ATTACHMNET 6.0

NOISE ENVIRONMENT CHAPTER

ATTACHMNET 6.1

SITE MAPS FOR NOISE ASSESSMENTS

Attachment 6.1.1: Noise Monitoring Locations Map

Notes

– Site Boundary

NM – Noise Monitoring Location

Project Title:

Noise Monitoring Location Map

Client Name:

TULLEKA TRADING LTD
GRAIGUE
BALLINAKILL
CO. LAOIS

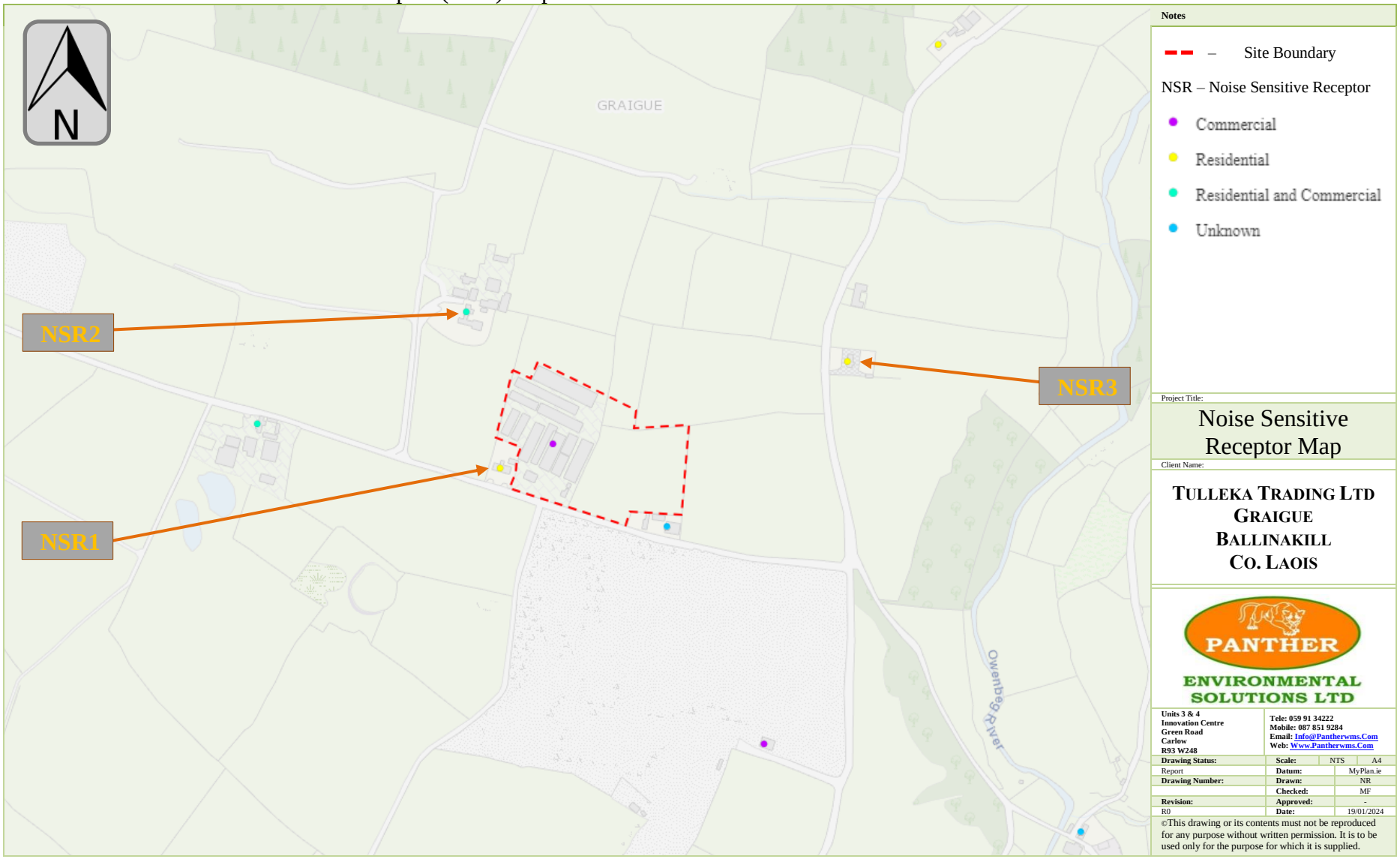
PANTHER ENVIRONMENTAL SOLUTIONS LTD

Units 3 & 4
Innovation Centre
Green Road
Carlow
R93 W248

Tele: 059 91 34222
Mobile: 087 851 9284
Email: Info@Pantherwms.Com
Web: Www.Pantherwms.Com

Drawing Status:	Scale:	NTS	A4
Report	Datum:	Apple Maps	
Drawing Number:	Drawn:	NR	
	Checked:	MF	
Revision:	Approved:	-	
R0	Date:	19/01/2024	

Attachment 6.1.2: Noise Sensitive Receptor (NSR) Map



Attachment 6.1.3: Proposed Operational Noise Source

Notes

– Existing Sheds
– Existing Vents
– Proposed Sheds
– Proposed Vents

Project Title:

Operational Noise Source Map

Client Name:

TULLEKA TRADING LTD
GRAIGUE
BALLINAKILL
CO. LAOIS

PANTHER ENVIRONMENTAL SOLUTIONS LTD

Units 3 & 4
Innovation Centre
Green Road
Carlow
R93 W248

Tele: 059 91 34222
Mobile: 087 851 9284
Email: Info@Pantherwms.Com
Web: Www.Pantherwms.Com

Drawing Status:	Scale:	NTS	A4
Report	Datum:	MyPlan.ie	
Drawing Number:	Drawn:	NR	
	Checked:	MF	
Revision:	Approved:	-	
R0	Date:	19/01/2024	

ATTACHMNET 6.2

CALIBRATION CERTIFICATES

CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research plc**

DATE OF ISSUE **04 October 2022** CERTIFICATE NUMBER **181033**

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Approved signatory
J.johnston
Electronically signed:

Sound Level Meter : IEC 61672-3:2013

Instrument information

Manufacturer:	Cirrus Research plc	Notes:
Model:	CR:171B	
Serial number:	G071199	
Class:	1	
Firmware version:	3.2.3197	

Test summary

Date of calibration: 04 October 2022

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.

The sound level meter submitted for testing successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Notes

CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research GmbH**

DATE OF ISSUE **09 August 2023** CERTIFICATE NUMBER **196955**

Cirrus Research GmbH
Arabella Center
Lyoner Strasse 44-48
D-60528 Frankfurt
Germany

Page 1 of 2

Approved signatory
M.Laakel
Electronically signed:

Sound Level Meter : IEC 61672-3:2006

Instrument information

Manufacturer:	Cirrus Research plc	Notes:
Model:	CR:831C	
Serial number:	D21509FF	
Class:	1	
Firmware version:	v04.00	

Test summary

Date of calibration: 09 August 2023

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
Periodic tests were performed in accordance with procedures from IEC 61672-3:2006.

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002 and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Notes

CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research plc**

DATE OF ISSUE **04 October 2022** CERTIFICATE NUMBER **181032**

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Test engineer:
D.Swalwell
Electronically signed:

Microphone

Microphone capsule

Manufacturer: Cirrus Research plc

Model: MK:224

Serial Number: 216368A

Calibration procedure

Open circuit: 51.1 mV/Pa

Sensitivity at 1 kHz: -25.8 dB rel 1 V/Pa

The microphone capsule detailed above has been calibrated to the published data as described in the operating manual of the associated sound level meter (where applicable).

The frequency response was measured using an electrostatic actuator in accordance with BS EN 61094-6:2005 with the free-field response derived via standard correction data traceable to a National Measurement Institute.

The absolute sensitivity at 1 kHz was measured using an acoustic calibrator conforming to IEC 60942:2003 Class 1.

Environmental conditions

Pressure: 101.20 kPa

Temperature: 21.0 °C

Humidity: 54.0 %

CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research GmbH

DATE OF ISSUE 08 August 2023 CERTIFICATE NUMBER 196816

Cirrus Research GmbH
Arabella Center
Lyoner Strasse 44-48
D-60528 Frankfurt
Germany

Page 1 of 2

Test engineer:
M.Laakel
Electronically signed:

Microphone

Microphone capsule

Manufacturer: Cirrus Research plc

Model: MK:224

Serial Number: 203215A

Calibration procedure

Date of calibration: 08 August 2023

Open circuit: 52.3 mV/Pa

Sensitivity at 1 kHz: -25.6 dB rel 1 V/Pa

The microphone capsule detailed above has been calibrated to the published data as described in the operating manual of the associated sound level meter (where applicable).

The frequency response was measured using an electrostatic actuator in accordance with BS EN 61094-6:2005 with the free-field response derived via standard correction data traceable to a National Measurement Institute.

The absolute sensitivity at 1 kHz was measured using an acoustic calibrator conforming to IEC 60942:2003 Class 1.

Environmental conditions

Pressure: 100.40 kPa

Temperature: 24.8 °C

Humidity: 37.8 %

CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research GmbH**

DATE OF ISSUE **09 August 2023** CERTIFICATE NUMBER **196888**

Cirrus Research GmbH
Arabella Center
Lyoner Strasse 44-48
D-60528 Frankfurt
Germany

Page 1 of 2

Approved signatory
M.Laakel
Electronically signed:

Sound Calibrator : IEC 60942:2003

Instrument information

Manufacturer: Cirrus Research plc **Notes:**
Model: CR:515
Serial number: 54060
Class: 1

Test summary

Date of calibration: 09 August 2023

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

As public evidence was available, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the Class 1 requirements of IEC 60942:2003.

The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC60942_2003 Annex A to Class 1. This has been confirmed by Laboratoire National d'Essais (LNE), APPLUS (APPLUS) and PhysikalischTechnische Bundesanstalt (PTB).

Notes:

ATTACHMNET 6.3

BS 5228 SOUND LEVEL DATA TABLE

Ref no.	Equipment	Power rating, kW	Equipment size, weight (mass), capacity	Octave band sound pressure levels at 10 m, Hz								A-weighted sound pressure level, $L_{Aeq,T}$ dB at 10 m	
				63	125	250	500	1k	2k	4k	8k		
Table C.2	**Sound level data on site preparation**												
	Clearing site												
7	Tracked excavator	69	14 t	74	70	68	67	64	62	58	50	70	
8	Wheeled backhoe loader	62	8 t	74	66	64	64	63	60	59	50	68	
	Loading lorries												
28	Wheeled loader	170	—	86	82	77	74	70	66	62	55	76	
	Distribution of material												
35	Telescopic handler	60	10 t	85	79	69	67	64	62	56	47	71	
	Rolling and compaction												
37	Roller (rolling fill) ⁎	145	18 t	72	75	81	78	74	70	63	55	79	⁎
Table C.4	**Sound level data on general site activities**												
	Distribution of materials												
4	Dumper ⁎	75	9 t	82	76	75	74	68	68	64	55	76	⁎
14	Wheeled backhoe loader	62	9 t	68	67	63	62	62	61	54	47	67	
	Mixing concrete												
18	Cement mixer truck (discharging)	—	—	80	69	66	70	71	69	64	58	75	
23	Small cement mixer	2	—	61	65	58	58	57	53	51	49	61	
	Lifting												
46	Mobile telescopic crane	240	50 t	78	69	67	64	62	57	49	40	67	
59	Diesel scissor lift	24	6 t	80	77	74	74	74	71	65	63	78	
93	Angle grinder (grinding steel)	2.3	4.7 kg	57	51	52	60	70	77	73	73	80	

ATTACHMNET 6.4

NOISE SURVEY PHOTO LOG

Figure E.1: Baseline Monitoring Location No.1

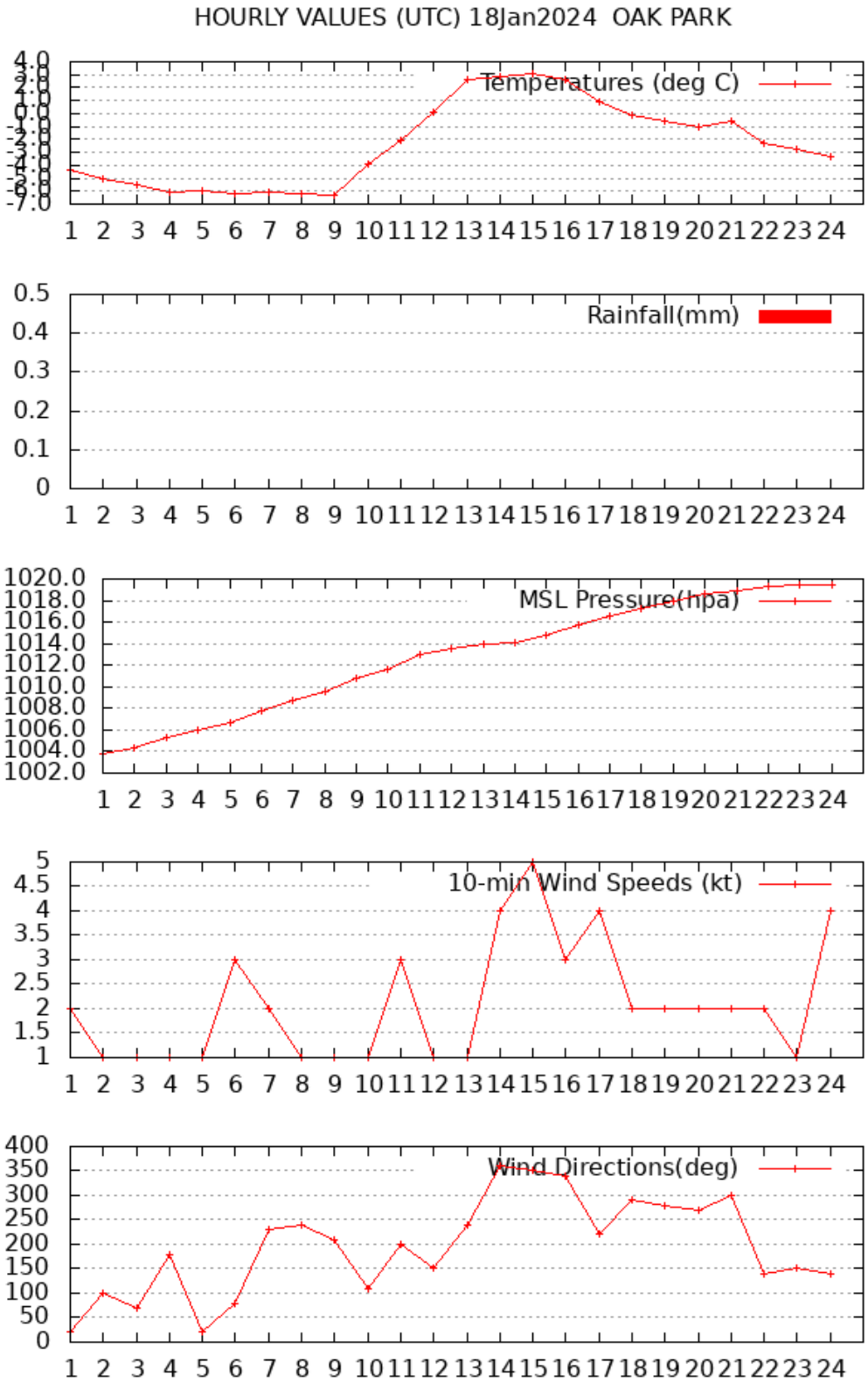
Figure E.2: Baseline Monitoring Location No.2

Figure E.3: Baseline Monitoring Location No.3

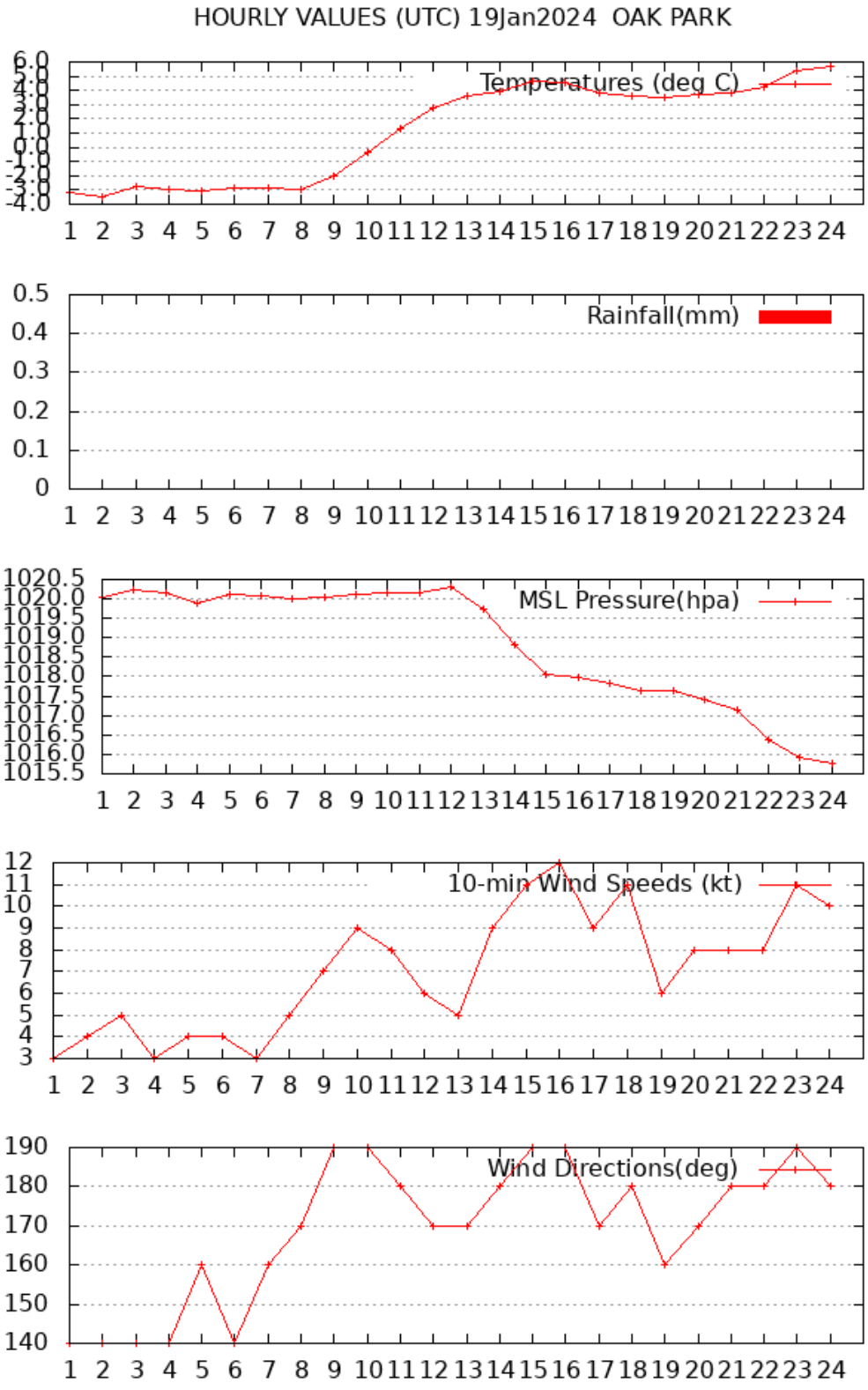
ATTACHMNET 6.5

METEOROLOGICAL CONDITIONS

Date	Rainfall (mm)	Max Temp (°C)	Min Temp (°C)	Grass Min Temp (°C)	Mean Wind Speed (knots)
18/01/2024	0.0	3.9	-6.5	-13.3	1.9

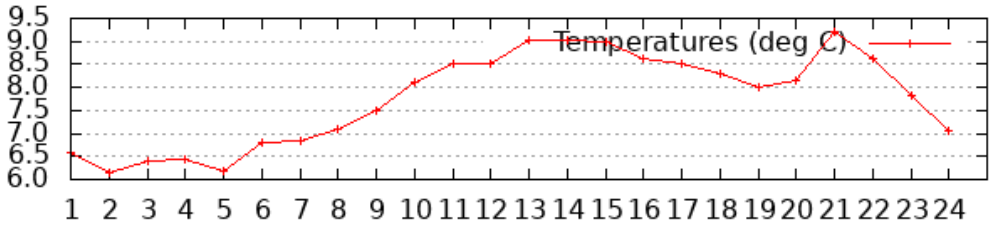


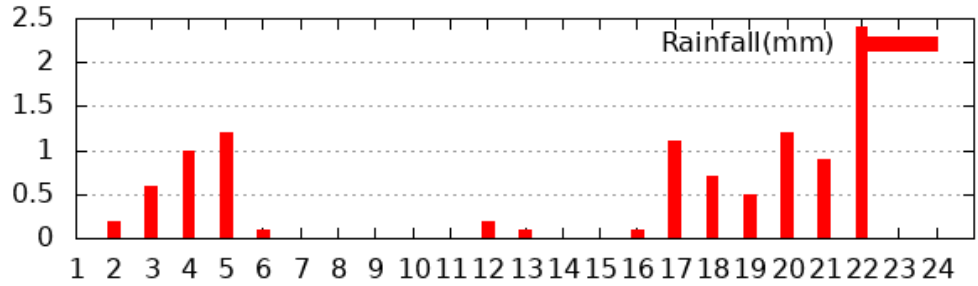
Date	Rainfall (mm)	Max Temp (°C)	Min Temp (°C)	Grass Min Temp (°C)	Mean Wind Speed (knots)
19/01/2024	0.0	5.7	-3.8	-10.6	6.8

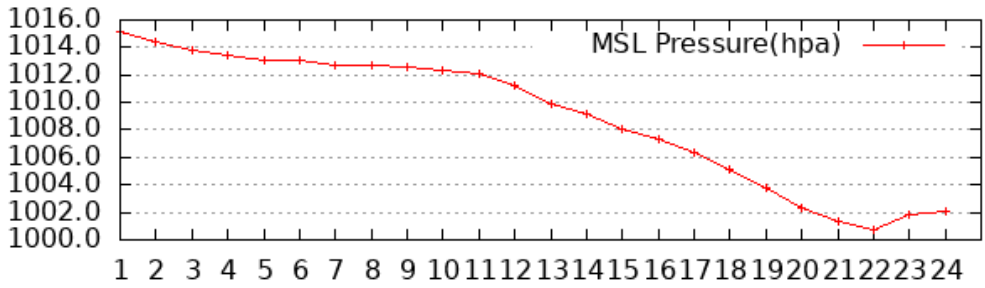


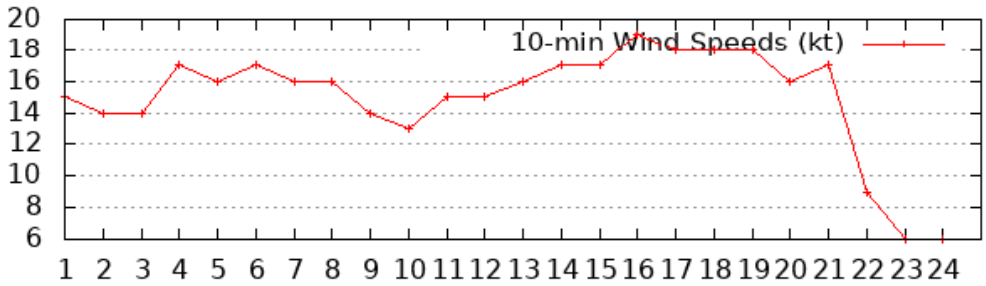
Date	Rainfall (mm)	Max Temp (°C)	Min Temp (°C)	Grass Min Temp (°C)	Mean Wind Speed (knots)
20/01/2024	10.3	9.3	5.7	3.4	15.5

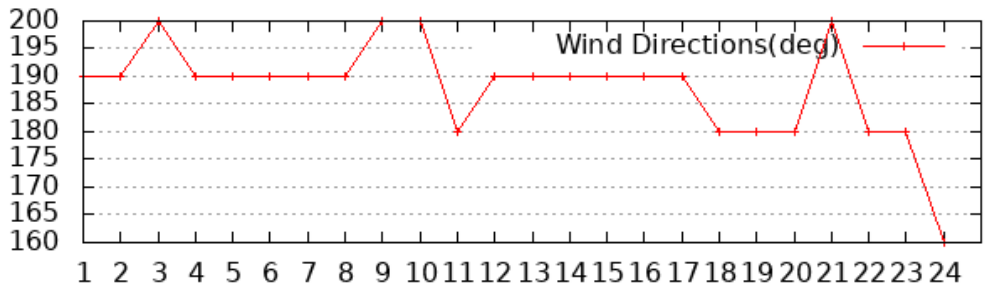
HOURLY VALUES (UTC) 20Jan2024 OAK PARK









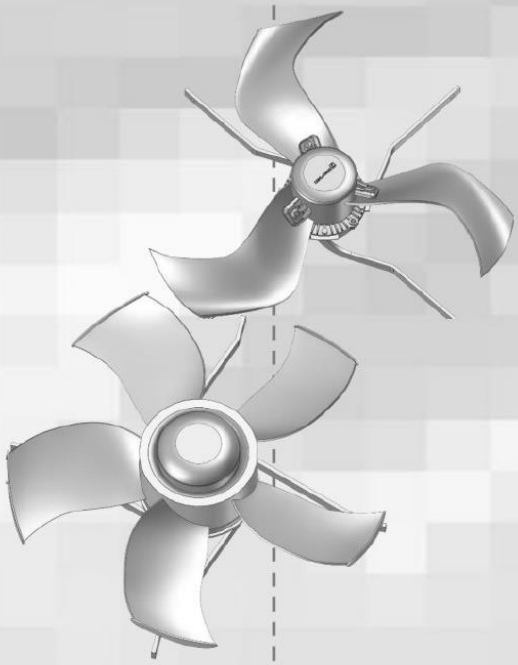


ATTACHMNET 6.6

EXTRACTION FAN DATA SHEET

Fans

Technical Info



2019.02.15 • 604061

SKOV

3.3 DA 600

Fan type	445085 DA 600-7F	445090 DA 600-7
Electric		
Rated voltage [V AC]	1x230 ± 10 %	3x400 ± 10 %
Operational voltage [V AC]	207 - 253	380 - 415
Frequency [Hz]	50	50
Max. power consumption [A]	4.5	2.01
Power consumption at [A] - 40Pa	4.1	1.9
Power [W]	730	720
Earth leak circuit breaker	To be installed in accordance with applicable laws and standards. RCCB 300 mA (type B) is applicable in front of the power supply to DOL 38-2 regulated fans.	-
Leak current to earth	Max. 2.5 mA. Pay attention to other leak current sources in the house.	-
Adjustment ability	Frequency	ON/OFF
Motor protection	DOL 38-2	TP 211
Motor relay	DOL 38-2	1.6-2.5 A
Mechanic		
Cable length [m]	1.5	1.5
Min. duct diameter [mm]	636	636
Blade diameter [mm]	625	625
Number of blades [pcs.]	3	3
Vingehældning [°]	Periferi 25 Nav 45	Periferi 25 Nav 45
Fan output		
Revolutions [per minute] (mark)	1,390-1,410	1,390-1,410
Air output [m^3/h] (at –10 Pa)	15,900	17,000
Air output [m^3/h] (at –20 Pa)	15,600	16,700
Air output [m^3/h] (at –30 Pa)	15,200	16,400
Air output [m^3/h] (at –40 Pa)	15,000	16,100
Air output [m^3/h] (at –50 Pa)	14,700	15,900
Power consumption [W] (at -10 Pa)	874	827
Specific output [m^3/kWh] (at -10 Pa)	18,200	19.800
Specific energy [Watt/1000 m^3/h] (at -10 Pa)	55	51
Test authorities	SKOV A/S	Bygholm, AAU
Environment		
Fan noise, outside [dB (A)] (2m, 45 degrees)	71	71

SKOV
Fans

3.3.1 ErP/Ecodesign

Fan type	445085 DA 600-7F	445090 DA 600-7
Ecodesign	ErP 2015(N58)	ErP 2015(N58)
Efficiency classification [N]	59.5	62.8
Efficiency (η) [%]	48.8	59.5
Measurement category	D	D
Efficiency category	Total	Total
Optimum efficiency [%]	51.6	51.7
VSD required	Yes	No
Year of manufacture	2012	2012
Manufacturer's name	SKOV A/S	SKOV A/S
Product's model number	445085	445090
Motor power input [kW]	0.978	1,014
Flow rate [m^3/s]	3.35	4.19
Optimum pressure [Pa]	100	70
Total pressure [Pa]	142	137
Rotations per minute [RPM]	1,325	1,396
Specific ratio	1.0	1.0
Recycling/disposal	The product is designed for recycling and it will be possible for customers to deliver worn-out product to SKOV A/S or to local collection sites/recycling stations according to local instructions	
Impact on environment	-	-
Additional items used when determining the fan energy efficiency	Bell mouth, shutter, air direction plate, 0.5m DA 600 duct and outlet cone.	

SKOV
Fans

ATTACHMNET 6.7

NOISE ASSESSMENT TABLES

Baseline Noise Monitoring Summary Table – Daytime

Ref.	Time	LAeq	LA_{10}	LA_{90}	LAF_{max}	Background Noise Sources
NM1	19/01/2024 10:24	49	53	41	72	• Intermittent local traffic (x6) • Intermittent distant traffic noise • Continuous /Low bird song • Continuous/ Low fan type noise from the existing farm • Intermittent/Low speaking from staff • Intermittent/Moderate traffic entering / exiting the site (x5) • Intermittent distant dog barking
	19/01/2024 12:00	59	62	44	86	
	19/01/2024 12:35	51	54	44	78	
NM2	19/01/2024 09:47	46	49	37	63	• Continuous /Moderate bird song • Intermittent local traffic (x3) • Intermittent/Low engine and reverse signal noise from farm, • Continuous/Low motor noise from quarry/ cement site • Intermittent distant dog barking
	19/01/2024 11:18	47	43	38	77	
	19/01/2024 11:54	44	46	40	58	
NM3	19/01/2024 10:05	52	53	50	66	• Continuous /Moderate bird song • Intermittent local traffic (x6) • Intermittent/Low reverse signal noise from farm, • Intermittent distant dog barking
	19/01/2024 10:36	60	48	40	87	
	19/01/2024 12:36	56	45	38	87	

Baseline Noise Monitoring Summary Table – Evening

Ref.	Time	LAeq	LA_{10}	LA_{90}	LAF_{max}	Background Noise Sources
NM1	18/01/2024 22:22	41	32	27	71	• Intermittent/Moderate local traffic (x1) • Icy roads and v. low temperatures reducing traffic and speeds • Intermittent/Faint distant traffic in surround roads • Continuous/Very Low fan type noise from the existing farm
NM2	18/01/2024 21:48	34	36	27	55	• Intermittent local traffic (x1) • Icy roads and v. low temperatures reducing traffic and speeds • Intermittent/Faint distant traffic in surround roads • Intermittent dog barking
NM3	18/01/2024 22:19	48	45	37	78	• Intermittent local traffic (x1) • Icy roads and v. low temperatures reducing traffic and speeds • Intermittent/Faint distant traffic in surround roads • Intermittent dog barking

Baseline Noise Monitoring Summary Table – Night-Time

Ref.	Time	LAeq	LA_{10}	LA_{90}	LAF_{max}	Background Noise Sources
NM1	18/01/2024 23:38	39	34	28	64	• Intermittent/Moderate local traffic (x1) • Icy roads and v. low temperatures reducing traffic and speeds • Intermittent/Faint distant traffic in surround roads • Continuous/Very Low fan type noise from the existing farm • Second recording was on the following night in mild conditions, intermittent breezes and passing traffic.
	20/01/2024 00:07	53	56	45	61	
NM2	18/01/2024 23:04	40	33	26	66	• Intermittent local traffic (x1) • Icy roads and v. low temperatures reducing traffic and speeds • Intermittent/Faint distant traffic in surround roads • Intermittent dog barking • Second recording was on the following night in mild conditions, intermittent breezes and passing traffic.
	19/01/2024 23:34	49	52	42	62	
NM3	19/01/2024 00:19	30	28	22	65	• Intermittent local traffic (x1) • Icy roads and v. low temperatures reducing traffic and speeds • Intermittent/Faint distant traffic in surround roads • Intermittent dog barking • Second recording was on the following night in mild conditions, intermittent breezes and passing traffic.
	19/01/2024 23:00	48	46	37	76	

Predictive Noise – Construction Phase

In order to determine the potential impact of noise from the proposed development during the construction phase, the resultant noise levels at the three defined noise sensitive receptors have been calculated, based on distance from the NSR to the closest area with the potential to contain construction plant operations.

A source noise level of 102 dB has been utilized to represent *Phases 2* of construction, as outlined in Section 6.3.1 above.

Receptor			Construction Source				Divergence		LAeq (dB)
Ref_R	**X_R**	**Y_R**	**Ref_S**	**X_S**	**Y_S**	**L_S (dB)**	**Dist (m)**	**A_{div} (dB)**	
NSR1	615509	5862230	C1	615611	5862209	102	104	40	62
NSR2	615473	5862410	C2	615644	5862278	102	216	47	55
NSR3	615942	5862371	C3	615733	5862277	102	229	47	55

$\text{Dist} = \sqrt{(X_R - X_S)^2 + (Y_R - Y_S)^2}$ when S = source & R = receptor

$A_{div} = 20.\text{Log}\left(\frac{\text{dist}}{\text{do}}\right)$ when Adiv = noise reduction with distance
d_o = 1m

$LAeq = L_S - A_{div}$ when L_S = source noise level

Predictive Noise – Operational Phase

In order to determine the potential impact of noise from the proposed development during the operational phase, the resultant noise levels at the three defined noise sensitive receptors have been calculated, based on distance from the NSR's to each of the 125 individual noise sources in the form of rooftop vents and an individual level of 77 dB as per Section 6.3.2. Table 7.7 outlines this calculation for NSR1 only.

Operational Noise Attenuation Calculation – NSR1								
Source				Receptor NSR1		Divergence		L_R (dB)
Ref.	X_S	Y_S	L_S (dB)	X_R	Y_R	Dist (m)	A_{div} (dB)	
B1.1	615555	5862347	77	615509	5862230	126	42	35
B1.2	615567	5862342				126	42	35
B1.3	615580	5862337				128	42	35
B1.4	615593	5862332				132	42	35
B1.5	615607	5862324				136	43	34
B1.6	615614	5862321				139	43	34
B2.1	615526	5862337				108	41	36
B2.2	615535	5862334				107	41	36
B2.3	615544	5862330				106	41	36
B2.4	615551	5862327				106	40	37
B2.5	615559	5862324				106	41	36
B2.6	615566	5862321				107	41	36
B2.7	615575	5862316				108	41	36
B2.8	615583	5862313				111	41	36
B2.9	615591	5862309				114	41	36
B2.10	615598	5862306				117	41	36
B3.1	615520	5862322				93	39	38
B3.2	615524	5862320				91	39	38
B3.3	615529	5862318				90	39	38

Operational Noise Attenuation Calculation – NSR1								
Source				Receptor NSR1		Divergence		L_R (dB)
Ref.	X_S	Y_S	L_S (dB)	X_R	Y_R	Dist (m)	A_{div} (dB)	
B3.4	615538	5862314				89	39	38
B3.5	615546	5862310				88	39	38
B4.1	615561	5862305				91	39	38
B4.2	615567	5862302				92	39	38
B4.3	615579	5862297				97	40	37
B4.4	615585	5862294				99	40	37
B4.5	615598	5862289				107	41	36
B4.6	615603	5862287				110	41	36
B5.1	615512	5862277				47	33	44
B5.2	615514	5862281				51	34	43
B5.3	615516	5862286				56	35	42
B5.4	615518	5862291				62	36	41
B5.5	615520	5862296				67	37	40
B5.6	615523	5862301	77	615509	5862230	72	37	40
B6.1	615522	5862270				42	32	45
B6.2	615524	5862275				47	34	43
B6.3	615526	5862280				53	34	43
B6.4	615529	5862285				59	35	42
B6.5	615531	5862290				64	36	41
B6.6	615533	5862295				69	37	40
B7.1	615541	5862241				34	31	46
B7.2	615543	5862247				38	32	45
B7.3	615546	5862253				44	33	44
B7.4	615549	5862259				49	34	43

Operational Noise Attenuation Calculation – NSR1								
Source				Receptor NSR1		Divergence		L_R (dB)
Ref.	X_S	Y_S	L_S (dB)	X_R	Y_R	Dist (m)	A_{div} (dB)	
B7.5	615551	5862264				54	35	42
B7.6	615554	5862269				60	35	42
B7.7	615556	5862274				64	36	41
B7.8	615559	5862280				71	37	40
B8.1	615548	5862242				41	32	45
B8.2	615550	5862247				44	33	44
B8.3	615552	5862247				46	33	44
B8.4	615551	5862252				47	34	43
B8.5	615553	5862251				49	34	43
B8.6	615556	5862257				54	35	42
B8.7	615558	5862263				59	35	42
B8.8	615559	5862262				59	35	42
B8.9	615562	5862270				66	36	41
B8.10	615565	5862275				72	37	40
B9.1	615560	5862236				51	34	43
B9.2	615562	5862235	77	615509	5862230	53	35	42
B9.3	615564	5862245				57	35	42
B9.4	615566	5862244				59	35	42
B9.5	615570	5862255				66	36	41
B9.6	615572	5862254				67	37	40
B9.7	615575	5862267				76	38	39
B9.8	615577	5862266				77	38	39
B10.1	615581	5862243				73	37	40
B10.2	615575	5862231				66	36	41

Operational Noise Attenuation Calculation – NSR1								
Source				Receptor NSR1		Divergence		L_R (dB)
Ref.	X_S	Y_S	L_S (dB)	X_R	Y_R	Dist (m)	A_{div} (dB)	
B10.3	615581	5862236				72	37	40
B11.1	615595	5862270				95	40	37
B11.2	615591	5862262				88	39	38
B11.3	615587	5862254				82	38	39
B12.1	615592	5862219				84	38	39
B12.2	615594	5862223				85	39	38
B12.3	615595	5862226				86	39	38
B12.4	615597	5862229				88	39	38
B12.5	615599	5862232				90	39	38
B12.6	615602	5862239				93	39	38
B12.7	615603	5862242				95	40	37
B12.8	615605	5862245				97	40	37
B12.9	615606	5862248				99	40	37
B12.10	615609	5862255				103	40	37
B12.11	615610	5862258				105	40	37
B12.12	615612	5862261				108	41	36
B12.13	615613	5862263				109	41	36
B13.1	615538	5862223				30	29	48
B13.2	615543	5862221	77	615509	5862230	35	31	46
B13.3	615547	5862220				39	32	45
B14.1	615623.2	5862230				114	41	36
B14.2	615625	5862235				116	41	36
B14.3	615627.5	5862239				119	41	36
B14.4	615629.5	5862245				121	42	35

Operational Noise Attenuation Calculation – NSR1								
Source				Receptor NSR1		Divergence		L_R (dB)
Ref.	X_S	Y_S	L_S (dB)	X_R	Y_R	Dist (m)	A_{div} (dB)	
B14.5	615631.7	5862249				124	42	35
B14.6	615634	5862255				127	42	35
B14.7	615636.6	5862260				131	42	35
B14.8	615639	5862266				135	43	34
B15.1	615639	5862222				130	42	35
B15.2	615641	5862227				132	42	35
B15.3	615643.5	5862232				135	43	34
B15.4	615646.1	5862239				137	43	34
B15.5	615648.2	5862243				140	43	34
B15.6	615650.7	5862249				143	43	34
B15.7	615652.8	5862254				146	43	34
B15.8	615655.3	5862259				149	43	34
B16.1	615655.9	5862217				147	43	34
B16.2	615656.7	5862221				148	43	34
B16.3	615659.8	5862227				151	44	33
B16.4	615662.3	5862233				153	44	33
B16.5	615664.6	5862238				156	44	33
B16.6	615667.5	5862244				159	44	33
B16.7	615669.8	5862249	77	615509	5862230	162	44	33
B16.8	615671.8	5862254				165	44	33
B17.1	615670.7	5862209				163	44	33
B17.2	615672.9	5862214				165	44	33
B17.3	615674.8	5862218				166	44	33
B17.4	615677.3	5862224				168	45	32

Operational Noise Attenuation Calculation – NSR1								
Source				Receptor NSR1		Divergence		L_R (dB)
Ref.	X_S	Y_S	L_S (dB)	X_R	Y_R	Dist (m)	A_{div} (dB)	
B17.5	615679.6	5862229				171	45	32
B17.6	615681.3	5862234				172	45	32
B17.7	615683.5	5862240				175	45	32
B17.8	615686.4	5862246				178	45	32
B18.1	615617	5862211				110	41	36
B18.2	615639.2	5862205				133	42	35
B18.3	615661.5	5862197				156	44	33
B18.4	615610.3	5862194				108	41	36
B18.5	615631.9	5862187				130	42	35
B18.6	615655.6	5862181				155	44	33
Total LAeq at NSR1								**61**

$\text{Dist} = \sqrt{(X_R - X_S)^2 + (Y_R - Y_S)^2}$ when S = source & R = receptor

$A_{div} = 20.\text{Log}\left(\frac{\text{dist}}{\text{do}}\right)$ when A_{div} = noise reduction with distance
d_o = 1m

$L_R = L_S - A_{div}$ when L_S = source noise level at 1m &
L_R = individual noise level at receptor

$\text{Total LAeq} = 10.\text{Log} \sum_{i=1}^{n} 10^{LR/10}$ when L_R = individual noise level at receptor