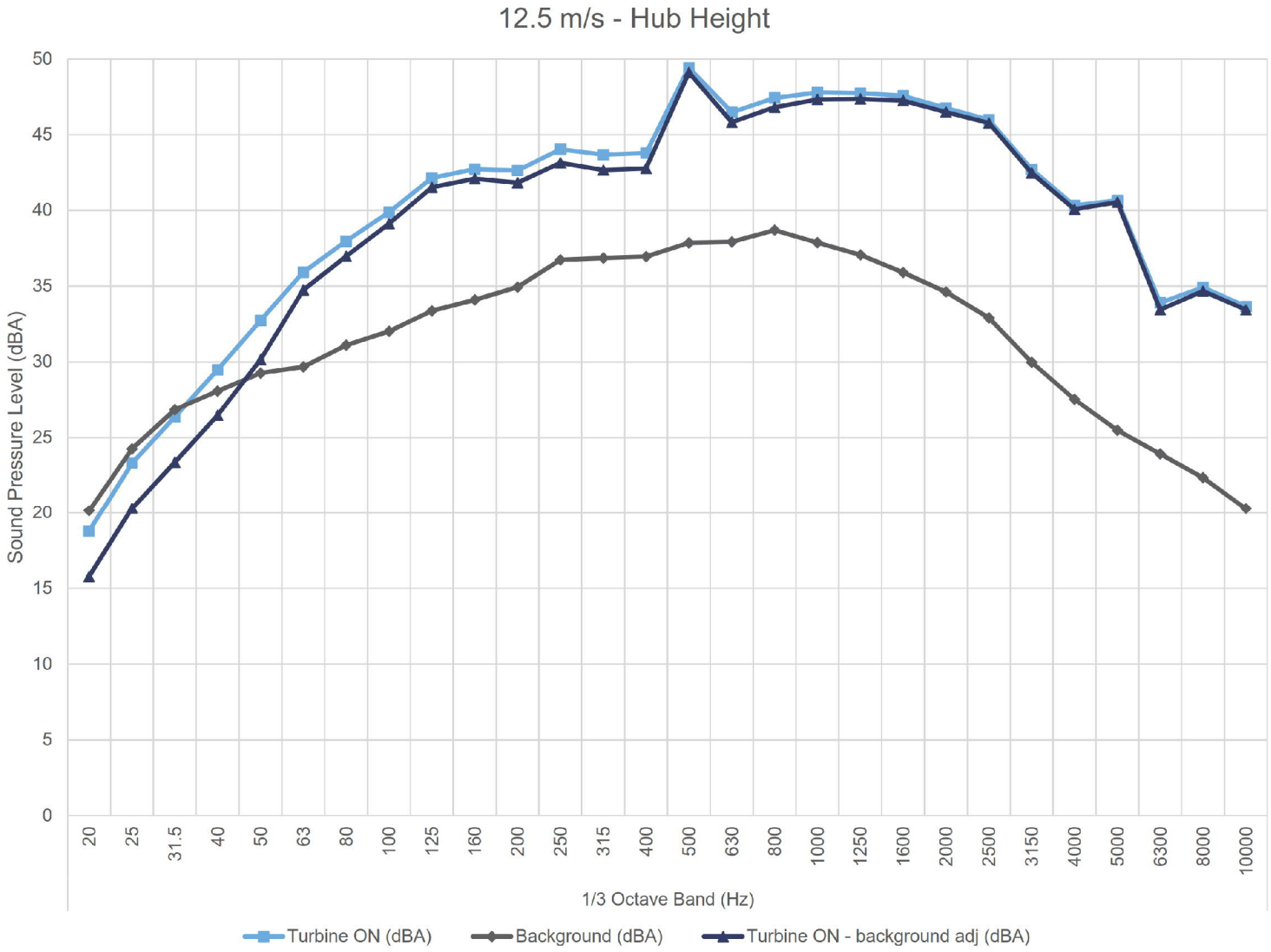

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Figure C.14

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

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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	
8.0	Turbine ON (dBA)	15.4	19.1	22.9	26.8	30.1	34.2	35.7	37.6	39.9	41.2	40.8	42.8	43.0	43.3	46.3	46.2	47.1	46.8	46.7	46.2	45.2	44.1	41.4	38.6	40.6	31.6	33.4	33.6	56.8
	Background (dBA)	10.5	12.0	14.5	16.5	19.3	23.5	24.1	25.2	27.3	28.6	28.7	29.2	29.6	31.3	31.5	31.8	32.2	30.4	28.6	26.5	24.2	22.6	20.1	18.9	18.6	18.9	18.9	18.6	41.4
	Turbine ON - background adj (dBA)	13.7	18.1	22.3	26.3	29.8	33.8	35.4	37.4	39.7	41.0	40.5	42.6	42.8	43.0	46.2	46.0	46.9	46.7	46.6	46.1	45.1	44.1	41.3	38.6	40.6	31.4	33.2	33.5	56.7
	Signal to noise (dB)	4.9	7.1	8.4	10.2	10.9	10.7	11.6	12.4	12.6	12.6	12.1	13.6	13.4	11.9	14.8	14.4	14.9	16.5	18.1	19.7	21.0	21.6	21.3	19.7	22.0	12.8	14.4	15.0	15.4
	Uncertainty (dB)	2.4	1.8	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9	1.0	0.9	0.9	0.9	0.9	0.9	1.1	1.1	1.2	1.5	1.6	1.6	2.3	1.0
	PWL (dBA)	62.7	67.0	71.2	75.3	78.7	82.7	84.3	86.3	88.6	89.9	89.4	91.5	91.7	91.9	95.1	95.0	95.9	95.7	95.5	95.0	94.1	93.0	90.3	87.5	89.5	80.3	82.2	82.4	105.6
8.5	Turbine ON (dBA)	16.3	21.0	24.8	28.9	32.1	35.5	37.9	39.7	41.7	42.6	42.4	44.0	44.3	44.5	48.5	47.1	47.8	47.8	47.6	47.2	46.3	45.3	42.4	39.9	41.9	33.4	35.1	34.8	58.0
	Background (dBA)	3.7	7.8	12.1	15.0	18.6	23.6	23.6	24.8	26.7	29.1	29.0	29.7	30.2	30.7	31.5	31.6	32.2	31.0	29.6	27.6	25.7	24.0	20.9	18.9	17.8	17.4	17.1	15.7	41.6
	Turbine ON - background adj (dBA)	16.0	20.8	24.6	28.7	31.9	35.2	37.8	39.6	41.5	42.4	42.2	43.8	44.2	44.3	48.4	47.0	47.7	47.7	47.5	47.1	46.3	45.3	42.4	39.9	41.9	33.2	35.0	34.8	57.9
	Signal to noise (dB)	12.5	13.2	12.7	13.9	13.5	11.9	14.4	15.0	14.9	13.5	13.4	14.3	14.1	13.8	17.0	15.5	15.7	16.8	18.1	19.5	20.6	21.3	21.5	21.0	24.1	15.9	18.0	19.1	16.4
	Uncertainty (dB)	1.1	1.1	0.9	0.9	0.9	0.9	0.9	0.9	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	0.8	0.8	0.9	0.9	1.0	0.9	1.5	0.8
	PWL (dBA)	65.0	69.8	73.5	77.6	80.8	84.2	86.7	88.5	90.4	91.3	91.1	92.8	93.1	93.3	97.3	95.9	96.7	96.7	96.5	96.1	95.2	94.2	91.3	88.8	90.8	82.2	84.0	83.7	106.8
9.0	Turbine ON (dBA)	16.0	20.8	24.3	28.3	31.6	35.2	37.3	39.4	41.5	42.4	42.5	44.0	44.5	44.6	48.8	47.3	48.0	48.0	47.7	47.2	46.4	45.5	42.6	40.2	41.8	33.7	35.3	34.6	58.1
	Background (dBA)	6.1	9.7	12.4	15.6	19.6	25.9	24.5	26.2	29.1	31.3	30.9	31.0	30.6	32.4	32.4	32.6	33.5	32.1	30.5	28.5	26.6	24.7	21.8	19.8	18.6	18.5	17.8	16.3	42.9
	Turbine ON - background adj (dBA)	15.5	20.5	24.0	28.0	31.3	34.6	37.1	39.2	41.3	42.1	42.1	43.8	44.3	44.4	48.7	47.1	47.9	47.9	47.6	47.2	46.3	45.5	42.6	40.2	41.8	33.5	35.2	34.5	58.0
	Signal to noise (dB)	9.9	11.2	11.9	12.7	12.0	9.2	12.8	13.2	12.5	11.1	11.5	13.1	13.9	12.3	16.4	14.6	14.5	15.9	17.1	18.7	19.8	20.8	20.8	20.4	23.2	15.2	17.5	18.3	15.3
	Uncertainty (dB)	1.1	1.1	0.8	0.8	0.8	0.9	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	0.7
	PWL (dBA)	64.5	69.4	72.9	76.9	80.3	83.6	86.0	88.1	90.2	91.0	91.1	92.7	93.3	93.3	97.7	96.0	96.8	96.8	96.5	96.1	95.2	94.4	91.5	89.1	90.8	82.5	84.1	83.4	106.9
9.5	Turbine ON (dBA)	16.2	21.1	24.8	28.6	32.0	35.3	37.5	39.7	42.2	42.8	42.9	44.6	45.0	45.2	49.6	47.5	48.2	48.2	47.8	47.3	46.5	45.7	42.8	40.5	41.7	34.0	35.4	34.4	58.4
	Background (dBA)	6.5	10.3	12.8	16.1	19.8	25.4	25.8	26.1	28.6	31.2	30.7	30.8	30.3	30.3	31.8	31.7	32.5	32.0	30.5	28.9	27.0	25.6	23.5	22.0	21.1	20.4	19.8	18.2	42.5
	Turbine ON - background adj (dBA)	15.7	20.8	24.5	28.4	31.7	34.9	37.2	39.5	42.0	42.5	42.7	44.4	44.9	45.0	49.5	47.4	48.1	48.1	47.7	47.3	46.4	45.7	42.8	40.5	41.7	33.8	35.2	34.3	58.3
	Signal to noise (dB)	9.7	10.8	11.9	12.5	12.1	9.9	11.7	13.6	13.6	11.6	12.2	13.9	14.7	14.8	17.8	15.9	15.7	16.2	17.2	18.4	19.4	20.2	19.3	18.5	20.7	13.5	15.6	16.2	16.0
	Uncertainty (dB)	1.1	1.1	0.8	0.8	0.8	0.9	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	0.8	1.4	0.7
	PWL (dBA)	64.7	69.7	73.4	77.3	80.6	83.8	86.2	88.5	90.9	91.4	91.6	93.4	93.8	94.0	98.4	96.4	97.0	97.0	96.6	96.2	95.3	94.6	91.7	89.4	90.6	82.7	84.2	83.2	107.3
10.0	Turbine ON (dBA)	17.5	22.5	25.4	29.0	32.2	37.5	37.8	39.8	42.6	42.8	42.9	44.6	44.8	45.0	49.5	47.5	48.1	48.2	47.9	47.5	46.6	45.9	42.9	40.6	41.2	33.9	35.1	33.9	58.5
	Background (dBA)	11.6	15.1	17.2	18.8	21.2	25.5	25.7	29.3	29.5	31.5	31.8	32.8	32.7	32.3	33.5	33.3	33.9	33.2	32.4	31.0	29.5	27.6	24.5	21.9	20.1	19.1	18.3	16.9	44.0
	Turbine ON - background adj (dBA)	16.2	21.6	24.7	28.6	31.9	37.2	37.5	39.4	42.4	42.4	42.6	44.3	44.6	44.7	49.4	47.3	48.0	48.1	47.8	47.4	46.6	45.8	42.8	40.6	41.2	33.7	35.0	33.8	58.3
	Signal to noise (dB)	5.8	7.4	8.2	10.2	11.1	12.0	12.1	10.5	13.1	11.3	11.1	11.8	12.2	12.7	16.0	14.1	14.2	15.0	15.5	16.5	17.2	18.3	18.4	18.7	21.1	14.8	16.7	17.0	14.4
	Uncertainty (dB)	1.6	1.3	1.0	0.9	0.9	1.0	0.8	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	0.8	0.9	0.8	1.4	0.7
	PWL (dBA)	65.1	70.5	73.6	77.5	80.8	86.1	86.4	88.3	91.3	91.4	91.5	93.2	93.5	93.7	98.3	96.2	96.9	97.0	96.7	96.3	95.5	94.8	91.8	89.5	90.1	82.7	83.9	82.7	107.2
10.5	Turbine ON (dBA)	16.9	21.6	24.8	28.7	32.1	35.4	37.5	39.7	42.3	42.6	42.7	44.4	44.6	44.8	49.5	47.3	48.1	48.2	47.9	47.5	46.7	45.9	42.8	40.5	41.1	33.9	35.2	33.9	58.4
	Background (dBA)	18.0	21.5	23.7	25.2	25.4	28.3	28.2	31.7	31.1	33.0	33.5	34.6	34.5	34.3	35.3	35.3	36.0	35.2	34.2	33.0	31.6	29.9	26.9	24.0	22.2	20.7	19.3	17.7	46.0
	Turbine ON - background adj (dBA)	[13.9]	[18.6]	[21.8]	26.1	31.1	34.5	37.0	38.9	42.0	42.1	42.1	43.9	44.2	44.4	49.3	47.1	47.8	48.0	47.7	47.3	46.5	45.7	42.7	40.4	41.1	33.7	35.1	33.8	58.1
	Signal to noise (dB)	-1.1	0.1	1.1	3.5	6.8	7.1	9.3	8.0	11.2	9.6	9.1	9.8	10.1	10.5	14.2	12.1	12.1	13.0	13.6	14.5	15.0	16.0	16.0	16.5	18.9	13.2	15.9	16.2	12.4
	Uncertainty (dB)	4.3	3.8	3.4	2.5	1.1	1.0	0.9	1.0	0.9	0.9	0.8	0.8	0.8	0.8	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	0.8
	PWL (dBA)	[62.9]	[67.6]	[70.7]	75.0	80.0	83.4	85.9	87.9	90.9	91.0	91.1	92.8	93.1	93.3	98.2	96.0	96.7	96.9	96.6	96.3	95.4	94.7	91.6	89.3	90.0	82.6	84.0	82.7	107.0

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

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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)	17.7	22.4	25.3	29.0	32.6	35.6	37.7	39.9	42.3	42.7	42.7	44.3	44.0	44.3	49.4	46.9	47.8	48.1	47.9	47.6	46.7	45.8	42.7	40.2	40.2	33.3	34.2	33.0		58.2
	Background (dBA)	19.2	22.7	24.4	26.0	27.5	28.3	29.3	30.2	31.2	32.8	33.2	35.0	34.8	34.5	35.5	35.4	35.9	35.4	34.6	33.4	32.0	30.3	27.3	24.9	25.1	22.0	20.2	18.2		46.2
	Turbine ON - background adj (dBA)	[14.7]	[19.4]	[22.3]	26.0	31.1	34.8	37.1	39.4	41.9	42.2	42.2	43.7	43.5	43.8	49.3	46.6	47.5	47.8	47.6	47.4	46.6	45.7	42.6	40.1	40.1	33.0	34.0	32.8		58.0
	Signal to noise (dB)	-1.5	-0.3	0.9	3.0	5.2	7.3	8.4	9.7	11.0	9.8	9.5	9.3	9.2	9.7	14.0	11.5	11.9	12.6	13.2	14.2	14.7	15.6	15.4	15.3	15.1	11.3	14.0	14.8		12.0
	Uncertainty (dB)	3.2	3.1	2.6	2.4	1.3	1.0	0.9	0.9	0.8	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.9	0.8	1.5		0.7
	PWL (dBA)	[63.7]	[68.3]	[71.2]	74.9	80.0	83.7	86.0	88.3	90.8	91.1	91.1	92.7	92.4	92.7	98.2	95.5	96.4	96.7	96.6	96.4	95.5	94.7	91.5	89.0	89.0	81.9	83.0	81.8		106.9
11.5	Turbine ON (dBA)	18.0	22.8	25.5	29.1	32.6	35.9	38.0	39.9	42.3	42.8	42.7	44.4	44.0	44.2	49.3	46.9	47.7	48.0	47.9	47.6	46.8	46.0	42.8	40.3	40.5	33.7	34.7	33.4		58.2
	Background (dBA)	16.8	19.1	21.4	23.0	24.1	27.8	27.5	31.1	31.3	33.4	33.6	34.5	34.3	34.3	35.3	35.1	35.8	35.4	34.5	33.3	31.9	30.0	26.9	24.2	22.9	22.9	21.3	18.5		46.0
	Turbine ON - background adj (dBA)	[15]	20.4	23.4	27.9	32.0	35.2	37.7	39.3	42.0	42.3	42.2	43.9	43.5	43.7	49.1	46.6	47.4	47.8	47.7	47.4	46.6	45.9	42.7	40.2	40.4	33.3	34.5	33.3		58.0
	Signal to noise (dB)	1.2	3.7	4.2	6.2	8.5	8.1	10.6	8.8	11.1	9.4	9.1	9.9	9.7	9.8	14.0	11.8	11.9	12.6	13.3	14.3	14.9	16.0	15.9	16.2	17.6	10.8	13.4	14.9		12.2
	Uncertainty (dB)	3.0	2.3	1.7	1.2	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	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		0.8
	PWL (dBA)	[64]	69.4	72.4	76.9	80.9	84.1	86.6	88.3	90.9	91.2	91.1	92.8	92.5	92.6	98.1	95.5	96.4	96.7	96.6	96.4	95.6	94.8	91.6	89.2	89.4	82.3	83.4	82.2		106.9
12.0	Turbine ON (dBA)	17.3	22.5	25.3	28.9	33.6	36.4	37.8	39.9	42.2	42.7	42.7	44.2	43.8	43.9	49.2	46.6	47.5	47.9	47.8	47.7	46.9	46.2	42.9	40.6	41.0	34.2	35.3	33.9		58.2
	Background (dBA)	19.5	22.8	23.1	24.8	26.7	28.4	29.6	32.1	32.0	33.3	34.1	35.6	36.0	35.8	37.1	36.7	37.7	37.0	36.1	34.9	33.5	31.6	28.5	25.6	23.5	22.1	20.8	18.9		47.4
	Turbine ON - background adj (dBA)	[14.3]	[19.5]	[22.3]	26.7	32.6	35.6	37.1	39.1	41.8	42.2	42.0	43.6	43.0	43.2	48.9	46.2	47.1	47.6	47.5	47.4	46.7	46.0	42.8	40.5	40.9	33.9	35.1	33.8		57.8
	Signal to noise (dB)	-2.2	-0.3	2.2	4.1	7.0	8.0	8.2	7.8	10.2	9.4	8.6	8.6	7.9	8.1	12.1	9.9	9.8	10.9	11.7	12.8	13.4	14.5	14.5	15.0	17.5	12.0	14.4	15.1		10.8
	Uncertainty (dB)	3.1	3.1	2.5	1.7	1.1	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.9	0.8	1.5		0.8
	PWL (dBA)	[63.2]	[68.4]	[71.2]	75.7	81.6	84.5	86.0	88.0	90.7	91.1	91.0	92.5	92.0	92.1	97.8	95.1	96.0	96.5	96.5	96.4	95.6	94.9	91.7	89.4	89.8	82.8	84.0	82.7		106.8
12.5	Turbine ON (dBA)	18.8	23.3	26.4	29.5	32.7	35.9	38.0	39.9	42.1	42.7	42.6	44.0	43.7	43.8	49.4	46.5	47.4	47.8	47.8	47.6	46.8	46.0	42.7	40.3	40.7	33.9	34.9	33.7		58.1
	Background (dBA)	20.2	24.3	26.9	28.1	29.3	29.7	31.1	32.0	33.4	34.1	34.9	36.7	36.9	37.0	37.9	37.9	38.7	37.9	37.1	35.9	34.6	32.9	30.0	27.5	25.5	23.9	22.4	20.3		48.5
	Turbine ON - background adj (dBA)	[15.8]	[20.3]	[23.4]	[26.5]	30.1	34.8	37.0	39.1	41.5	42.1	41.8	43.1	42.7	42.8	49.1	45.8	46.8	47.3	47.4	47.3	46.5	45.8	42.5	40.1	40.5	33.5	34.7	33.5		57.6
	Signal to noise (dB)	-1.4	-1.0	-0.5	1.4	3.5	6.2	6.9	7.9	8.8	8.6	7.7	7.3	6.8	6.8	11.6	8.5	8.7	9.9	10.7	11.7	12.1	13.1	12.7	12.8	15.2	10.0	12.6	13.4		9.6
	Uncertainty (dB)	2.9	3.0	2.7	2.5	1.9	1.1	1.0	1.0	0.9	0.9	0.8	0.9	0.9	0.9	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.9	0.9	1.5		0.8
	PWL (dBA)	[64.7]	[69.2]	[72.3]	[75.4]	79.1	83.7	85.9	88.1	90.5	91.0	90.8	92.1	91.6	91.7	98.0	94.8	95.7	96.3	96.3	96.2	95.4	94.7	91.4	89.0	89.5	82.4	83.6	82.4		106.6

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

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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	
6.0	Turbine ON (dBA)	15.9	20.6	24.3	28.3	31.6	35.0	37.4	39.3	41.1	42.2	42.1	43.7	44.1	44.3	48.2	46.9	47.7	47.7	47.4	47.0	46.0	45.1	42.2	39.6	41.7	33.0	34.8	34.6	57.8
	Background (dBA)	7.7	10.1	13.1	15.7	19.2	24.7	24.1	25.5	28.0	29.9	29.7	30.0	30.1	31.0	31.6	31.8	32.3	31.0	29.5	27.7	25.7	23.9	21.0	19.2	18.3	18.1	17.9	17.0	41.9
	Turbine ON - background adj (dBA)	15.2	20.2	23.9	28.1	31.3	34.5	37.2	39.1	40.9	42.0	41.8	43.5	43.9	44.1	48.1	46.8	47.6	47.6	47.4	46.9	46.0	45.1	42.2	39.6	41.7	32.8	34.7	34.5	57.7
	Signal to noise (dB)	8.2	10.5	11.2	12.6	12.3	10.3	13.3	13.8	13.2	12.4	12.4	13.6	14.0	13.2	16.6	15.2	15.4	16.6	17.9	19.3	20.3	21.2	21.2	20.4	23.4	14.8	16.9	17.6	15.9
	Uncertainty (dB)	1.6	1.5	1.2	1.1	1.1	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.1	1.1	1.1	1.1	1.2	1.1	2.0	1.0
	PWL (dBA)	64.1	69.1	72.9	77.0	80.2	83.5	86.2	88.0	89.8	90.9	90.8	92.4	92.8	93.0	97.1	95.7	96.5	96.5	96.3	95.9	94.9	94.0	91.1	88.5	90.6	81.7	83.6	83.5	106.6
7.0	Turbine ON (dBA)	16.7	21.6	24.9	28.7	32.1	36.1	37.6	39.7	42.3	42.7	42.9	44.5	44.9	45.0	49.4	47.5	48.2	48.2	47.8	47.4	46.6	45.8	42.9	40.6	41.5	33.9	35.3	34.2	58.4
	Background (dBA)	12.3	15.7	17.7	19.2	21.5	25.8	25.9	28.1	29.3	31.5	31.7	32.4	32.2	32.6	33.4	33.4	34.2	33.3	32.1	30.7	29.1	27.3	24.6	22.3	20.9	19.9	19.0	17.5	43.9
	Turbine ON - background adj (dBA)	14.7	20.3	24.0	28.2	31.7	35.7	37.3	39.4	42.0	42.4	42.5	44.2	44.6	44.8	49.3	47.3	48.0	48.1	47.7	47.3	46.5	45.7	42.8	40.5	41.5	33.8	35.2	34.1	58.3
	Signal to noise (dB)	4.4	5.9	7.2	9.5	10.6	10.4	11.6	11.6	13.0	11.2	11.2	12.1	12.6	12.4	16.0	14.1	14.0	14.9	15.7	16.8	17.5	18.5	18.3	18.3	20.7	14.0	16.2	16.7	14.5
	Uncertainty (dB)	1.9	1.5	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.9	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	1.5	0.7
	PWL (dBA)	63.7	69.3	72.9	77.1	80.6	84.6	86.2	88.3	91.0	91.3	91.5	93.2	93.6	93.7	98.3	96.2	96.9	97.0	96.6	96.3	95.4	94.7	91.7	89.4	90.4	82.7	84.1	83.1	107.2
8.0	Turbine ON (dBA)	17.7	22.5	25.3	29.0	32.8	35.8	37.9	39.9	42.3	42.7	42.7	44.4	44.2	44.3	49.4	47.0	47.8	48.1	47.9	47.6	46.7	45.9	42.8	40.4	40.6	33.7	34.7	33.4	58.3
	Background (dBA)	18.4	21.5	23.3	25.0	26.0	28.1	28.6	31.0	31.2	33.1	33.4	34.7	34.5	34.4	35.3	35.2	35.8	35.3	34.5	33.2	31.8	30.0	26.9	24.4	23.8	22.3	20.6	18.3	46.1
	Turbine ON - background adj (dBA)	[14.7]	[19.5]	[22.3]	26.8	31.8	35.0	37.3	39.3	41.9	42.2	42.2	43.9	43.7	43.8	49.2	46.7	47.5	47.8	47.6	47.4	46.6	45.8	42.7	40.2	40.5	33.3	34.5	33.3	58.0
	Signal to noise (dB)	-0.7	0.9	2.0	4.0	6.8	7.7	9.3	8.9	11.0	9.6	9.3	9.6	9.6	9.9	14.1	11.7	12.0	12.7	13.4	14.4	15.0	15.9	15.9	16.0	16.8	11.4	14.0	15.1	12.2
	Uncertainty (dB)	2.6	2.5	2.0	1.4	1.0	0.9	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	0.6	0.7	0.7	0.7	0.7	0.8	0.8	1.4	0.7
	PWL (dBA)	[63.6]	[68.4]	[71.3]	75.7	80.7	83.9	86.2	88.2	90.9	91.2	91.1	92.8	92.6	92.8	98.2	95.6	96.4	96.7	96.6	96.3	95.5	94.7	91.6	89.2	89.4	82.3	83.4	82.2	106.9
9.0	Turbine ON (dBA)	17.9	22.8	25.7	29.1	32.6	36.0	37.9	39.8	42.1	42.7	42.6	44.1	43.6	43.7	49.3	46.5	47.4	47.8	47.8	47.6	46.8	46.1	42.8	40.4	40.8	33.9	35.0	33.7	58.1
	Background (dBA)	20.1	23.6	25.9	27.1	28.5	29.3	30.7	32.5	33.1	34.0	35.0	36.6	36.9	36.8	37.7	37.7	38.5	37.8	36.9	35.8	34.5	32.7	29.6	26.8	24.5	22.9	21.4	19.4	48.3
	Turbine ON - background adj (dBA)	[14.9]	[19.8]	[22.7]	[26.1]	30.5	34.9	37.0	38.9	41.5	42.0	41.8	43.2	42.6	42.7	49.0	45.9	46.8	47.4	47.4	47.3	46.6	45.9	42.6	40.2	40.6	33.6	34.8	33.5	57.7
	Signal to noise (dB)	-2.2	-0.8	-0.2	2.0	4.1	6.6	7.2	7.3	9.0	8.7	7.6	7.4	6.7	6.9	11.6	8.8	8.9	10.1	10.8	11.8	12.4	13.4	13.2	13.6	16.2	11.1	13.6	14.3	9.8
	Uncertainty (dB)	2.6	2.6	2.2	2.1	1.5	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.8	0.8	0.8	0.8	0.9	0.8	1.5	0.8
	PWL (dBA)	[63.8]	[68.7]	[71.6]	[75]	79.4	83.9	85.9	87.8	90.5	91.0	90.7	92.1	91.5	91.7	97.9	94.8	95.8	96.3	96.3	96.2	95.5	94.8	91.5	89.1	89.6	82.5	83.7	82.5	106.6
10.0	Turbine ON (dBA)	18.3	23.1	25.8	29.4	32.7	35.9	38.0	39.9	42.2	42.8	42.8	44.2	43.7	43.6	49.4	46.4	47.3	47.8	47.8	47.7	47.0	46.2	42.9	40.4	40.7	33.9	34.8	33.7	58.2
	Background (dBA)	18.2	21.1	24.1	25.0	26.5	28.3	29.8	34.6	33.4	34.3	36.2	37.6	37.9	38.1	38.4	38.0	38.7	37.9	37.2	36.1	34.8	32.9	29.5	26.3	23.2	21.3	19.6	17.7	48.8
	Turbine ON - background adj (dBA)	[15.3]	[20.1]	[22.8]	27.4	31.5	35.1	37.3	38.3	41.6	42.2	41.7	43.2	42.4	42.2	49.1	45.7	46.7	47.3	47.4	47.4	46.7	46.0	42.7	40.3	40.6	33.7	34.7	33.6	57.6
	Signal to noise (dB)	0.1	2.0	1.7	4.4	6.2	7.6	8.2	5.2	8.8	8.5	6.5	6.6	5.8	5.5	11.1	8.4	8.6	9.8	10.6	11.5	12.2	13.3	13.4	14.2	17.5	12.7	15.2	16.0	9.4
	Uncertainty (dB)	2.6	2.7	2.4	1.5	1.1	1.0	0.9	1.2	0.9	0.9	0.9	0.9	1.0	1.0	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4	0.8
	PWL (dBA)	[64.3]	[69]	[71.7]	76.4	80.4	84.0	86.2	87.2	90.6	91.1	90.6	92.1	91.3	91.1	98.0	94.6	95.6	96.2	96.3	96.3	95.6	95.0	91.6	89.2	89.6	82.6	83.6	82.5	106.6

Table C.03 Type B measurement uncertainty summary

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: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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	
8.0	Turbine ON	8.10	6	Average (dBA)	15.6	19.5	23.3	27.2	30.5	34.4	36.2	38.1	40.3	41.5	41.1	43.0	43.3	43.5	46.7	46.4	47.2	47.0	46.9	46.4	45.4	44.4	41.6	38.9	40.8	32.0	33.7	33.8	57.0
				Uncertainty A (dB)	0.6	0.5	0.3	0.3	0.4	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.5	0.9	0.9	0.9	1.1		
				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	0.8	0.9	0.9	0.9	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	0.8	0.9	0.9	1.2	1.2	1.2	1.8		
	Background	7.99	13	Average (dBA)	10.6	12.1	14.5	16.6	19.3	23.5	24.1	25.2	27.3	28.6	28.7	29.2	29.6	31.3	31.5	31.8	32.2	30.3	28.6	26.5	24.2	22.5	20.1	18.9	18.6	18.9	19.0	18.7	41.4
				Uncertainty A (dB)	1.8	1.3	1.0	0.6	0.6	0.8	0.5	0.4	0.4	0.7	0.5	0.3	0.3	0.7	0.4	0.6	0.7	0.5	0.5	0.5	0.6	0.7	0.5	0.4	0.5	0.5	0.7	0.9		
				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)	2.1	1.7	1.3	1.0	1.0	1.1	0.9	0.9	0.9	1.1	0.9	0.8	0.8	1.0	0.8	0.9	1.0	0.9	0.8	0.9	0.9	1.1	1.0	0.9	0.9	1.0	1.0	1.7		
8.5	Turbine ON	8.50	17	Average (dBA)	16.3	21.1	24.8	28.9	32.1	35.5	38.0	39.7	41.7	42.6	42.4	44.0	44.3	44.5	48.5	47.1	47.9	47.8	47.6	47.2	46.3	45.3	42.4	39.9	41.9	33.4	35.1	34.8	58.0
				Uncertainty A (dB)	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.5	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	0.9	0.9	1.0	0.9	1.5		
	Background	8.51	11	Average (dBA)	3.6	7.8	12.1	15.0	18.6	23.6	23.6	24.8	26.7	29.1	29.0	29.7	30.2	30.7	31.5	31.5	32.2	31.0	29.6	27.7	25.8	24.0	20.9	18.9	17.8	17.4	17.0	15.7	41.6
				Uncertainty A (dB)	1.3	1.0	0.7	0.4	0.5	1.1	0.6	0.5	0.6	1.0	0.8	0.7	0.7	0.8	0.7	0.7	0.9	0.9	0.9	1.0	1.2	1.3	0.9	0.6	0.2	0.1	0.1	0.1		
				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)	1.6	1.4	1.1	0.9	0.9	1.4	1.0	0.9	1.0	1.3	1.1	1.0	1.0	1.0	1.0	1.0	1.1	1.2	1.1	1.2	1.4	1.5	1.2	1.0	0.8	0.8	0.8	1.4		
9.0	Turbine ON	8.97	37	Average (dBA)	16.0	20.8	24.3	28.2	31.6	35.2	37.3	39.4	41.5	42.4	42.4	44.0	44.5	44.6	48.8	47.2	48.0	48.0	47.7	47.2	46.3	45.5	42.6	40.2	41.9	33.6	35.3	34.6	58.1
				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	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.4		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	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	0.9	0.9	0.9	1.5		
	Background	8.94	18	Average (dBA)	6.1	9.7	12.4	15.5	19.6	26.0	24.3	26.2	29.1	31.3	31.0	31.0	30.7	32.6	32.5	32.8	33.6	32.1	30.6	28.5	26.5	24.7	21.7	19.6	18.3	18.3	17.6	16.1	42.9
				Uncertainty A (dB)	1.2	0.8	0.5	0.3	0.4	0.9	0.3	0.3	0.5	0.7	0.6	0.5	0.4	0.8	0.5	0.5	0.6	0.5	0.5	0.6	0.7	0.7	0.6	0.4	0.3	0.3	0.2	0.2		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	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)	1.6	1.3	1.0	0.9	0.9	1.2	0.9	0.9	0.9	1.1	0.9	0.8	0.8	1.0	0.8	0.9	0.9	0.8	0.8	0.9	1.0	1.1	1.0	0.9	0.8	0.8	0.8	1.5		
9.5	Turbine ON	9.53	41	Average (dBA)	16.2	21.2	24.8	28.6	32.0	35.4	37.5	39.7	42.2	42.8	43.0	44.7	45.1	45.2	49.6	47.6	48.2	48.2	47.8	47.3	46.5	45.7	42.8	40.5	41.7	34.0	35.4	34.4	58.5
				Uncertainty A (dB)	0.2	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	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	0.9	0.9	0.9	1.5		
	Background	9.47	14	Average (dBA)	6.2	10.0	12.6	15.9	19.8	25.4	25.8	25.9	28.5	31.2	30.6	30.6	30.2	30.2	31.7	31.6	32.4	31.9	30.4	28.8	26.9	25.4	23.4	22.0	21.1	20.5	19.9	18.3	42.4
				Uncertainty A (dB)	1.4	1.1	0.8	0.5	0.4	0.8	0.9	0.4	0.4	0.8	0.7	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.8	1.0	1.1	1.2	1.2	1.1	1.0	0.9	0.9		
				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)	1.7	1.5	1.1	0.9	0.9	1.1	1.2	0.9	0.9	1.1	1.0	0.8	0.8	0.8	0.8	0.8	0.9	0.9	1.0	1.0	1.2	1.4	1.5	1.4	1.4	1.3	1.2	1.7		
10.0	Turbine ON	9.97	26	Average (dBA)	17.5	22.5	25.5	29.1	32.3	37.6	37.8	39.8	42.6	42.8	42.9	44.6	44.9	45.0	49.5	47.5	48.1	48.2	47.9	47.5	46.6	45.9	42.9	40.6	41.2	33.9	35.1	33.9	58.5
				Uncertainty A (dB)	0.5	0.4	0.3	0.3	0.3	0.6	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	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)	1.1	1.1	0.9	0.9	0.9	1.0	0.8	0.8	0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.9	0.9	1.5		
	Background	9.96	19	Average (dBA)	11.1	14.5	16.6	18.3	20.8	25.2	25.4	29.1	29.3	31.4	31.7	32.6	32.5	32.1	33.4	33.2	33.7	33.1	32.2	30.8	29.3	27.4	24.3	21.7	19.9	19.0	18.3	16.8	43.9
				Uncertainty A (dB)	1.7	1.5	1.2	0.9	0.5	0.5	0.5	0.9	0.5	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.8	0.9	1.1	1.1	0.9	0.7	0.5	0.4	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)	2.0	1.8	1.4	1.2	0.9	1.0	1.0	1.2	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.2	1.3	1.3	1.2	1.1	1.0	0.9	0.9	1.5		

Table C.04 Detailed measruement uncertainty at hub height

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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	
10.5	Turbine ON	10.47	21	Average (dBA)	16.9	21.6	24.8	28.7	32.1	35.4	37.5	39.7	42.3	42.6	42.7	44.4	44.6	44.8	49.5	47.4	48.1	48.2	47.9	47.5	46.6	45.9	42.8	40.5	41.2	34.0	35.2	33.9	58.4
				Uncertainty A (dB)	0.5	0.3	0.4	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	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)	1.1	1.1	0.9	0.9	0.9	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	10.57	12	Average (dBA)	18.9	22.4	24.6	26.1	25.9	28.7	28.5	32.0	31.3	33.2	33.8	34.9	34.7	34.5	35.5	35.5	36.3	35.4	34.5	33.3	31.9	30.2	27.2	24.3	22.5	20.9	19.4	17.8	46.3
				Uncertainty A (dB)	4.0	3.5	3.2	2.7	1.7	0.7	1.3	1.7	0.9	0.6	0.7	1.0	1.3	1.3	1.2	1.2	1.2	1.1	1.2	1.3	1.5	1.5	1.5	1.4	1.3	1.0	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)	4.2	3.7	3.3	2.8	1.9	1.0	1.6	1.9	1.2	1.0	1.0	1.2	1.4	1.5	1.4	1.4	1.4	1.3	1.4	1.5	1.6	1.7	1.7	1.6	1.5	1.3	1.1	1.6		
11.0	Turbine ON	11.03	45	Average (dBA)	17.8	22.5	25.3	29.0	32.7	35.7	37.8	39.9	42.3	42.7	42.7	44.3	44.0	44.2	49.4	46.9	47.7	48.0	47.8	47.6	46.7	45.8	42.7	40.2	40.2	33.3	34.2	32.9	58.2
				Uncertainty A (dB)	0.3	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	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)	1.1	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	0.8	0.8	0.8	0.9	0.9	1.5		
	Background	11.01	23	Average (dBA)	19.2	22.7	24.3	26.0	27.5	28.3	29.4	30.1	31.2	32.8	33.2	35.0	34.8	34.5	35.5	35.4	35.9	35.4	34.6	33.4	32.0	30.3	27.3	24.9	25.2	22.1	20.2	18.2	46.2
				Uncertainty A (dB)	2.3	2.2	2.0	1.8	1.4	0.8	1.0	0.8	0.5	0.5	0.5	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.8	1.0	1.0	1.0	0.9	1.2	0.8	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)	2.5	2.4	2.1	1.9	1.6	1.1	1.3	1.1	1.0	1.0	0.9	1.0	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.1	1.2	1.3	1.3	1.2	1.5	1.1	1.0	1.5		
11.5	Turbine ON	11.49	77	Average (dBA)	18.1	22.8	25.5	29.1	32.6	35.9	38.1	39.9	42.3	42.8	42.7	44.4	44.0	44.2	49.3	46.9	47.7	48.0	47.9	47.6	46.8	46.0	42.8	40.3	40.5	33.7	34.7	33.4	58.3
				Uncertainty A (dB)	0.3	0.2	0.2	0.2	0.2	0.1	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	0.2	0.2	0.2	0.2		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	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	0.8	1.5		
	Background	11.51	24	Average (dBA)	16.8	19.0	21.3	22.9	24.0	27.8	27.4	31.1	31.3	33.4	33.6	34.5	34.3	34.3	35.3	35.1	35.8	35.4	34.5	33.3	31.9	30.0	26.9	24.1	22.8	22.9	21.3	18.5	46.0
				Uncertainty A (dB)	2.0	1.7	1.5	1.3	0.8	0.4	0.6	0.8	0.4	0.2	0.3	0.6	0.7	0.7	0.6	0.7	0.6	0.6	0.7	0.8	0.9	0.9	0.9	0.8	0.9	1.0	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)	2.2	2.0	1.7	1.5	1.1	0.9	1.0	1.1	0.9	0.8	0.8	0.9	1.0	1.0	0.9	1.0	0.9	0.9	1.0	1.1	1.1	1.2	1.2	1.1	1.2	1.3	1.1	1.6		
12.0	Turbine ON	12.01	58	Average (dBA)	17.3	22.5	25.3	28.9	33.6	36.4	37.8	39.9	42.2	42.7	42.7	44.2	43.8	43.9	49.1	46.6	47.5	47.9	47.8	47.7	46.9	46.2	42.9	40.6	41.0	34.2	35.3	33.9	58.2
				Uncertainty A (dB)	0.3	0.2	0.2	0.2	0.4	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	0.2	0.2	0.2	0.2		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	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	0.9	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	1.5		
	Background	12.05	13	Average (dBA)	19.8	23.2	23.3	25.0	26.9	28.4	29.8	32.2	32.1	33.3	34.2	35.8	36.1	36.0	37.3	36.9	37.9	37.2	36.3	35.0	33.7	31.8	28.6	25.7	23.5	22.1	20.8	18.9	47.6
				Uncertainty A (dB)	2.4	2.3	1.9	1.6	1.3	0.8	0.9	1.1	0.6	0.5	0.5	0.7	0.9	0.9	0.7	0.7	0.8	0.7	0.8	1.0	1.1	1.1	1.1	1.0	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)	2.6	2.5	2.1	1.8	1.6	1.1	1.2	1.4	1.0	0.9	0.9	1.0	1.1	1.1	1.0	1.0	1.0	1.0	1.1	1.2	1.3	1.4	1.4	1.3	1.2	1.2	1.1	1.6		
12.5	Turbine ON	12.52	52	Average (dBA)	18.8	23.4	26.4	29.5	32.7	35.9	38.0	39.9	42.1	42.7	42.6	44.0	43.7	43.8	49.4	46.5	47.4	47.8	47.7	47.6	46.8	46.0	42.7	40.3	40.7	33.9	34.9	33.7	58.1
				Uncertainty A (dB)	0.4	0.3	0.4	0.3	0.2	0.2	0.2	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	0.2	0.2	0.2	0.3		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	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	0.8	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	1.5		
	Background	12.50	19	Average (dBA)	20.2	24.3	26.9	28.1	29.3	29.7	31.1	32.0	33.4	34.1	35.0	36.7	36.9	37.0	37.9	37.9	38.7	37.9	37.1	35.9	34.6	32.9	30.0	27.5	25.5	23.9	22.4	20.3	48.5
				Uncertainty A (dB)	1.8	1.9	1.9	1.6	1.2	0.8	0.7	0.7	0.5	0.4	0.4	0.5	0.5	0.6	0.5	0.6	0.6	0.5	0.6	0.6	0.7	0.7	0.8	0.9	1.1	1.1	1.0	0.9		
				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)	2.1	2.2	2.1	1.8	1.4	1.1	1.1	1.0	1.0	0.9	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.1	1.2	1.2	1.3	1.4	1.3	1.7		

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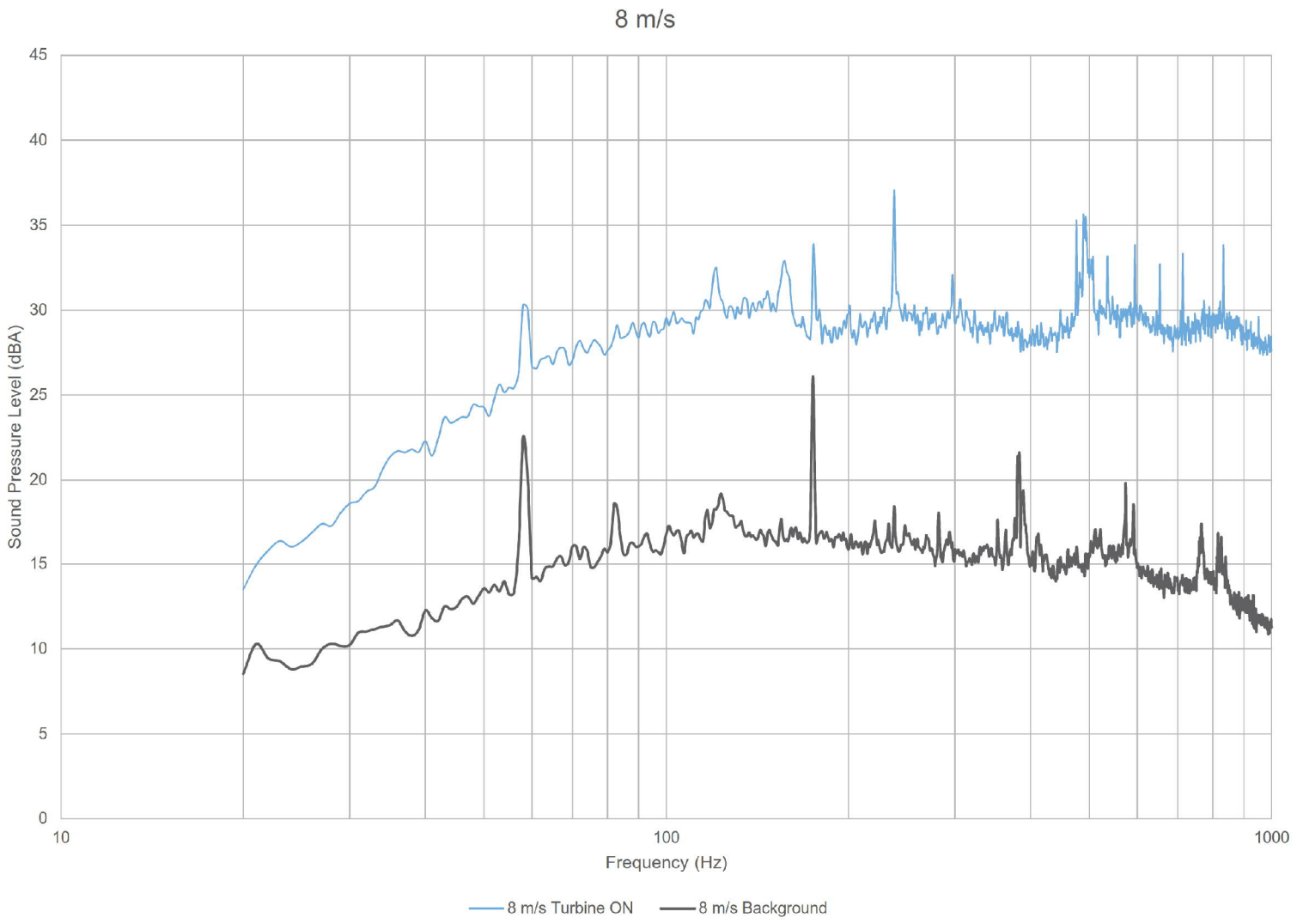
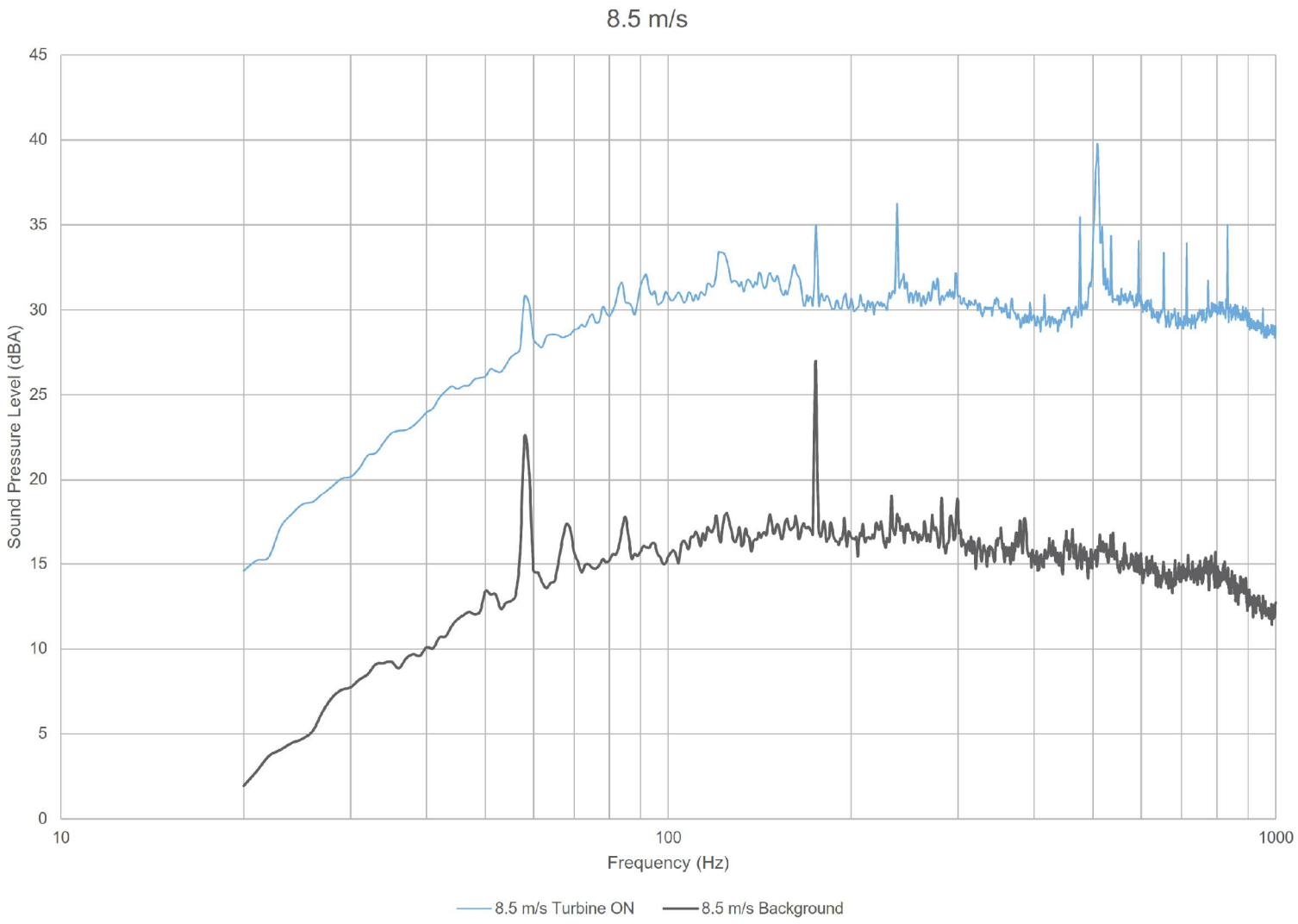
Appendix D
Tonality Assessment



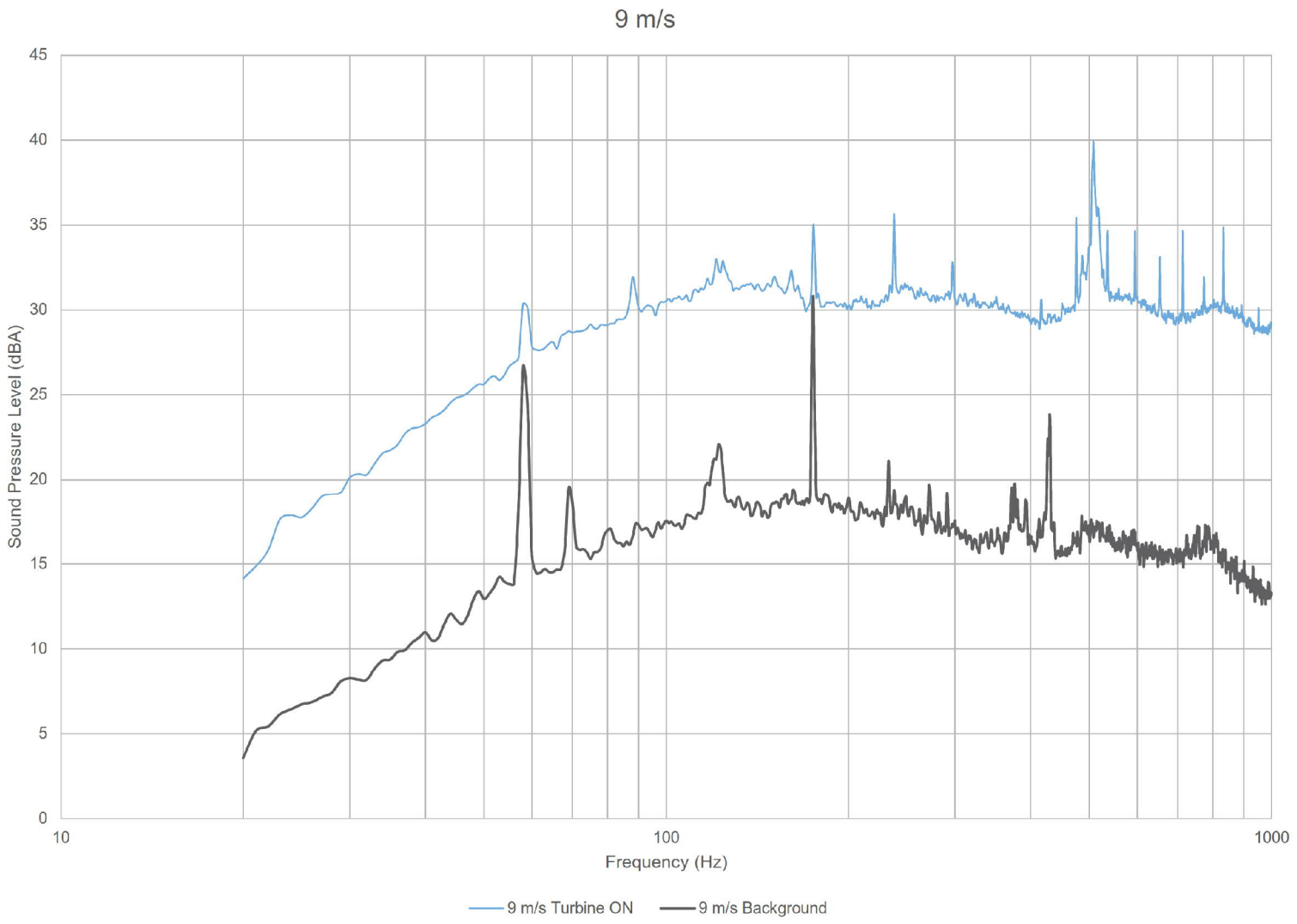
aercoustics	13259.00.T38.RP1 Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	**Project Name** Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 8 m/s

Figure D.01

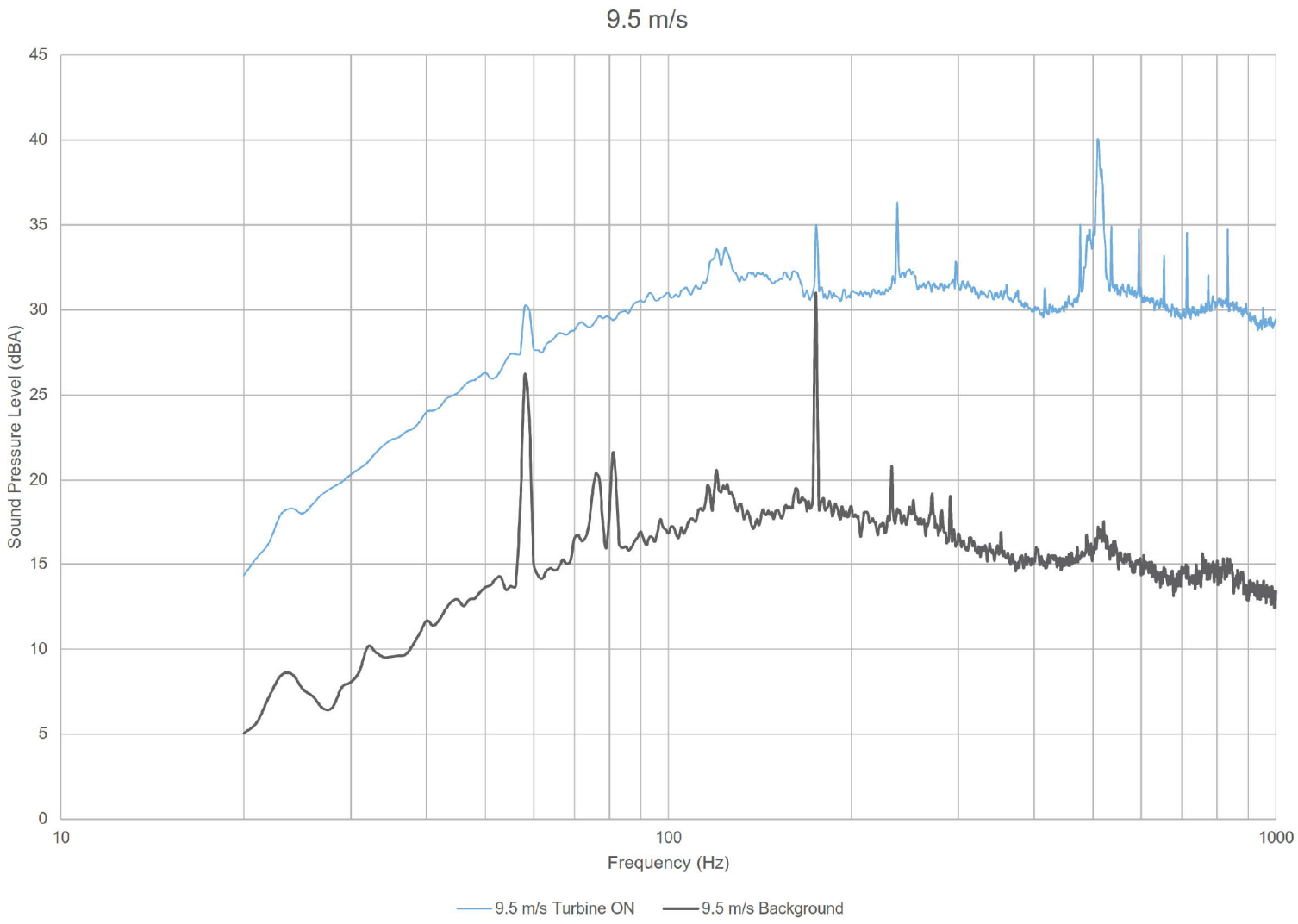


aercoustics	13259.00.T38.RP1 Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	**Project Name** Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 8.5 m/s

Figure D.02

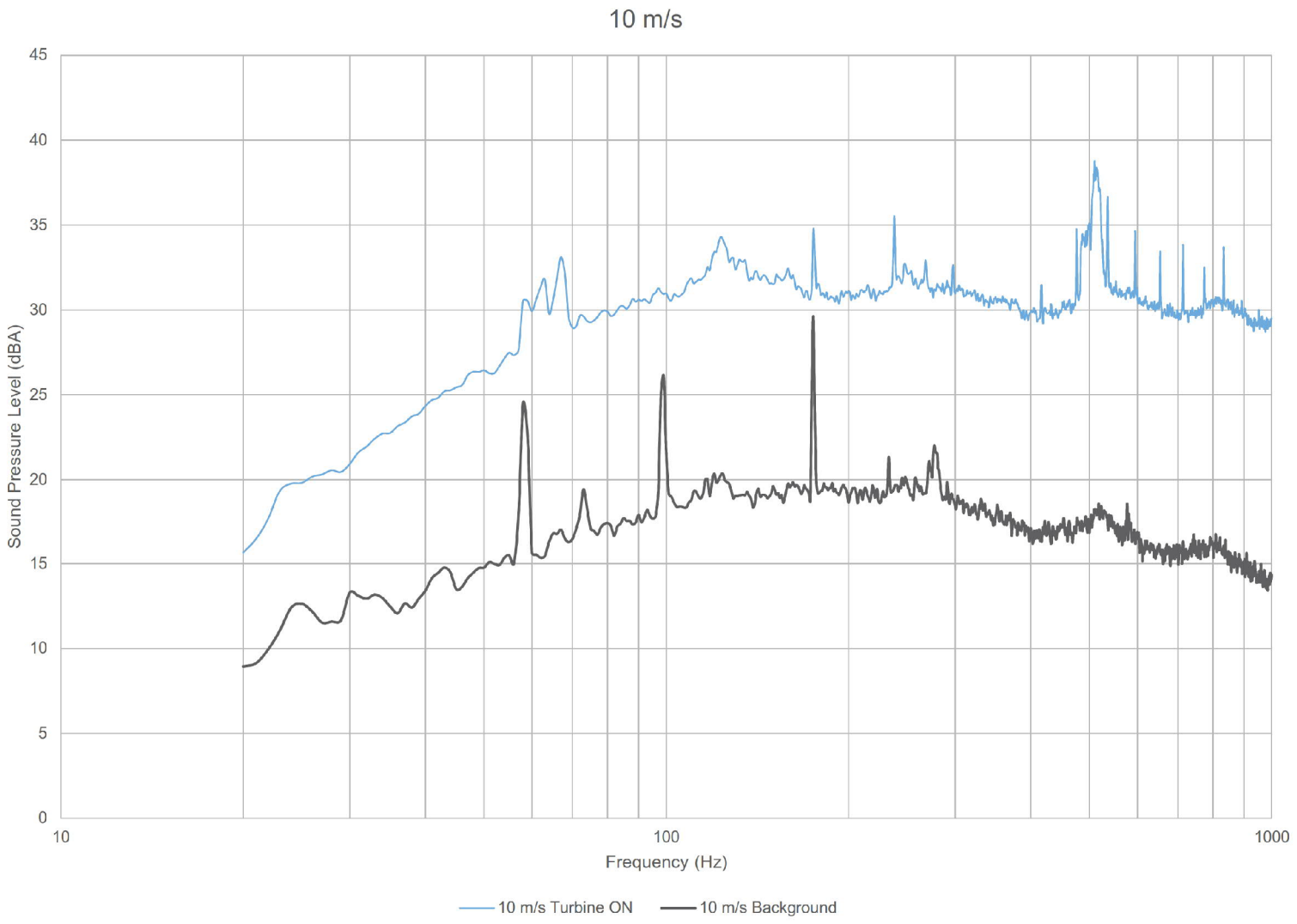


aercoustics	13259.00.T38.RP1	**Project Name**
	Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0
		Figure Title Plot of narrow band spectra – Turbine ON vs. Background at 9 m/s
		Figure D.03



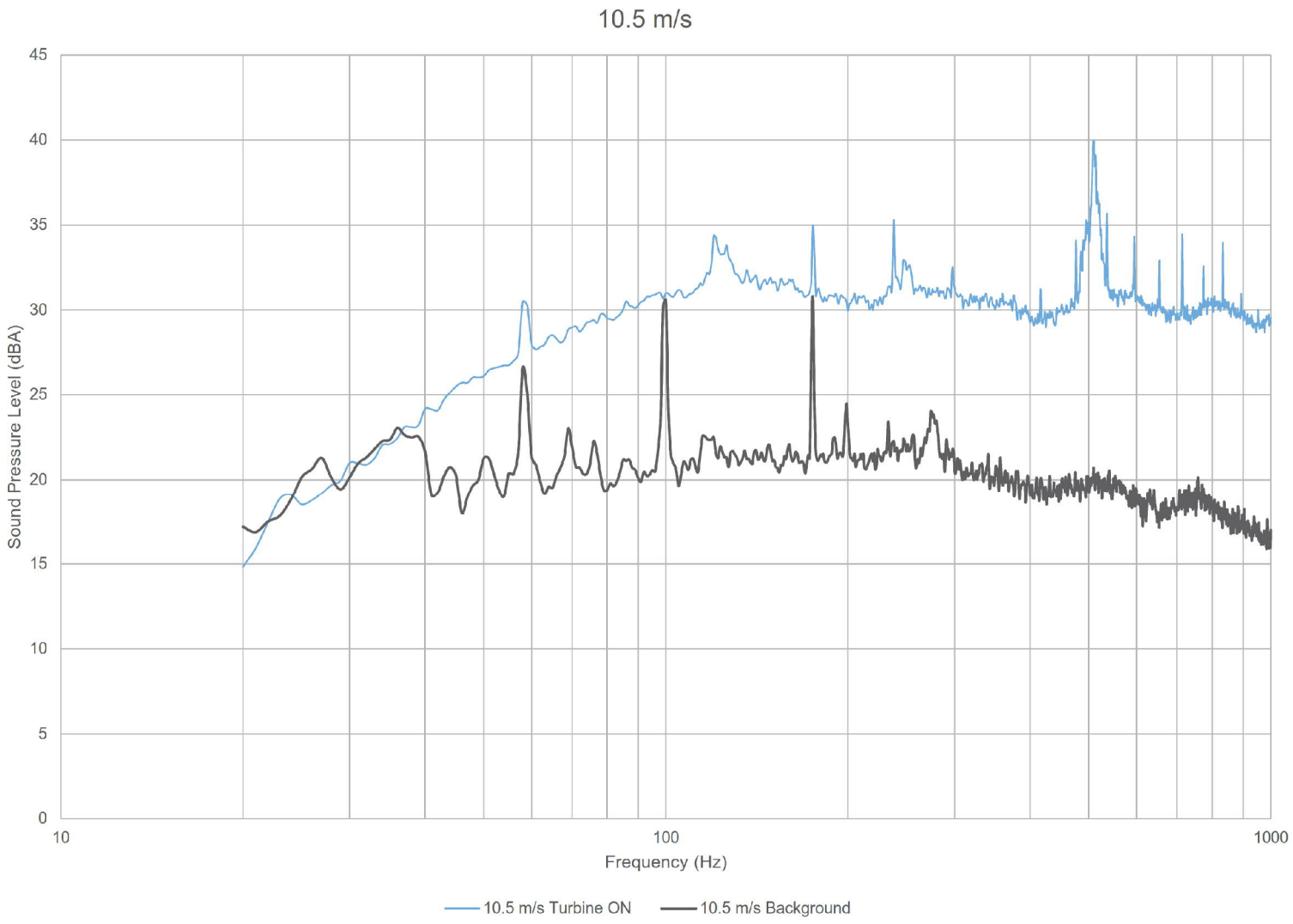
aercoustics	13259.00.T38.RP1 Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	**Project Name** Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 9.5 m/s

Figure D.04



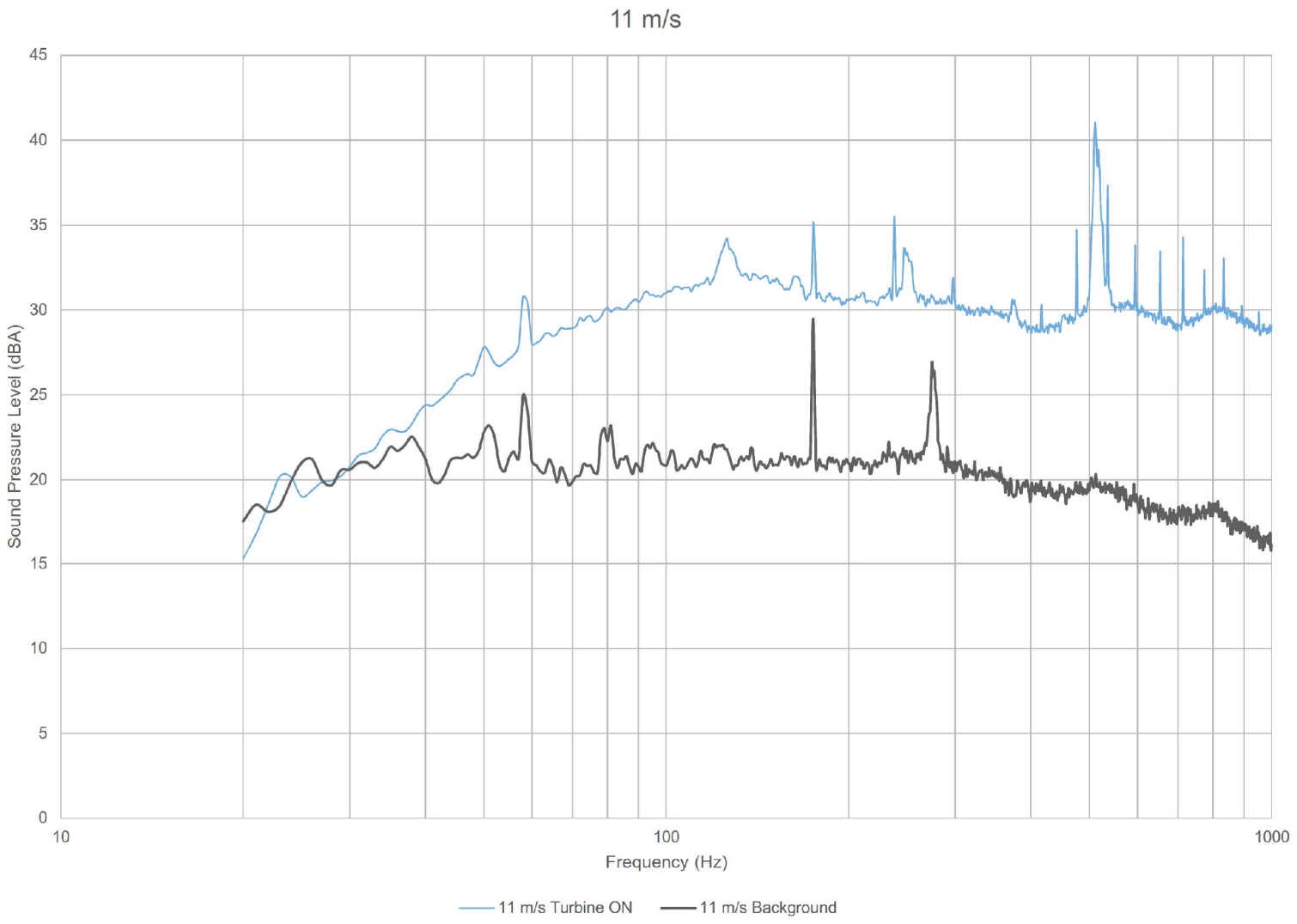
aercoustics	13259.00.T38.RP1 Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	**Project Name** Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 10 m/s

Figure D.05



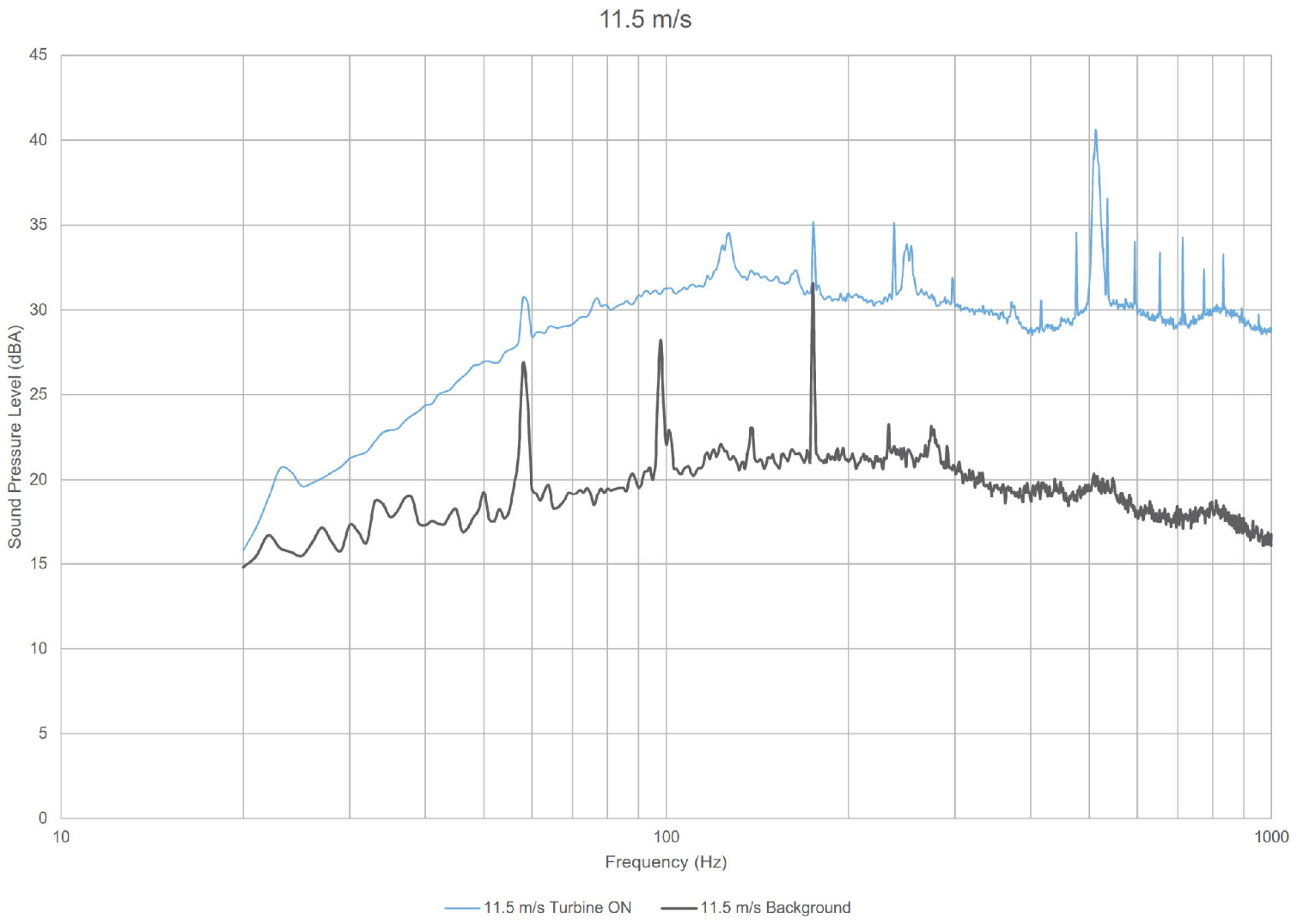
aercoustics	13259.00.T38.RP1 Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	**Project Name** Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 10.5 m/s

Figure D.06



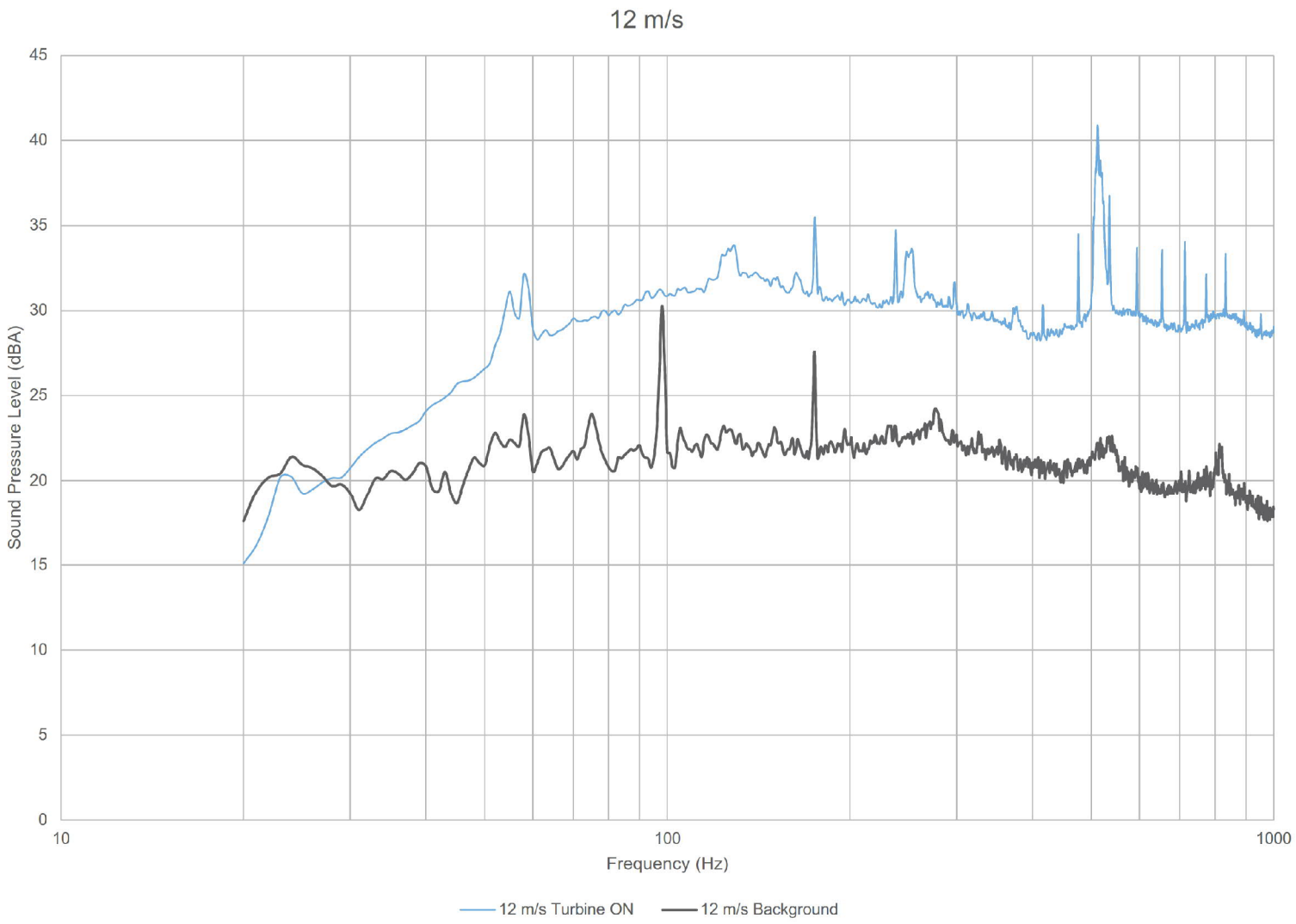
aercoustics	13259.00.T38.RP1 Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	**Project Name** Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 11 m/s

Figure D.07



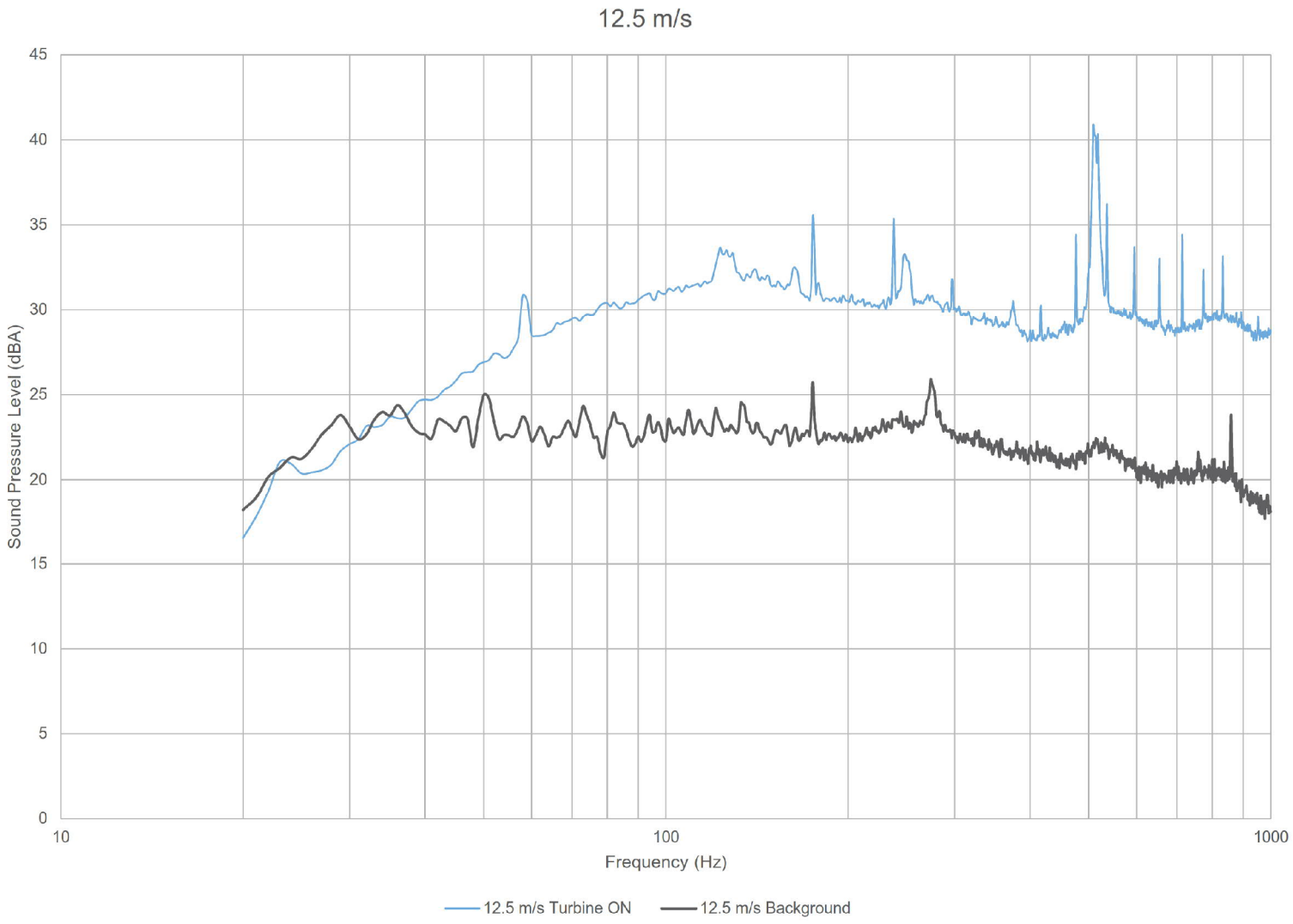
aercoustics	13259.00.T38.RP1 Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	**Project Name** Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 11.5 m/s

Figure D.08



aercoustics	13259.00.T38.RP1 Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	**Project Name** Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 12 m/s

Figure D.09



aercoustics	13259.00.T38.RP1 Scale: NTS Drawn by: AM Reviewed by: PA Date: Jan 05, 2018 Revision: 1	**Project Name** Summerhaven Wind Energy Centre - Turbine T38 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 12.5 m/s

Figure D.10

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

Project: Summerhaven Wind Energy Centre- Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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)
225	501			30.9	49.9	47.6	-2.2	-2.3	0.1
407	504			30.2	49.2	46.5	-2.6	-2.3	-0.3
71	506			31.2	50.1	47.3	-2.8	-2.3	-0.5
410	507			31.1	50.0	46.3	-3.7	-2.3	-1.4
137	507			29.7	48.7	45.7	-2.9	-2.3	-0.6
145	508			30.0	48.9	44.8	-4.1	-2.3	-1.8
420	508			31.3	50.3	44.5	-5.7	-2.3	-3.4
38	509			30.2	49.2	49.8	0.6	-2.3	2.9
474	509			32.2	51.2	46.9	-4.3	-2.3	-2.0
70	510			30.9	49.9	46.4	-3.5	-2.3	-1.2
579	511			33.0	52.0	40.6	-11.4	-2.3	-9.1
11	511			30.2	49.2	49.5	0.3	-2.3	2.6
136	514			30.8	49.8	47.3	-2.5	-2.3	-0.2
39	517			30.5	49.5	49.0	-0.5	-2.3	1.8
405	518			31.6	50.6	43.7	-6.8	-2.3	-4.5
126	529			31.1	50.1	38.1	-12.0	-2.3	-9.7
Average	511						-3.0	-2.3	-0.6

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

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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)
6	476			30.1	49.0	45.2	-3.8	-2.3	-1.5
732	484			30.3	49.2	43.1	-6.0	-2.3	-3.7
473	487			30.2	49.1	45.6	-3.4	-2.3	-1.1
132	487			30.3	49.2	45.8	-3.4	-2.3	-1.2
69	499			30.7	49.6	45.2	-4.4	-2.3	-2.1
393	502			31.3	50.3	45.4	-4.8	-2.3	-2.5
402	504			31.4	50.3	40.4	-9.9	-2.3	-7.6
449	504			30.3	49.2	49.2	-0.1	-2.3	2.2
578	505			31.9	50.9	43.6	-7.3	-2.3	-5.0
143	506			31.5	50.4	42.0	-8.3	-2.3	-6.0
10	506			30.0	48.9	49.8	0.9	-2.3	3.2
37	506			30.7	49.7	47.3	-2.4	-2.3	-0.1
403	507			31.1	50.1	46.3	-3.8	-2.3	-1.5
394	508			32.0	50.9	49.6	-1.3	-2.3	1.0
418	508			30.2	49.1	49.7	0.6	-2.3	2.9
581	508			32.4	51.3	50.0	-1.4	-2.3	0.9
73	508			31.2	50.2	52.1	1.9	-2.3	4.2
222	508			31.4	50.4	51.5	1.1	-2.3	3.4
476	509			31.8	50.8	47.4	-3.4	-2.3	-1.1
219	509			32.1	51.1	48.1	-2.9	-2.3	-0.6
144	510			30.4	49.4	47.3	-2.1	-2.3	0.2
40	511			30.6	49.5	48.5	-1.0	-2.3	1.3
408	511			31.2	50.2	44.5	-5.7	-2.3	-3.4
409	512			30.6	49.6	50.8	1.2	-2.3	3.5
135	513			31.0	49.9	42.8	-7.1	-2.3	-4.8
Average	504						-2.1	-2.3	0.2

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

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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)
24	483			30.7	49.6	46.7	-2.9	-2.3	-0.7
574	483			32.3	51.2	40.5	-10.7	-2.3	-8.4
99	487			31.4	50.3	49.5	-0.8	-2.3	1.5
27	487			31.6	50.5	48.2	-2.4	-2.3	-0.1
60	489			30.2	49.1	48.6	-0.5	-2.3	1.8
34	491			30.9	49.8	45.3	-4.5	-2.3	-2.2
554	493			31.8	50.7	47.4	-3.3	-2.3	-1.0
218	494			31.8	50.7	42.5	-8.2	-2.3	-5.9
390	497			30.9	49.8	45.2	-4.6	-2.3	-2.4
716	501			31.2	50.2	46.0	-4.1	-2.3	-1.8
567	505			32.0	51.0	48.7	-2.3	-2.3	0.1
556	505			32.6	51.5	47.8	-3.8	-2.3	-1.5
448	507			30.6	49.6	48.6	-0.9	-2.3	1.4
9	508			30.1	49.1	53.0	3.9	-2.3	6.2
557	508			32.5	51.4	50.5	-1.0	-2.3	1.3
140	509			31.0	50.0	49.5	-0.4	-2.3	1.9
391	509			32.1	51.0	46.1	-5.0	-2.3	-2.7
422	509			32.2	51.1	54.3	3.1	-2.3	5.4
735	510			31.5	50.5	51.6	1.1	-2.3	3.4
423	511			31.8	50.7	51.6	0.9	-2.3	3.2
134	511			30.9	49.8	49.5	-0.4	-2.3	1.9
84	511			31.0	50.0	47.0	-2.9	-2.3	-0.6
452	512			31.3	50.3	51.7	1.4	-2.3	3.7
417	512			31.1	50.0	49.0	-1.0	-2.3	1.3
Average	501						-1.0	-2.3	1.3

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

Project: Summerhaven Wind Energy Centre- Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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)
76	506			30.9	49.8	51.5	1.7	-2.3	4.0
413	508			29.5	48.4	51.0	2.6	-2.3	4.9
361	509			32.5	51.5	41.1	-10.4	-2.3	-8.1
85	510			30.6	49.6	49.1	-0.5	-2.3	1.8
396	510			32.3	51.3	46.6	-4.7	-2.3	-2.4
75	510			30.9	49.9	49.6	-0.2	-2.3	2.1
61	511			31.4	50.3	49.5	-0.8	-2.3	1.5
411	514			30.4	49.4	49.7	0.2	-2.3	2.6
123	514			31.8	50.7	51.6	0.9	-2.3	3.2
119	515			33.2	52.2	47.3	-4.9	-2.3	-2.6
86	515			31.1	50.1	51.4	1.3	-2.3	3.6
74	516			31.0	50.0	49.5	-0.5	-2.3	1.9
734	517			31.5	50.5	50.1	-0.4	-2.3	1.9
576	518			32.4	51.4	43.8	-7.6	-2.3	-5.3
477	519			32.0	51.0	47.3	-3.7	-2.3	-1.4
568	520			32.2	51.2	48.2	-3.0	-2.3	-0.7
582	522			32.9	51.9	47.1	-4.9	-2.3	-2.5
718	535			32.0	51.1	45.3	-5.7	-2.3	-3.4
Average	515						-1.1	-2.3	1.2

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

Project: Summerhaven Wind Energy Centre- Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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)
118	485			31.0	49.9	50.4	0.6	-2.3	2.9
68	494			30.1	49.0	46.8	-2.2	-2.3	0.1
441	500			30.8	49.8	47.9	-1.8	-2.3	0.5
296	504			32.4	51.3	47.5	-3.8	-2.3	-1.5
569	508			32.3	51.2	47.9	-3.4	-2.3	-1.1
719	508			30.7	49.7	48.7	-0.9	-2.3	1.4
180	508			32.5	51.4	45.7	-5.7	-2.3	-3.4
94	508			30.7	49.6	49.2	-0.5	-2.3	1.8
515	509			31.1	50.1	50.8	0.8	-2.3	3.1
560	510			32.2	51.1	48.0	-3.1	-2.3	-0.8
120	510			30.4	49.4	51.5	2.1	-2.3	4.4
720	513			30.6	49.6	52.6	3.0	-2.3	5.3
721	514			31.5	50.5	47.3	-3.2	-2.3	-0.9
722	514			32.3	51.3	46.3	-4.9	-2.3	-2.6
Average	506						-0.9	-2.3	1.4

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

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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)
430	503			30.1	49.1	49.1	0.0	-2.3	2.3
573	504			31.1	50.0	52.6	2.6	-2.3	4.9
605	506			30.7	49.7	48.4	-1.3	-2.3	1.0
59	507			29.8	48.8	50.7	2.0	-2.3	4.3
657	509			32.1	51.0	50.4	-0.6	-2.3	1.7
22	509			28.5	47.4	53.8	6.4	-2.3	8.7
49	509			30.8	49.8	49.5	-0.3	-2.3	2.1
117	509			29.8	48.8	46.8	-2.0	-2.3	0.3
607	510			30.7	49.7	52.7	3.0	-2.3	5.4
67	511			30.3	49.3	51.3	2.0	-2.3	4.3
464	511			29.8	48.8	49.4	0.6	-2.3	2.9
468	511			30.2	49.1	49.2	0.1	-2.3	2.4
442	511			31.5	50.5	48.9	-1.6	-2.3	0.7
384	511			31.4	50.4	52.1	1.7	-2.3	4.0
95	511			30.6	49.6	50.7	1.1	-2.3	3.4
360	511			31.7	50.7	53.1	2.4	-2.3	4.8
644	512			30.8	49.8	51.0	1.2	-2.3	3.5
611	512			30.4	49.4	51.8	2.4	-2.3	4.7
178	513			31.8	50.8	49.6	-1.1	-2.3	1.2
98	513			31.0	49.9	49.0	-0.9	-2.3	1.4
51	513			29.3	48.3	49.0	0.7	-2.3	3.0
553	513			31.6	50.5	48.6	-1.9	-2.3	0.4
552	513			31.5	50.5	50.1	-0.4	-2.3	1.9
161	514			30.1	49.1	49.0	-0.1	-2.3	2.2
52	515			29.1	48.1	50.1	2.0	-2.3	4.3
115	517			30.1	49.0	50.5	1.4	-2.3	3.8
21	517			30.1	49.0	51.2	2.2	-2.3	4.5
29	517			29.2	48.2	48.5	0.4	-2.3	2.7
637	518			30.3	49.3	47.3	-2.0	-2.3	0.4
416	518			30.4	49.4	48.8	-0.6	-2.3	1.8
106	518			28.8	47.8	48.0	0.2	-2.3	2.5
606	518			30.6	49.6	49.5	-0.1	-2.3	2.2
20	518			30.9	49.9	46.9	-3.0	-2.3	-0.7
114	518			30.4	49.4	48.4	-1.0	-2.3	1.3
3	519			29.0	48.0	49.3	1.3	-2.3	3.6
478	520			29.8	48.8	46.3	-2.5	-2.3	-0.2
677	520			31.8	50.8	48.5	-2.3	-2.3	0.0
102	521			28.7	47.7	46.7	-1.0	-2.3	1.3
454	523			30.3	49.3	43.7	-5.6	-2.3	-3.3
495	524			30.1	49.1	47.7	-1.4	-2.3	1.0
558	525			32.3	51.3	49.2	-2.1	-2.3	0.3
176	526			32.9	51.9	41.1	-10.7	-2.3	-8.4
141	528			31.3	50.3	45.8	-4.5	-2.3	-2.2
Average	515						0.4	-2.3	2.7

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

Project: Summerhaven Wind Energy Centre- Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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)
48	500			29.8	48.8	48.7	-0.1	-2.3	2.2
387	503			31.0	49.9	49.7	-0.2	-2.3	2.1
444	504			29.9	48.8	47.0	-1.8	-2.3	0.5
112	505			28.9	47.8	50.9	3.1	-2.3	5.4
681	506			30.8	49.8	50.8	1.0	-2.3	3.3
676	507			31.0	49.9	52.2	2.3	-2.3	4.6
593	508			31.1	50.1	48.2	-1.9	-2.3	0.4
532	508			30.3	49.2	51.6	2.3	-2.3	4.6
400	508			29.5	48.4	50.0	1.5	-2.3	3.8
603	508			31.1	50.1	45.0	-5.1	-2.3	-2.8
159	508			28.4	47.3	47.1	-0.2	-2.3	2.1
306	508			33.3	52.3	45.0	-7.2	-2.3	-4.9
533	508			31.8	50.7	51.0	0.3	-2.3	2.6
388	508			32.0	50.9	48.5	-2.4	-2.3	-0.1
594	508			31.8	50.7	50.0	-0.7	-2.3	1.6
5	509			29.4	48.4	49.9	1.5	-2.3	3.8
32	510			29.9	48.9	49.0	0.1	-2.3	2.4
514	510			31.0	50.0	44.0	-6.0	-2.3	-3.7
512	510			31.7	50.7	51.9	1.2	-2.3	3.5
217	510			31.7	50.7	53.7	3.0	-2.3	5.3
323	510			30.6	49.5	45.6	-3.9	-2.3	-1.6
104	512			28.2	47.2	50.9	3.7	-2.3	6.0
435	512			28.8	47.8	50.7	3.0	-2.3	5.3
262	512			30.2	49.2	51.2	2.0	-2.3	4.3
426	512			31.6	50.5	48.2	-2.3	-2.3	0.0
493	512			29.2	48.1	49.3	1.1	-2.3	3.4
33	512			29.9	48.8	48.7	-0.1	-2.3	2.2
182	513			31.5	50.5	50.3	-0.1	-2.3	2.2
600	513			30.7	49.7	48.7	-1.0	-2.3	1.4
544	513			30.5	49.5	51.1	1.6	-2.3	4.0
295	513			32.6	51.5	48.7	-2.8	-2.3	-0.5
456	513			28.5	47.5	49.0	1.5	-2.3	3.8
728	513			32.0	50.9	50.4	-0.5	-2.3	1.8
297	514			32.3	51.3	52.3	1.0	-2.3	3.3
157	514			28.7	47.7	50.4	2.7	-2.3	5.0
19	514			30.1	49.1	48.4	-0.7	-2.3	1.6
428	514			29.7	48.7	51.1	2.5	-2.3	4.8
56	514			29.1	48.1	50.4	2.3	-2.3	4.6
111	515			29.0	47.9	48.2	0.3	-2.3	2.6
443	515			29.8	48.8	47.9	-0.9	-2.3	1.4
507	515			29.9	48.9	49.7	0.9	-2.3	3.2
54	515			29.1	48.1	51.4	3.4	-2.3	5.7
216	516			31.3	50.2	52.0	1.8	-2.3	4.1
294	516			32.1	51.1	49.5	-1.7	-2.3	0.7
66	516			29.7	48.7	46.5	-2.2	-2.3	0.1
383	516			30.8	49.7	50.0	0.3	-2.3	2.6
398	516			29.9	48.8	47.9	-0.9	-2.3	1.4
612	516			30.2	49.2	49.7	0.5	-2.3	2.8
57	517			28.8	47.7	51.2	3.5	-2.3	5.8
647	517			30.6	49.6	50.8	1.2	-2.3	3.5
725	517			30.3	49.3	47.1	-2.3	-2.3	0.1
255	518			30.9	49.9	49.8	-0.1	-2.3	2.2
377	518			30.3	49.2	48.5	-0.7	-2.3	1.6
724	518			30.2	49.1	49.9	0.8	-2.3	3.1
177	518			32.5	51.5	48.6	-2.8	-2.3	-0.5
308	518			32.3	51.3	48.4	-2.9	-2.3	-0.6
655	518			31.7	50.7	46.0	-4.7	-2.3	-2.4
652	519			32.0	51.0	46.4	-4.6	-2.3	-2.3
90	519			28.4	47.3	47.9	0.5	-2.3	2.9
682	519			32.6	51.6	48.7	-2.9	-2.3	-0.6
673	520			31.7	50.7	47.3	-3.4	-2.3	-1.1
190	520			30.3	49.3	48.0	-1.3	-2.3	1.1
18	521			31.3	50.3	51.1	0.8	-2.3	3.1
87	521			30.3	49.3	47.6	-1.6	-2.3	0.7
307	521			32.1	51.1	49.1	-2.0	-2.3	0.4
379	522			31.2	50.2	47.9	-2.2	-2.3	0.1
671	522			30.8	49.8	48.0	-1.8	-2.3	0.5

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

Project: Summerhaven Wind Energy Centre- Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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)
707	522			30.8	49.7	47.4	-2.3	-2.3	0.0
96	523			31.1	50.1	49.4	-0.7	-2.3	1.6
50	523			29.9	48.9	44.7	-4.2	-2.3	-1.9
17	524			31.1	50.1	48.9	-1.2	-2.3	1.1
101	525			30.7	49.7	46.7	-3.0	-2.3	-0.6
41	527			30.2	49.2	46.7	-2.4	-2.3	-0.1
471	527			29.0	48.0	47.5	-0.5	-2.3	1.9
465	527			30.2	49.2	49.2	0.0	-2.3	2.3
Average	515						0.1	-2.3	2.4

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

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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)
91	504			28.6	47.5	47.1	-0.4	-2.3	1.9
324	505			30.5	49.4	50.0	0.6	-2.3	2.9
536	506			29.6	48.5	49.6	1.1	-2.3	3.4
193	508			29.8	48.7	49.9	1.2	-2.3	3.5
149	508			29.2	48.1	51.1	3.0	-2.3	5.3
46	508			28.9	47.8	47.9	0.1	-2.3	2.4
429	508			30.8	49.7	52.7	3.0	-2.3	5.3
610	508			30.4	49.3	50.5	1.2	-2.3	3.5
648	508			30.3	49.3	53.1	3.8	-2.3	6.1
462	510			31.0	50.0	45.4	-4.5	-2.3	-2.2
113	510			30.4	49.3	50.2	0.9	-2.3	3.2
467	510			29.2	48.2	49.8	1.7	-2.3	4.0
713	510			31.3	50.2	50.7	0.5	-2.3	2.8
4	512			29.0	47.9	50.3	2.3	-2.3	4.7
58	512			28.6	47.5	49.3	1.8	-2.3	4.1
267	512			31.4	50.4	50.9	0.5	-2.3	2.8
726	512			30.5	49.5	45.5	-4.0	-2.3	-1.7
378	512			30.3	49.2	52.7	3.5	-2.3	5.8
160	512			29.3	48.3	48.2	-0.1	-2.3	2.2
382	512			29.5	48.4	50.7	2.3	-2.3	4.6
660	512			30.1	49.1	48.7	-0.3	-2.3	2.0
527	512			30.0	49.0	47.5	-1.5	-2.3	0.8
130	513			30.1	49.0	50.9	1.9	-2.3	4.2
739	513			29.5	48.5	51.4	2.9	-2.3	5.2
741	513			29.7	48.7	50.3	1.6	-2.3	3.9
414	513			29.8	48.7	50.5	1.8	-2.3	4.1
737	514			30.8	49.8	46.8	-2.9	-2.3	-0.6
731	514			31.2	50.2	48.4	-1.9	-2.3	0.5
53	515			28.7	47.6	48.5	0.9	-2.3	3.2
659	515			30.1	49.1	51.0	1.9	-2.3	4.2
729	516			29.7	48.7	44.3	-4.4	-2.3	-2.1
590	516			32.0	51.0	42.9	-8.1	-2.3	-5.7
626	517			30.6	49.6	49.5	-0.1	-2.3	2.2
447	517			30.8	49.8	47.5	-2.2	-2.3	0.1
608	518			30.7	49.7	50.4	0.6	-2.3	3.0
463	518			29.6	48.6	51.0	2.4	-2.3	4.8
399	518			29.6	48.6	47.5	-1.1	-2.3	1.2
592	518			30.6	49.5	47.1	-2.5	-2.3	-0.2
184	518			30.4	49.3	48.8	-0.6	-2.3	1.8
715	519			31.8	50.8	50.1	-0.6	-2.3	1.7
723	519			29.6	48.6	46.2	-2.4	-2.3	0.0
658	519			31.1	50.1	46.7	-3.4	-2.3	-1.1
480	520			29.4	48.4	47.6	-0.8	-2.3	1.5
584	521			31.3	50.3	46.5	-3.8	-2.3	-1.4
309	521			31.0	50.0	48.3	-1.6	-2.3	0.7
431	521			31.0	50.0	49.6	-0.4	-2.3	1.9
562	521			30.9	49.9	50.5	0.6	-2.3	2.9
128	522			31.2	50.2	49.9	-0.3	-2.3	2.0
683	522			30.5	49.5	49.1	-0.4	-2.3	1.9
129	524			30.0	49.0	48.4	-0.6	-2.3	1.7
436	524			29.0	48.0	50.4	2.4	-2.3	4.7
415	525			30.4	49.4	46.7	-2.7	-2.3	-0.4
621	526			31.7	50.7	51.8	1.1	-2.3	3.4
181	526			32.1	51.1	38.2	-12.9	-2.3	-10.6
427	528			30.8	49.8	46.9	-2.8	-2.3	-0.5
Average	515						0.3	-2.3	2.6

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

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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)
313	502			31.4	50.3	47.0	-3.4	-2.3	-1.1
320	504			30.9	49.9	49.0	-0.9	-2.3	1.4
472	504			30.0	48.9	50.2	1.3	-2.3	3.6
191	506			32.1	51.0	49.4	-1.6	-2.3	0.7
266	507			31.2	50.1	48.0	-2.1	-2.3	0.2
529	507			29.8	48.7	52.5	3.8	-2.3	6.1
357	507			29.1	48.1	49.1	1.1	-2.3	3.4
376	508			29.6	48.5	52.5	4.0	-2.3	6.3
566	508			31.2	50.2	52.7	2.6	-2.3	4.9
672	508			30.5	49.4	50.7	1.2	-2.3	3.5
434	509			28.7	47.7	50.5	2.9	-2.3	5.2
509	509			30.6	49.5	51.6	2.1	-2.3	4.4
189	509			30.9	49.8	51.2	1.4	-2.3	3.7
23	509			29.5	48.4	49.8	1.4	-2.3	3.7
80	510			28.2	47.1	50.2	3.1	-2.3	5.4
712	510			30.9	49.9	47.6	-2.3	-2.3	0.0
679	510			32.6	51.5	46.9	-4.6	-2.3	-2.3
479	511			29.4	48.4	48.8	0.4	-2.3	2.7
645	511			30.8	49.8	51.3	1.5	-2.3	3.8
572	511			30.5	49.5	51.2	1.7	-2.3	4.0
110	511			29.1	48.0	50.5	2.5	-2.3	4.8
669	512			31.8	50.8	45.7	-5.1	-2.3	-2.8
381	512			29.1	48.1	50.0	1.9	-2.3	4.2
268	512			30.1	49.1	47.4	-1.7	-2.3	0.6
273	513			30.5	49.4	48.6	-0.9	-2.3	1.5
401	513			30.3	49.3	49.9	0.6	-2.3	2.9
299	513			31.5	50.5	41.6	-8.9	-2.3	-6.6
542	513			29.3	48.3	51.2	3.0	-2.3	5.3
638	513			30.2	49.2	48.8	-0.4	-2.3	1.9
103	513			28.2	47.2	48.3	1.1	-2.3	3.4
505	514			30.0	49.0	51.1	2.1	-2.3	4.4
633	514			30.8	49.7	50.6	0.8	-2.3	3.1
738	514			29.3	48.2	47.8	-0.4	-2.3	1.9
358	514			29.9	48.8	48.8	0.0	-2.3	2.3
109	515			27.9	46.9	50.8	3.9	-2.3	6.2
730	515			30.4	49.3	50.4	1.1	-2.3	3.4
162	517			30.5	49.4	51.2	1.8	-2.3	4.1
492	517			29.4	48.4	50.7	2.3	-2.3	4.6
304	517			31.2	50.2	49.8	-0.3	-2.3	2.0
30	518			29.0	48.0	49.4	1.4	-2.3	3.7
64	518			28.6	47.6	50.7	3.1	-2.3	5.5
711	518			30.2	49.2	49.8	0.7	-2.3	3.0
675	518			30.9	49.9	52.0	2.2	-2.3	4.5
79	518			28.2	47.2	48.2	1.0	-2.3	3.3
599	519			31.1	50.1	47.4	-2.7	-2.3	-0.3
528	520			29.6	48.6	47.1	-1.5	-2.3	0.8
667	522			30.7	49.7	46.4	-3.3	-2.3	-1.0
634	523			30.5	49.5	48.1	-1.5	-2.3	0.9
545	524			29.8	48.8	51.4	2.6	-2.3	4.9
744	526			30.2	49.2	47.8	-1.4	-2.3	0.9
25	527			31.3	50.3	47.8	-2.5	-2.3	-0.2
Average	513						0.9	-2.3	3.2

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Appendix E
Measurement Data

Table E.01 Measurement data - Turbine ON

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

***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	13.0	56.8	2233	270.5	262.5	5.5	15.5	11.9	9.7	8	97567.7	53
2	13.0	57.2	2236	270.5	262.5	3.8	15.5	11.9	8.0	8	97567.2	53
3	10.8	57.1	2231	270.5	262.5	2.3	15.5	9.8	9.3	8	97566.1	53
4	12.1	57.1	2231	270.5	262.4	2.7	15.5	11.0	10.7	8	97565.1	53
5	11.4	57.2	2221	270.5	262.5	0.3	15.4	10.4	9.5	8	97564.4	53
6	9.1	56.8	1641	270.5	262.4	-1.8	14.6	7.7	9.4	8	97559.6	53
7	8.2	57.2	1211	270.5	263.1	-2.5	15.0	8.2	9.3	8	97155.8	53
8	8.8	57.7	1513	270.5	265.3	-2.3	15.6	8.2	9.0	8	97240.0	53
9	9.7	57.9	1877	270.5	266.1	-1.8	15.5	8.5	8.8	8	97347.8	53
10	8.9	57.3	1563	270.5	266.2	-2.4	15.2	9.0	8.5	8	97501.1	53
11	8.7	57.4	1440	270.5	266.3	-2.5	15.3	8.6	8.6	8	97563.6	53
12	8.1	56.2	1162	270.5	266.3	-2.5	14.8	8.1	8.3	8	97566.1	53
13	8.0	56.8	1148	270.5	266.3	-2.5	14.8	7.5	6.5	8	97566.2	53
14	8.9	58.1	1567	270.5	266.3	-2.4	15.6	9.0	6.7	8	97564.9	54
15	9.4	57.6	1771	270.5	266.3	-2.2	15.6	9.1	7.2	8	97565.0	54
16	10.4	58.3	2067	270.5	266.3	-1.3	15.6	9.8	7.6	8	97564.6	54
17	11.4	58.2	2235	270.5	266.3	-0.6	15.7	10.5	7.2	8	97564.0	54
18	11.3	58.8	2237	270.5	266.3	0.0	15.7	10.4	8.3	8	97564.3	54
19	11.3	58.0	2235	270.5	266.3	-0.4	15.5	10.3	9.3	8	97563.7	54
20	10.9	58.1	2245	270.5	266.3	0.4	15.6	10.0	11.0	8	97539.5	52
21	11.0	57.9	2235	270.5	266.3	1.6	15.5	10.1	11.5	8	97540.4	52
22	11.1	57.6	2230	270.5	266.3	2.9	15.5	10.2	10.9	8	97541.1	52
23	12.3	57.6	2216	270.5	266.3	1.3	15.4	11.3	10.7	8	97541.2	52
24	9.7	57.4	1900	270.5	266.3	-1.7	14.8	9.1	11.2	8	97541.3	52
25	12.3	58.2	2170	270.5	266.4	1.6	15.8	11.3	11.1	8	97541.6	52
26	13.1	57.6	2227	270.5	266.5	0.8	15.8	12.0	12.2	8	97552.5	51
27	9.5	57.9	1793	270.5	266.4	-1.9	14.9	9.3	11.7	8	97550.0	51
28			2209	270.5	266.4	0.0	15.9	9.6	9.8	8	97442.3	51
29	10.8	57.1	2230	270.5	266.4	4.5	15.8	9.9	9.2	8	96283.3	51
30	12.3	56.9	2229	270.5	266.4	2.7	15.5	11.2	8.4	8	96213.7	51
31			2221	270.5	266.3	1.2	15.5	9.4	7.9	8	96293.8	52
32	11.5	57.1	2226	270.5	264.5	0.2	15.5	10.5	8.0	8	96131.5	53
33	11.5	57.4	2222	270.5	263.7	0.0	15.4	10.5	8.3	8	95982.7	53
34	9.5	57.4	1814	270.5	263.7	-1.9	14.8	8.7	8.7	8	95246.1	53
35	8.8	57.4	1488	270.5	263.7	-2.4	15.1	8.2	8.5	8	95630.0	53
36	9.3	58.0	1727	270.5	264.7	-2.2	15.6	8.2	9.0	8	97380.1	53
37	8.8	57.6	1527	270.5	267.3	-2.5	15.3	9.6	9.8	8	97562.8	53
38	8.3	57.7	1289	270.5	268.6	-2.5	15.2	8.6	10.4	8	97507.2	51
39	8.6	57.8	1422	270.5	268.7	-2.4	15.5	8.9	9.4	8	97380.6	51
40	8.9	58.2	1571	270.5	269.1	-2.0	15.7	8.7	8.6	8	97412.9	51
41	11.6	58.1	2169	270.5	271.1	1.2	15.9	10.6	8.0	8	97369.7	51
42			2234	270.5	273.1	1.4	15.6	9.8	8.5	8	97016.0	51
43	13.0	56.9	2237	270.5	273.4	5.6	15.8	11.9	7.5	8	96942.7	52
44	12.8	57.3	2221	270.5	273.4	5.6	15.4	11.7	9.0	8	97079.7	53
45	13.5	56.6	2235	270.5	273.4	4.6	15.5	12.4	9.4	8	96998.9	53
46	12.2	57.0	2232	270.5	273.4	2.9	15.4	11.2	9.8	8	97049.5	53
47	12.9	57.5	2221	270.5	273.4	0.4	15.4	11.8	10.3	8	97106.8	53
48	11.5	57.4	2181	270.5	273.4	-0.9	15.2	10.5	10.1	8	97218.0	53
49	11.1	58.1	2203	270.5	273.4	-0.9	15.3	10.2	9.1	8	97203.4	53
50	11.6	57.3	2238	270.5	273.5	2.2	15.8	10.7	8.2	8	97147.3	52
51	10.8	57.2	2224	270.5	273.5	1.3	15.6	9.9	9.4	8	97061.5	52
52	11.2	57.1	2240	270.5	273.5	2.4	15.6	10.2	8.4	8	97253.7	52
53	12.2	56.8	2238	270.5	273.4	3.4	15.6	11.1	7.2	8	97409.1	52
54	11.5	57.3	2227	270.5	273.5	3.5	15.4	10.5	7.5	8	96678.9	52
55			2227	270.5	273.4	4.5	15.5	9.8	7.6	8	96844.4	52
56	11.6	57.0	2227	270.5	273.4	3.1	15.5	10.6	8.2	8	96661.2	53
57	11.7	57.0	2231	270.5	272.0	3.5	15.5	10.7	7.7	8	97063.0	53
58	11.8	56.8	2226	270.5	270.0	3.0	15.4	10.8	7.8	8	97572.8	53
59	11.0	57.4	2202	270.5	269.9	0.0	15.3	10.0	9.7	8	97574.1	53
60	9.6	56.9	1840	270.5	269.8	-1.9	14.9	8.8	9.4	8	97574.1	53
61	9.8	58.0	1915	270.5	268.2	-1.7	15.4	9.3	10.9	8	97573.9	53
62	10.3	58.1	2053	270.5	266.1	-1.4	15.5	10.4	10.6	8	97574.2	51
63	12.9	57.6	2240	270.5	265.7	1.0	15.9	11.8	10.6	8	97574.2	51
64	12.6	57.3	2236	270.5	265.7	4.4	15.7	11.5	10.6	8	97574.2	51
65	13.3	56.9	2230	270.5	265.7	2.9	15.4	12.1	9.8	8	97574.1	51
66	11.4	57.3	2232	270.5	265.7	1.8	15.5	10.4	10.1	8	97574.0	51
67	11.1	57.7	2225	270.5	265.7	-0.1	15.4	10.2	10.4	8	97573.1	51
68	10.5	57.1	2085	270.5	265.7	-1.1	15.0	10.5	10.8	8	97560.9	50
69	9.0	57.0	1578	270.5	265.7	-2.4	15.0	10.0	10.5	8	97560.3	50
70	8.4	58.0	1333	270.5	265.7	-2.5	15.2	7.6	10.4	8	97559.2	50
71	8.3	58.4	1260	270.5	266.4	-2.4	15.2	7.2	10.6	8	97559.4	50
72	9.0	58.4	1588	270.5	268.5	-2.3	15.7	8.6	9.1	8	97560.2	50
73	9.2	58.5	1702	270.5	269.3	-2.2	15.4	8.7	9.7	8	97560.1	50
74	9.8	58.2	1929	270.5	269.3	-1.7	15.6	9.1	10.4	8	97559.9	51
75	10.2	57.8	2047	270.5	269.4	-1.3	15.5	9.0	10.4	8	97560.1	51
76	10.0	57.9	1994	270.5	269.4	-1.5	15.4	9.3	11.6	8	97560.9	51
77	11.9	57.5	2226	270.5	269.4	3.9	16.0	10.8	10.6	8	97561.0	51
78	13.1	56.9	2238	270.5	269.4	4.9	15.6	12.0	10.5	8	97560.8	51
79	12.7	56.8	2236	270.5	269.5	4.7	15.6	11.6	9.0	8	97560.4	51
80	12.7	56.8	2229	270.5	269.5	4.2	15.4	11.6	9.3	8	97560.8	50
81			2238	270.5	269.5	1.6	15.5	9.7	7.2	8	97560.0	50
82			2231	270.5	269.6	-0.1	15.5	9.6	8.8	8	97560.1	50
83	9.9	57.4	1971	270.5	269.5	-1.5	14.9	9.9	9.2	8	97561.0	50
84	9.4	57.9	1776	270.5	269.5	-2.1	15.2	9.9	10.7	8	97561.0	50
85	9.9	58.0	1949	270.5	269.5	-1.6	15.5	9.1	9.9	8	97560.7	50
86	10.1	58.2	2019	270.5	269.5	-1.5	15.5	8.9	9.7	8	97561.0	50
87	11.6	57.9	2232	270.5	269.6	0.6	15.8	10.6	10.0	8	97560.8	50
88			2242	270.5	269.6	1.6	15.7	9.8	10.4	8	97561.0	50

***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	11.3	57.3	2227	270.5	269.8	3.1	15.6	10.4	9.7	8	97560.9	50
90	11.6	57.0	2239	270.5	270.3	4.4	15.6	10.6	9.7	8	97561.6	50
91	12.0	56.9	2207	270.5	272.5	2.6	15.3	11.0	9.8	8	97561.6	51
92	11.2	57.5	2235	270.5	273.0	2.0	15.6	10.3	9.1	8	97561.5	51
93			2208	270.5	273.0	0.4	15.3	8.2	10.0	8	97561.7	51
94	10.7	57.5	2129	270.5	273.0	-1.0	15.1	7.3	10.1	8	97561.6	51
95	11.0	58.0	2169	270.5	272.3	-1.0	15.3	10.1	9.6	8	97561.1	51
96	11.5	58.2	2242	270.5	270.8	-0.2	15.7	10.5	9.6	8	97561.7	51
97			2231	270.5	270.7	1.5	15.6	9.3	10.6	8	97561.7	51
98	11.0	57.8	2227	270.5	270.7	-0.6	15.5	10.1	11.3	8	97561.7	51
99	9.7	57.9	1898	270.5	270.6	-1.7	15.0	7.8	10.7	8	97562.0	51
100			2226	270.5	269.1	-0.8	15.6	8.8	9.5	8	97562.2	51
101	11.4	57.9	2237	270.5	268.1	1.4	15.8	10.4	10.1	8	97561.8	51
102	11.2	57.4	2237	270.5	268.1	4.1	15.7	10.3	9.1	8	97562.0	51
103	12.3	56.5	2234	270.5	268.2	6.4	15.5	11.2	9.6	8	97562.0	50
104	11.6	56.5	2218	270.5	268.1	4.6	15.4	10.6	9.5	8	97561.8	50
105			2231	270.5	268.1	3.2	15.4	8.6	9.7	8	97562.2	50
106	11.2	57.1	2238	270.5	268.1	3.6	15.6	10.3	9.1	8	97562.5	50
107	13.7	57.0	2234	270.5	268.0	5.2	15.5	12.5	11.4	8	97562.1	50
108	13.9	57.0	2218	270.5	268.1	5.0	15.4	12.8	11.1	8	97562.4	50
109	12.3	56.6	2237	270.5	268.1	4.4	15.5	11.3	9.6	8	97563.8	51
110	12.5	57.2	2226	270.5	268.1	3.2	15.4	11.4	10.7	8	97562.3	51
111	11.6	56.8	2241	270.5	268.1	3.7	15.6	10.6	10.9	8	97562.4	51
112	11.4	56.9	2203	270.5	268.1	2.0	15.3	10.5	9.9	8	97560.8	51
113	11.8	57.5	2227	270.5	268.1	-0.8	15.4	10.8	10.7	8	97561.8	51
114	11.0	58.1	2232	270.5	268.1	-0.2	15.5	10.0	10.5	8	97561.5	51
115	11.1	57.9	2240	270.5	268.1	1.5	15.6	10.1	9.5	9	97561.9	51
116	13.1	57.6	2230	270.5	268.1	2.4	15.5	12.0	9.0	9	97562.0	51
117	11.0	57.4	2220	270.5	268.1	0.7	15.4	10.0	10.0	9	97561.8	51
118	10.5	58.2	2096	270.5	268.1	-1.0	15.0	8.7	10.2	9	97562.2	51
119	9.8	58.2	1943	270.5	268.1	-1.7	15.3	7.8	9.0	9	97561.6	51
120	10.5	58.0	2097	270.5	268.1	-1.1	15.3	9.3	8.5	9	97560.8	51
121			2239	270.5	267.1	-0.5	15.7	9.1	9.1	9	97561.3	51
122	10.0	57.2	2006	270.5	265.0	-1.4	15.1	9.0	9.6	9	97562.3	51
123	9.9	58.6	1956	270.5	264.7	-1.6	15.4	8.9	9.0	9	97562.0	51
124	9.3	58.0	1707	270.5	264.6	-2.0	15.1	7.5	9.1	9	97562.3	51
125	8.2	57.0	1204	270.5	263.5	-2.5	15.0	7.0	8.2	9	97562.9	51
126	8.6	57.4	1392	270.5	261.9	-2.3	15.4	9.2	8.0	9	97562.4	51
127	10.4	58.1	2075	270.5	261.8	-1.1	15.7	10.1	7.9	9	97563.1	51
128	12.1	58.2	2171	270.5	261.8	-0.7	15.6	11.0	7.6	9	97563.3	51
129	11.8	58.0	2236	270.5	261.8	1.0	15.7	10.8	8.1	9	97561.7	51
130	12.2	57.6	2216	270.5	263.3	-0.7	15.4	11.1	8.7	9	97562.4	51
131			2200	270.5	264.3	-0.8	15.2	9.6	9.1	9	97562.3	51
132	8.8	57.4	1514	270.5	264.3	-2.2	14.8	7.5	9.6	9	97562.5	51
133	9.3	58.3	1705	270.5	264.3	-2.2	15.6	7.7	8.1	9	97561.6	51
134	9.4	57.9	1772	270.5	264.3	-2.1	15.4	8.8	9.9	9	97561.8	51
135	8.8	57.3	1513	270.5	264.3	-2.3	15.2	7.5	8.4	9	97562.4	51
136	8.5	57.9	1356	270.5	264.3	-2.5	15.4	7.6	7.4	9	97562.4	51
137	8.4	57.3	1319	270.5	262.8	-2.5	15.3	7.9	8.1	9	97562.0	51
138	9.2	58.4	1695	270.5	261.4	-2.0	15.8	9.0	9.9	9	97555.5	51
139	10.4	57.7	2074	270.5	261.4	-1.1	15.5	9.3	12.4	9	97548.5	52
140	9.5	58.0	1790	270.5	261.4	-2.1	15.3	9.7	12.6	9	97548.4	52
141	11.2	58.5	2171	270.5	261.4	-0.6	15.8	10.3	10.9	9	97548.5	52
142			2154	270.5	261.4	-0.7	15.3	8.4	10.5	9	97548.5	52
143	9.0	57.8	1591	270.5	261.4	-2.4	15.0	8.8	10.4	9	97549.0	52
144	8.8	57.7	1519	270.5	261.4	-2.5	15.3	9.0	8.7	9	97550.3	51
145	8.5	57.3	1366	270.5	261.4	-2.5	15.3	8.1	7.6	9	97551.0	51
146	8.8	57.8	1485	270.5	261.4	-2.4	15.5	8.8	13.1	9	97551.2	51
147	10.4	58.5	2073	270.5	261.4	-1.2	15.8	9.7	12.6	9	97551.0	51
148			2234	270.5	261.4	3.1	15.9	9.5	13.5	9	97550.9	51
149	12.0	57.6	2237	270.5	261.4	3.2	15.5	11.0	12.6	9	97550.7	51
150	12.9	57.6	2224	270.5	261.1	5.1	15.7	11.8	12.9	9	97545.0	50
151	13.2	56.8	2217	270.5	261.2	4.9	15.4	12.0	12.6	9	97538.5	49
152	13.2	57.6	2237	270.5	261.2	4.2	15.6	12.1	11.0	9	97537.7	49
153	13.8	56.9	2233	270.5	261.2	6.9	15.7	12.6	11.3	9	97531.4	49
154	15.8	57.0	2231	270.5	261.2	8.8	15.5	14.4	11.1	9	97461.7	49
155	15.1	56.9	2226	270.5	261.2	7.1	15.4	13.8	9.1	9	97530.3	49
156	14.0	57.0	2222	270.5	261.2	5.5	15.4	12.8	9.2	9	97541.0	50
157	11.7	57.1	2233	270.5	261.2	4.3	15.5	10.8	8.8	9	97548.2	51
158			2228	270.5	261.5	3.1	15.6	9.8	7.9	9	97548.4	51
159	11.6	56.8	2229	270.5	263.6	3.9	15.4	10.6	7.4	9	97548.8	51
160	12.1	57.5	2221	270.5	264.3	2.5	15.4	11.1	7.0	9	97548.5	51
161	11.0	58.0	2232	270.5	264.3	-0.1	15.4	10.1	9.2	9	97546.6	51
162	12.4	58.6	2234	270.5	264.7	0.8	15.5	11.3	9.9	9	97543.9	51
163			2220	270.5	266.5	-0.3	15.4	9.7	10.2	9	97529.2	51
164	9.5	59.2	1820	270.5	266.9	-1.9	14.9	6.2	10.4	9	96521.4	51
165			2224	270.5	266.5	2.2	15.9	8.2	10.6	9	96113.0	51
166			2224	270.5	264.5	3.0	15.5	8.4	9.5	9	96518.2	51
167	13.8	59.3	2197	270.5	263.2	7.9	15.5	12.6	10.4	8	97530.6	67
168			2230	270.5	263.2	4.6	15.6	9.7	10.3	8	97529.4	67
169			2238	270.5	263.2	1.9	15.6	9.3	9.3	8	97529.6	67
170			2234	270.5	263.1	3.1	15.7	9.4	9.7	8	97529.5	67
171			2231	270.5	261.0	2.6	15.6	10.7	12.3	8	97529.7	67
172			2218	270.5	260.1	1.9	15.4	10.7	13.4	8	97530.3	68
173			2230	270.5	260.1	1.6	15.5	10.8	12.7	8	97530.8	68
174			2232	270.5	260.1	-0.1	15.4	9.1	13.9	8	97530.0	68
175	9.8	58.4	1917	270.5	260.1	-1.5	14.9	8.3	14.6	8	97529.1	68
176	11.0	59.3	2169	270.5	260.1	-0.2	15.7	10.0	12.7	8	97529.4	68

Table E.01 Measurement data - Turbine ON

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

***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	11.7	59.3	2241	270.5	260.1	0.2	15.7	10.7	11.7	8	97530.6	68
178	11.2	59.2	2230	270.5	260.1	1.2	15.5	10.2	11.5	8	97530.9	68
179			2212	270.5	260.1	-0.4	15.3	9.1	12.1	8	97530.3	69
180	10.7	58.8	2126	270.5	260.1	-1.0	15.2	8.9	11.7	8	97530.7	69
181	11.8	58.8	2239	270.5	260.1	2.8	15.8	10.8	11.0	8	97531.0	69
182	11.3	59.1	2229	270.5	260.1	1.3	15.5	10.3	10.9	8	97530.9	69
183			2245	270.5	260.1	2.4	15.7	9.2	11.8	8	97530.9	69
184	12.0	58.4	2233	270.5	260.1	4.6	15.6	11.0	12.8	8	97530.9	69
185	13.6	58.7	2230	270.5	260.1	5.5	15.4	12.4	14.5	8	97531.0	69
186	14.5	58.7	2237	270.5	260.1	7.9	15.8	13.3	13.5	8	97531.1	69
187	14.0	58.2	2232	270.5	260.1	8.8	15.5	12.8	11.9	8	97530.9	69
188	13.2	57.8	2218	270.5	260.1	6.5	15.3	12.1	13.1	8	97531.0	69
189	12.3	58.6	2220	270.5	260.1	4.4	15.5	11.2	12.1	8	97530.9	69
190	11.3	58.5	2231	270.5	260.3	6.3	15.6	10.3	11.5	8	97530.3	69
191	12.7	59.2	2191	270.5	260.3	2.0	15.2	11.6	10.4	8	97530.5	70
192	14.2	59.5	2228	270.5	260.3	6.6	16.0	13.0	9.6	8	97531.3	70
193	12.2	58.3	2220	270.5	260.3	8.9	15.4	11.2	9.5	8	97531.1	70
194	15.2	58.7	2231	270.5	260.6	9.2	15.5	13.9	10.0	8	97529.8	70
195	15.2	59.3	2230	270.5	262.7	9.7	15.6	13.9	9.8	8	97529.7	70
196	16.1	58.7	2229	270.5	263.9	10.6	15.5	14.7	9.3	7	97535.9	70
197	17.3	58.2	2216	270.5	263.9	10.4	15.4	15.8	10.8	7	97543.2	71
198	14.1	58.1	2227	270.5	264.0	8.2	15.5	12.9	10.8	7	97544.5	71
199	14.6	57.8	2225	270.5	264.0	7.8	15.4	13.4	8.3	7	97544.6	71
200	14.6	58.6	2240	270.5	264.2	8.1	15.6	13.4	8.9	7	97544.6	71
201	13.5	58.8	2220	270.5	264.4	7.9	15.4	12.4	8.4	7	97544.5	71
202	14.8	58.3	2227	270.5	264.3	7.5	15.4	13.5	9.0	7	97544.5	71
203	14.4	58.3	2222	270.5	264.3	5.7	15.5	13.1	9.0	7	97544.6	71
204	13.4	58.1	2235	270.5	264.3	7.9	15.6	12.2	12.2	7	97544.6	71
205	15.5	58.9	2233	270.5	264.3	9.5	15.6	14.2	12.9	7	97543.6	71
206	15.3	58.5	2227	270.5	264.3	8.4	15.4	14.0	11.4	7	97543.5	71
207	13.9	58.3	2220	270.5	264.3	6.2	15.5	12.7	8.7	7	97542.4	71
208	12.8	58.5	2236	270.5	264.3	4.2	15.5	11.7	8.6	7	97542.6	71
209	13.3	58.2	2233	270.5	264.3	5.4	15.6	12.2	8.5	7	97543.4	71
210	13.3	58.2	2234	270.5	264.3	4.6	15.5	12.1	8.5	7	97544.7	71
211	14.3	58.4	2221	270.5	264.3	3.8	15.4	13.1	7.8	7	97544.6	71
212	12.8	58.9	2236	270.5	264.2	1.0	15.4	11.7	8.0	7	97544.9	71
213			2222	270.5	264.2	0.3	15.5	9.2	9.4	7	97544.6	72
214			2218	270.5	264.2	-0.5	15.4	9.6	9.3	7	97543.4	73
215			2238	270.5	264.2	2.3	15.6	9.6	8.3	7	97543.3	73
216	11.6	58.9	2225	270.5	264.2	1.5	15.5	10.7	8.0	7	97544.4	73
217	11.6	59.1	2220	270.5	264.2	0.6	15.4	10.6	7.4	7	97544.7	73
218	9.7	57.9	1877	270.5	264.2	-1.6	14.8	8.8	8.2	7	97544.8	73
219	9.0	58.4	1595	270.5	264.2	-2.4	15.2	7.9	7.8	7	97548.0	73
220	9.3	59.0	1726	270.5	264.2	-2.3	15.5	7.8	8.2	7	97556.7	73
221	9.5	59.1	1804	270.5	264.2	-2.0	15.4	9.0	9.8	7	97556.7	73
222	8.9	58.7	1552	270.5	264.2	-2.4	15.3	8.2	10.0	7	97556.1	73
223	9.6	59.1	1834	270.5	264.2	-2.0	15.7	9.2	9.4	7	97555.6	73
224	9.5	58.7	1808	270.5	264.2	-1.9	15.3	8.6	11.9	7	97556.6	73
225	8.5	58.3	1383	270.5	264.2	-2.5	15.2	8.1	11.2	7	97554.8	73
226	8.8	58.7	1494	270.5	264.2	-2.4	15.5	8.2	11.2	7	97545.1	73
227	9.6	59.0	1862	270.5	264.2	-1.9	15.7	9.1	11.1	7	97545.1	73
228	12.8	58.7	2225	270.5	264.2	2.8	16.0	11.7	10.6	7	97545.1	73
229	13.6	58.1	2229	270.5	264.2	5.1	15.8	12.4	9.8	7	97544.9	73
230	15.2	58.5	2245	270.5	264.2	9.4	15.8	13.9	9.6	7	97544.3	73
231	18.8	59.2	2239	270.5	264.2	12.0	15.7	17.2	9.2	7	97545.6	73
232	17.6	59.1	2234	270.5	264.2	11.7	15.5	16.1	8.9	7	97555.5	74
233	16.5	58.6	2207	270.5	264.2	10.1	15.4	15.1	8.4	7	97555.0	74
234	16.8	58.7	2240	270.5	264.2	11.9	15.7	15.4	8.7	7	97554.9	74
235	17.2	58.2	2223	270.5	264.2	11.7	15.4	15.8	10.4	7	97554.7	74
236	18.0	58.6	2240	270.5	264.2	12.0	15.5	16.5	9.7	7	97556.5	74
237	18.9	58.1	2247	270.5	264.2	13.7	15.7	17.3	8.7	7	97556.9	74
238	18.0	57.8	2203	270.5	264.2	12.4	15.3	16.4	8.2	7	97555.8	74
239	17.3	58.6	2234	270.5	264.2	12.3	15.6	15.8	10.2	7	97555.3	74
240	17.5	58.0	2206	270.5	264.2	13.5	15.5	16.0	11.2	7	97555.0	74
241	15.8	57.7	2192	270.5	264.2	9.2	15.2	14.4	12.0	7	97555.4	74
242	13.5	58.2	2227	270.5	264.2	7.1	15.6	12.4	12.6	7	97556.1	74
243	14.0	58.3	2212	270.5	264.1	5.4	15.4	12.8	14.4	7	97552.0	73
244	14.4	59.0	2233	270.5	264.1	6.4	15.9	13.2	14.4	7	97532.0	70
245	14.6	58.2	2237	270.5	264.2	8.6	15.5	13.4	12.2	7	97531.9	70
246	13.6	57.8	2224	270.5	264.3	7.0	15.4	12.5	11.8	7	97531.2	70
247	15.4	58.6	2233	270.5	264.2	8.7	15.5	14.1	10.3	7	97531.7	70
248	14.1	58.0	2206	270.5	264.2	7.1	15.3	12.9	10.6	7	97531.5	70
249	15.6	59.0	2238	270.5	264.2	7.8	15.8	14.3	11.8	7	97530.4	71
250	15.3	58.0	2224	270.5	264.2	9.2	15.4	14.0	11.0	7	97529.9	71
251	14.1	57.9	2226	270.5	264.2	8.3	15.4	12.9	9.6	7	97529.9	71
252	14.9	58.3	2229	270.5	264.2	6.9	15.4	13.6	8.8	7	97530.9	71
253	15.3	58.4	2239	270.5	264.2	5.9	15.4	14.0	9.5	7	97532.1	71
254	13.0	58.6	2230	270.5	264.2	4.3	15.5	11.9	9.9	7	97532.1	71
255	11.5	58.3	2235	270.5	264.2	3.9	15.5	10.6	9.0	7	97542.0	71
256	12.9	58.5	2225	270.5	264.2	6.8	15.7	11.8	9.5	7	97543.1	71
257	14.1	58.1	2229	270.5	264.2	5.7	15.4	12.9	10.1	7	97543.9	71
258	13.9	58.4	2229	270.5	264.2	8.1	15.7	12.7	9.1	7	97544.1	71
259	13.5	58.3	2207	270.5	264.2	5.1	15.3	12.4	8.8	7	97543.6	71
260	13.7	58.3	2232	270.5	264.2	7.6	15.7	12.6	9.1	7	97544.6	71
261	15.4	58.3	2226	270.5	264.2	8.5	15.4	14.1	10.6	7	97532.7	72
262	11.6	58.3	2226	270.5	264.2	5.8	15.4	10.7	10.7	7	97531.4	72
263	13.5	58.3	2238	270.5	264.2	5.7	15.6	12.4	9.5	7	97530.4	72
264	13.6	58.1	2240	270.5	264.2	6.1	15.6	12.4	9.4	7	97530.3	72

***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	14.1	58.1	2230	270.5	264.2	6.7	15.4	12.9	11.3	7	97531.1	72
266	12.3	58.3	2219	270.5	264.1	4.1	15.4	11.2	9.5	7	97531.3	72
267	12.1	58.9	2241	270.5	262.1	4.0	15.6	11.1	10.6	7	97532.8	72
268	12.3	57.9	2230	270.5	261.2	6.5	15.6	11.2	12.2	7	97532.1	72
269	13.6	57.9	2239	270.5	261.1	6.7	15.5	12.5	11.8	7	97532.0	72
270	13.8	58.0	2226	270.5	261.2	6.0	15.4	12.6	12.1	7	97532.1	72
271	14.6	58.6	2233	270.5	261.2	5.1	15.4	13.4	13.1	7	97532.2	72
272	13.6	58.6	2230	270.5	261.2	4.6	15.6	12.4	10.6	7	97530.7	72
273	12.7	58.4	2229	270.5	261.2	5.4	15.4	11.6	10.0	7	97542.2	71
274	13.1	58.8	2237	270.5	261.2	4.9	15.5	12.0	11.6	7	97544.0	71
275	13.4	59.2	2235	270.5	261.2	6.0	15.5	12.2	10.4	7	97544.2	71
276	14.0	58.1	2237	270.5	261.2	6.3	15.5	12.8	10.8	7	97545.3	71
277	13.8	59.2	2234	270.5	261.1	6.4	15.5	12.6	11.2	7	97545.4	71
278	15.2	58.5	2244	270.5	261.0	8.2	15.7	13.9	10.9	7	97545.6	71
279	16.2	57.8	2223	270.5	261.1	9.5	15.5	14.8	9.5	7	97545.6	71
280	15.6	58.3	2229	270.5	262.9	8.6	15.4	14.3	9.7	7	97545.6	71
281	15.4	57.5	2241	270.5	265.1	8.3	15.5	14.1	8.7	7	97545.7	71
282	16.5	59.0	2233	270.5	265.6	8.9	15.5	15.1	8.1	7	97545.7	71
283	15.5	59.1	2239	270.5	265.7	9.7	15.5	14.2	9.1	7	97545.7	71
284	14.5	57.7	2189	270.5	265.7	9.7	15.3	13.3	10.0	7	97545.7	71
285	12.8	58.1	2220	270.5	265.7	6.5	15.7	11.7	8.6	7	97555.6	72
286	14.0	58.1	2232	270.5	265.6	7.9	15.5	12.8	9.5	7	97556.3	72
287	15.3	58.3	2241	270.5	265.6	9.3	15.6	14.0	7.7	7	97557.0	72
288	15.5	57.9	2210	270.5	265.6	10.0	15.4	14.2	8.0	7	97556.5	72
289	14.3	58.3	2221	270.5	265.6	6.5	15.4	13.1	9.5	7	97556.6	72
290	14.4	58.5	2229	270.5	265.6	6.4	15.5	13.1	8.9	7	97556.3	72
291	13.1	58.7	2232	270.5	265.6	4.9	15.6	12.0	11.4	7	97545.5	71
292	13.5	58.0	2207	270.5	265.6	2.7	15.3	12.4	10.8	7	97545.1	71
293			2219	270.5	265.6	-0.8	15.3	9.5	10.8	7	97545.1	71
294	11.3	58.8	2241	270.5	265.6	-0.7	15.5	10.4	13.8	7	97545.7	71
295	11.3	59.0	2232	270.5	265.7	-0.5	15.5	10.3	12.2	7	97545.9	71
296	10.4	58.8	2075	270.5	265.7	-1.2	15.1	9.2	9.8	7	97544.7	71
297	11.6	59.2	2217	270.5	265.6	-0.8	15.4	10.6	10.4	7	97544.3	72
298	11.0	59.3	2247	270.5	265.6	2.7	15.9	10.1	10.9	7	97544.5	72
299	12.3	58.7	2232	270.5	265.6	5.9	15.6	11.3	10.8	7	97543.6	72
300	13.9	58.4	2239	270.5	265.6	7.9	15.6	12.7	10.3	7	97544.5	72
301	14.1	58.6	2222	270.5	265.6	6.7	15.4	12.9	11.5	7	97544.7	72
302	13.8	58.3	2230	270.5	265.6	5.9	15.4	12.6	11.8	7	97544.4	72
303	12.9	58.2	2227	270.5	265.6	3.5	15.5	11.8	10.6	7	97544.4	72
304	12.7	58.6	2240	270.5	265.7	3.3	15.5	11.6	10.4	7	97544.2	71
305			2161	270.5	265.7	-0.6	15.1	9.8	11.6	7	97544.7	71
306	11.3	59.6	2230	270.5	265.6	0.0	15.5	10.3	12.0	7	97543.8	71
307	11.5	59.5	2233	270.5	265.6	2.7	15.7	10.5	10.8	7	97543.8	71
308	11.3	59.1	2228	270.5	265.6	1.6	15.5	10.3	12.9	7	97545.2	71
309	12.2	58.7	2241	270.5	265.6	4.3	15.7	11.1	12.7	7	97534.4	71
310	14.6	58.4	2222	270.5	265.6	5.7	15.5	13.3	11.0	7	97532.8	71
311	14.1	58.4	2237	270.5	266.0	8.4	15.9	12.9	11.0	7	97532.7	71
312	15.5	57.7	2199	270.5	268.1	8.9	15.3	14.2	10.2	7	97531.4	71
313	12.7	58.7	2224	270.5	268.4	5.8	15.5	11.6	10.4	7	97532.1	71
314	14.2	58.7	2219	270.5	268.4	8.7	15.6	13.0	8.7	7	97532.1	71
315	14.4	58.8	2236	270.5	268.4	7.5	15.5	13.2	10.4	7	97544.4	72
316	13.9	58.1	2220	270.5	268.5	7.5	15.4	12.7	10.0	7	97546.0	72
317	13.4	58.9	2236	270.5	268.6	7.1	15.6	12.2	8.7	7	97546.0	72
318	14.3	58.3	2218	270.5	268.6	8.6	15.5	13.1	8.9	7	97546.0	72
319	13.3	58.8	2225	270.5	268.5	6.5	15.4	12.2	10.0	7	97545.4	72
320	12.7	58.5	2212	270.5	268.5	3.2	15.4	11.6	10.6	7	97544.9	72
321			2230	270.5	266.9	3.3	15.5	8.2	12.2	7	97534.5	72
322			2235	270.5	264.3	2.1	15.7	8.0	12.0	7	97533.0	72
323	11.6	58.3	2225	270.5	262.5	5.1	15.5	10.6	13.3	7	97532.8	72
324	12.0	58.1	2225	270.5	262.3	4.0	15.4	11.0	13.4	7	97531.1	72
325			2234	270.5	262.1	5.3	15.6	9.6	11.7	7	97532.8	72
326	15.0	58.7	2245	270.5	262.0	9.3	15.9	13.7	12.2	7	97532.6	72
327	13.8	58.5	2226	270.5	262.1	6.6	15.5	12.6	11.0	7	97544.9	73
328	14.3	58.7	2239	270.5	262.1	6.9	15.6	13.1	10.1	7	97544.8	73
329	14.9	58.2	2232	270.5	262.1	8.0	15.5	13.6	8.8	7	97546.0	73
330	14.6	58.4	2233	270.5	262.1	7.2	15.4	13.4	9.1	7	97545.7	73
331	13.1	58.6	2219	270.5	262.1	5.3	15.4	12.0	9.2	7	97544.4	73
332	11.7	58.3	2237	270.5	262.1	7.0	15.8	10.7	9.0	7	97552.8	73
333	14.3	57.4	2225	270.5	262.1	7.4	15.4	13.1	7.7	7	97556.8	73
334	15.1	57.9	2234	270.5	262.1	7.4	15.4	13.8	7.4	7	97557.4	73
335	13.6	57.3	2219	270.5	262.1	5.5	15.4	12.5	8.0	7	97558.3	73
336	13.2	57.8	2234	270.5	262.1	5.6	15.5	12.0	8.2	7	97558.2	73
337	12.8	58.3	2236	270.5	262.1	6.5	15.7	11.7	7.7	7	97557.2	73
338	14.8	57.5	2214	270.5	262.1	9.4	15.5	13.5	8.4	7	97558.1	74
339	15.2	58.1	2229	270.5	262.1	7.5	15.5	13.9	9.0	7	97558.1	74
340	15.0	57.6	2239	270.5	262.1	8.1	15.5	13.7	8.4	7	97558.2	74
341	16.0	58.5	2243	270.5	262.1	10.0	15.7	14.6	8.1	7	97558.5	74
342	18.1	58.5	2221	270.5	262.0	11.1	15.4	16.6	8.1	7	97558.4	74
343	14.4	57.8	2218	270.5	261.9	9.5	15.3	13.2	10.5	7	97558.5	74
344	15.2	57.9	2232	270.5	262.0	8.2	15.5	13.9	8.5	7	97558.6	74
345	14.6	58.1	2221	270.5	262.0	7.1	15.4	13.4	7.7	7	97557.9	74
346	14.4	58.2	2231	270.5	262.0	8.6	15.8	13.2	7.2	7	97558.5	74
347	13.4	58.0	2196	270.5	261.9	7.0	15.2	12.3	8.5	7	97558.5	74
348	13.5	58.7	2231	270.5	262.0	7.1	15.8	12.4	8.4	7	97557.6	74
349	15.3	57.8	2226	270.5	263.6	9.1	15.5	14.0	7.4	7	97557.3	74
350	13.2	57.8	2200	270.5	265.3	4.9	15.3	12.1	7.6	7	97557.1	75
351	12.0	59.2	2230	270.5	265.4	6.5	15.9	11.0	10.5	7	97557.1	75
352	14.3	57.6	2212	270.5	265.3	8.9	15.4	13.1	9.4	7	97558.5	75

Table E.01 Measurement data - Turbine ON

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

***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	14.3	57.9	2242	270.5	265.3	8.4	15.6	13.1	8.5	7	97558.5	75
354	15.1	57.7	2230	270.5	265.4	9.5	15.5	13.8	8.2	7	97558.9	75
355	15.8	57.8	2227	270.5	265.3	9.9	15.5	14.5	9.0	7	97558.3	75
356	15.7	57.1	2227	270.5	265.3	8.3	15.4	14.4	8.6	7	97556.6	75
357	12.6	57.4	2216	270.5	265.3	6.3	15.4	11.5	10.1	7	97556.7	75
358	12.4	57.9	2239	270.5	265.3	6.1	15.5	11.3	10.1	7	97558.4	75
359	13.8	58.4	2216	270.5	265.3	3.1	15.4	12.6	10.1	7	97558.9	75
360	10.9	58.9	2230	270.5	265.3	-0.1	15.4	9.9	11.8	7	97558.5	75
361	10.1	58.6	2030	270.5	265.1	-1.4	15.0	9.8	10.7	7	97558.6	75
362	10.0	58.8	1997	270.5	263.4	-1.4	15.2	9.0	12.1	7	97544.2	74
363	12.4	59.0	2179	270.5	263.0	2.6	16.0	11.4	12.0	7	97533.4	74
364	13.9	58.3	2235	270.5	262.7	7.7	15.8	12.7	11.8	7	97533.5	74
365	15.3	57.8	2243	270.5	262.5	8.8	15.6	14.0	11.9	7	97533.2	74
366	14.6	58.0	2208	270.5	262.6	7.6	15.3	13.4	10.8	7	97532.5	74
367	14.3	57.5	2206	270.5	262.6	7.8	15.4	13.1	11.5	7	97531.5	74
368	13.9	58.0	2237	270.5	262.7	6.9	15.6	12.8	11.4	7	97533.0	75
369	13.5	58.2	2219	270.5	264.3	5.9	15.4	12.3	10.9	7	97531.8	75
370	13.0	58.6	2249	270.5	264.7	6.8	15.6	11.9	9.3	7	97531.7	75
371	12.8	58.2	2231	270.5	264.8	6.4	15.4	11.8	8.7	7	97531.6	75
372	13.4	57.7	2241	270.5	265.0	7.9	15.6	12.3	10.4	7	97531.8	75
373	15.4	57.6	2226	270.5	265.0	9.0	15.5	14.1	11.9	7	97532.7	75
374	15.0	58.3	2231	270.5	265.1	8.0	15.4	13.7	11.1	7	97532.6	75
375	13.4	57.8	2229	270.5	265.1	6.5	15.5	12.3	12.2	7	97533.6	75
376	12.6	58.1	2224	270.5	265.1	3.8	15.4	11.5	13.1	7	97533.4	75
377	11.7	58.4	2232	270.5	265.1	3.0	15.6	10.7	12.0	7	97533.5	75
378	11.8	58.4	2232	270.5	265.0	2.9	15.5	10.8	11.7	7	97533.4	75
379	11.3	58.3	2235	270.5	265.0	2.7	15.6	10.3	10.2	7	97537.2	75
380	13.0	58.7	2241	270.5	265.0	5.2	15.5	11.9	9.6	7	97546.4	75
381	12.7	57.8	2238	270.5	265.0	5.5	15.5	11.7	9.9	7	97546.8	75
382	12.1	57.9	2216	270.5	265.0	4.6	15.3	11.1	9.5	7	97545.8	75
383	11.4	58.4	2239	270.5	265.0	2.9	15.5	10.4	10.2	7	97546.3	75
384	11.1	58.7	2219	270.5	265.0	0.2	15.3	10.1	11.6	7	97546.9	75
385	9.7	58.3	1874	270.5	265.0	-1.8	14.9	8.6	12.2	7	97543.0	76
386			2205	270.5	265.0	-0.7	15.7	9.1	12.8	7	97532.7	76
387	11.3	58.1	2163	270.5	265.0	-1.0	15.3	10.4	11.5	7	97532.7	76
388	11.3	58.5	2144	270.5	265.0	-1.0	15.4	10.4	10.3	7	97533.6	76
389			2229	270.5	265.0	-0.3	15.7	9.0	10.4	7	97533.7	76
390	9.5	57.8	1787	270.5	265.0	-1.9	15.0	7.8	12.2	7	97533.7	76
391	9.5	58.8	1804	270.5	265.0	-2.1	15.5	7.8	10.1	7	97532.8	76
392	10.4	58.5	2079	270.5	265.0	-1.2	15.5	8.7	9.3	7	97532.4	76
393	9.1	58.1	1630	270.5	265.0	-2.3	15.1	8.0	10.2	7	97532.3	76
394	9.0	58.8	1597	270.5	265.0	-2.4	15.4	8.2	9.8	7	97532.7	76
395	9.5	59.1	1807	270.5	265.0	-2.0	15.5	8.8	9.4	7	97533.4	76
396	10.0	58.9	2006	270.5	265.0	-0.4	15.8	8.6	9.6	7	97533.8	76
397	13.4	57.9	2234	270.5	265.0	3.8	15.8	12.3	8.1	7	97541.8	77
398	11.6	57.6	2234	270.5	265.0	2.4	15.6	10.6	8.3	7	97557.5	77
399	12.1	57.7	2240	270.5	265.0	3.4	15.7	11.1	10.4	7	97557.4	77
400	11.5	57.9	2222	270.5	264.3	2.8	15.4	10.5	11.1	7	97557.4	77
401	12.3	58.1	2198	270.5	262.5	-0.1	15.3	11.2	9.8	7	97557.3	77
402	9.1	57.7	1636	270.5	262.3	-2.2	14.8	8.2	9.7	7	97557.8	77
403	8.8	58.4	1498	270.5	262.9	-2.5	15.2	8.7	9.1	7	97555.8	78
404	8.1	57.5	1176	270.5	264.9	-2.5	14.8	6.9	9.2	7	97547.2	78
405	8.5	58.2	1363	270.5	265.3	-2.4	15.4	7.2	9.1	7	97545.5	78
406	9.2	58.5	1670	270.5	265.4	-2.4	15.6	8.9	8.3	7	97544.5	78
407	8.7	57.8	1448	270.5	265.5	-2.5	15.2	8.6	7.1	7	97545.7	78
408	8.9	58.3	1544	270.5	265.5	-2.4	15.6	8.8	7.0	7	97546.9	78
409	8.9	58.3	1550	270.5	265.5	-1.8	15.3	7.9	7.2	7	97546.2	80
410	8.7	57.9	1476	270.5	266.0	-1.4	15.5	7.6	7.5	7	97546.2	80
411	10.1	58.3	2030	270.5	267.4	-0.4	15.7	8.9	6.7	7	97546.8	80
412			2151	270.5	267.4	0.0	15.4	8.9	7.4	7	97546.2	80
413	10.2	57.8	2036	270.5	267.5	-0.4	15.3	10.2	7.2	7	97545.3	80
414	12.0	57.9	2185	270.5	267.6	0.0	15.4	11.0	6.9	7	97547.1	80
415	12.1	58.1	2243	270.5	267.7	0.2	15.7	11.1	7.7	7	97545.3	79
416	11.2	58.0	2215	270.5	267.8	-0.6	15.5	10.3	8.7	7	97545.6	79
417	9.6	58.0	1865	270.5	267.7	-1.9	15.1	9.8	8.2	7	97546.1	79
418	9.1	57.8	1657	270.5	267.7	-2.1	15.1	9.3	6.9	7	97546.9	79
419	8.1	57.4	1163	270.5	267.7	-2.5	14.8	7.2	7.0	7	97545.4	79
420	8.3	58.3	1281	270.5	267.7	-2.5	15.3	8.5	7.1	7	97548.1	79
421	9.6	58.6	1851	270.5	267.7	-1.8	15.8	9.4	7.2	6	97557.4	80
422	9.4	59.2	1771	270.5	267.7	-2.1	15.4	8.7	7.3	6	97557.3	80
423	9.4	58.8	1783	270.5	267.7	-2.1	15.4	8.5	8.2	6	97557.8	80
424	9.5	58.7	1806	270.5	267.7	-2.0	15.5	8.3	8.0	6	97559.1	80
425			2146	270.5	267.7	-1.0	15.6	9.2	7.7	6	97558.8	80
426	11.5	58.5	2148	270.5	266.6	-1.0	15.4	10.5	7.0	6	97559.0	80
427	12.2	58.3	2235	270.5	264.9	1.8	15.9	11.2	7.1	6	97558.9	80
428	11.6	58.0	2236	270.5	264.7	2.4	15.5	10.7	7.6	6	97558.2	80
429	11.8	58.5	2209	270.5	264.6	-0.8	15.3	10.8	8.3	6	97558.6	80
430	10.9	57.8	2205	270.5	264.7	-0.9	15.3	10.0	8.2	6	97558.7	80
431	12.2	58.7	2237	270.5	264.7	0.0	15.7	11.2	8.3	6	97558.3	80
432			2239	270.5	264.7	2.3	15.7	9.4	8.0	6	97558.9	80
433	12.8	57.4	2239	270.5	264.7	4.3	15.6	11.7	7.6	6	97558.8	79
434	12.6	57.5	2221	270.5	266.1	3.1	15.4	11.5	6.9	6	97558.7	79
435	11.3	57.6	2231	270.5	267.2	3.7	15.5	10.4	6.7	6	97558.8	79
436	12.1	57.5	2237	270.5	267.2	5.9	15.7	11.1	6.4	6	97559.1	79
437	12.8	57.2	2214	270.5	267.2	5.4	15.3	11.7	6.2	6	97559.1	79
438	13.2	57.8	2237	270.5	267.3	4.5	15.6	12.1	5.6	6	97559.0	79
439			2227	270.5	267.4	3.8	15.4	9.4	6.3	6	97558.7	81
440			2224	270.5	267.3	2.2	15.5	9.7	7.8	6	97558.7	81

***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	10.3	58.0	2063	270.5	267.3	-1.2	15.0	8.6	9.2	6	97558.6	81
442	10.9	58.8	2207	270.5	267.3	0.7	15.7	10.0	9.1	6	97557.9	81
443	11.7	57.9	2226	270.5	267.3	2.1	15.6	10.7	8.8	6	97559.0	81
444	11.5	57.6	2212	270.5	267.3	2.4	15.5	10.5	9.3	6	97557.7	80
445			2193	270.5	266.3	-0.9	15.2	9.8	8.5	6	97546.8	77
446	9.9	57.9	1963	270.5	265.0	-1.5	15.0	8.8	8.3	6	97547.0	77
447	11.8	58.3	2151	270.5	264.9	-1.0	15.6	10.8	9.5	6	97546.6	77
448	9.7	58.1	1880	270.5	264.9	-1.7	15.2	9.3	9.8	6	97547.0	77
449	9.0	57.9	1614	270.5	264.9	-2.4	15.2	9.1	9.8	6	97544.8	77
450	9.2	58.4	1684	270.5	264.8	-2.4	15.5	9.6	11.4	6	97533.4	78
451	9.6	58.6	1840	270.5	264.8	-1.9	15.5	10.3	13.0	6	97534.0	78
452	9.7	59.1	1893	270.5	264.8	-1.8	15.5	8.2	11.0	6	97533.2	78
453			2216	270.5	264.7	-0.8	15.7	9.3	9.6	6	97532.2	78
454	11.0	58.4	2233	270.5	264.7	3.1	15.9	10.1	9.4	6	97531.6	78
455	12.8	57.8	2241	270.5	264.7	5.9	15.7	11.7	9.7	6	97533.8	78
456	11.7	58.3	2231	270.5	264.7	4.4	15.4	10.7	9.2	6	97545.4	78
457			2225	270.5	264.7	2.9	15.4	10.7	8.8	6	97546.6	78
458			2233	270.5	264.7	2.3	15.6	9.8	8.3	6	97546.8	78
459			2234	270.5	264.7	2.0	15.4	10.5	8.3	6	97546.7	78
460			2146	270.5	264.7	-0.8	15.1	8.7	8.7	6	97546.8	78
461	10.1	58.8	2022	270.5	264.7	-1.4	15.2	9.3	8.2	6	97547.1	78
462	12.0	58.7	2209	270.5	264.7	0.4	15.7	11.0	8.5	6	97546.9	79
463	11.8	58.1	2235	270.5	264.7	3.4	15.7	10.8	7.3	6	97547.0	79
464	10.8	58.2	2219	270.5	264.7	2.5	15.5	9.9	6.9	6	97546.6	79
465	11.3	58.7	2249	270.5	264.7	3.6	15.8	10.3	7.4	6	97546.9	79
466	13.7	57.8	2212	270.5	264.7	4.9	15.4	12.5	7.5	6	97546.6	79
467	12.1	58.1	2231	270.5	264.7	3.2	15.5	11.1	8.2	6	97548.1	79
468	11.0	58.2	2227	270.5	264.7	1.3	15.5	10.0	7.7	6	97546.7	80
469			2225	270.5	264.7	-0.3	15.4	8.9	7.6	6	97546.6	80
470			2222	270.5	264.7	-0.2	15.4	8.6	9.1	6	97546.3	80
471	11.7	57.6	2232	270.5	264.7	4.8	15.7	10.7	7.1	6	97546.8	80
472	12.6	57.6	2176	270.5	264.7	0.2	15.1	11.5	6.5	6	97547.0	80
473	9.0	57.4	1591	270.5	264.8	-2.3	14.8	9.7	6.6	6	97546.3	80
474	8.6	58.6	1419	270.5	264.7	-2.4	15.3	5.8	8.2	6	97533.6	80
475	9.2	58.6	1697	270.5	264.7	-2.2	15.5	8.0	7.9	6	97533.1	80
476	8.8	58.4	1485	270.5	264.8	-2.4	15.4	7.5	7.5	6	97533.4	80
477	10.0	59.1	1990	270.5	264.8	-1.4	15.8	7.1	9.1	6	97532.5	80
478	10.8	58.3	2227	270.5	264.7	4.7	16.0	9.9	9.3	6	97532.1	80
479	12.3	57.9	2236	270.5	264.7	3.1	15.5	11.2	10.5	6	97533.6	80
480	12.0	57.9	2230	270.5	264.7	4.1	15.6	11.0	9.6	6	97532.2	78
481			2241	270.5	264.8	5.9	15.7	9.6	9.8	6	97533.6	78
482	15.1	58.1	2236	270.5	264.7	8.7	15.6	13.8	10.3	6	97533.5	78
483	16.2	58.1	2236	270.5	264.7	8.5	15.5	14.8	9.1	6	97533.6	78
484	13.1	57.9	2212	270.5	264.7	7.7	15.4	12.0	9.7	6	97533.6	78
485	15.3	57.9	2214	270.5	264.5	9.4	15.5	14.0	9.8	6	97533.4	78
486	15.9	58.4	2240	270.5	264.5	9.7	15.6	14.6	9.1	6	97532.4	78
487	13.6	58.9	2232	270.5	264.5	7.8	15.8	12.5	11.0	6	97532.9	78
488	16.8	58.2	2207	270.5	264.5	11.2	15.4	15.4	11.1	6	97533.8	78
489	15.9	57.8	2226	270.5	264.5	8.9	15.5	14.5	10.9	6	97533.3	78
490	16.2	57.7	2235	270.5	264.5	9.0	15.5	14.8	9.0	6	97533.9	78
491	14.3	57.3	2209	270.5	264.5	7.4	15.3	13.1	9.5	6	97534.2	80
492	12.3	57.9	2247	270.5	264.5	4.7	15.5	11.3	11.6	6	97534.3	80
493	11.7	57.8	2231	270.5	264.5	3.2	15.5	10.7	12.1	6	97533.7	80
494			2237	270.5	264.5	1.9	15.5	9.4	13.4	6	97533.4	80
495	11.0	58.6	2229	270.5	264.4	5.9	15.8	10.0	13.2	6	97533.4	80
496	15.2	57.3	2242	270.5	262.5	9.8	15.7	13.9	12.2	6	97533.6	80
497	14.1	57.6	2214	270.5	261.1	7.7	15.3	12.9	11.2	6	97533.9	79
498	13.4	57.9	2237	270.5	261.0	6.6	15.5	12.3	12.7	6	97533.6	79
499	13.5	57.7	2240	270.5	261.0	7.8	15.7	12.4	13.0	6	97532.5	79
500	15.2	57.7	2231	270.5	261.0	8.2	15.4	13.9	10.9	6	97532.0	79
501	14.8	57.7	2232	270.5	261.0	6.9	15.4	13.6	10.8	6	97532.7	79
502	13.2	57.5	2231	270.5	261.0	6.2	15.5	12.1	10.4	6	97533.6	79
503	14.1	57.7	2240	270.5	261.0	6.2	15.5	12.9	9.4	6	97533.1	80
504	14.5	57.8	2233	270.5	261.0	5.1	15.5	13.3	10.1	6	97532.3	80
505	12.5	58.3	2241	270.5	261.0	5.0	15.5	11.5	11.1	6	97532.5	80
506	13.2	58.1	2228	270.5	261.0	4.0	15.4	12.1	11.0	6	97533.7	80
507	11.5	58.0	2238	270.5	261.0	4.3	15.6	10.5	10.1	6	97533.9	80
508	14.1	57.9	2227	270.5	261.0	6.3	15.5	12.9	9.9	6	97533.7	80
509	12.7	58.4	2209	270.5	261.0	2.6	15.3	11.6	13.1	6	97533.1	80
510			2218	270.5	261.0	-0.7	15.4	8.9	12.1	6	97533.0	80
511			2236	270.5	260.9	0.9	15.6	9.4	11.9	6	97533.7	80
512	11.4	59.0	2210	270.5	260.9	-0.7	15.3	10.4	10.8	6	97533.8	80
513			2241	270.5	260.9	0.0	15.6	9.7	10.9	6	97533.8	80
514	11.4	58.4	2221	270.5	260.9	3.5	15.7	10.4	10.2	6	97533.8	80
515	10.6	58.5	2112	270.5	260.8	-0.2	15.0	9.3	9.5	6	97535.0	80
516	10.0	58.8	2009	270.5	260.8	-0.5	15.5	9.2	13.3	6	97533.9	80
517	13.5	57.9	2223	270.5	260.8	8.3	15.9	12.3	12.8	6	97533.6	80
518	15.3	57.5	2222	270.5	260.8	7.9	15.4	14.0	11.6	6	97533.8	80
519	15.3	57.9	2240	270.5	260.8	8.4	15.5	14.0	10.3	6	97533.8	80
520	14.0	57.2	2225	270.5	260.8	7.1	15.4	12.8	9.7	6	97533.7	80
521	13.4	57.4	2228	270.5	260.8	6.3	15.4	12.3	10.2	6	97532.8	80
522	13.3	57.9	2236	270.5	260.9	5.3	15.5	12.2	10.9	6	97532.3	80
523	13.0	58.1	2226	270.5	260.9	5.3	15.6	11.9	11.1	6	97532.6	80
524	14.1	58.4	2236	270.5	260.9	7.5	15.5	12.9	9.9	6	97533.7	80
525	14.0	57.4	2218	270.5	260.9	6.3	15.4	12.8	9.5	6	97533.7	80
526	14.4	58.3	2239	270.5	261.2	5.6	15.5	13.2	12.4	6	97533.8	80
527	12.0	57.9	2226	270.5	263.6	2.5	15.4	11.0	10.7	6	97545.5	81
528	12.4	57.8	2237	270.5	263.7	4.4	15.7	11.3	11.0	6	97546.8	81

Table E.01 Measurement data - Turbine ON

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

***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 (%)
529	12.4	58.1	2219	270.5	263.7	4.3	15.4	11.4	11.6	6	97546.6	81
530	12.8	58.6	2235	270.5	263.7	4.6	15.6	11.7	11.6	6	97547.0	81
531	13.3	58.4	2241	270.5	263.7	5.3	15.5	12.2	11.4	6	97546.7	81
532	11.5	58.5	2224	270.5	263.7	3.9	15.4	10.5	10.7	6	97539.6	81
533	11.7	58.9	2216	270.5	263.5	1.2	15.5	10.7	9.9	6	97533.8	81
534	13.1	58.4	2239	270.5	261.9	4.7	15.6	12.0	8.8	6	97533.8	81
535	13.0	58.0	2235	270.5	261.4	5.4	15.5	11.9	9.5	6	97533.8	81
536	12.1	57.8	2221	270.5	261.4	3.3	15.3	11.0	8.8	6	97533.7	81
537	13.4	57.9	2226	270.5	261.4	5.0	15.7	12.3	8.2	6	97533.2	81
538	13.5	58.5	2227	270.5	261.3	4.9	15.5	12.4	8.7	6	97543.1	82
539	13.9	57.9	2233	270.5	261.3	6.3	15.5	12.7	8.6	6	97546.4	82
540	13.5	57.3	2233	270.5	261.3	6.0	15.4	12.4	9.2	6	97547.0	82
541	14.0	58.1	2218	270.5	261.3	5.5	15.4	12.8	9.2	6	97546.7	82
542	12.4	57.5	2235	270.5	261.3	4.2	15.5	11.3	8.0	6	97547.1	82
543	12.8	58.1	2229	270.5	261.3	3.3	15.4	11.7	8.3	6	97547.1	82
544	11.6	58.4	2239	270.5	261.3	2.7	15.5	10.6	8.4	6	97547.0	82
545	12.4	58.4	2233	270.5	261.2	5.5	15.7	11.3	7.9	6	97546.9	82
546	14.6	57.9	2241	270.5	261.2	8.2	15.7	13.4	8.2	6	97547.2	82
547	16.4	57.7	2234	270.5	261.2	9.9	15.5	15.0	9.0	6	97546.9	82
548	15.7	57.4	2223	270.5	261.2	8.6	15.4	14.4	9.0	6	97547.1	82
549	14.9	57.9	2214	270.5	261.2	6.7	15.3	13.6	7.7	6	97546.2	82
550	13.7	58.0	2231	270.5	261.2	5.9	15.5	12.6	7.6	6	97545.6	82
551	12.9	58.5	2215	270.5	261.9	2.2	15.4	11.8	7.2	6	97546.9	82
552	11.2	58.5	2246	270.5	263.4	0.8	15.5	10.3	8.5	6	97547.2	82
553	11.1	58.5	2215	270.5	263.5	-0.7	15.3	10.2	9.6	6	97546.2	82
554	9.5	58.4	1823	270.5	263.6	-1.9	14.9	8.4	9.0	6	97545.9	82
555	9.5	59.4	1807	270.5	263.6	-2.1	15.4	8.8	9.5	6	97546.5	82
556	9.7	58.9	1877	270.5	263.7	-1.7	15.4	9.4	9.4	6	97538.2	81
557	9.5	59.0	1797	270.5	263.7	-2.1	15.5	8.7	9.0	6	97533.0	80
558	10.8	59.0	2219	270.5	263.6	0.8	15.9	9.9	8.3	6	97533.0	80
559			2204	270.5	263.6	0.3	15.4	9.7	8.1	6	97532.4	80
560	10.3	58.6	2061	270.5	263.7	-1.3	15.2	8.9	9.1	6	97532.8	80
561	11.8	58.9	2238	270.5	263.7	1.9	15.9	10.8	10.5	6	97533.7	80
562	11.9	58.9	2227	270.5	263.6	4.3	15.7	10.9	10.6	6	97533.6	80
563	13.0	57.8	2234	270.5	263.7	4.9	15.5	11.9	10.3	6	97533.4	80
564			2213	270.5	263.7	0.8	15.4	9.8	10.0	6	97533.4	80
565			2236	270.5	262.3	1.3	15.6	9.8	9.3	6	97532.5	80
566	12.7	58.8	2200	270.5	260.3	-0.7	15.3	11.7	10.4	6	97532.0	80
567	9.5	58.7	1786	270.5	260.2	-2.1	15.3	9.4	10.2	6	97531.7	80
568	10.2	59.3	2047	270.5	260.2	-1.3	15.6	10.9	12.3	6	97531.7	80
569	10.3	58.7	2061	270.5	260.3	-1.0	15.6	9.7	11.0	6	97532.1	80
570	13.6	58.3	2234	270.5	260.3	3.0	15.9	12.5	10.1	6	97532.4	80
571	13.9	58.4	2222	270.5	260.3	4.4	15.6	12.7	13.2	6	97533.4	80
572	12.7	58.3	2237	270.5	260.3	2.5	15.5	11.6	11.6	6	97533.6	80
573	11.2	58.7	2222	270.5	260.3	1.3	15.4	10.2	13.6	6	97533.6	79
574	9.4	58.4	1758	270.5	260.4	-1.9	14.8	7.5	12.4	7	97533.7	78
575	10.6	59.7	2107	270.5	262.2	-1.2	15.7	10.2	11.8	7	97533.5	78
576	9.9	58.9	1956	270.5	263.7	-1.5	15.1	9.2	11.8	7	97533.5	78
577	9.6	59.0	1846	270.5	263.8	-1.9	15.3	10.1	11.2	7	97533.4	78
578	8.8	58.5	1504	270.5	263.9	-2.4	15.2	8.6	12.6	7	97533.9	78
579	8.5	59.2	1388	270.5	263.9	-2.4	15.4	7.6	13.2	7	97533.6	78
580	9.2	59.0	1670	270.5	264.0	-2.3	15.6	8.8	12.6	7	97532.3	77
581	9.0	59.0	1612	270.5	265.7	-2.4	15.4	8.2	12.2	7	97532.3	77
582	10.0	59.5	2012	270.5	267.3	-1.4	15.8	8.2	11.1	7	97532.3	77
583			2230	270.5	267.4	2.7	15.9	9.4	9.6	7	97533.4	77
584	12.0	58.7	2234	270.5	267.6	3.5	15.6	10.9	10.5	7	97533.6	77
585	13.0	58.6	2234	270.5	267.6	3.2	15.6	11.9	12.7	7	97533.4	77
586	12.9	58.4	2244	270.5	267.5	3.5	15.5	11.8	12.4	7	97533.4	77
587			2227	270.5	267.6	3.7	15.4	9.7	11.5	7	97533.5	77
588			2196	270.5	267.5	-0.1	15.2	9.7	10.2	7	97533.6	77
589			2216	270.5	267.6	0.0	15.4	7.4	9.8	7	97533.7	77
590	12.0	59.1	2232	270.5	269.0	2.3	15.7	11.0	9.4	7	97533.6	77
591	13.8	58.8	2219	270.5	271.6	0.7	15.4	12.6	8.4	7	97539.6	78
592	12.1	58.2	2248	270.5	273.8	3.3	15.6	11.1	10.7	7	97542.1	79
593	11.5	58.5	2213	270.5	274.2	1.5	15.4	10.6	9.5	7	97545.7	79
594	11.4	59.0	2221	270.5	274.2	0.0	15.4	10.4	10.3	7	97545.7	79
595			2144	270.5	274.2	-1.0	15.1	8.9	9.6	7	97546.3	79
596			2228	270.5	274.2	-0.4	15.5	8.9	10.6	7	97546.9	79
597	13.9	58.2	2224	270.5	274.2	7.4	16.0	12.8	9.8	7	97553.5	78
598	12.9	57.9	2213	270.5	274.2	5.2	15.3	11.8	9.2	7	97558.3	76
599	12.6	58.6	2230	270.5	274.2	5.1	15.6	11.5	8.2	7	97558.4	76
600	11.3	58.3	2219	270.5	274.2	1.8	15.4	10.3	8.8	7	97558.6	76
601			2241	270.5	274.2	3.6	15.7	9.1	10.2	7	97558.3	76
602			2228	270.5	274.2	4.9	15.5	9.5	9.4	7	97558.3	76
603	11.4	58.4	2213	270.5	274.2	2.0	15.3	10.5	10.2	7	97556.6	76
604			2228	270.5	274.0	2.5	15.6	8.6	11.2	7	97556.8	76
605	11.2	58.4	2219	270.5	272.5	3.8	15.5	10.3	9.8	7	97558.2	76
606	11.2	58.5	2240	270.5	270.2	3.3	15.6	10.3	9.2	7	97558.4	76
607	10.8	58.7	2229	270.5	269.9	2.4	15.4	9.9	10.6	7	97557.9	76
608	12.2	58.3	2233	270.5	269.8	4.8	15.7	11.2	10.1	7	97557.0	76
609	14.3	57.8	2246	270.5	269.8	5.8	15.5	13.1	8.6	7	97556.9	76
610	11.9	58.2	2218	270.5	269.8	4.4	15.4	10.9	9.8	7	97556.8	76
611	11.0	58.3	2239	270.5	269.8	2.9	15.5	10.1	11.6	7	97557.0	76
612	11.3	58.3	2232	270.5	269.8	5.0	15.7	10.4	13.9	7	97558.0	76
613	15.0	58.4	2233	270.5	269.8	8.9	15.6	13.8	12.1	7	97558.2	76
614	15.2	59.0	2228	270.5	269.8	8.3	15.4	13.9	14.2	7	97552.4	75
615	14.4	58.8	2236	270.5	269.5	8.5	15.6	13.2	14.1	7	97545.3	74
616	16.8	58.4	2223	270.5	269.5	9.2	15.4	15.4	13.3	7	97546.2	74

***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 (%)
617	14.0	58.2	2215	270.5	269.5	6.6	15.4	12.8	12.2	7	97545.5	74
618	13.8	58.1	2229	270.5	269.5	6.4	15.6	12.6	13.3	7	97546.2	74
619	14.3	58.3	2235	270.5	269.5	7.5	15.5	13.1	13.0	7	97546.4	74
620	14.9	58.0	2209	270.5	269.0	5.2	15.3	13.7	14.1	7	97539.9	74
621	12.2	59.1	2243	270.5	267.3	5.6	15.7	11.2	13.3	7	97533.0	74
622	14.8	58.9	2231	270.5	267.1	7.8	15.5	13.5	13.1	7	97532.4	74
623	14.6	58.3	2225	270.5	267.1	6.7	15.4	13.4	13.0	7	97533.2	74
624	13.2	58.1	2231	270.5	267.1	7.0	15.5	12.1	12.8	7	97533.3	74
625	13.3	58.6	2226	270.5	267.1	5.5	15.4	12.2	12.8	7	97533.3	74
626	11.8	58.4	2241	270.5	267.1	6.9	15.7	10.8	12.6	7	97539.7	74
627	14.7	58.1	2235	270.5	267.1	7.4	15.5	13.5	13.2	7	97546.2	73
628	14.2	58.2	2221	270.5	267.1	7.5	15.6	13.0	13.6	7	97546.4	73
629	16.8	58.3	2231	270.5	267.1	9.9	15.6	15.4	12.5	7	97546.6	73
630	17.5	58.8	2234	270.5	267.1	11.7	15.7	16.0	12.4	7	97546.2	73
631	15.7	57.3	2186	270.5	267.1	9.4	15.1	14.4	10.0	7	97546.3	73
632	13.5	58.4	2231	270.5	267.1	5.9	15.5	12.3	11.2	7	97552.1	74
633	12.6	58.4	2236	270.5	267.1	4.3	15.5	11.6	10.5	7	97557.5	75
634	12.7	58.5	2235	270.5	267.1	4.9	15.7	11.6	10.7	7	97557.7	75
635	14.0	58.5	2246	270.5	267.2	5.9	15.5	12.8	12.5	7	97557.7	75
636	13.1	58.3	2214	270.5	267.3	2.8	15.3	11.9	12.9	7	97557.8	75
637	11.2	58.3	2232	270.5	267.3	4.5	15.7	10.2	11.9	7	97557.9	75
638	12.5	57.7	2226	270.5	267.2	4.3	15.4	11.4	11.7	7	97558.0	75
639	14.5	57.6	2226	270.5	267.2	7.8	15.8	13.3	10.9	7	97558.3	75
640	14.4	58.0	2221	270.5	267.2	6.4	15.3	13.2	11.1	7	97558.4	75
641	13.6	58.3	2227	270.5	267.3	6.1	15.6	12.4	10.7	7	97558.3	75
642	14.2	58.0	2229	270.5	267.2	5.8	15.4	13.0	12.2	7	97558.5	75
643	13.3	58.1	2224	270.5	267.2	4.5	15.5	12.2	10.3	7	97558.4	75
644	10.9	58.5	2232	270.5	267.3	3.6	15.4	10.0	10.2	7	97558.4	74
645	12.6	58.8	2234	270.5	267.2	3.0	15.6	11.5	10.2	7	97557.6	74
646	12.9	58.2	2230	270.5	267.2	4.1	15.5	11.8	9.6	7	97557.6	74
647	11.6	58.7	2231	270.5	267.3	3.4	15.5	10.6	10.8	7	97557.8	74
648	11.9	58.2	2224	270.5	267.3	2.8	15.4	10.9	12.1	7	97558.2	74
649			2229	270.5	267.2	2.4	15.5	9.4	10.5	7	97558.2	74
650			2216	270.5	267.1	0.8	15.5	9.6	9.3	7	97550.1	73
651			2230	270.5	267.2	0.5	15.4	9.7	10.8	7	97546.1	73
652	11.6	59.2	2226	270.5	267.2	5.2	15.9	10.6	13.7	7	97545.0	73
653	13.6	59.0	2233	270.5	267.1	7.7	15.6	12.4	13.5	7	97544.8	73
654	13.6	57.9	2217	270.5	267.1	7.9	15.4	12.4	13.3	7	97544.8	73
655	11.3	58.8	2207	270.5	267.1	3.6	15.4	10.4	12.7	7	97544.8	73
656			2235	270.5	267.1	2.1	15.4	9.5	12.5	7	97544.8	73
657	11.1	59.1	2223	270.5	267.1	-0.5	15.5	10.1	9.7	7	97545.2	73
658	12.1	58.6	2240	270.5	267.1	4.5	15.8	11.1	10.4	7	97544.8	73
659	12.1	58.3	2236	270.5	267.1	6.1	15.5	11.0	8.4	7	97544.7	73
660	12.2	58.0	2226	270.5	267.1	5.0	15.4	11.2	11.1	7	97545.0	73
661	12.9	59.1	2239	270.5	267.1	5.8	15.8	11.8	10.8	7	97545.0	73
662	15.1	58.4	2233	270.5	267.1	9.4	15.6	13.8	12.2	7	97534.8	73
663	16.6	58.3	2228	270.5	267.1	8.4	15.4	15.2	10.3	7	97531.6	73
664	15.0	58.3	2235	270.5	267.1	8.5	15.6	13.8	8.5	7	97531.2	73
665	13.8	57.8	2212	270.5	267.1	7.4	15.3	12.6	8.4	7	97531.3	73
666	13.2	58.3	2221	270.5	267.1	3.9	15.5	12.1	11.4	7	97531.5	73
667	12.5	58.2	2244	270.5	267.1	6.4	15.7	11.4	12.0	7	97532.5	73
668	13.0	58.2	2212	270.5	267.1	5.8	15.3	11.9	11.8	7	97532.7	74
669	12.6	58.7	2236	270.5	267.1	4.4	15.7	11.6	12.8	7	97533.1	74
670	13.9	58.4	2208	270.5	267.1	5.9	15.4	12.7	13.1	7	97533.0	74
671	11.7	58.3	2232	270.5	267.1	5.9	15.7	10.7	11.9	7	97532.1	74
672	12.7	58.3	2221	270.5	267.1	4.9	15.4	11.6	11.5	7	97531.7	74
673	11.5	58.7	2231	270.5	267.1	4.8	15.7	10.5	11.0	7	97531.8	74
674	13.9	59.0	2231	270.5	267.1	3.2	15.4	12.7	11.3	7	97531.7	73
675	12.5	58.7	2242	270.5	267.1	3.8	15.6	11.5	13.0	7	97531.5	73
676	11.3	58.6	2212	270.5	267.1	2.6	15.3	10.3	12.2	7	97532.2	73
677	10.8	59.1	2240	270.5	267.1	2.3	15.6	9.9	11.5	7	97531.3	73
678	13.2	58.1	2224	270.5	266.9	6.4	15.7	12.1	11.6	7	97531.6	73
679	12.6	58.9	2232	270.5	266.9	5.3	15.6	11.5	11.6	7	97531.8	73
680	14.4	59.0	2222	270.5	266.9	7.2	15.5	13.1	11.2	7	97541.4	72
681	11.4	58.5	2215	270.5	266.9	4.7	15.3	10.5	11.0	7	97545.0	72
682	11.4	59.3	2239	270.5	266.9	2.6	15.6	10.4	10.2	7	97545.9	72
683	12.0	58.4	2234	270.5	266.9	5.2	15.6	11.0	10.3	7	97544.8	72
684	15.2	58.8	2243	270.5	266.9	9.7	15.9	13.9	10.5	7	97545.0	72
685	16.5	57.5	2225	270.5	266.9	10.8	15.5	15.1	11.5	7	97544.7	72
686	15.2	58.4	2208	270.5	266.9	8.3	15.2	13.9	11.6	7	97545.5	73
687	14.2	58.8	2227	270.5	267.0	6.9	15.8	13.0	10.5	7	97546.1	73
688	15.9	58.4	2239	270.5	267.0	9.9	15.5	14.5	10.3	7	97546.1	73
689	15.7	58.1	2217	270.5	267.0	8.0	15.4	14.3	9.2	7	97545.9	73
690	13.8	58.8	2229	270.5	267.0	6.8	15.4	12.7	11.0	7	97545.5	73
691	14.2	59.2	2238	270.5	267.0	9.5	15.8	13.0	11.1	7	97546.3	73
692	16.7	58.0	2220	270.5	267.0	11.0	15.5	15.3	10.7	7	97558.1	74
693	15.7	58.3	2220	270.5	267.0	9.3	15.4	14.3	11.5	7	97558.5	74
694	15.5	58.3	2233	270.5	267.0	7.6	15.5	14.2	11.3	7	97558.3	74
695	14.8	58.1	2234	270.5	267.0	8.8	15.5	13.5	10.8	7	97558.4	74
696	14.2	58.2	2224	270.5	267.0	7.3	15.4	13.0	8.8	7	97558.2	74
697	13.0	58.8	2232	270.5	267.0	6.1	15.6	11.9	8.5	7	97557.8	74
698	14.9	58.3	2244	270.5	267.0	8.9	15.7	13.7	9.0	7	97557.2	75
699	15.4	58.3	2213	270.5	267.0	8.0	15.3	14.1	10.0	7	97557.2	75
700	13.9	57.7	2235	270.5	267.0	7.3	15.6	12.7	9.2	7	97557.0	75
701	14.4	57.5	2231	270.5	267.0	7.4	15.5	13.2	10.3	7	97556.9	75
702	15.1	58.2	2225	270.5	267.0	6.2	15.5	13.8	11.8	7	97556.5	75
703	15.5	58.7	2230	270.5	267.0	8.8	15.7	14.2	11.7	7	97554.7	75
704	16.6	58.0	2226	270.5	267.0	9.6	15.5	15.2	12.4	7	97532.2	73

Table E.01 Measurement data - Turbine ON

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

***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 (%)
705	15.7	57.8	2218	270.5	267.0	8.2	15.4	14.4	11.8	7	97532.9	73
706	15.3	58.2	2212	270.5	267.0	5.8	15.3	14.0	12.2	7	97533.1	73
707	11.6	58.4	2234	270.5	267.0	4.0	15.7	10.7	10.9	7	97533.1	73
708	13.2	58.7	2225	270.5	267.0	6.0	15.5	12.0	9.2	7	97533.1	73
709	13.6	58.4	2215	270.5	267.0	6.0	15.4	12.4	8.7	7	97534.9	73
710	14.1	58.6	2224	270.5	267.7	3.7	15.4	12.9	8.7	7	97558.4	75
711	12.7	58.3	2225	270.5	269.6	3.6	15.5	11.6	8.5	7	97558.5	75
712	12.7	58.6	2231	270.5	269.9	2.7	15.5	11.6	8.5	7	97558.8	75
713	12.2	59.0	2209	270.5	270.1	-0.4	15.4	11.2	8.5	7	97557.4	75
714	9.8	58.9	1940	270.5	272.3	-1.6	14.9	10.0	9.0	7	97557.8	75
715	12.2	59.5	2179	270.5	274.4	-0.9	15.5	11.1	8.4	7	97558.5	75
716	9.7	58.6	1888	270.5	274.9	-1.6	15.0	9.8	7.7	7	97558.7	75
717	8.4	58.4	1306	270.5	274.9	-2.4	15.0	8.5	7.5	7	97558.5	75
718	9.9	59.1	1969	270.5	274.9	-0.8	15.9	8.4	8.2	7	97558.0	75
719	10.5	58.4	2089	270.5	274.9	-1.1	15.4	8.2	8.5	7	97558.4	75
720	10.7	58.9	2122	270.5	274.0	-1.1	15.4	9.0	7.2	7	97558.5	75
721	10.7	58.5	2133	270.5	271.8	-1.0	15.3	9.6	7.2	7	97558.3	75
722	10.4	58.7	2069	270.5	271.5	-0.8	15.6	9.0	7.9	7	97558.8	76
723	11.9	58.2	2235	270.5	271.5	4.0	15.9	10.9	7.2	7	97557.7	76
724	11.5	58.6	2221	270.5	271.4	2.8	15.6	10.5	7.8	7	97558.1	76
725	11.5	58.3	2235	270.5	271.5	1.7	15.5	10.5	9.2	7	97557.6	76
726	12.0	58.1	2230	270.5	271.4	0.0	15.5	11.0	9.8	7	97557.3	76
727			2161	270.5	271.4	-1.0	15.2	9.4	8.8	7	97556.9	75
728	11.4	58.9	2212	270.5	271.4	-0.3	15.6	10.4	8.2	7	97557.2	75
729	12.2	57.8	2232	270.5	271.4	3.5	15.8	11.1	6.8	7	97558.1	75
730	12.7	58.0	2231	270.5	271.4	1.6	15.5	11.6	7.0	7	97558.1	75
731	11.8	58.3	2227	270.5	271.3	-0.5	15.4	10.8	7.0	7	97558.5	75
732	9.1	57.6	1653	270.5	271.3	-2.0	14.7	9.1	6.4	7	97559.3	75
733	9.1	59.0	1623	270.5	271.4	-2.3	15.5	9.0	7.0	7	97572.0	79
734	9.9	58.8	1950	270.5	271.3	-1.6	15.6	8.4	7.4	7	97571.7	79
735	9.6	58.8	1860	270.5	271.1	-1.8	15.4	7.6	8.4	7	97571.8	79
736			2226	270.5	271.1	2.2	16.0	9.5	8.7	7	97570.5	79
737	11.8	58.5	2237	270.5	271.2	2.2	15.7	10.8	7.8	7	97571.4	79
738	12.6	57.7	2230	270.5	271.2	4.8	15.6	11.5	7.3	7	97570.4	79
739	12.0	58.1	2234	270.5	271.2	4.2	15.5	11.0	6.8	7	97569.7	77
740	12.9	58.1	2233	270.5	270.1	5.8	15.6	11.8	7.8	7	97570.4	77
741	12.0	58.4	2233	270.5	267.9	6.8	15.6	11.0	9.0	7	97570.7	77
742	14.9	58.2	2227	270.5	267.7	8.2	15.5	13.6	9.3	7	97571.8	77
743	13.5	57.7	2197	270.5	267.7	5.4	15.3	12.3	10.2	7	97571.7	77
744	12.5	58.5	2228	270.5	267.6	6.1	15.7	11.4	9.7	7	97571.7	77
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***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	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 (%)
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Table E.02 Measurement data - Background

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

***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	10.2	42.4	0.0	10.0	9	97540.8	50
2	10.1	42.7	0.0	9.9	9	97549.5	51
3	11.5	42.5	0.0	11.2	9	97553.0	51
4	11.0	43.3	0.0	10.7	9	97553.4	51
5	10.6	42.1	0.0	10.4	9	97553.2	51
6	10.6	42.3	0.0	10.4	9	97553.3	51
7	10.8	42.7	0.0	10.5	9	97552.7	51
8	9.9	42.2	0.0	9.7	9	97552.4	51
9	9.8	42.3	0.0	9.6	9	97552.2	50
10	9.4	42.9	0.0	9.2	9	97552.0	50
11	9.0	43.0	0.0	8.8	9	97551.5	50
12	10.7	43.7	0.0	10.5	9	97551.0	50
13	11.5	44.1	0.0	11.2	9	97550.0	50
14	12.3	43.4	0.0	12.0	9	97539.2	51
15	11.7	43.5	0.0	11.5	9	97534.7	51
16	11.6	43.9	0.0	11.4	9	97527.0	51
17	11.5	43.3	0.0	11.2	9	96429.5	51
18	8.9	44.4	0.0	8.7	9	96133.2	51
19	11.2	43.0	0.0	10.9	9	96282.4	51
20	10.9	42.0	0.0	10.6	9	96399.0	51
21	8.3	42.7	0.0	8.1	9	96490.6	50
22	9.1	43.0	0.0	8.9	9	96638.0	50
23	9.5	42.9	0.0	9.3	9	96787.9	50
24	9.9	42.6	0.0	9.7	9	96599.4	50
25	9.8	41.9	0.0	9.5	9	96687.1	50
26	10.6	42.8	0.0	10.4	9	96788.6	51
27	11.2	42.6	0.0	11.0	9	96821.8	51
28	12.2	43.4	0.0	11.9	9	96877.1	51
29	11.3	42.1	0.0	11.0	9	96902.7	51
30	12.2	42.4	0.0	11.9	9	96926.1	51
31	11.4	43.0	0.0	11.2	9	96854.5	51
32	11.4	43.2	0.0	11.2	9	96960.9	50
33	11.3	42.5	0.0	11.0	9	96929.3	50
34	9.6	41.5	0.0	9.4	9	96884.3	50
35	8.9	41.9	0.0	8.7	9	96884.2	50
36	8.2	42.2	0.0	8.0	9	96906.6	50
37	8.8	43.4	0.0	8.6	9	96941.0	50
38	8.9	43.6	0.0	8.6	9	96942.2	51
39	9.1	47.2	0.0	8.9	9	96981.1	51
40	8.7	42.7	0.0	8.5	9	96923.7	51
41	7.7	42.1	0.0	7.5	9	96861.5	51
42	8.1	42.6	0.0	7.9	9	96909.4	51
43	9.5	42.4	0.0	9.2	9	96950.6	51
44	8.9	41.3	0.0	8.7	9	97041.3	51
45	10.0	40.4	0.0	9.8	9	97056.5	51
46	10.4	40.6	0.0	10.2	9	96998.2	51
47	11.7	40.8	0.0	11.4	9	97050.6	51
48	10.7	41.0	0.0	10.4	9	97117.9	51
49	9.6	41.5	0.0	9.3	9	97072.5	51
50	8.8	42.5	0.0	8.6	9	96993.8	51
51	9.3	41.9	0.0	9.1	9	96997.4	51
52	9.6	42.9	0.0	9.3	9	97043.9	51
53	11.7	43.7	0.0	11.4	9	97034.6	51
54	11.6	44.0	0.0	11.4	9	96998.7	51
55	11.5	43.3	0.0	11.2	9	97055.9	51
56	10.8	40.9	0.0	10.5	9	97055.7	50
57	9.5	40.8	0.0	9.2	9	97068.5	50
58	11.0	40.8	0.0	10.7	9	97138.3	50
59	10.0	42.1	0.0	9.8	9	97072.1	50
60	9.9	40.4	0.0	9.6	9	97078.5	50
61	9.8	40.0	0.0	9.5	9	97120.1	50
62	9.4	40.0	0.0	9.2	9	97086.8	51
63	9.4	39.1	0.0	9.2	9	97073.6	51
64	10.1	39.4	0.0	9.9	9	97073.6	51
65	9.0	40.1	0.0	8.8	9	97051.3	51
66	8.5	39.7	0.0	8.3	9	97103.8	51
67	7.3	40.4	0.0	7.2	9	97042.2	51
68	7.4	40.7	0.0	7.2	9	97056.4	51
69	7.8	43.1	0.0	7.6	9	97139.4	51
70	7.3	41.2	0.0	7.1	9	97080.5	51
71	7.5	40.1	0.0	7.3	9	97049.6	51
72	7.2	40.6	0.0	7.0	9	97040.7	51
73	7.7	40.7	0.0	7.5	9	96978.6	51
74	6.9	40.8	0.0	6.7	9	97266.0	52
75	7.9	41.2	0.0	7.7	9	97524.7	52
76	7.8	40.5	0.0	7.6	9	97526.1	52
77	7.9	39.1	0.0	7.7	9	97526.6	52
78	7.6	39.7	0.0	7.4	9	97527.5	52
79	8.8	39.7	0.0	8.6	9	97524.6	52
80	7.7	39.4	0.0	7.6	9	97519.3	51
81	8.6	38.8	0.0	8.4	9	97492.3	51
82	9.4	39.6	0.0	9.2	9	97279.4	51
83	8.7	40.9	0.0	8.5	9	97190.7	51

***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	8.2	40.0	0.0	8.0	9	97236.4	51
85	8.0	39.2	0.0	7.8	9	97513.0	51
86	8.1	40.1	0.0	7.9	9	97528.9	51
87	6.9	39.5	0.0	6.8	9	97528.5	51
88	6.7	40.1	0.0	6.6	9	97528.5	51
89	7.5	40.4	0.0	7.3	9	97528.4	51
90	7.9	39.5	0.0	7.7	9	97528.4	51
91	8.7	38.9	0.0	8.5	9	97528.4	51
92	8.7	38.4	0.0	8.4	9	97528.9	52
93	8.3	39.2	0.0	8.1	9	97528.9	52
94	8.9	40.0	0.0	8.7	9	97529.0	52
95	9.2	39.6	0.0	9.0	9	97529.8	52
96	8.6	39.4	0.0	8.4	9	97530.2	52
97	8.1	40.7	0.0	7.9	9	97530.1	52
98	10.2	39.8	0.0	10.0	9	97529.4	52
99	9.1	41.3	0.0	8.9	9	97528.9	52
100	7.8	43.6	0.0	7.6	9	97529.0	52
101	8.0	43.0	0.0	7.8	9	97529.4	52
102	7.6	46.9	0.0	7.4	9	97529.0	52
103	9.3	45.8	0.0	9.1	9	97529.0	52
104	9.8	43.4	0.0	9.6	9	97528.9	52
105	9.6	43.0	0.0	9.4	9	97529.1	52
106	10.0	42.2	0.0	9.7	9	97529.3	52
107	8.9	42.3	0.0	8.6	9	97529.1	52
108	8.3	43.5	0.0	8.1	9	97529.1	52
109	10.2	43.1	0.0	10.0	9	97528.8	52
110	8.8	42.5	0.0	8.6	9	97529.0	52
111	10.9	41.1	0.0	10.7	9	97529.4	52
112	11.1	42.3	0.0	10.9	9	97529.7	52
113	10.8	42.2	0.0	10.5	9	97529.0	52
114	8.9	43.3	0.0	8.7	9	97529.1	52
115	9.5	44.2	0.0	9.3	9	97529.8	52
116	12.3	52.6	0.0	12.0	9	97528.7	53
117	12.8	45.1	0.0	12.5	9	97529.3	53
118	12.5	45.9	0.0	12.2	9	97529.4	53
119	10.7	45.5	0.0	10.5	9	97528.2	53
120	10.0	45.5	0.0	9.7	9	97528.3	53
121	11.1	46.1	0.0	10.9	9	97528.2	53
122	11.0	46.4	0.0	10.8	9	97528.7	53
123	10.6	45.8	0.0	10.3	9	97528.7	53
124	11.4	46.5	0.0	11.1	9	97528.2	53
125	11.4	44.7	0.0	11.1	9	97528.7	53
126	11.2	46.4	0.0	10.9	9	97528.5	53
127	10.8	46.2	0.0	10.5	9	97530.2	53
128	8.3	45.7	0.0	8.1	9	97542.8	54
129	9.0	45.1	0.0	8.8	9	97541.9	54
130	10.5	46.5	0.0	10.2	9	97542.0	54
131	11.1	50.4	0.0	10.8	9	97542.0	54
132	12.5	45.8	0.0	12.2	9	97542.0	54
133	12.5	45.9	0.0	12.2	9	97541.4	54
134	12.1	48.3	0.0	11.8	9	97528.8	54
135	11.9	45.1	0.0	11.6	9	97528.6	54
136	12.2	45.2	0.0	11.9	9	97528.7	54
137	12.2	45.8	0.0	11.9	9	97528.2	54
138	12.6	46.9	0.0	12.3	9	97528.5	54
139	12.6	50.2	0.0	12.3	9	97529.2	54
140	11.9	48.4	0.0	11.6	9	97530.1	54
141	11.2	49.3	0.0	11.0	9	97529.5	54
142	9.8	46.5	0.0	9.5	9	97529.1	54
143	11.8	48.2	0.0	11.5	9	97528.8	54
144	11.2	49.1	0.0	10.9	9	97528.9	54
145	12.6	47.8	0.0	12.3	9	97530.5	54
146	13.5	47.5	0.0	13.2	9	97530.2	56
147	13.4	47.5	0.0	13.1	9	97529.2	56
148	13.2	46.2	0.0	12.8	9	97528.6	56
149	12.1	47.0	0.0	11.9	9	97528.8	56
150	13.0	48.1	0.0	12.7	9	97529.0	56
151	12.4	46.4	0.0	12.1	9	97529.4	56
152	12.7	47.6	0.0	12.4	9	97530.2	56
153	14.2	49.7	0.0	13.8	9	97529.9	56
154	14.9	49.4	0.0	14.6	9	97529.9	56
155	13.0	49.3	0.0	12.7	9	97529.4	56
156	13.7	47.6	0.0	13.4	9	97529.9	56
157	14.1	46.4	0.0	13.8	9	97530.7	56
158	14.8	46.0	0.0	14.4	9	97530.4	55
159	14.8	45.5	0.0	14.5	9	97529.2	55
160	12.6	45.4	0.0	12.2	9	97528.9	55
161	14.5	46.0	0.0	14.2	9	97529.9	55
162	13.7	45.9	0.0	13.3	9	97529.6	55
163	13.1	45.5	0.0	12.8	9	97528.9	56
164	11.3	45.6	0.0	11.0	9	97529.0	56
165	11.1	46.5	0.0	10.9	9	97528.8	56
166	11.6	47.4	0.0	11.4	9	97528.6	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	11.6	47.1	0.0	11.3	9	97530.1	56
168	12.6	48.3	0.0	12.3	9	97530.4	56
169	16.4	48.1	0.0	16.0	9	97521.9	56
170	17.0	46.7	0.0	16.6	9	97504.9	56
171	16.1	47.7	0.0	15.7	9	97505.1	56
172	13.9	48.4	0.0	13.5	9	97504.8	56
173	12.5	48.5	0.0	12.2	9	97504.9	56
174	11.9	49.6	0.0	11.6	9	97504.1	56
175	12.3	49.0	0.0	12.0	9	97514.6	56
176	12.7	48.6	0.0	12.4	9	97529.3	56
177	10.4	50.5	0.0	10.1	9	97529.7	56
178	12.2	50.2	0.0	11.9	9	97530.9	56
179	15.2	50.0	0.0	14.9	9	97530.8	56
180	14.8	51.2	0.0	14.5	9	97530.9	56
181	14.4	50.4	0.0	14.1	9	97530.9	56
182	12.4	51.7	0.0	12.1	9	97530.8	56
183	12.9	51.7	0.0	12.6	9	97530.8	56
184	12.4	48.8	0.0	12.1	9	97530.9	56
185	13.0	49.0	0.0	12.7	9	97530.9	56
186	11.5	50.6	0.0	11.2	9	97530.6	56
187	12.3	49.7	0.0	12.1	9	97529.0	56
188	13.8	49.8	0.0	13.4	9	97528.9	56
189	13.9	51.0	0.0	13.6	9	97530.6	56
190	14.7	51.5	0.0	14.4	9	97530.9	56
191	16.6	49.7	0.0	16.2	9	97530.8	56
192	15.8	48.5	0.0	15.4	9	97529.8	56
193	15.4	49.0	0.0	15.0	8	97524.7	56
194	13.0	50.2	0.0	12.7	8	97516.8	56
195	13.2	50.5	0.0	12.9	8	97516.5	56
196	14.0	49.8	0.0	13.6	8	97517.8	56
197	13.3	51.0	0.0	13.0	8	97517.3	56
198	13.5	50.4	0.0	13.2	8	97516.8	56
199	10.6	50.6	0.0	10.4	8	97526.7	56
200	9.8	49.2	0.0	9.5	8	97544.0	57
201	11.6	49.1	0.0	11.3	8	97543.8	57
202	12.0	49.8	0.0	11.7	8	97544.1	57
203	13.0	49.2	0.0	12.7	8	97544.1	57
204	12.5	48.1	0.0	12.2	8	97544.1	57
205	10.9	49.2	0.0	10.7	8	97544.1	57
206	12.9	47.8	0.0	12.6	8	97544.2	57
207	13.9	46.7	0.0	13.6	8	97544.2	57
208	14.0	47.6	0.0	13.6	8	97543.9	57
209	11.7	48.2	0.0	11.4	8	97543.3	57
210	10.0	48.5	0.0	9.7	8	97544.2	57
211	12.1	47.8	0.0	11.8	8	97544.0	57
212	10.8	47.6	0.0	10.6	8	97544.2	58
213	11.3	48.6	0.0	11.1	8	97544.2	58
214	13.1	48.1	0.0	12.8	8	97543.2	58
215	11.0	48.2	0.0	10.7	8	97543.9	58
216	11.0	48.2	0.0	10.8	8	97544.3	58
217	11.4	47.8	0.0	11.1	8	97540.6	59
218	13.1	47.5	0.0	12.8	8	97531.3	62
219	11.1	46.2	0.0	10.9	8	97530.3	62
220	10.3	48.3	0.0	10.1	8	97530.4	62
221	11.7	48.9	0.0	11.4	8	97531.2	62
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Table E.02 Measurement data - Background

Project: Summerhaven Wind Energy Centre - Turbine T38 - IEC 61400-11 Measurement

Report ID: 13259.00.T38.RP1

Created on: 1/5/2018

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

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
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***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
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***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

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