KEADBY
NEXT GENERATION
POWER STATION
Hydrogen-enabled flexible power

Keadby Next Generation Power Station

Environmental Permit Application

Appendix I – Noise Impact Assessment

The Environmental Permitting (England and Wales) Regulations 2016

Applicant: Keadby Next Generation Limited

Date: October 2025

Document Version Control

Version	Date	Author	Approver	Changes
Draft	29/09/25	Matthew Griffin	David Hiller	
Final	29/10/2025	David Hiller	Helen Watson	Updated with SSE comments

GLOSSARY

Abbreviation	Description
AGI	Above Ground Installation
AMIOA	Associate Member of the Institute of Acoustics
CCGT	Combined-Cycle Gas Turbine
CCS	Carbon Capture and Storage
DCO	Development Consent Order
EA	Environmental Agency
ES	Environmental Statement
HRSG	Heat Recovery Steam Generator
$L_{Aeq,Tr}$	Equivalent continuous A-weighted sound pressure level from a specific source over a reference time interval Tr
$L_{A90,T}$	A-weighted background sound level exceeded 90% of a given time interval, T
$L_{Ar,Tr}$	Rating level – the A-weighted specific sound level plus adjustments for characteristic features of noise over a specified time period Tr
$L_{A,max}$	Maximum A-weighted sound pressure level recorded over a time period
MIOA	Member of the Institute of Acoustics
NIA	Noise Impact Assessment
NSR	Noise Sensitive Receptor
OEM	Original Equipment Manufacturer
SLM	Sound Level Meter

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TABLES

1. Synopsis

Arup has been commissioned by SSE to undertake a Noise Impact Assessment (NIA) to support the Environmental Permit application for the Keadby Next Generation Power Station (the 'Proposed Installation').

As detailed in the Main Supporting Document, the Proposed Installation is an alternative to the already permitted Keadby 3 Carbon Capture and Storage (CCS) Power Station, the operation of which has been included in the existing Keadby Power Station Environmental Permit (EPR/YP3133LL/V013) and would be located on the same plot of land.

An environmental sound survey was undertaken by AECOM in May 2023 to inform the DCO application for Keadby 3 CCS Power Station. As this is a recent environmental noise survey for the same location as the Proposed Installation, this has been used to support this Environmental Permit application. The survey aimed to capture the site's prevailing conditions and set noise thresholds at the closest sensitive receptors in line with BS 7445-1:2003 *Description and measurement of environmental noise - Guide to quantities and procedures* and BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*. The survey methodology was discussed and agreed with an Environmental Protection Officer at North Lincolnshire Council (the relevant planning authority).

To assess the noise impacts from operation of the Proposed Installation, a three-dimensional noise model has been constructed using proprietary software to assess the noise sources with the potential to cause adverse impacts. The assessment was undertaken following *EA Guidance – Noise and vibration management: environmental permits* and other best practice guidance. It concluded that, with the implementation of suitable mitigation, as detailed in the report, noise impacts at the closest noise sensitive receptors would be low.

Mitigation measures include selection of equipment with lowest practicable noise emission; design of building envelopes with appropriate sound insulation performance; provision of acoustic louvres for the building openings which face the closest receptors; and acoustic enclosures.

The Proposed Installation would be in an existing and former industrial area and so there would be no change to the soundscape character as a result of the development.

2. Introduction

This Noise Impact Assessment (NIA) is part of a suite of documents submitted to the Environmental Agency (EA) in support of an application by Keadby Next Generation Limited (the Applicant) for an Environmental Permit.

The Proposed Installation is a high-efficiency CCGT electricity generating station with an electrical output of up to 910MWe, designed to run on 100% hydrogen and capable of operating on 100% natural gas from the start of operations. When hydrogen becomes available and operation with hydrogen firing is commercially viable, the Proposed Installation will be upgraded to operate on a blend of natural gas and hydrogen or 100% hydrogen.

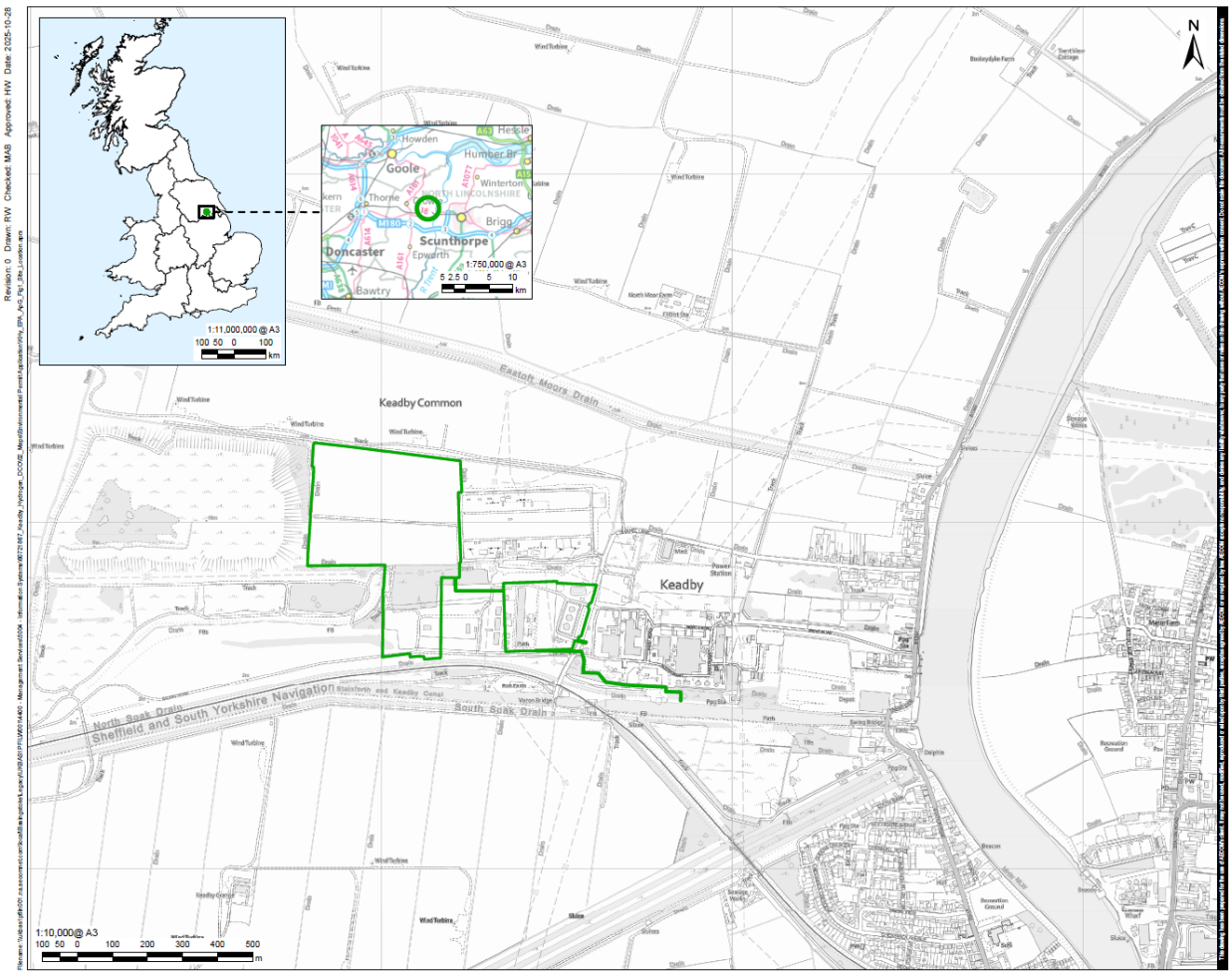
The Site is located to the north-west of Keadby 2 Power Station on the wider Keadby Power Station site, encompassing an area of approximately 15 hectares (ha) (see Figure 1).

The CCGT will includes turbines, boilers, exhaust gas treatment, stack(s), ancillary plant, and cooling infrastructure. Additionally, overhead electricity transmission lines are present within the vicinity passing over a swathe of unmanaged semi-improved grassland and pockets of scattered scrub. Additional administrative buildings would also be present on the Site.

The Proposed Installation is planned to operate 24 hours a day, seven days a week. Any heavy goods vehicles (HGV) associated with material deliveries would be limited to daytime. There will be maintenance works and provision for emergency operation for some plant items.

As detailed in the Main Supporting Document, the Proposed Installation is an alternative to the already permitted Keadby 3 Carbon Capture and Storage (CCS) Power Station, the operation of which has been included in the existing Keadby Power Station Environmental Permit (EPR/YP3133LL/V013) and would be located on the same plot of land.

Figure 1: Location of the Installation



3. Assessment Location

The Proposed Installation site is located adjacent to the existing Keadby Power Station Site in Keadby, Scunthorpe; to the north-west of the existing Keadby 1 and Keadby 2 Power Stations. The village of Keadby is the nearest settlement which lies approximately 1km southeast of the Installation Boundary at its closest point. The Proposed Installation is bounded to the north by agricultural land, which includes Keadby Wind Farm. Immediately to the west exists a steep ridge associated with the former Keadby Ash Tip, beyond which is farmland and the settlement of Ealand approximately 3.5km from the Site. The River Trent is to the east of the Site, with the settlement of Gunness approximately 1.5km from the site. Immediately to the south of the site is industrial land of the wider power station site with farmland, including a wind farm, a railway and various watercourses.

The nearest residential receptors to the Proposed Installation are the dwellings adjacent to Vazon Bridge, approximately 700m away from Proposed Installation Site Boundary. The ground between the Proposed Installation and the receiver consists of a mix of rough vegetation and former industrial areas. The receptors are at a slightly higher elevation than the Proposed Installation Site.

The soundscape around the Proposed Installation is dominated by the existing Keadby Power Station, with local roads and birdsong becoming more dominant towards Keadby village.

The assessment locations (Noise Sensitive Receptors (NSR)) selected for the NIA were agreed with the local authority for use in the Environmental Statement prepared for the Development Consent Order Planning application. These locations are presented in Figure 2 and described in Table 1. These assessment locations are representative of the closest residential receptors. Photographs of the locations and details of the environmental sound level survey are presented in Annex A.

Figure 2: Noise Sensitive Receptor Assessment Locations

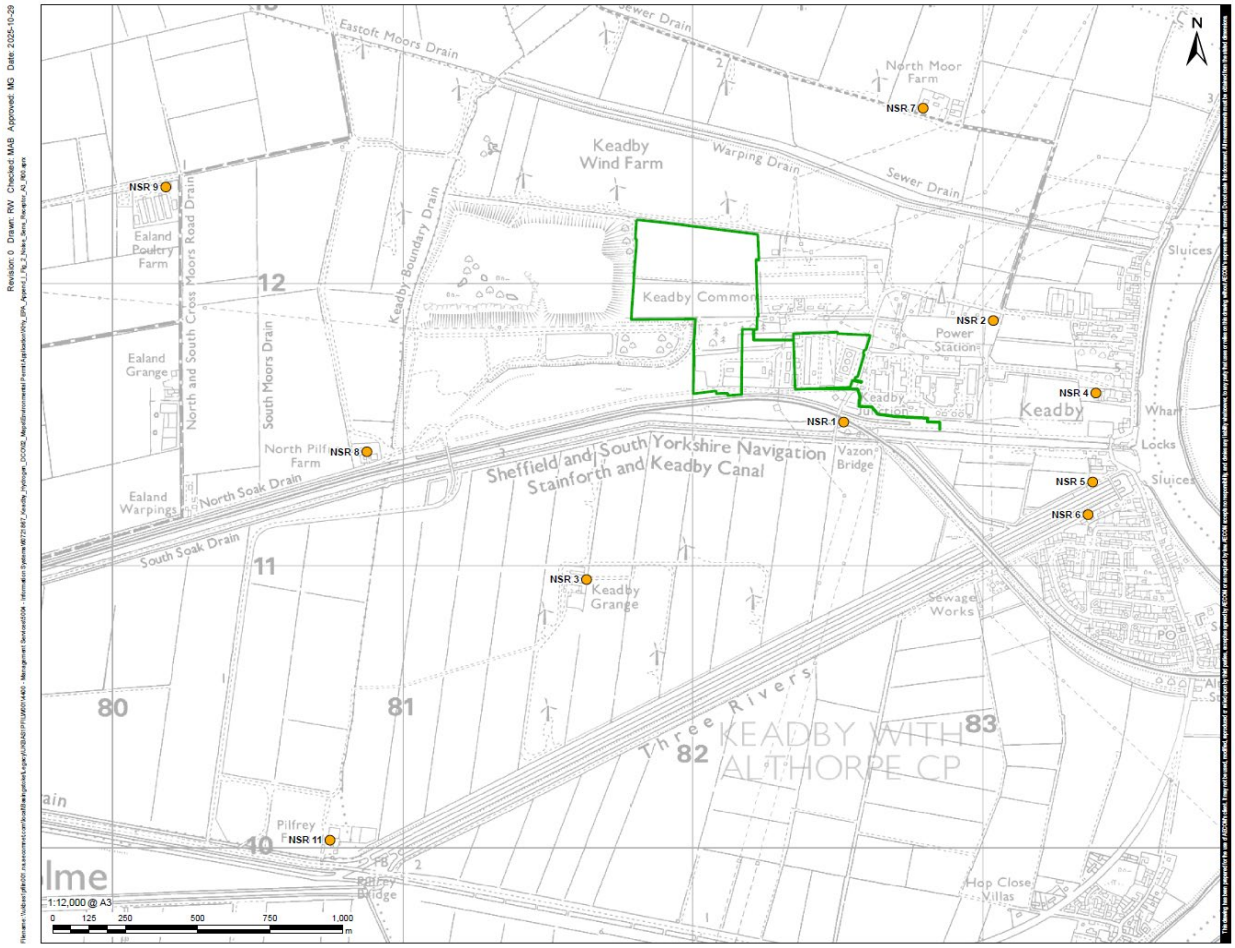


Table 1: Description of Assessment Locations and Baseline Survey Dates

NSR Reference	Address	Coordinates British National Grid		Measurement Dates and Times
		X	Y	
NSR 1	Vazon Bridge, Pasture Lane, Keadby, Scunthorpe, England, DN17 3ER, United Kingdom	482520	411510	11/05/2023 11:20 to 18/05/2023 13:39
NSR 2	Hawthorne House, Chapel Lane, Keadby, Scunthorpe, England, DN17 3EN, United Kingdom	483059	411869	11/05/2023 10:34 to 18/05/2023 09:52
NSR 3	76, Chapel Lane, Keadby, Scunthorpe, England, DN17 3EL, United Kingdom (Keadby Village)	483223	411892	11/05/2023 10:05 to 18/05/2023 13:57
NSR 4	Mariners Arms Flats, Keadby, Scunthorpe, England, DN17 3EH, United Kingdom (Mariners Arms Flats)	483391	411613	11/05/2023 10:47 to 18/05/2023 11:05
NSR 6	9 Queens Crescent, Keadby, Scunthorpe, England, DN17 3DJ, United Kingdom	483200	411078	11/05/2023 11:31 to 18/05/2023 11:34
NSR 8	North Pilfrey Farm, Crowle, Scunthorpe, England, DN17 4DG, United Kingdom	480862	411425	11/05/2023 13:06 to 18/05/2023 13:00
NSR 9	Ealand Poultry Farm, Keadby, Scunthorpe, England, DN17 4JE, United Kingdom	480224	411592	11/05/2023 13:42 to 18/05/2023 12:40
NSR 11	South Pilfrey Farm, Keadby, Scunthorpe, England, DN17 3HZ, United Kingdom	480776	410004	11/05/2023 10:00 to 18/05/2023 10:39
NSR 5, 7, 10 and 12 from the survey have been excluded from this assessment as NSR 7 and NSR 10 are no longer in residential use; and NSR 5 and 12 were close to and therefore considered adequately represented by NSR 4.				

4. Equipment and Meteorology

The environmental sound level survey was undertaken by Samuel Ellwood (BSc, MIOA) and Patrick Wood Martinez (BEng, MEng, AMIOA) from 11 to 18 May 2023, in line with BS 7445-1:2003 *Description and measurement of environmental noise - Guide to quantities and procedures* and according to the principles of BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*. The sound level meters (SLMs) were all positioned in free-field conditions, approximately 1.2-1.5m above the local ground. Full details of the environmental sound level survey are presented in Annex A.

The SLMs, microphones and sound pressure level calibrators used were Class 1 instruments, conforming to BS EN 61672-1:2013 *Electroacoustics. Sound level meters - Specifications*. The instrumentation has traceable calibration to national and internation standards, undertaken by an accredited calibration laboratory. Calibration certificates are provided in Annex C.

The SLMs and related noise monitoring instrumentation used to undertake the survey are described in Table 2.

Table 2: Equipment used for Environmental Sound Survey

Description	Serial Number	Item Type	Calibration due date
Rion NL-52	00386762	Sound level meter	12 August 2023
Rion NL-52	00620880	Sound level meter	29 March 2024
Rion NL-52	00821105	Sound level meter	6 January 2024
Rion NL-52	00710387	Sound level meter	11 October 2022*
Rion NL-52	00743081	Sound level meter	16 May 2023*
Rion NL-52	00386763	Sound level meter	13 May 2023
Rion NL-52	01143558	Sound level meter	1 December 2023
Rion NL-52	01121402	Sound level meter	27 October 2023
Bruel & Kjaer 4231	2217877	Calibrator	11 August 2022*
Bruel & Kjaer 4231	3005464	Calibrator	9 December 2022*
*These items were used for the survey either partially or entirely after their calibration due dates. They have been used to inform this assessment as they were acquired and used for the previous Keadby 3 Low Carbon Power Station (on the same site) for which development consent was granted.			

The calibration of the SLMs was checked before and after each series of measurements. No significant drift was recorded when performing calibration checks in the field[1].

A weather station (RS Hydro) was used at NSR 3 to record meteorological data throughout the duration of the survey. Due to a period of rain from 14:30 to 17:00 on the 11 May 2023 sound level data was excluded from the analysis. In addition, data from 15 minute periods from 21:15 on 15 May 2023 and 16:45 and 18:45 on 16 May 2023 have also been excluded due to rain.

The wind direction was mainly from the south-west with additional periods from the north-north-east, for approximately one day from the evening of 13 May and approximately one day from the evening of 17 May.

The raw data from the SLMs was exported and processed using Microsoft Excel to calculate appropriate background sound levels for analysis.

[1] The Keadby 3 Low Carbon Power Station Sound Monitoring report states only that the calibration was “checked in the field before and after conducting measurements. No significant drift was recorded”. The data from the calibration checks are not reported.

5. Methodology

The assessment of potential noise impacts associated with operation of the Proposed Installation has been undertaken in line with BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound.*

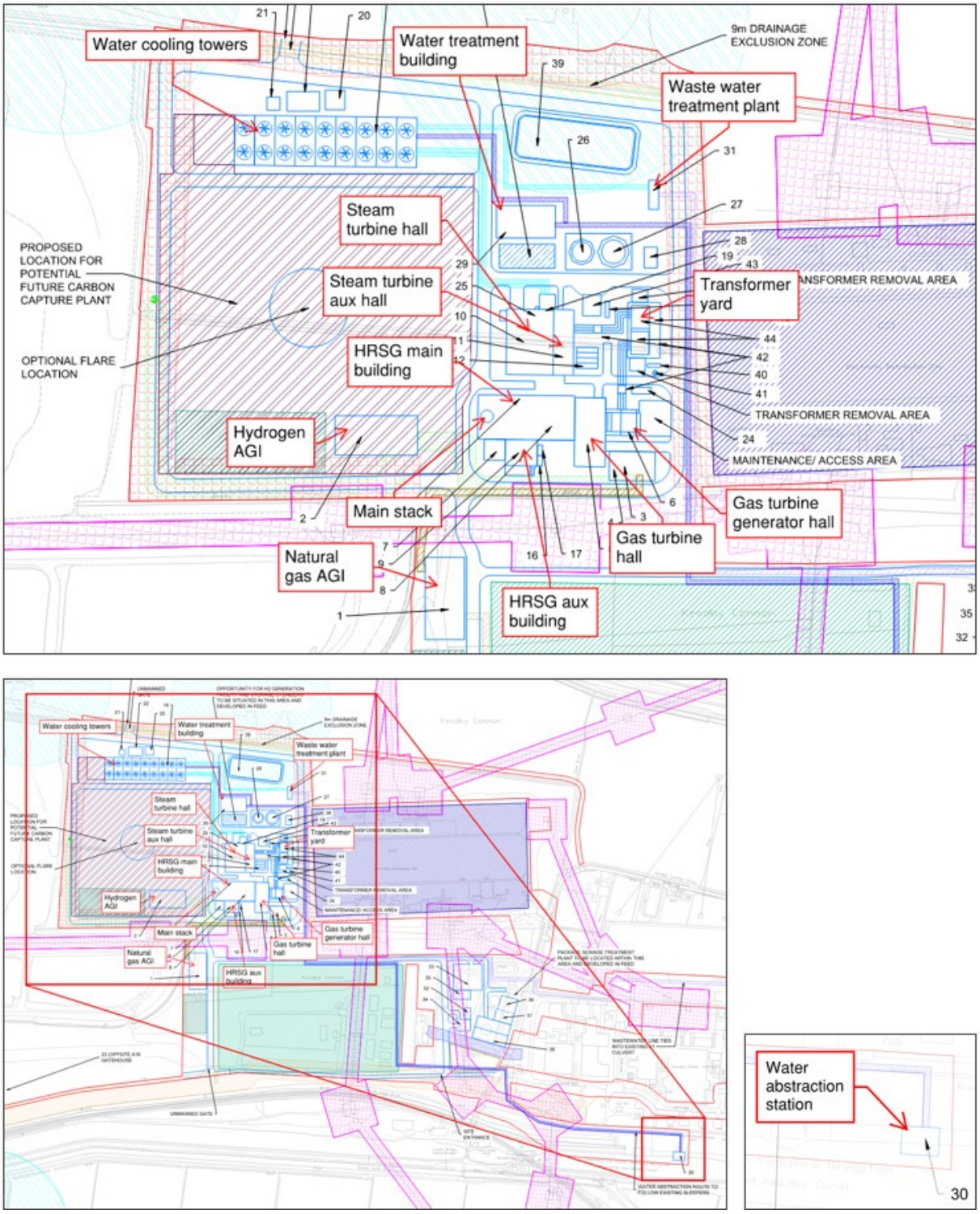
A three-dimensional model has been developed, using SoundPlan 9.1 software, to assess the current layout options for the Proposed Development. SoundPlan implements the sound attenuation method ISO 9613-2: 2024 *Acoustics - Attenuation of sound during propagation outdoors*, which has been used to calculate sound levels at surrounding NSR due to operations at the Proposed Installation (from both proposed external plant and breakout of sound from plant within buildings). The sources of data used in the noise model are shown in Table 3.

Table 3: Modelling Input Data

Model Element	Data Package	Format	Source File	Source	Received Data Date
Digital terrain map (converted to contours)	Keadby 3 Power Station ES	.cna	Keadby 3 Power Station ES - Cadnaa noise model files	AECOM	26 Jul 2024
Topography; building heights; and ground absorption	Keadby 3 Power Station ES and OS Open Data	.cna	Keadby 3 Power Station ES - Cadnaa noise model files	AECOM	26 Jul 2024
Site building dimensions	Scheme designs	.pdf	Various files	Project Team	Updated throughout project
Sound source data	Keadby 3 Power Station ES and provided by design team	.pdf / e-mail	Various files	Project Team	Updated throughout project
Sound source data	OEM Information	.pdf/ e-mail	Typical Plant Layout 100% Hydrogen Reference Plant	Siemens Energy via SSE Thermal	03 Feb 2025

The locations of sound sources within the Proposed Installation are shown in Figure 3. A schedule of sound sources and model assumptions are presented in Section 6.2, Table 5 and Annex B.

Figure 3: Location of Sound Sources in the Prediction Model



The impact of the operational noise has been assessed according to BS4142, based upon the difference between the measured background sound level ($L_{A90,\,T}$) without the sound of the Proposed Installation and the rating level of the Proposed Installation, at the receiver locations.

The background sound level is defined in BS4142 as the typical level existing in the absence of the specific sound level from the plant at the receiver location. The specific sound level ($L_{Aeq,Tr}$) from the industrial sources can be subject to a weighting (penalty) where it displays an identifiable character (such as tonality, impulsivity, intermittency, or otherwise distinctive character) to provide a rating level ($L_{Ar,Tr}$). The background sound level is subtracted from the rating level and the difference used to inform the NIA.

An initial estimate of the impact of the specific sound is conducted by subtracting the measured background sound level from the rating level and considering the following:

- Typically, the greater this difference, the greater the magnitude of the impact;
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

BS4142 also states that “The significance of sound of an industrial and/ or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs”.

The significance of effect has been determined based on the methodology described above and other factors, including the acoustic context of the area, magnitude of exceedance, changes in soundscape, predicted absolute noise levels, time of the day where impact occurs and professional judgement.

6. Noise Monitoring Data and Predictions

6.1 Noise Monitoring Data Results

Results of the environmental sound level survey are presented below. Full details of the environmental sound level survey, calibration certificates and the credentials of those who performed the survey are presented in Annex A, C, and D.

No attended measurements were performed. The unattended 15-minute contiguous measurement results are summarised in Table 4. Representative background sound levels have been determined as discussed below. Ambient levels are the logarithmic average of all data measured during each time period.

Table 4: Summary of Sound Survey Measurement Data

Location	Sound Pressure Level, dB(A) (re 20 µPa)	
	Representative background, L_{90}	Ambient, L_{eq}
Daytime (07:00 – 19:00)		
NSR 1	41	60
NSR 2	37	52
NSR 3	36	53
NSR 4	35	52
NSR 6	35	51
NSR 8	31	43
NSR 9	31	51
NSR 11	42	58
Evening (19:00 – 23:00)		
NSR 1	N/A	58
NSR 2	N/A	49
NSR 3	N/A	44
NSR 4	N/A	48
NSR 6	N/A	46
NSR 8	N/A	41
NSR 9	N/A	47
NSR 11	N/A	52
Night time (23:00 – 07:00)		
NSR 1	42	54
NSR 2	35	45
NSR 3	36	42

Location	Sound Pressure Level, dB(A) (re 20 µPa)	
	Representative background, L_{90}	Ambient, L_{eq}
NSR 4	32	47
NSR 6	30	45
NSR 8	28	42
NSR 9	27	47
NSR 11	27	48

A statistical analysis of the measured sound levels has been undertaken in line with BS4142 to determine the background sound level at the closest NSRs. The assessment below is presented for the night-time as it is the worst-case scenario to determine the need for mitigation, since the Proposed Installation is expected to operate continuously. If noise emissions are effectively controlled for the night-time, then they are expected to meet the assessment criteria at other times.

Figure 5 to Figure 12 present histograms and cumulative frequency curves that show the number of occurrences of values of $L_{A90,15min}$ during the night (23:00-07:00) at each NSR location. The $L_{A90,15\ min}$ values shown in Table 4 are the representative background levels derived from these plots.

Figure 4: Nighttime L_{A90} Histogram and Cumulative Frequency Curve – NSR 1

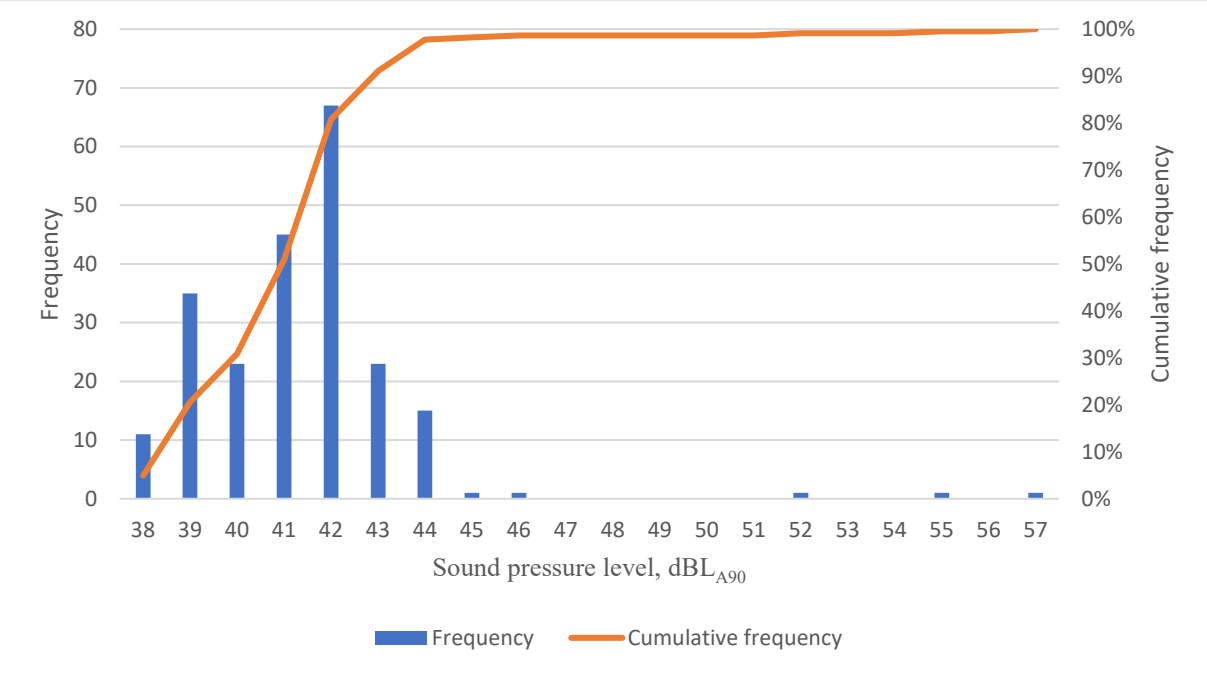


Figure 5: Nighttime L_{A90} Histogram and Cumulative Frequency Curve – NSR 2

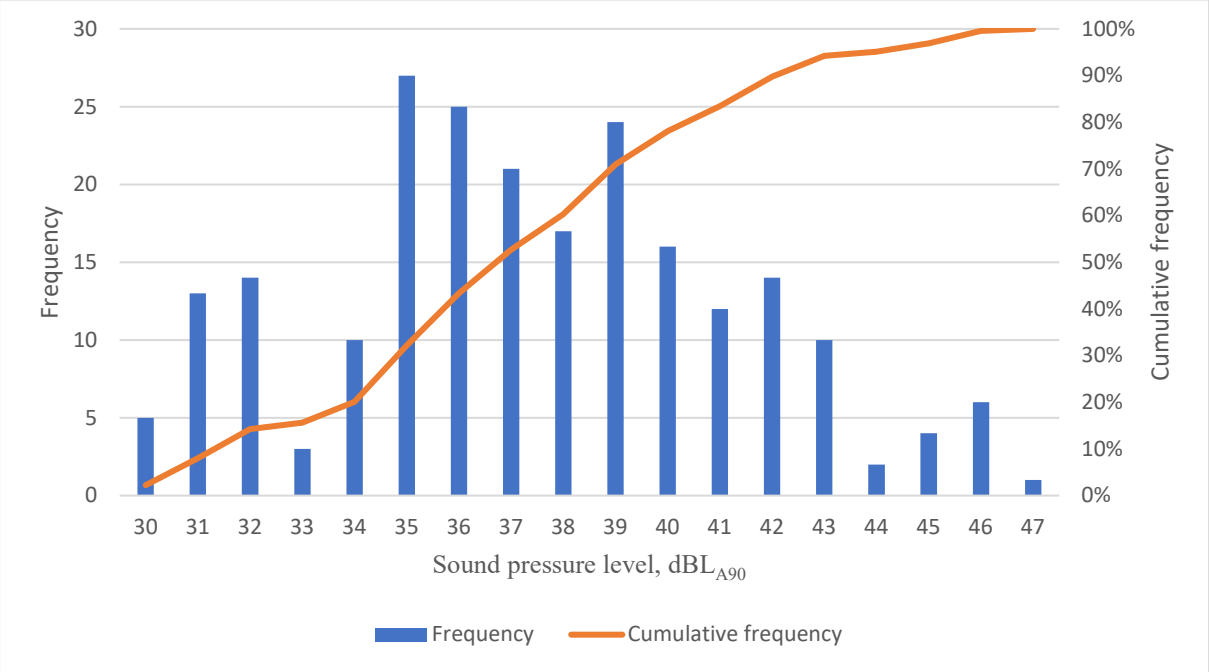


Figure 6: Nighttime L_{A90} Histogram and Cumulative Frequency Curve – NSR 3

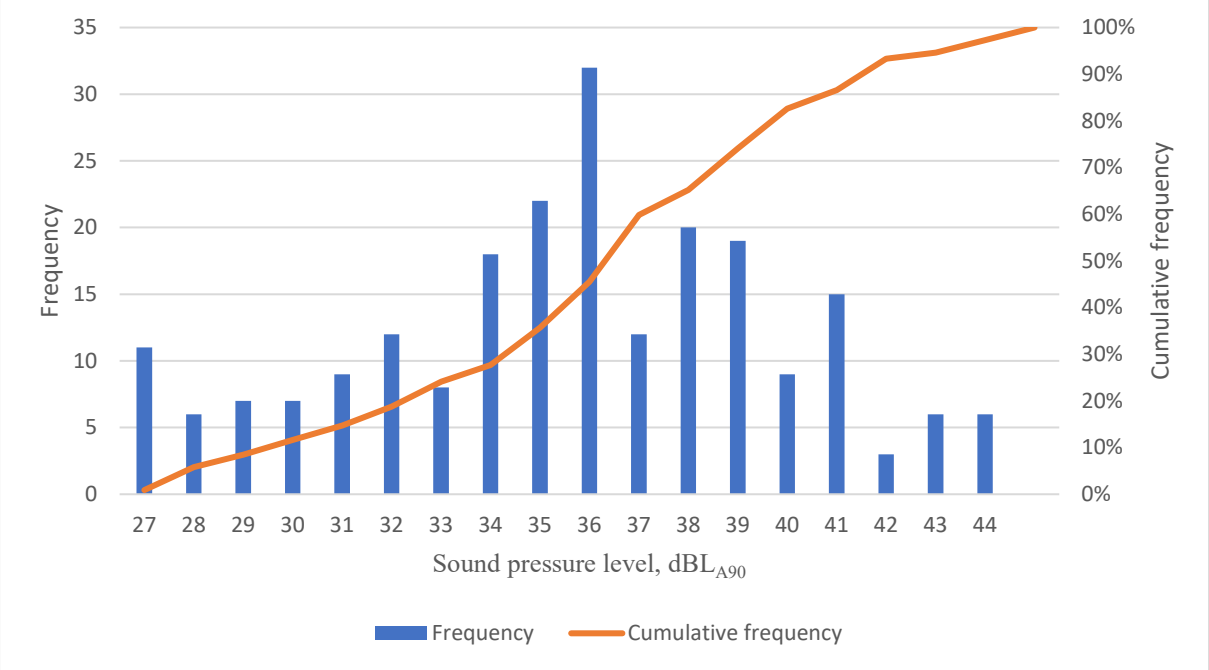


Figure 7: Nighttime L_{A90} Histogram and Cumulative Frequency Curve – NSR 4

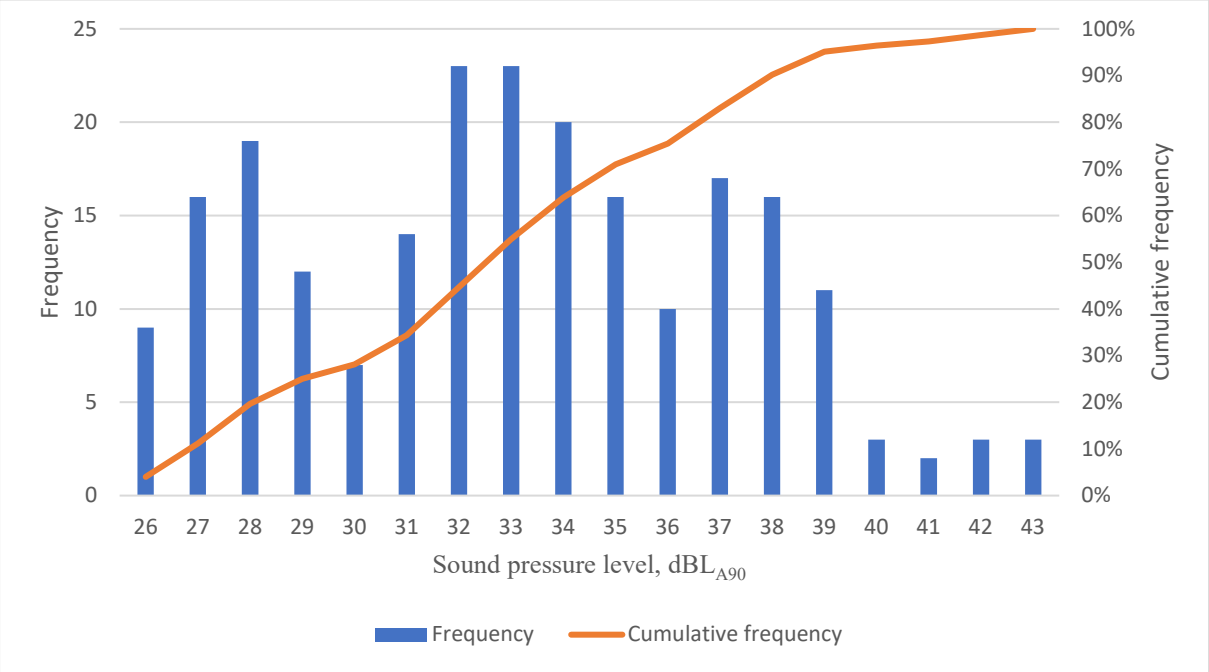


Figure 8: Nighttime L_{A90} Histogram and Cumulative Frequency Curve – NSR 6

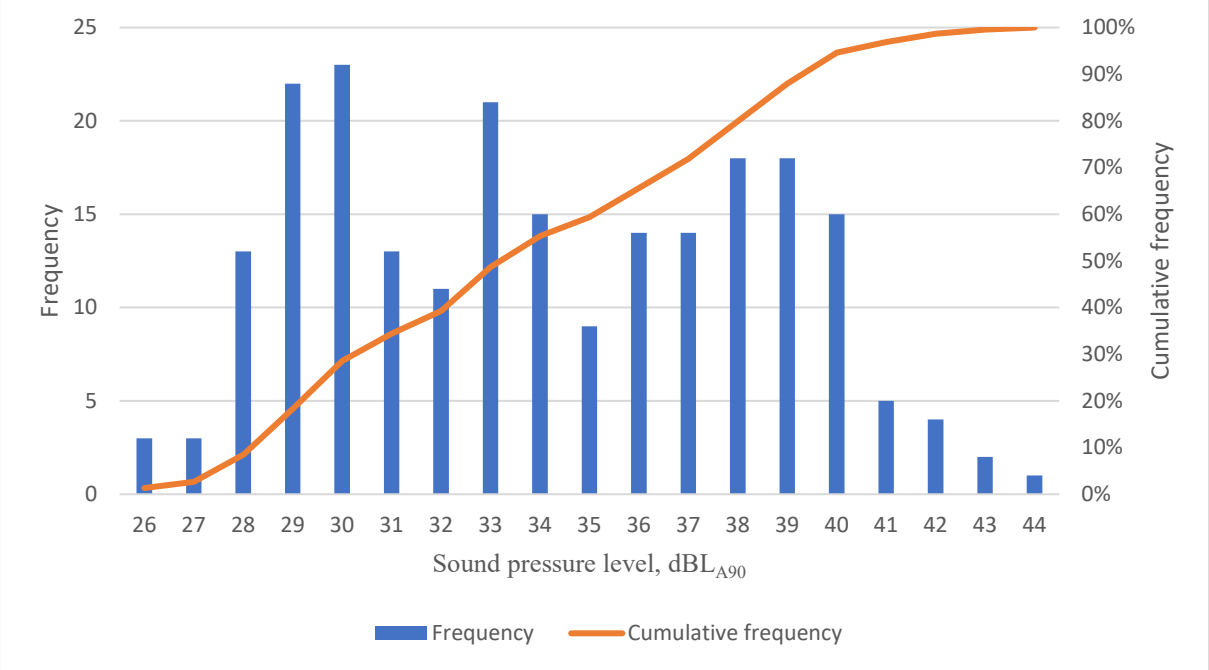


Figure 9: Nighttime L_{A90} Histogram and Cumulative Frequency Curve – NSR 8

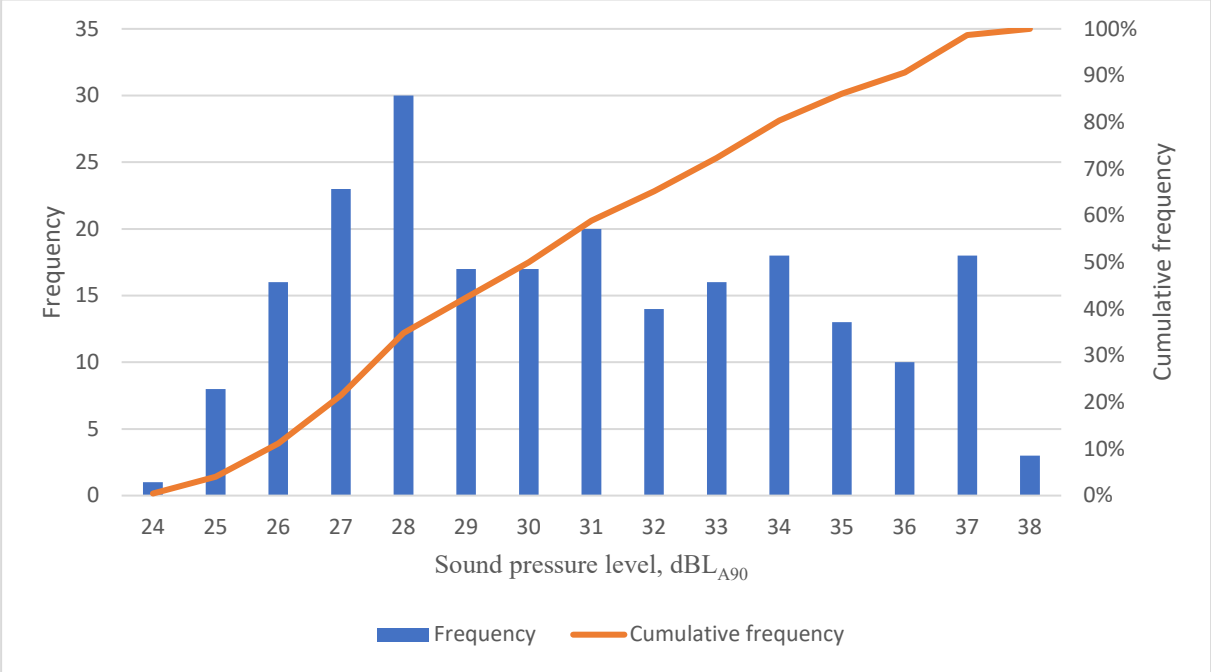


Figure 10: Nighttime L_{A90} Histogram and Cumulative Frequency Curve – NSR 9

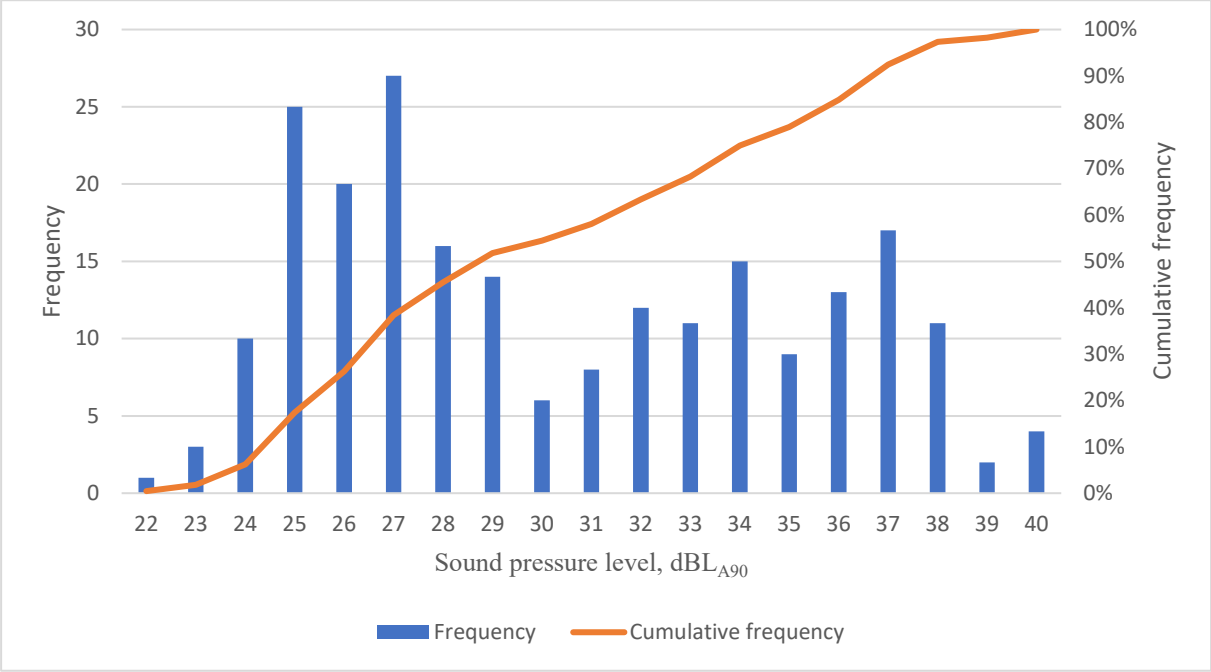
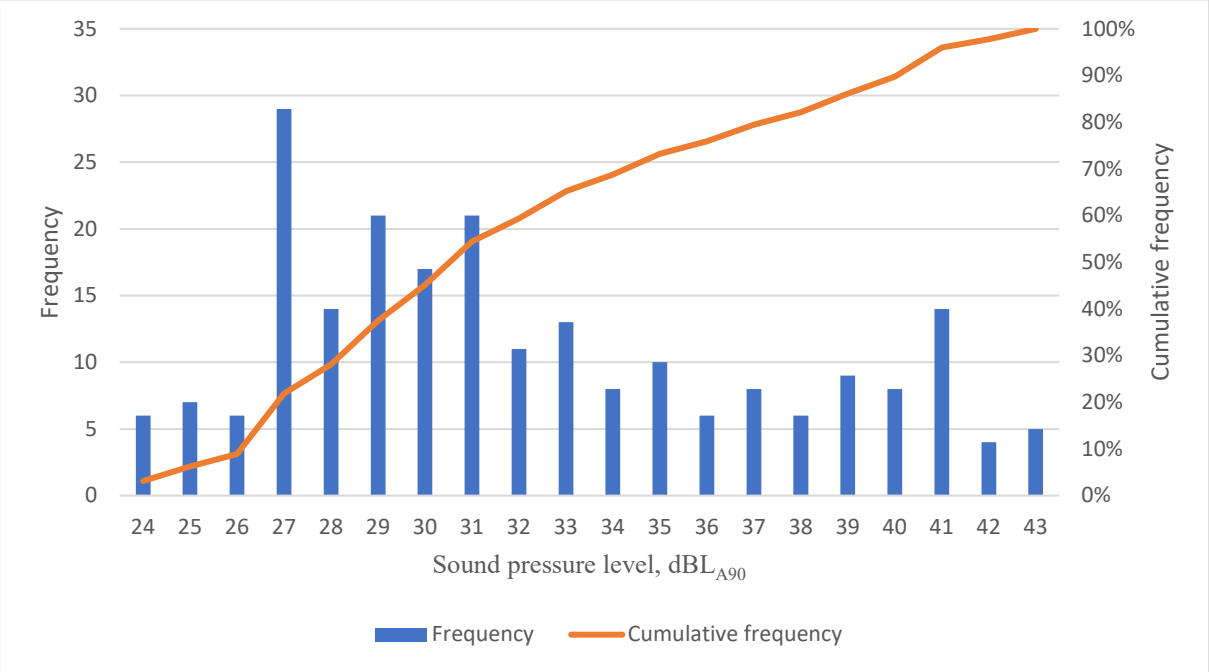


Figure 11: Nighttime L_{A90} Histogram and Cumulative Frequency Curve – NSR 11



6.2 Sound Prediction Model

The sound power levels of the proposed sound sources are presented in Table 5 below. For sound sources housed within buildings, internal reverberant sound pressure levels have been converted to sound power level per m^2 assuming a facade sound reduction of R_w 25dB such as a single-skin construction.

Table 5: Sound Power Levels of Plant Items

Building	Sound Power Level (dB) per unit								
	L_w dB(A)	L_w / Octave band centre frequency, Hz							
		63	125	250	500	1k	2k	4k	8k
Natural Gas AGI	97	89	88	86	86	88	92	91	87
Hydrogen Gas AGI	97	89	88	86	86	88	92	91	87
Blending Skid	97	89	88	86	86	88	92	91	87
Gas Turbine Hall*	75	90	71	41	24	24	3	0	0
Gas Turbine Gen Hall*	66	90	78	54	21	21	5	0	0
Gas Turbine Air Intakes	97	89	88	86	86	88	92	91	87
HRSG Building*	91	89	66	43	27	23	6	0	0
HRSG Aux Building*	99	89	90	92	92	95	92	88	82
HRSG Stack	97	89	88	86	86	88	92	91	87
Steam Turbine Hall*	82	89	70	40	23	23	2	0	0
Steam Turbine Aux Building*	68	90	71	41	24	24	3	0	0
Transformer Yard	110	125	125	112	90	84	71	51	50
Hydrous Ammonia Storage and Transfer	71	61	62	64	64	67	64	60	54
Water Tower Cooler	104	111	114	109	96	88	93	93	89
Cooling Water Pumps	97	111	110	99	88	81	79	77	74
Boiler Feed Water Chem Package	72	63	64	66	66	69	66	62	56
Demineralised Water Storage Plant	99	89	90	92	92	95	92	88	82
Demineralised Water Storage Pump	99	89	90	92	92	95	92	88	82
Water Treatment Building	83	108	94	71	52	38	31	21	18
Raw Water Storage Tank	87	97	99	89	81	75	75	67	60
Water Abstraction Station	99	89	90	92	92	95	92	88	82
Emergency Generator	99	94	95	95	95	93	91	88	83
**Sound power level is given as sound power per m^2*									

The assessment has assumed that potential noise of a tonal, impulsive or intermittent nature, as perceived at the NSR, will be designed out by the selection of appropriate plant, building cladding, louvres, silencers or attenuators, as necessary. However, a +3 dB correction has been included to allow for any potential to identify the new sound source in the existing acoustic environment.

7. Noise Impact Assessment

The results of the NIA, assuming that no additional mitigation is included in the plant design, are provided in Table 6 and Table 7. By reference to the EA permit guidance, the level of noise impact results in an “unacceptable level” of noise which requires action to be taken.

Table 6: BS4142 Assessment for Daytime with no Additional Mitigation

Receptor	NSR 1 Vazon Bridge	NSR 2 Hawthorne House, Chapel Lane	NSR 3 Keadby Village	NSR 4 Mariners Arms Flats	NSR 6 Queens Crescent	NSR 8 North Pilfrey Farm	NSR 9 Ealand Poultry Farm	NSR 11 – South Pilfrey Farm
Specific sound level L_s ($L_{Aeq,Tr}$), dB	44	44	42	41	39	40	37	35
Acoustic feature correction, dB	+3	+3	+3	+3	+3	+3	+3	+3
Rating level ($L_{Ar,Tr}$), dB	47	47	45	44	42	43	40	38
Representative *background sound level* ($L_{A90,T}$), dB	41	41	36	35	35	31	31	42
Excess of *rating level* over *background sound level* ($L_{Ar,Tr}$ - $L_{A90,T}$), dB	+6	+6	+9	+9	+7	+12	+9	0
BS 4142:2014 **impact** category	Adverse	Adverse	Adverse	Adverse	Adverse	Significant adverse	Adverse	Low

Table 7: BS4142 Assessment for Nighttime with no Additional Mitigation

Receptor	NSR 1 Vazon Bridge	NSR 2 Hawthorne House, Chapel Lane	NSR 3 Keadby Village	NSR 4 Mariners Arms Flats	NSR 6 Queens Crescent	NSR 8 North Pilfrey Farm	NSR 9 Ealand Poultry Farm	NSR 11 – South Pilfrey Farm
Specific sound level L_s ($L_{Aeq,Tr}$), dB	44	44	42	41	39	40	37	35
Acoustic feature correction, dB	+3	+3	+3	+3	+3	+3	+3	+3
Rating level ($L_{Ar,Tr}$), dB	47	47	45	44	42	43	40	38
Representative *background sound level* ($L_{A90,T}$), dB	42	35	36	32	30	28	27	27
Excess of *rating level* over *background sound level* ($L_{Ar,Tr}$ - $L_{A90,T}$), dB	+5	+12	+9	+12	+12	+15	+13	+11
BS 4142:2014 **impact** category	Low	Significant adverse	Adverse	Significant adverse	Significant adverse	Significant adverse	Significant adverse	Significant adverse

8. Noise Control

The following measures have been implemented in the noise prediction model to ensure that noise emissions from the Proposed Installation are reduced from the levels in Table 6 and Table 7.

- The sound power level of the noise sources presented in Table 8 are not to be exceeded.
- The minimum composite acoustic performance of the HRSG building, Gas Turbine Hall, and the Steam Turbine Hall fabric items (walls, roof, louvres and doors) should be 31 dB R_w with walls such as Kingspan structural insulated panels. This is an increase from the unmitigated modelling. The building fabric of all buildings is assumed to have holes/openings such as acoustic louvres or roller shutters acoustically treated and efficient sealing ensured around any penetrations, e.g. shafts, valves, etc. to control noise egress.
- The water abstraction station should be enclosed within appropriate acoustic enclosures, such that the sound pressure level at 1m from the enclosures should not exceed 83 dB(A).
- The transformers selected for the transformer yard should be limited to 110 dB (L_w).

The typical dominant noise sources during normal operation are presented in Table 8. Due to the number and dispersed location of the receptors, the rank order of the sound sources for the receptors will not be the same.

Table 8: Maximum Sound Power Levels and Additional Mitigation Proposals for the Dominant Noise Sources

Source	Mitigation Measure
HRSG Building	Selection of internal plant items (L_{Aeq}) such that the spatially averaged Sound Pressure Level inside the building is at or below 85 dB. Minimum composite acoustic performance of external facades of R_w31dB
Transformer Yard	Selection of plant items not exceeding 110dB (L_w) (no change from the unmitigated model). Maintenance activities to be undertaken during the daytime only.
Gas Turbine Hall	Selection of internal plant items such that the spatially averaged Sound Pressure Level inside the building is at or below 85 dB L_{Aeq}. Minimum composite acoustic performance of external facades of R_w31dB
Natural Gas AGI	Selection of plant items not exceeding 98dB (L_w).
Water Abstraction Station	Acoustic screen or enclosure around the pump or selection of a quieter pump. Selection of plant items not exceeding 99dB (L_w).

Source	Mitigation Measure
HRSG Stack	Minimum composite acoustic performance of external facades of R_w25 dB (no change from the unmitigated model).
Water Tower Coolers	Selection of plant items not exceeding 99dB (L_w). Attenuation reducing the plant sound power level (L_w) to not more than 90 dB(A)
Steam Turbine Hall	Selection of internal plant items such that the spatially averaged Sound Pressure Level inside the building is at or below 85 dB L_{Aeq} Minimum composite acoustic performance of external facades of R_w31dB

Table 9 and Table 10 present the BS4142 assessment undertaken with the mitigation described above implemented.

Table 9: Daytime BS4142 Assessment with Additional Mitigation

Receptor	NSR 1 Vazon Bridge	NSR 2 Hawthorne House, Chapel Lane	NSR 3 Keadby Village	NSR 4 Mariners Arms Flats	NSR 6 Queens Crescent	NSR 8 North Pilfrey Farm	NSR 9 Ealand Poultry Farm	NSR 11 – South Pilfrey Farm
Specific sound level L_s ($L_{Aeq,Tr}$), dB	37	35	33	32	30	26	26	23
Acoustic feature correction, dB	+3	+3	+3	+3	+3	+3	+3	+3
Rating level ($L_{Ar,Tr}$), dB	40	38	36	35	33	29	29	26
Representative *background sound level* ($L_{A90,T}$), dB	41	41	36	35	35	31	31	42
Excess of *rating level* over *background sound level* ($L_{Ar,Tr}$ - $L_{A90,T}$), dB	-1	-3	0	0	-2	-2	-2	-16
BS 4142:2014 impact category	Low	Low	Low	Low	Low	Low	Low	Low

Table 10: Night-time BS4142 Assessment with Additional Mitigation

Receptor	NSR 1 Vazon Bridge	NSR 2 Hawthorne House, Chapel Lane	NSR 3 Keadby Village	NSR 4 Mariners Arms Flats	NSR 6 Queens Crescent	NSR 8 North Pilfrey Farm	NSR 9 Ealand Poultry Farm	NSR 11 – South Pilfrey Farm
Specific sound level L_s ($L_{Aeq,Tr}$), dB	37	35	33	32	30	26	26	23
Acoustic feature correction, dB	+3	+3	+3	+3	+3	+3	+3	+3
Rating level ($L_{Ar,Tr}$), dB	40	38	36	35	33	29	29	26
Representative *background sound level* ($L_{A90,T}$), dB	42	35	36	32	30	28	27	27
Excess of *rating level* over *background sound level* ($L_{Ar,Tr}$ - $L_{A90,T}$), dB	+2	+3	0	+3	+3	+1	+2	+1
BS 4142:2014 impact category	Low	Low	Low	Low	Low	Low	Low	Low

9. Uncertainty

The level of uncertainty for this assessment is dependent upon the complexity and quality of elements included in the three-dimensional model listed in Table 5 above. The prediction model has been developed with the best available datasets such as building layouts, topography of site, existing building heights, amongst others. There is some uncertainty around the dimensions of these elements, however they are unlikely to change the resulting noise prediction levels.

The final selection of plant items and building fabric elements has not been undertaken at this stage, which means that specific acoustic datasheets are currently unavailable. Consequently, there is uncertainty associated with the noise emissions generated by plant items and attenuation provided by building fabric elements such as louvres and doors. To ensure a conservative assessment is carried out, realistic worst-case scenarios have been considered wherever appropriate, including:

- Using the higher end of plant noise levels;
- Conservative (low) estimates of the sound reduction index of building elements.

In this way, as long as the selected plant and building items are consistent with the assumptions outlined in this report, the NIA outcomes should be achieved, regardless of any alterations made to the items of plant finally selected.

In the absence of spectrum sound level data of plant items, a benchmark exercise has been undertaken using Arup's extensive library and empirical standards to select typical spectra for the plant items.

With regards to uncertainty of the environmental sound level survey, a statistical representation of typical sound levels was achieved through taking attended measurements over a continuous seven-day period (see Table 1). Meteorological data was recorded to ensure that the data analysed was acquired during conditions appropriate for environmental sound measurement. Data acquired during unsuitable periods was excluded from the analyses.

Some of the sound measurement equipment was used beyond the period for which the calibration certificates were valid (as noted in Table 2). The data has been used in the assessment since it had been previously applied to the Keadby 3 DCO and Environmental Permit application, as was accepted at this time.

Noise from the existing Keadby 1 Power Station and Keadby 2 Power Station was a key component of the sound environment at the NSR. Records of the operating conditions of each generating station were obtained so that this could be accounted for in defining representative sound levels for use in the impact analysis, as described in Annex A.

10. Conclusions

A NIA has been undertaken to assess the potential impacts associated with the operation of the proposed Keadby Next Generation Power Station upon the closest NSR.

A three-dimensional model has been constructed to predict noise emissions from plant items and an assessment of their likelihood of impact has been undertaken in line with the EA Guidance[2] and British Standard BS4142.

As part of the NIA, an environmental sound level survey has been undertaken to establish noise threshold limits at the closest noise sensitive receptors.

The predicted noise emissions arising from the Proposed Installation do not exceed a level more than 3dB above the background sound level ($L_{A90,\ T}$) at night after the proposed mitigation is in place. As noted in BS4142, where the rating level does not exceed background sound levels, this is an indication of the specific sound source having a low impact and around 5dB over background is an adverse impact, depending on the context.

By reference to the EA permit guidance, a low impact corresponds with levels “no noise, or barely audible or detectable noise” for which the EA may decide that taking action to minimise noise is a low priority. For noise levels around 5dB, “audible or detectable noise” means that action is needed to prevent or minimise noise.

Mitigation measures required to ensure that noise criteria are achieved include the selection of plant items not exceeding noise emission levels assumed in this assessment, and specified minimum acoustic performance of louvres, doors and enclosures. Mitigation will be reviewed further as design progresses to ensure compliance with EA permitting requirements.

The Proposed Installation would be in an existing and former industrial area and so there would be no change to the soundscape character as a result of the operation of the Proposed Installation.

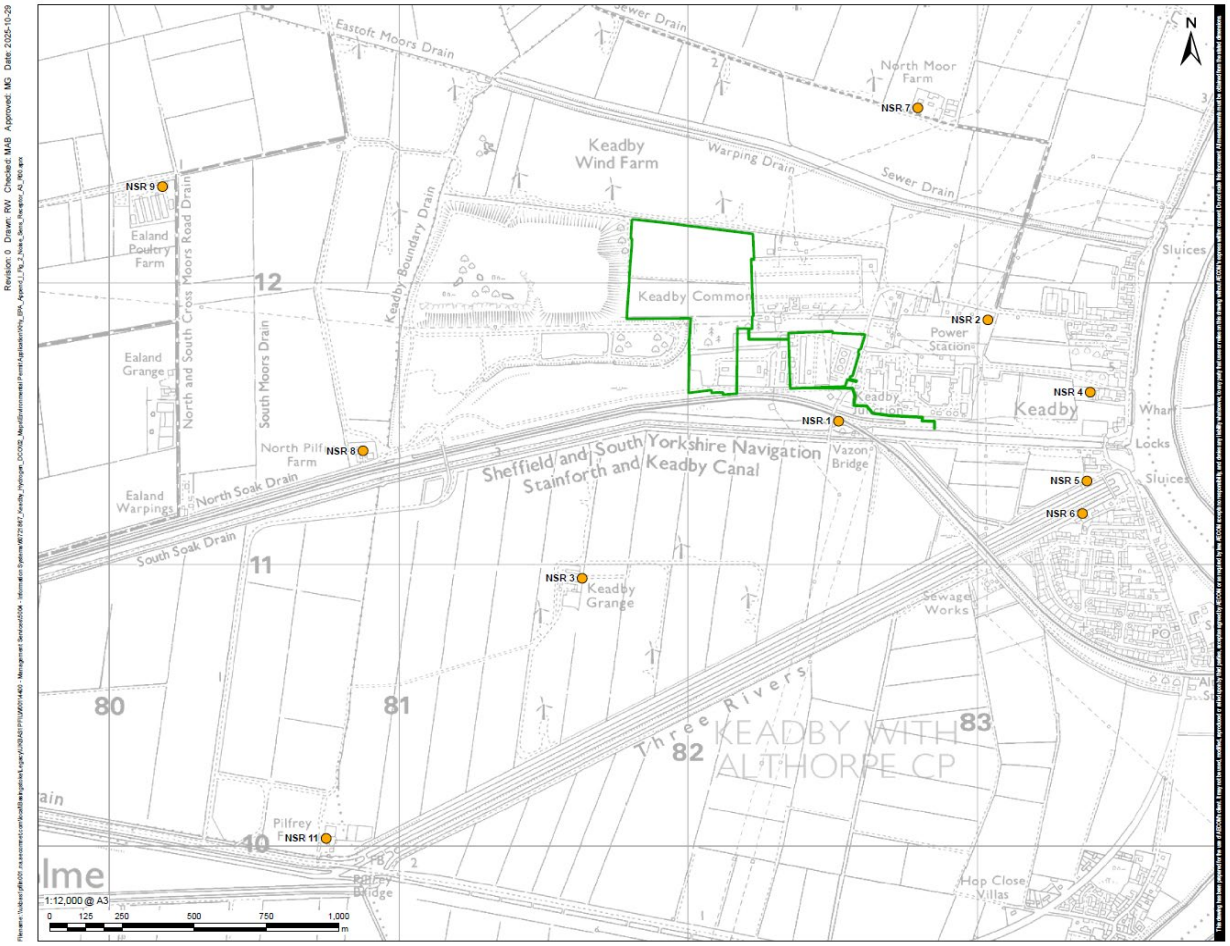
[2] https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits/noise-and-vibration-management-environmental-permits#NIA-report

ANNEX A: BASELINE SOUND SURVEY SUMMARY

Introduction

The following sections present the meteorological data (recorded at location NSR 3) and sound level data for all measurement locations, supported with a commentary to summarise sound sources and other notes. All measurements were unattended and each measurement location was chosen to represent the nearest noise sensitive receptors (NSRs) to the Proposed Installation. NSRs and the Proposed Installation Boundary are shown in Figure A1.

Figure A1: Noise Sensitive Receptor Assessment Locations



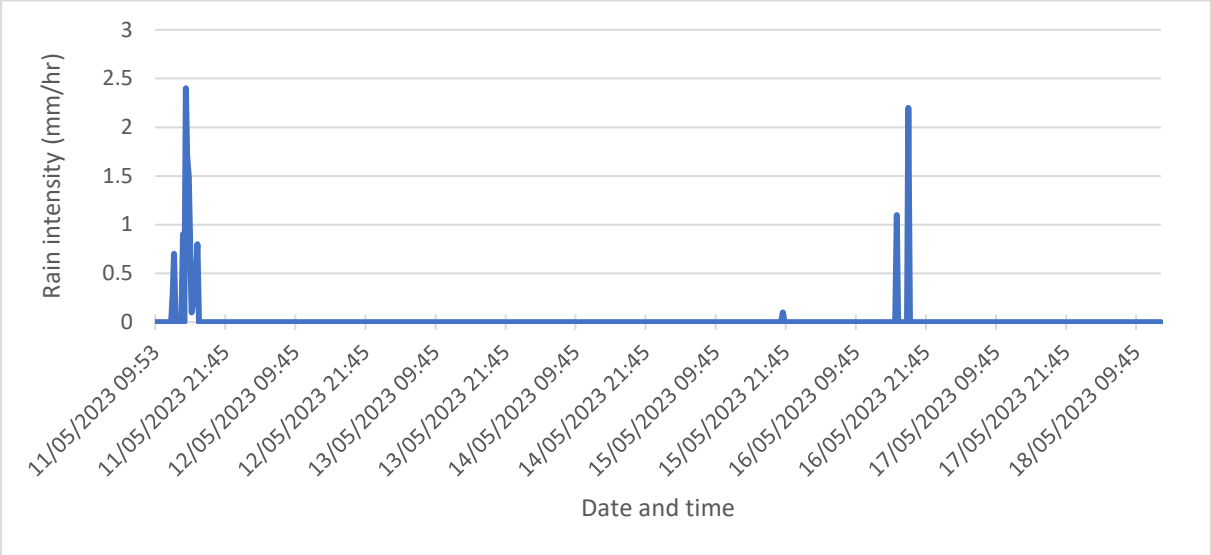
The survey was undertaken for the Keadby 3 Carbon Capture Power Station project and the results used for the Keadby Next Generation Power Station application, with the following changes to the NSRs and their notation.

NSR 7, 10 and 12 in the survey were excluded from the assessment as NSR 7 and NSR 10 are no longer in residential use; and NSR12 was close to and therefore considered to be adequately represented by NSR 4 and NSR 5.

Meteorological Conditions

Due to a period of rain from 14:30 to 17:00 on 11 May 2023, the sound survey data has been excluded from the analysis. In addition, data from 15 minute periods from 21:15 on 15 May 2023 and 16:45 and 18:45 on 16 May 2023 have also been excluded due to rain.

Figure A2: Rainfall Recorded During the Survey Period



The wind direction was mostly from the south-west, except for 24 hours from the evening of 13 May 2023 and 24 hours from the evening of 17 May 2023.

Figure A3: Wind Speed Data for the Survey Period

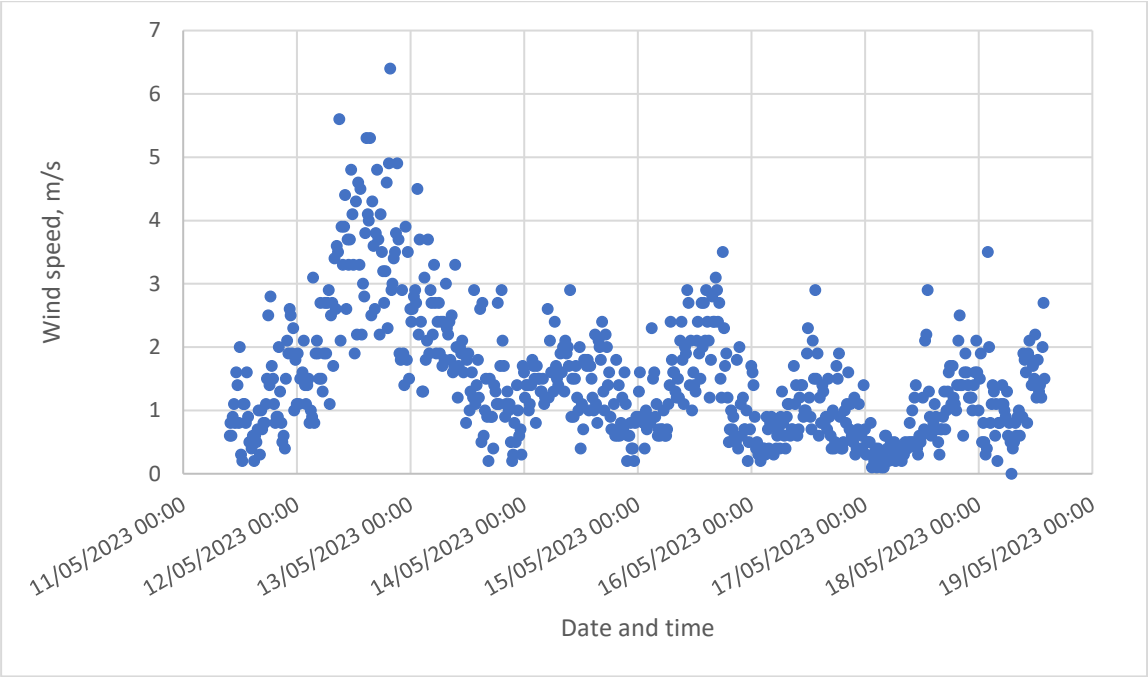
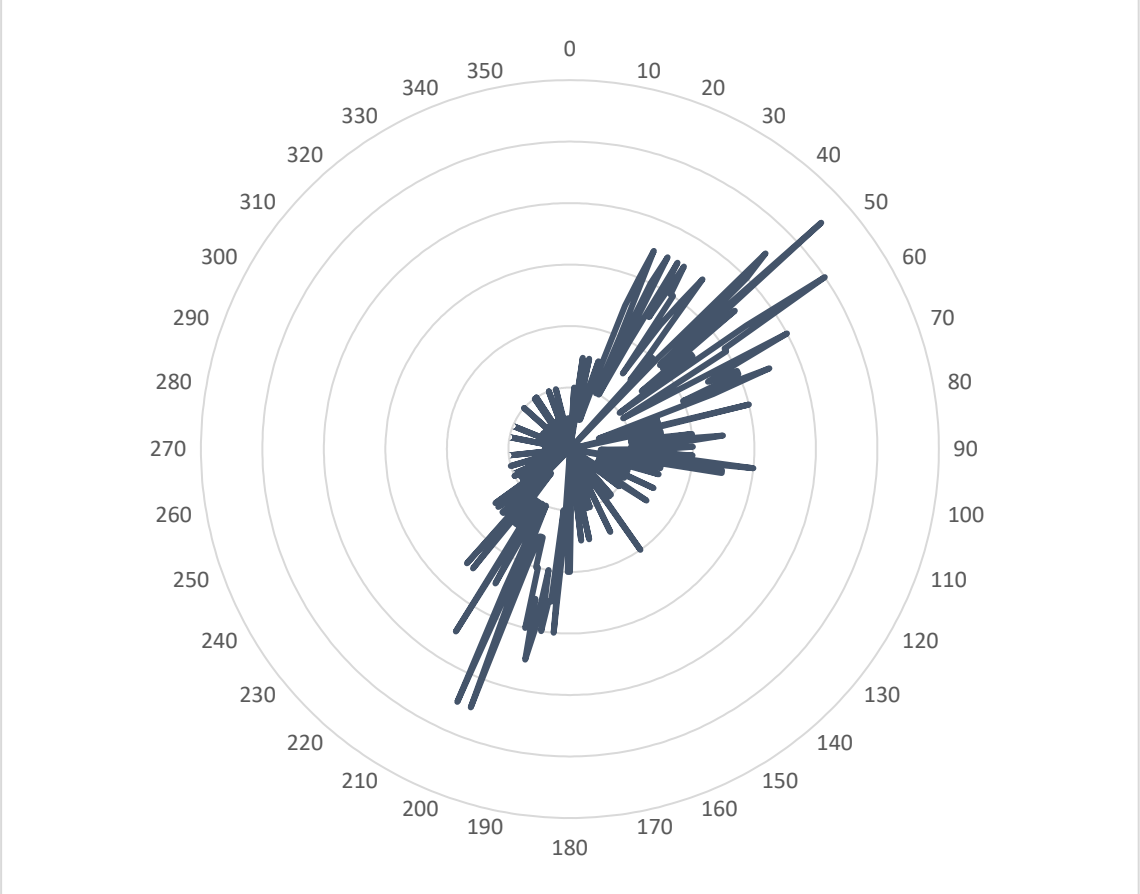


Figure A4: Prevailing Wind Direction During the Survey Period



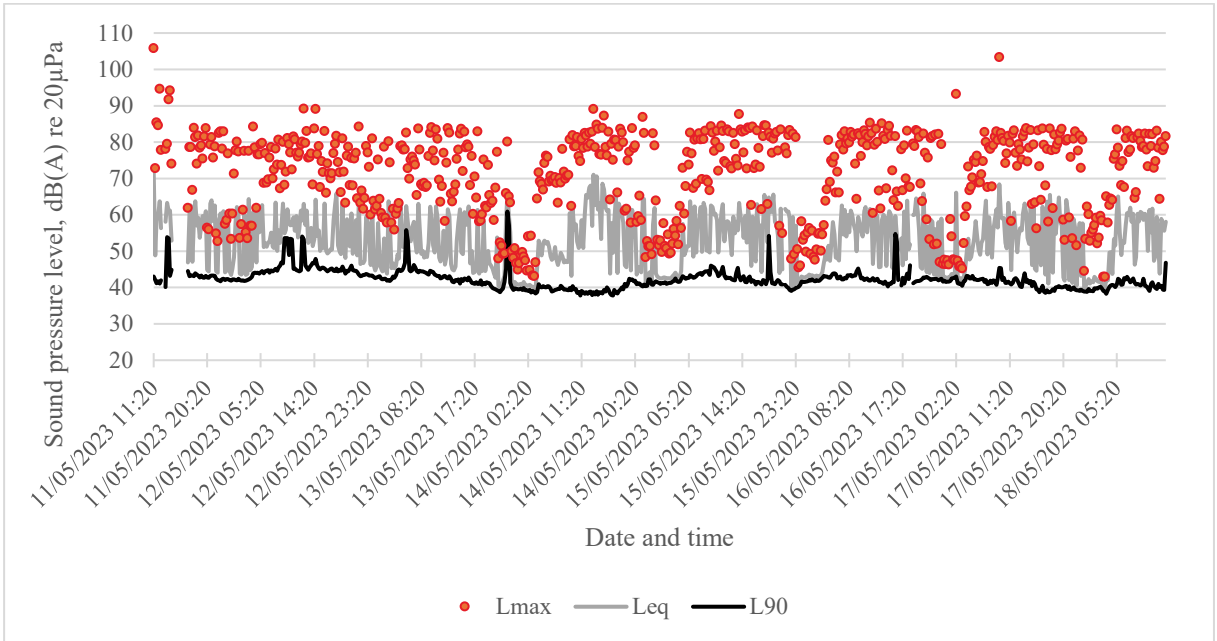
Sound Level Data

NSR 1 – Vazon Bridge

The dominant sound source was humming from the operation of the existing Keadby Power Station. There were also occasional passing trains and sound from the nearby level crossing, construction beside the rail line (including a generator) and birdsong.

Figure A5: NSR 1 Equipment Set up

Figure A6: Time History for NSR 1

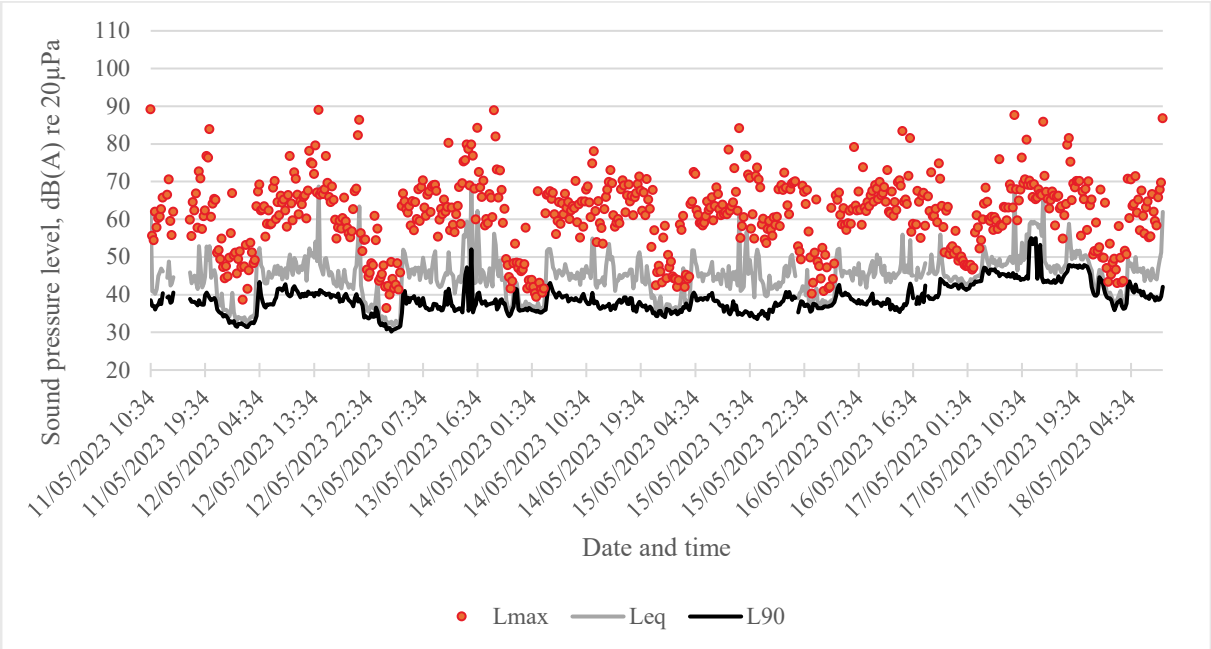


NSR 2 – Hawthorne House, Chapel Lane

Sound sources included local roads, domestic animals, birdsong and the operation of the existing Keadby Power Station.

Figure A7: NSR 2 Equipment Set up

Figure A8: Time History for NSR 2

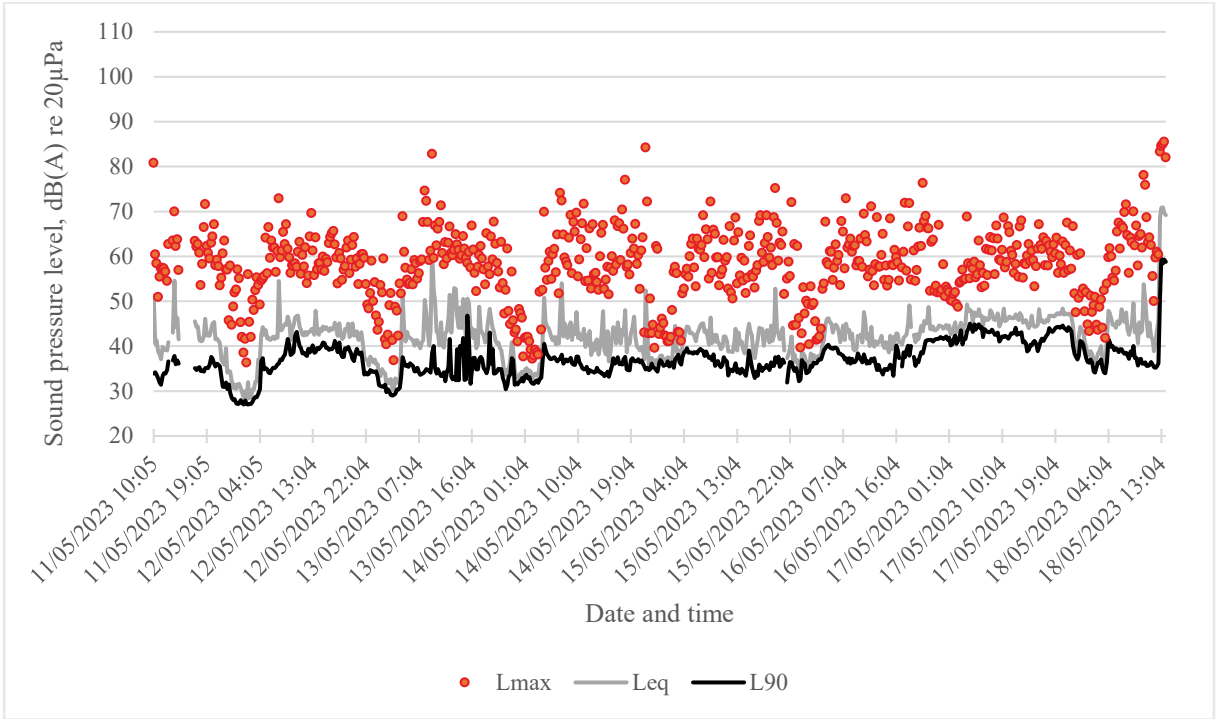


NSR 3 – Keadby Village

Sound sources included birdsong, overhead aircraft, gardening activity (including a lawn mower) and operation of the existing Keadby Power Station.

Figure A9: NSR 3 Equipment Set up (including weather station)

Figure A10: Time History for NSR 3

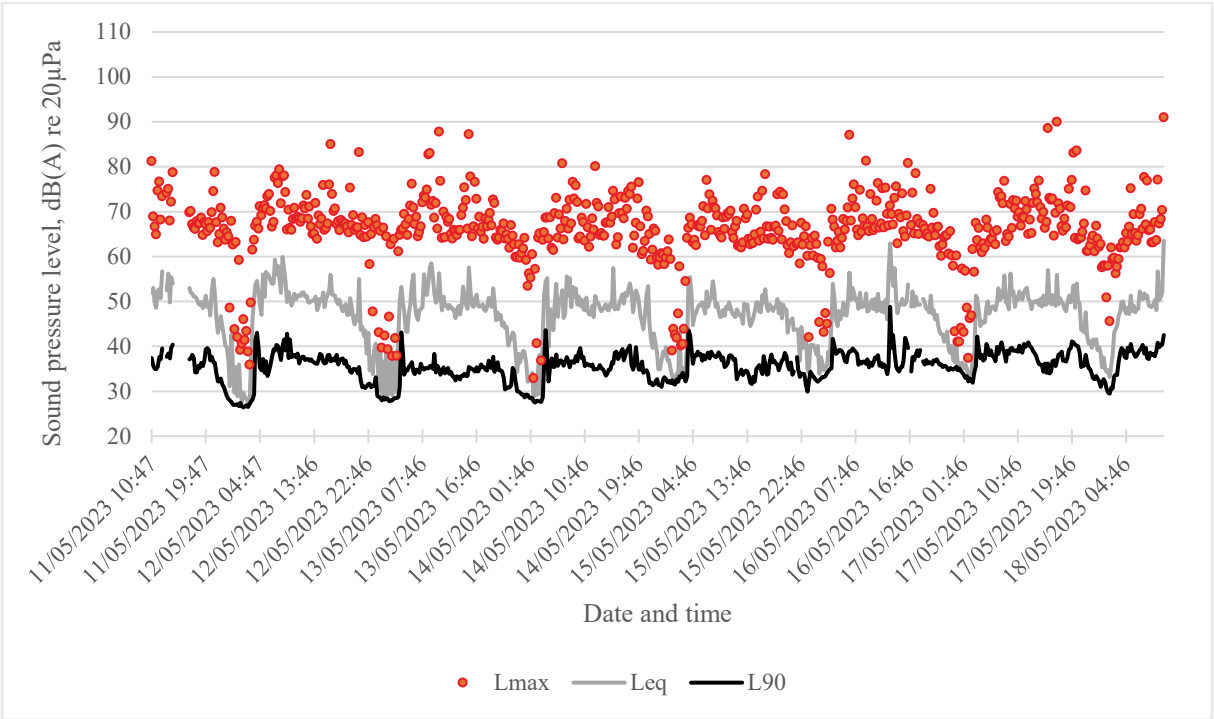


NSR 4 – Mariners Arms Flats

The dominant sound source was local roads. There was also birdsong.

Figure A11: NSR 4 Equipment Set up

Figure A12: Time History for NSR 4

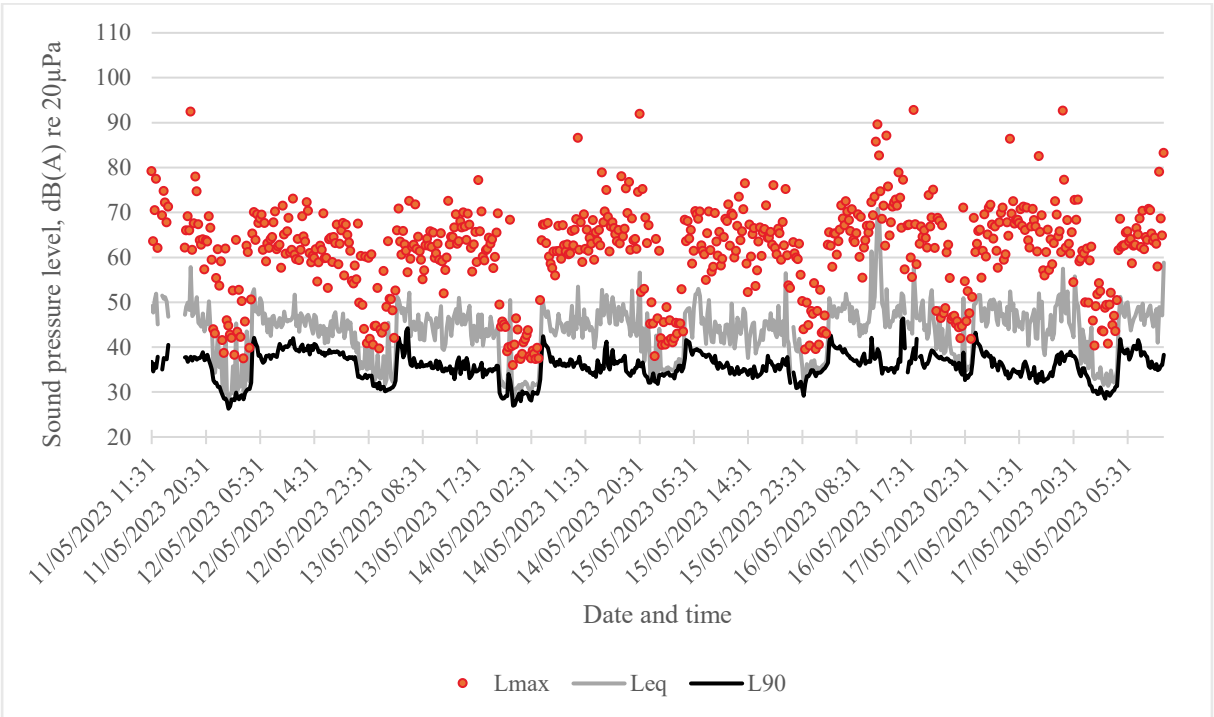


NSR 6 – Queens Crescent

The dominant sound source was birdsong. There were occasional overhead aircraft and trains passing by.

Figure A13: NSR 6 Equipment Set up

Figure A14: Time History for NSR 6

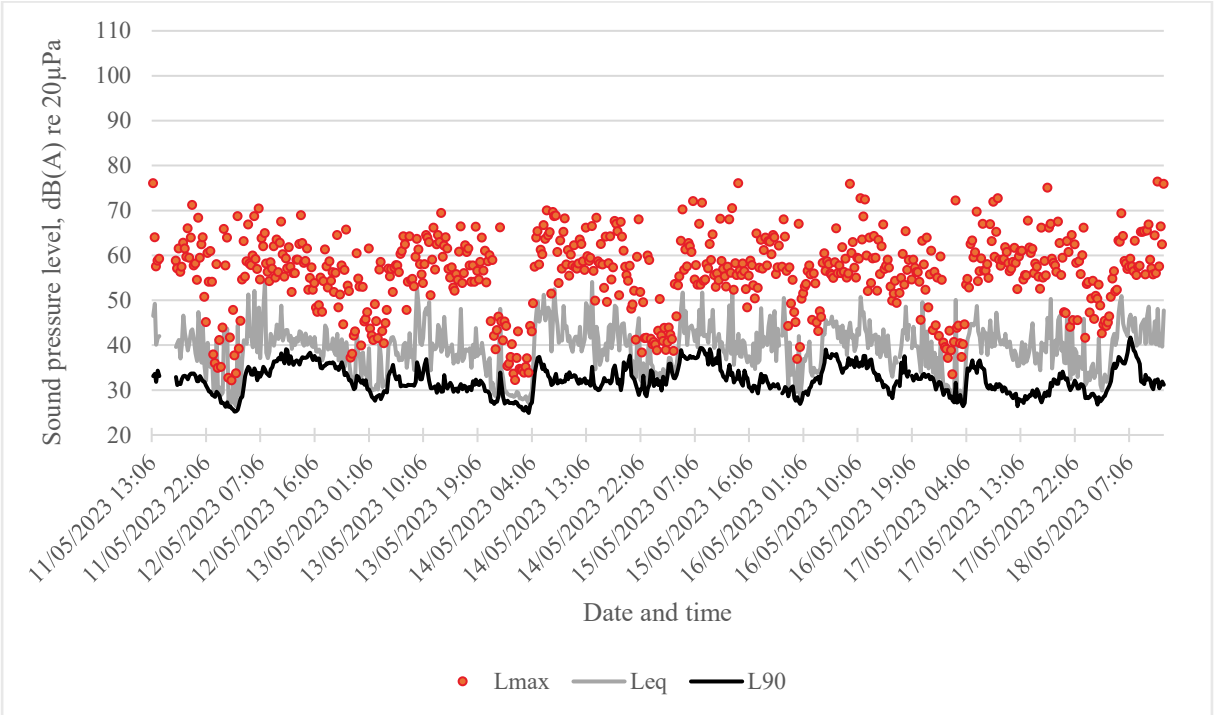


NSR 8 – North Pilfrey Farm

The dominant sound source was birdsong. There were occasional overhead aircraft and trains passing by.

Figure A15: NSR 8 Equipment Set up

Figure A16: Time History for NSR 8

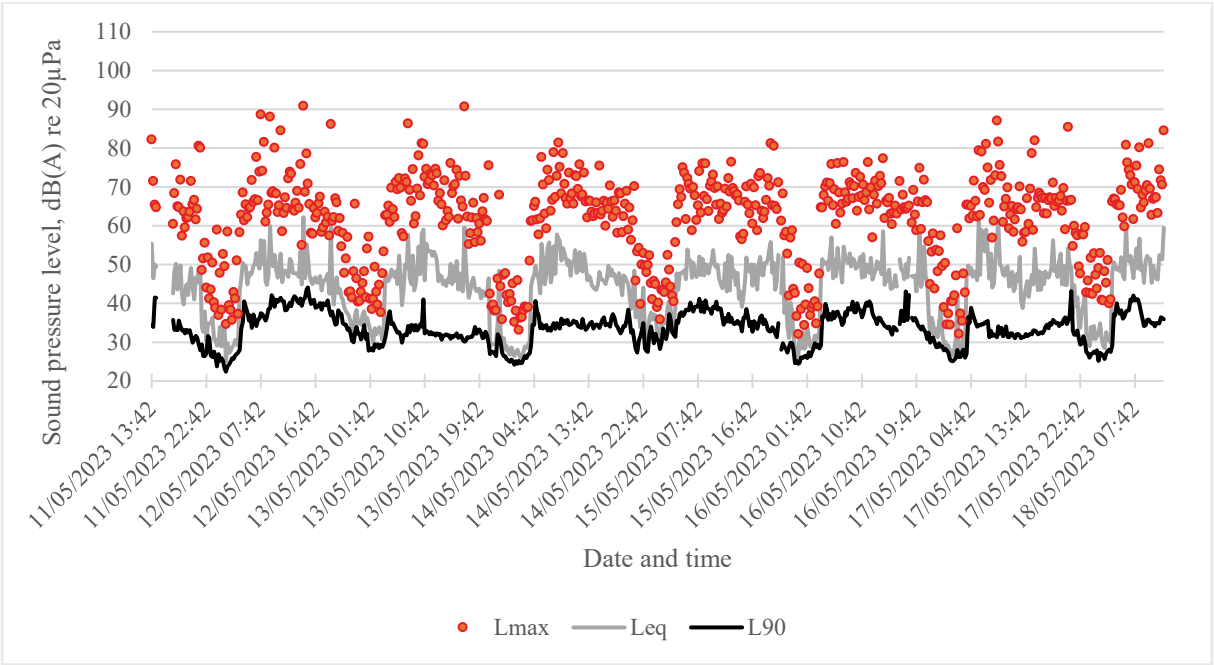


NSR 9 – Ealand Grange

The dominant sound source was birdsong. There was also distant traffic and trains passing by.

Figure A17: NSR 9 Equipment Set up

Figure A18: Time History for NSR 9

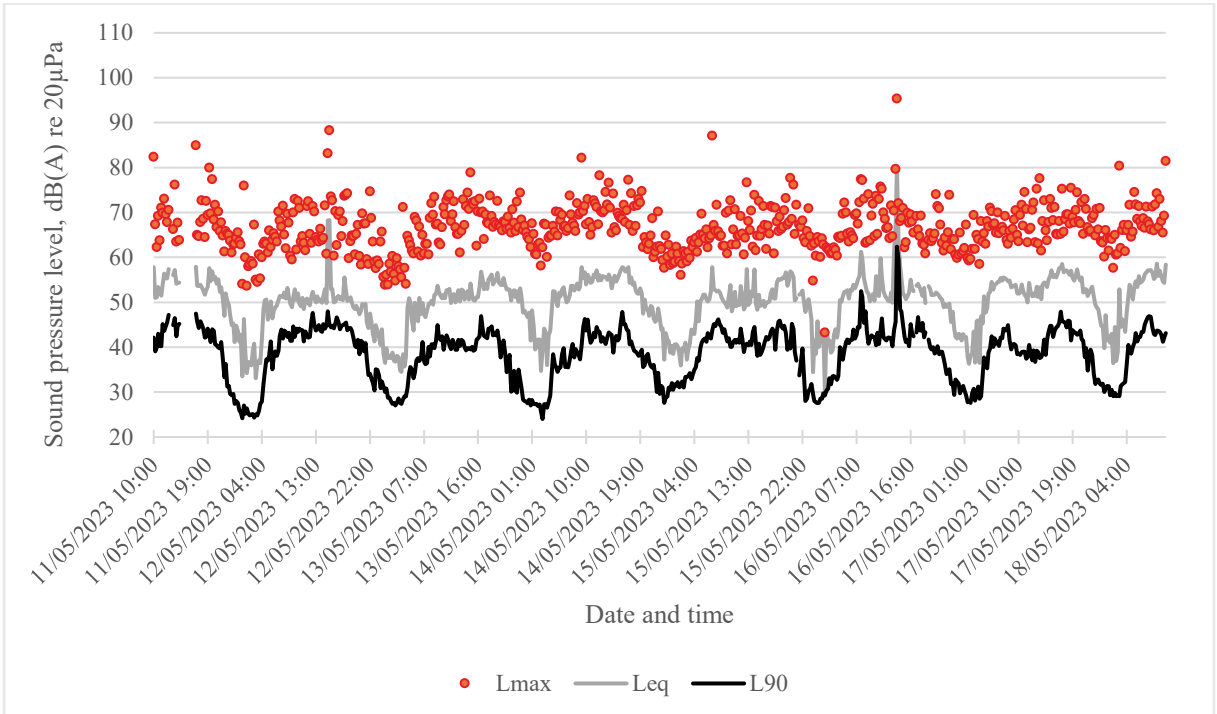


NSR 11 – South Pilfrey Farm

The dominant sound source was road traffic on the nearby A18 and birdsong. There was also noise from the ventilation system of the house.

Figure A19: NSR 11 Equipment Set up

Figure A20: Time History for NSR 11



ANNEX B: SOUND LEVEL MODELLING

Sound Level Modelling

Sound levels at NSRs were predicted using SoundPLAN version 9.1, which implements ISO 9613-2:2024 *Acoustics – Attenuation of sound during propagation outdoors Part 2: Engineering method for the prediction of sound pressure levels outdoors*.

Full calculation of each source for Vazon Bridge (NSR 1) is presented below. This is the receptor with the highest predicted noise levels arising from the operation of the Proposed Installation. The total predicted nighttime mitigated noise level for this receptor (L_p) is 37 $dBL_{Aeq,T}$.

- L'w dB(A) – Sound power level per m, m^2
- Lw dB(A) – Sound power level per unit
- l or A m,m^2 - Size of source m,m^2
- DO dB - Correction for propagation in limited spatial angle
- S m – Distance of source to receiver
- Adiv dB – Mean attenuation due to geometrical spreading
- Agr dB – Mean attenuation due to ground effect
- Abar dB - Mean attenuation due to screening
- Aatm dB - Mean attenuation due to air absorption
- Ls dB(A) – Unassessed sound power level at the receiver
- Lr dB(A) – Assessed level of time slice.

Mitigation measures suggested in Table 7 are implemented below and thus source levels and attenuation are adjusted from the non-mitigated scenario.

Table B.11 Sound Source Contribution for NSR 1 – Vazon Bridge in the Mitigated Scenario

Source	L'w dB(A)	Lw dB(A)	I or A m,m²	DO dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Ls dB(A)	Lr dB(A)
13. Transformer Yard		110+		0	615.86	-66.8	-4	-14.5	-0.2	28.0	28.0
18. Water Tower Cooler-Point source 05		95.1+		0	933.18	-70.4	-1.4	-11.0	-0.9	11.4	11.4
18. Water Tower Cooler-Point source 06		95.1+		0	922.02	-70.3	-1.4	-11.0	-0.8	11.7	11.7
18. Water Tower Cooler-Point source 07		95.1+		0	911.62	-70.2	-1.4	-11.9	-0.8	10.9	10.9
18. Water Tower Cooler-Point source 08		95.1+		0	900.53	-70.1	-1.4	-12.6	-0.7	10.4	10.4
18. Water Tower Cooler-Point source 09		95.1+		0	889.48	-70	-1.4	-13.1	-0.7	10.0	10.0
18. Water Tower Cooler-Point source 10		95.1+		0	879.07	-69.9	-1.4	-13.5	-0.7	9.7	9.7
18. Water Tower Cooler-Point source 11		95.1+		0	868.75	-69.8	-1.4	-13.7	-0.7	9.5	9.5
18. Water Tower Cooler-Point source 12		95.1+		0	858.56	-69.7	-1.4	-13.9	-0.7	10.5	10.5
15. Hydrous Ammonia Storage and Transfer		98.6		0	599.84	-66.6	-0.1	-24.7	-3.4	6.1	6.1
24. Boiler Feed Water Chemical Package		98.6		0	561.58	-66	-0.1	-17.0	-2.0	15.9	15.9
27. Demineralised Water Plant		98.6		0	677.96	-67.6	-0.4	-21.1	-2.7	16.0	16.0
29. Demineralised Water Storage Pump Skid		98.6		0	682.75	-67.7	-0.4	-22.3	-2.8	14.5	14.5
34. Water Abstraction Station		98.6		0	330.25	-61.4	-0.8	-15.3*	-2.5	33.9	18.6
1. Natural Gas AGI		97		0	532.65	-65.5	-0.1	0.0	-6.2	25.1	25.1
2. Hydrogen AGI		97		0	718.61	-68.1	-0.1	0.0	-7.5	21.2	21.2
3. Blending Skid		97		0	623.34	-66.9	0.0	0.0	-6.5	25.8	25.8
3. Blending Skid		97		0	674.59	-67.6	-0.1	0.0	-7.2	22.1	22.1
16. Instrument Air Package		97		0	571.59	-66.1	-0.1	-10.1	-4.7	25.9	25.9
Gas Turbine Air Intakes		97		0	541.72	-65.7	-0.1	-20.4	-3.5	11.4	11.4

Source	L'w dB(A)	Lw dB(A)	I or A m,m²	DO dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Ls dB(A)	Lr dB(A)
19. Cooling Water Pump		96.5		0	876.77	-69.8	-1.7	-16.6	-0.4	8.3	8.3
33. Raw Water Storage Tank		86.6		0	667.61	-67.5	-1.6	-11.7	-0.4	6.0	6.0
9. HRSG Aux Building-Facade 01	60	84.6	288.7	3	579.07	-66.2	-0.3	-1.8	-2.1	20.4	20.4
9. HRSG Aux Building-Facade 02	60	83.6	228	3	577.2	-66.2	-0.3	-8.8	-1.9	17.4	17.4
9. HRSG Aux Building-Facade 03	60	84.6	288.1	3	592.37	-66.4	-0.2	-24.7	-2.1	0.0	0.0
9. HRSG Aux Building-Facade 04	60	83.7	233.8	3	594.32	-66.5	-0.3	-18.9	-1.8	1.0	1.0
9. HRSG Aux Building-Roof 01	60	86.7	462.4	0	585.74	-66.3	-0.1	-7.5	-2.0	18.2	18.2
6. Gas Turbine Gen Hall-Facade 01	65.6	92.8	528.3	3	543.44	-65.7	2.1	-4.7	-0.1	27.5	27.5
6. Gas Turbine Gen Hall-Facade 02	65.6	91.8	416.5	3	543.11	-65.7	2.0	-4.9	-0.1	26.2	26.2
6. Gas Turbine Gen Hall-Facade 03	65.6	92.9	535.7	3	559.12	-65.9	2.1	-18.2	-0.1	14.9	14.9
6. Gas Turbine Gen Hall-Facade 04	65.6	91.9	422.1	3	559.51	-65.9	2.0	-22.5	-0.1	9.8	9.8
6. Gas Turbine Gen Hall-Roof 01	65.6	92.6	505.5	0	551.79	-65.8	1.4	-3.9	-0.1	24.2	24.2
35. Waste Water Treatment Plant-Facade 03	64.7	83.3	72.5	3	689.26	-67.8	3.5	-14.8	-0.1	7.1	7.1
35. Waste Water Treatment Plant-Facade 01	64.5	83.3	75.6	3	669.86	-67.5	3.4	-6.3	-0.1	15.9	15.9
5. Gas Turbine Hall-Facade 01	53.8+	82.3+	709.5	3	543.47	-65.7	3.1	-2.9	-0.1	19.8	19.8
5. Gas Turbine Hall-Facade 02	53.8+	78.3+	282.3	3	539.4	-65.6	3.1	-3.8	-0.1	15.8	15.8
5. Gas Turbine Hall-Facade 03	53.8+	79.7+	388.5	3	547.2	-65.8	3.1	-4.2	-0.1	15.9	15.9
5. Gas Turbine Hall-Facade 04	53.8+	81.9+	643.2	3	559.61	-65.9	3.2	-6.9	-0.1	15.1	15.1
5. Gas Turbine Hall-Facade 04	53.8+	82.1+	677.7	3	579.77	-66.3	3.2	-18.9	-0.1	4.4	4.4
5. Gas Turbine Hall-Facade 05	53.8+	77.5+	231.5	3	570.23	-66.1	3.1	-7.5	-0.1	10.1	10.1
5. Gas Turbine Hall-Facade 05	53.8+	75.2+	137.6	3	585.11	-66.3	3.0	-19	-0.1	0.0	0.0

Source	L'w dB(A)	Lw dB(A)	I or A m,m²	DO dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Ls dB(A)	Lr dB(A)
5. Gas Turbine Hall-Facade 08	53.8+	83.2+	863.2	3	573.44	-66.2	3.0	-24.1	-0.1	0.0	0.0
5. Gas Turbine Hall-Facade 09	53.8+	81.2+	551.2	3	557.34	-65.9	3.1	-13.9	-0.1	7.5	7.5
5. Gas Turbine Hall-Roof 01	53.8+	84.0+	1047.3	0	561.57	-66	2.6	-7.5	-0.1	14.7	14.7
11. Steam Turbine Aux Building-Facade 01	63.8	86.9	200.7	3	600.83	-66.6	4.0	-20.1	-0.1	7.1	7.1
11. Steam Turbine Aux Building-Facade 02	63.8	91.8	627.5	3	614.09	-66.8	4.0	-11.6	-0.1	20.6	20.6
11. Steam Turbine Aux Building-Facade 03	63.8	86.8	199.5	3	638.49	-67.1	4.1	-17.1	-0.1	11.5	11.5
11. Steam Turbine Aux Building-Facade 04	63.8	91.9	639.4	3	624.47	-66.9	4.0	-23.7	-0.1	8.3	8.3
11. Steam Turbine Aux Building-Roof 01	63.8	92.6	748.7	0	619.28	-66.8	3.1	-11.1	-0.1	19.1	19.1
8. HRSG Building - Main-Facade 01	53.4+	85.2+	1515.4	3	574.08	-66.2	3.2	-2.6	-0.1	22.6	22.6
8. HRSG Building - Main-Facade 02	53.4+	85.0+	1429.6	3	573.86	-66.2	3.2	-4.7	-0.1	20.2	20.2
8. HRSG Building - Main-Facade 03	53.4+	78.4+	314	3	586.12	-66.4	3.0	-19.8	-0.1	0.0	0.0
8. HRSG Building - Main-Facade 04	53.4+	84.7+	1328.2	3	596.98	-66.5	3.0	-19.8	-0.1	4.3	4.3
8. HRSG Building - Main-Facade 04	53.4+	85.1+	1477.5	3	615.85	-66.8	3.0	-13.8	-0.1	10.5	10.5
8. HRSG Building - Main-Facade 05	53.4+	85.2+	1507	3	615.61	-66.8	3.0	-19.0	-0.1	5.7	5.7
8. HRSG Building - Main-Facade 11	53.4+	78.6+	328.5	3	603.85	-66.6	3.2	-1.4	-0.1	16.7	16.7
8. HRSG Building - Main-Facade 12	53.4+	84.5+	1272.5	3	592.83	-66.5	3.2	-1.8	-0.1	22.4	22.4
8. HRSG Building - Main-Roof 01	53.4+	85.6+	1645.5	0	595.91	-66.5	2.8	-3.6	-0.1	18.2	18.2
HRSG Building - Stack-Facade 01	63.4	85.1	145.9	3	617.07	-66.8	2.9	-3.3	-0.1	20.8	20.8
HRSG Building - Stack-Facade 02	63.4	85	142.3	3	616.22	-66.8	2.8	-3.9	-0.1	20.0	20.0
HRSG Building - Stack-Facade 03	63.4	85.2	148.9	3	615.91	-66.8	3.0	-4.5	-0.1	19.8	19.8
HRSG Building - Stack-Facade 04	63.4	87.5	255.4	3	616.98	-66.8	2.8	-4.1	-0.1	22.3	22.3

Source	L'w dB(A)	Lw dB(A)	I or A m,m²	DO dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Ls dB(A)	Lr dB(A)
HRSG Building - Stack-Facade 05	63.4	84.7	134.3	3	618.79	-66.8	2.8	-4.3	-0.1	19.4	19.4
HRSG Building - Stack-Facade 06	63.4	85.2	151	3	620.39	-66.8	2.8	-14	-0.1	10.1	10.1
HRSG Building - Stack-Facade 07	63.4	88.3	305.9	3	622.56	-66.9	2.8	-14.2	-0.1	13.0	13.0
HRSG Building - Stack-Facade 08	63.4	86.7	212.7	3	623.52	-66.9	2.9	-12.2	-0.1	13.5	13.5
HRSG Building - Stack-Facade 09	63.4	87.5	256	3	622.23	-66.9	2.9	-9.1	-0.1	17.3	17.3
HRSG Building - Stack-Facade 10	63.4	86	180	3	620.2	-66.8	2.8	-7.2	-0.1	17.7	17.7
HRSG Building - Stack-Facade 11	63.4	85.1	145.5	3	618.36	-66.8	2.8	-3.4	-0.1	20.6	20.6
HRSG Building - Stack-Roof 01	63.4	80	45.4	0	623.17	-66.9	2.8	-2.2	-0.1	13.7	13.7
10. Steam Turbine Hall-Facade 01	53.2+	84.1+	1218.4	3	617.92	-66.8	3	-20.2	-0.1	3.0	3.0
10. Steam Turbine Hall-Facade 02	53.2+	85.6+	1721.4	3	624.55	-66.9	3.2	-8.2	-0.1	16.6	16.6
10. Steam Turbine Hall-Facade 03	53.2+	79.0+	381.5	3	647.35	-67.2	3.1	-18.7	-0.1	0.0	0.0
10. Steam Turbine Hall-Facade 04	53.2+	82.5+	842.1	3	658.45	-67.4	3.2	-18.7	-0.1	2.6	2.6
10. Steam Turbine Hall-Facade 05	53.2+	85.5+	1705.4	3	647.76	-67.2	3.1	-19.6	-0.1	4.8	4.8
10. Steam Turbine Hall-Roof 01	53.2+	85.6+	1711.3	0	636.57	-67.1	2.6	-8.9	-0.1	12.1	12.1
35. Waster Water Treatment Plant-Roof 01	61.2	83.3	162.5	0	679.46	-67.6	2.9	-3.3	-0.1	15.1	15.1
35. Waster Water Treatment Plant-Facade 02	59.9	83.3	217.4	3	677.51	-67.6	3.4	-3.8	-0.1	18.3	18.3
35. Waster Water Treatment Plant-Facade 04	59.8	83.3	222.8	3	681.46	-67.7	3.5	-15.4	-0.1	6.6	6.6
32. Water Treatment Building-Facade 03	59.6	83.3	237.7	3	704.94	-68	3.5	-16.2	-0.1	5.9	5.9
32. Water Treatment Building-Facade 01	59.4	83.3	246.7	3	669.74	-67.5	3.4	-4.4	-0.1	17.7	17.7
32. Water Treatment Building-Facade 02	57	83.3	432.9	3	679.8	-67.6	3.4	-4.2	-0.1	17.8	17.8
32. Water Treatment Building-Facade 04	56.9	83.3	438.4	3	694.35	-67.8	3.5	-16.5	-0.1	7.8	7.8

Source	L'w dB(A)	Lw dB(A)	I or A m,m²	DO dB	S m	Adiv dB	Agr dB	Abar dB	Aatm dB	Ls dB(A)	Lr dB(A)
32. Water Treatment Building-Roof 01	53.1	83.3	1054.9	0	687.02	-67.7	2.9	-3.8	-0.1	14.9	14.9

+Sound power level has been reduced via attenuation at source or by attenuation through sound insulation in the mitigated scenario

*Additional barrier attenuation has been applied in the mitigated scenario

ANNEX C: CALIBRATION CERTIFICATES

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 12 August 2022

Certificate Number: UCRT22/2001

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	AECOM 12 Regan Way Chetwynd Business Park Nottingham NG9 6RZ
Order No.	1535420
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	00386762
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	76912
Rion	Microphone	UC-59	12802
Brüel & Kjær	Calibrator	4231	2217877
	Calibrator adaptor type if applicable		UC 0210

Performance Class	1
Test Procedure	TP 10. SLM 61672-3:2013
	Procedures from IEC 61672-3:2013 were used to perform the periodic tests.
Type Approved to IEC 61672-1:2013	Yes
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2013
Date Received	11 August 2022 ANV Job No. UKAS22/08525
Date Calibrated	12 August 2022

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	14 July 2020	UCRT20/1623	0653

CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0653

Certificate Number
UCRT22/2001

Page 2 of 2 Pages

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	NL-52/NL-42 Description for IEC 61672-1		
SLM instruction manual ref / issue	No. 56034 21-03	Source	Rion
Date provided or internet download date	19 March 2021		

	Case Corrections	Wind Shield Corrections	Mic Pressure to Free Field Corrections
Uncertainties provided	Yes	Yes	Yes

Total expanded uncertainties within the requirements of IEC 61672-1:2013 YES

Specified or equivalent Calibrator	Equivalent		
Customer or Lab Calibrator	Customers Calibrator		
Calibrator adaptor type if applicable	UC 0210		
Calibrator cal. date	11 August 2022		
Calibrator cert. number	UCRT22/1994		
Calibrator cal cert issued by Lab	0653		
Calibrator SPL @ STP	93.98	dB	Calibration reference sound pressure level
Calibrator frequency	999.97	Hz	Calibration check frequency
Reference level range	Single	dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15

Note - The Extension Cable was used between the SLM and the pre-amp for this calibration.

Environmental conditions during tests	Start	End	
Temperature	22.56	23.73	± 0.30 °C
Humidity	48.8	46.5	± 3.00 %RH
Ambient Pressure	100.97	100.92	± 0.03 kPa

Indication at the Calibration Check Frequency

Initial indicated level	94.0	dB	Adjusted indicated level	94.0 dB
Uncertainty of calibrator used for Indication at the Calibration Check Frequency ±				0.10 dB

Self Generated Noise

Microphone installed - Less Than 18.4 dB A Weighting

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	12.7	dB	UR	16.5	dB	UR	22.3	dB	UR

Self Generated Noise reported for information only and not used to assess conformance to a requirement

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

None

END

Calibrated by: PB/BB

R 1

MEASUREMENT SYSTEMS

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 29 March 2023

Certificate Number: UCRT23/1442

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	ANV Measurement Systems Beaufort Court 17 Roebuck Way Knowlhill Milton Keynes MK5 8HL			
Order No.	ANV MS HIRE			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	00620880
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	20940
	Rion	Microphone	UC-59	03474
	Rion	Calibrator	NC-74	34536109
		Calibrator adaptor type if applicable		NC-74-002
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49 *Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*			
Type Approved to IEC 61672-1:2002	YES	Approval Number	21.21 / 13.02	
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003			
Date Received	23 March 2023	ANV Job No.	UKAS23/03211	
Date Calibrated	29 March 2023			

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. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	04 March 2022	UCRT22/1311	0653

CERTIFICATE OF CALIBRATION	Certificate Number UCRT23/1442
UKAS Accredited Calibration Laboratory No. 0653	Page 2 of 2 Pages

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter NL-42 / NL-52		
SLM instruction manual ref / issue	11-03		
SLM instruction manual source	Manufacturer		
Internet download date if applicable	N/A		
Case corrections available	Yes		
Uncertainties of case corrections	Yes		
Source of case data	Manufacturer		
Wind screen corrections available	Yes		
Uncertainties of wind screen corrections	Yes		
Source of wind screen data	Manufacturer		
Mic pressure to free field corrections	Yes		
Uncertainties of Mic to F.F. corrections	Yes		
Source of Mic to F.F. corrections	Manufacturer		
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes		
Specified or equivalent Calibrator	Specified		
Customer or Lab Calibrator	Lab Calibrator		
Calibrator adaptor type if applicable	NC-74-002		
Calibrator cal. date	23 March 2023		
Calibrator cert. number	UCRT23/1384		
Calibrator cal cert issued by	0653		
Calibrator SPL @ STP	94.04	dB	Calibration reference sound pressure level
Calibrator frequency	1001.98	Hz	Calibration check frequency
Reference level range	25 - 130	dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End		
Temperature	23.32	23.16	± 0.30	°C
Humidity	47.7	47.3	± 3.00	%RH
Ambient Pressure	99.75	99.69	± 0.03	kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.2	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	14.7	dB	UR	18.7	dB	UR	24.4	dB	UR
Uncertainty of the electrical self generated noise ±							0.12	dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

END

Calibrated by: BB/KZ R 1

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

None

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 06 January 2023 **Certificate Number: UCRT23/1023**

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	ANV Measurement Systems Beaufort Court 17 Roebuck Way Milton Keynes MK5 8HL			
Order No.	ANV MS HIRE			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	00821105
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	21146
	Rion	Microphone	UC-59	04086
	Rion	Calibrator	NC-74	34536109
		Calibrator adaptor type if applicable		NC-74-002
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49			
	Procedures from IEC 61672-3:2006 were used to perform the periodic tests.			
Type Approved to IEC 61672-1:2002	YES	Approval Number	21.21 / 13.02	
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003			
Date Received	23 December 2022	ANV Job No.	UKAS22/12805	
Date Calibrated	06 January 2023			

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. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	11 January 2022	UCRT22/1039	0653

CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0653

Certificate Number
UCRT23/1023

Page 2 of 2 Pages

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52	
SLM instruction manual ref / issue		11-03	
SLM instruction manual source		Manufacturer	
Internet download date if applicable		N/A	
Case corrections available		Yes	
Uncertainties of case corrections		Yes	
Source of case data		Manufacturer	
Wind screen corrections available		Yes	
Uncertainties of wind screen corrections		Yes	
Source of wind screen data		Manufacturer	
Mic pressure to free field corrections		Yes	
Uncertainties of Mic to F.F. corrections		Yes	
Source of Mic to F.F. corrections		Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes	
Specified or equivalent Calibrator		Specified	
Customer or Lab Calibrator		Lab Calibrator	
Calibrator adaptor type if applicable		NC-74-002	
Calibrator cal. date		14 December 2022	
Calibrator cert. number		UCRT22/2470	
Calibrator cal cert issued by		0653	
Calibrator SPL @ STP		94.03 dB	Calibration reference sound pressure level
Calibrator frequency		1001.99 Hz	Calibration check frequency
Reference level range		25 - 130 dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15

Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	23.76	23.47	± 0.30 °C
Humidity	45.9	45.0	± 3.00 %RH
Ambient Pressure	100.31	100.25	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.1 dB		Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	11.9	dB	UR	15.8	dB	UR	21.9	dB	UR
Uncertainty of the electrical self generated noise ±							0.12	dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

END

Calibrated by: PB R 1

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

None

MEASUREMENT SYSTEMS

CERTIFICATE OF CONFORMANCE

Date of Issue	**11 October 2021**
Customer	**AECOM Limited**
Certificate Number	**CONF102105**

	Manufacturer	**Type**	**Serial**
Sound Level Meter	Rion	NL-52	00710387
Preamplifier	Rion	NH-25	10930
Microphone	Rion	UC-59	19663

This is to certify that the instrument was tested and calibrated at the Manufacturer's factory according to their specification and that the product satisfied all the relevant requirements of the following Standards:

IEC 61672-1:2013 Class 1.

The instrument also received a functional check by ANV Measurement Systems prior to despatch in the UK, in accordance with our standard procedures.

Signed..... Position. Calibration Technician Date. 11 October 2021

B. Bogdan

BEAUFORT COURT, 17 ROEBUCK WAY, MILTON KEYNES, MK5 8HL
☎ 01908 642846 🖷 01908 642814
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CERTIFICATE OF CALIBRATION

0653

Date of Issue: 13 September 2023 **Certificate Number: UCRT23/2174**

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	AECOM 10th Floor Sunley House 4 Bedford Park Croydon CR0 2AP			
Order No.	1608126			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	00743081
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	43109
	Rion	Microphone	UC-59	23362
	Rion	Calibrator	NC-75	34334830
		Calibrator adaptor type if applicable		NC-75-022
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49 *Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*			
Type Approved to IEC 61672-1:2002	YES	Approval Number	21.21 / 13.02	
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003			
Date Received	16 August 2023	ANV Job No.	UKAS23/08569	
Date Calibrated	13 September 2023			

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. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	16 May 2022	UCRT22/1659	0653

CERTIFICATE OF CALIBRATION	Certificate Number UCRT23/2174
UKAS Accredited Calibration Laboratory No. 0653	Page 2 of 2 Pages

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title Sound Level Meter	NL-42 / NL-52		
SLM instruction manual ref / issue	11-03		
SLM instruction manual source	Manufacturer		
Internet download date if applicable	N/A		
Case corrections available	Yes		
Uncertainties of case corrections	Yes		
Source of case data	Manufacturer		
Wind screen corrections available	Yes		
Uncertainties of wind screen corrections	Yes		
Source of wind screen data	Manufacturer		
Mic pressure to free field corrections	Yes		
Uncertainties of Mic to F.F. corrections	Yes		
Source of Mic to F.F. corrections	Manufacturer		
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes		
Specified or equivalent Calibrator	Specified		
Customer or Lab Calibrator	Lab Calibrator		
Calibrator adaptor type if applicable	NC-75-022		
Calibrator cal. date	11 September 2023		
Calibrator cert. number	UCRT23/2156		
Calibrator cal cert issued by	0653		
Calibrator SPL @ STP	94.00	dB	Calibration reference sound pressure level
Calibrator frequency	1000.00	Hz	Calibration check frequency
Reference level range	25 - 130	dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	22.95	23.12	± 0.30 °C
Humidity	36.8	37.7	± 3.00 %RH
Ambient Pressure	101.23	101.23	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.0	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting	
Uncertainty of the microphone installed self generated noise ±	N/A	dB		

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	11.5	dB	UR	14.6	dB	UR	20.7	dB	UR
Uncertainty of the electrical self generated noise ±						0.12		dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

…… END ……

Calibrated by: K. Zablocki R 1

Additional Comments The results on this certificate only relate to the items calibrated as identified above.
Prior to calibration the instrument's microphone was replaced and the meter was realigned.

Sem 45

MEASUREMENT SYSTEMS

CERTIFICATE OF CONFORMANCE

Date of Issue	**26 June 2018**
Customer	**AECOM Infrastructure & Environment UK Ltd**
Certificate Number	**CONF061817**

	Manufacturer	**Type**	**Serial**
Sound Level Meter	Rion	NL-52	00386763
Preamplifier	Rion	NH-25	76913
Microphone	Rion	UC-59	12806

This is to certify that the instrument was tested and calibrated at the Manufacturer's factory according to their specification and that the product satisfied all the relevant requirements of the following Standards:

IEC 61672-1:2013 Class 1.

The instrument also received a functional check by ANV Measurement Systems prior to despatch in the UK, in accordance with our standard procedures.

Signed. Amrat C. Patel Position. Calibration Technician Date. 26 June 2018

A Patel

BEAUFORT COURT, 17 ROEBUCK WAY, MILTON KEYNES, MK5 8HL
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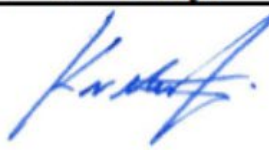
CERTIFICATE OF CALIBRATION

0653

Date of Issue: 01 December 2022 **Certificate Number: UCRT22/2425**

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory



K. Mistry

Customer	ANV Measurement Systems Beaufort Court 17 Roebuck Way Milton Keynes MK5 8HL
Order No.	ANV MS HIRE
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	01143558
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	43575
Rion	Microphone	UC-59	07367
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1
Test Procedure TP 2.SLM 61672-3 TPS-49
Procedures from IEC 61672-3:2006 were used to perform the periodic tests.
Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02
If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003
Date Received 29 November 2022 ANV Job No. UKAS22/11747
Date Calibrated 01 December 2022

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. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate

Dated	*Certificate No.*	*Laboratory*
10 January 2022	UCRT22/1036	0653

CERTIFICATE OF CALIBRATION	Certificate Number
UKAS Accredited Calibration Laboratory No. 0653	UCRT22/2425
	Page 2 of 2 Pages

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52	
SLM instruction manual ref / issue		11-03	
SLM instruction manual source		Manufacturer	
Internet download date if applicable		N/A	
Case corrections available		Yes	
Uncertainties of case corrections		Yes	
Source of case data		Manufacturer	
Wind screen corrections available		Yes	
Uncertainties of wind screen corrections		Yes	
Source of wind screen data		Manufacturer	
Mic pressure to free field corrections		Yes	
Uncertainties of Mic to F.F. corrections		Yes	
Source of Mic to F.F. corrections		Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002		Yes	
Specified or equivalent Calibrator		Specified	
Customer or Lab Calibrator		Lab Calibrator	
Calibrator adaptor type if applicable		NC-74-002	
Calibrator cal. date		09 November 2022	
Calibrator cert. number		UCRT22/2334	
Calibrator cal cert issued by		0653	
Calibrator SPL @ STP	94.02	dB	Calibration reference sound pressure level
Calibrator frequency	1001.92	Hz	Calibration check frequency
Reference level range	25 - 130	dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End		
Temperature	22.29	22.22	± 0.30	°C
Humidity	47.1	47.2	± 3.00	%RH
Ambient Pressure	101.95	101.90	± 0.03	kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.0	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	13.3	dB	UR	17.9	dB	UR	24.6	dB	UR
Uncertainty of the electrical self generated noise ±							0.12	dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

END

Calibrated by: PB/BB R 1

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

None

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 27 October 2022

Certificate Number: UCRT22/2282

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

B. Bogdan

Customer	ANV Measurement Systems Beaufort Court 17 Roebuck Way Milton Keynes MK5 8HL			
Order No.	ANV MS HIRE			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	01121402
	Rion	Firmware		2.1
	Rion	Pre Amplifier	NH-25	21446
	Rion	Microphone	UC-59	04419
	Rion	Calibrator	NC-74	34536109
		Calibrator adaptor type if applicable		NC-74-002
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49 *Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*			
Type Approved to IEC 61672-1:2002	YES	Approval Number	21.21 / 13.02	
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003			
Date Received	19 October 2022	ANV Job No.	UKAS22/10657	
Date Calibrated	27 October 2022			

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. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	12 September 2019	UCRT19/2022	0653

CERTIFICATE OF CALIBRATION	Certificate Number UCRT22/2282
UKAS Accredited Calibration Laboratory No. 0653	Page 2 of 2 Pages

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title Sound Level Meter	NL-42 / NL-52		
SLM instruction manual ref / issue	11-03		
SLM instruction manual source	Manufacturer		
Internet download date if applicable	N/A		
Case corrections available	Yes		
Uncertainties of case corrections	Yes		
Source of case data	Manufacturer		
Wind screen corrections available	Yes		
Uncertainties of wind screen corrections	Yes		
Source of wind screen data	Manufacturer		
Mic pressure to free field corrections	Yes		
Uncertainties of Mic to F.F. corrections	Yes		
Source of Mic to F.F. corrections	Manufacturer		
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes		
Specified or equivalent Calibrator	Specified		
Customer or Lab Calibrator	Lab Calibrator		
Calibrator adaptor type if applicable	NC-74-002		
Calibrator cal. date	07 October 2022		
Calibrator cert. number	UCRT22/2190		
Calibrator cal cert issued by	0653		
Calibrator SPL @ STP	94.02	dB	Calibration reference sound pressure level
Calibrator frequency	1001.92	Hz	Calibration check frequency
Reference level range	25 - 130	dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	23.07	22.86	± 0.30 °C
Humidity	64.4	58.4	± 3.00 %RH
Ambient Pressure	100.22	100.20	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.0	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than			N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±			N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	12.5	dB	UR	16.5	dB	UR	22.2	dB	UR
Uncertainty of the electrical self generated noise ±							0.12	dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

END

Calibrated by: PB/BB R 1

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

None

ANNEX D: CREDENTIALS

Surveyors

Samuel Ellwood, BSc (Hons) MIOA

Patrick Wood Martinez, BEng MEng AMIOA

Reporting

Matthew Griffin, BSc MSc AMIOA

Sarah Dennison, MEng MIOA

David Hiller, BSc MSc PhD CEng MIOA MIMMM FGS