Powerfuel Portland

Portland Energy Recovery Facility

BS4142 Noise Impact Assessment

AAc/267701/R04

Issue | 17 October 2023

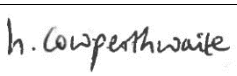
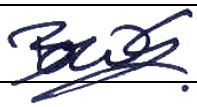
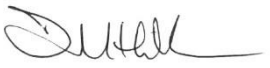
Job number 267701-15

Ove Arup & Partners Ltd
6th Floor 3 Piccadilly Place
Manchester M1 3BN
United Kingdom
www.arup.com

ARUP

Document verification

ARUP

Job title		Portland Energy Recovery Facility			**Job number** 267701-15
Document title		BS4142 Noise Impact Assessment			**File reference**
Document ref		AAc/267701/R04			
Revision	**Date**	**Filename**	R03a-dh-2021-05-21.docx		
Issue 2	21 May 2021	**Description**	Minor corrections to first version		
			Prepared by	Checked by	Approved by
		Name	David Hiller BSc MSc PhD CEng MIOA MIMMM FGS	Greg Harris MSc MIOA	David Hiller BSc MSc PhD CEng MIOA MIMMM FGS
		Signature			
Issue 3	17 October 2023	**Filename**	R04-2023-10-10.docx		
		Description	Consideration of Bibby Stockholm and update to baseline survey data.		
			Prepared by	**Checked by**	**Approved by**
		Name	Holly Cowperthwaite BEng AMIOA	Ben Cox BEng MIOA	David Hiller BSc MSc PhD CEng MIOA MIMMM FGS
		Signature			
		Filename			
		Description			
			Prepared by	**Checked by**	**Approved by**
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	**Checked by**	**Approved by**
		Name			
		Signature			

Press Control+Shift+D to insert or **Issue Document verification with document** ✓

Contents

Page

1 Introduction 2

2 The site, its location and noise sensitive receptors 2

2.1 Proposed site activities 4
2.2 Sensitive receptors 6

3 Baseline sound surveys 7

4 Noise modelling 8

4.1 Noise sources 9
4.2 Noise from the ERF 9
4.3 Noise from the Bibby Stockholm generators 10
4.4 Modelling results 11

5 Assessment 12

5.1 Noise mitigation measures 14

6 Conclusions 15

Appendices

Appendix A

Environment Agency's letter dated 08.09.2023 in relation to Environmental Permit reference EPR/AP3304SZ/A001

Appendix B

Acoustic Terminology

Appendix C

Baseline sound survey

Appendix D

Noise modelling assumptions

Executive summary

This report responds to Environment Agency's letter dated 08 September 2023 in relation to Environmental Permit reference EPR/AP3304SZ/A001 (see Appendix A). Amongst other things this requests further assessment of noise impact from the proposed Powerfuel Portland Energy Recovery Facility (ERF) in relation to the Bibby Stockholm migrant accommodation barge. Specifically, a more detailed assessment was requested in line with British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*.

The ERF application site is located on the north end of the Isle of Portland, to the west of Balaclava Bay. The closest permanent residential building is more than 500m from the west of the site. However, a Bibby Marine Ltd accommodation vessel, the Bibby Stockholm, is presently moored at the Portland Dock around 300m from the north west perimeter of the site. This is planned to accommodate migrants into the UK. The Bibby Stockholm arrived at Portland Port on 17th July 2023 and is contracted to remain at the Port for 18 months. Whilst the contract end date occurs some years before the ERF would be operational, the Environment Agency has requested that the Bibby Stockholm be included as a noise sensitive residential dwelling for the assessment.

An initial baseline noise survey was undertaken in April 2021 at a time when some but not all the COVID-19 pandemic restrictions had been eased. For this reason, and because of the passage of time, a new second baseline noise survey has been undertaken in September 2023.

Noise impacts from the ERF were calculated using a 3D model developed with SoundPlan noise modelling software. The plant sound levels used in the model were taken from data from permitted facilities elsewhere.

The assessment shows the predicted rating sound levels from the ERF to be above the background levels by 3dB at the Bibby Stockholm and at properties along Verne Common Road. Practicable mitigation measures have been designed and applied to the stack and to the façade of the turbine hall to reduce the overall noise emission level from the ERF to below background at all assessment locations. These mitigation measures will not change the external dimensions or appearance of the buildings compared to the application drawings.

In absolute terms the noise levels are low, indicating that the effect of noise from the operation of the ERF with the additional mitigation would be not significant.

1 Introduction

This report responds to Environment Agency's letter dated 08 September 2023 in relation to Environmental Permit reference EPR/AP3304SZ/A001 (see Appendix A). Amongst other things this requests further assessment of noise impact from the proposed Powerfuel Portland Energy Recovery Facility (ERF) in relation to the Bibby Stockholm migrant accommodation barge. Specifically, a more detailed assessment was requested in line with British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*.

An initial assessment was undertaken during the Covid-19 lockdown period, which prevented a baseline survey from being undertaken at that time. Consequently, that initial assessment used baseline survey data collected around the port, as part of on-going environmental monitoring, using an approach agreed with Dorset Council. This initial assessment was presented in the Noise Impact Assessment report referenced AAc/267701-15/R01 and dated 26 August 2020.

A subsequent assessment was undertaken in April 2021 and included a baseline noise survey at various noise sensitive receptors around the site. The assessment report, referenced AAc/267701/R03a, was undertaken at a time when some of the restrictions associated with the third national lockdown due to the COVID-19 pandemic were still in place. These restrictions meant that operations at the port along with the amounts of traffic on the roads around Portland may not have been representative of the normal operation before the pandemic.

Accordingly, for robustness, this report presents the results of new baseline noise measurements made in September 2023 when all COVID-19 restrictions had been lifted for more than 6 months, allowing the conditions to return to normal levels. Further, and for completeness, given the new survey work carried out, the noise effects have been re-assessed for all representative noise sensitive receptors, not just the Bibby Stockholm.

Appendix B provides a glossary of acoustic terminology used in this report.

2 The site, its location and noise sensitive receptors

Figure 1 shows the ERF installation boundary and Figures 2 and 3 show the boundary in the context of the wider Portland area. The closest noise sensitive receptors are identified in Figure 2 in red, with other noise sensitive locations in yellow.

The site is bordered to the south west by a former railway embankment and Incline Road, which is a private road within the port that is actively used by port traffic. Cliffs supporting grassland, scrub and woodland habitats lie to the south west of the disused rail embankment and rise steeply to approximately 125m above ordinance datum. His Majesty's Prison The Verne is approximately 430m to the south west of the site at the top of the steep slope. The eastern site boundary is formed by the shingle shoreline and overland fuel pipes from Portland Bunkers,

which are fuel bunkers in the nearby cliffs used for marine fuel supply. Existing operational port developments lies to the north and north west of the site, including the moored Bibby Stockholm accommodation vessel.

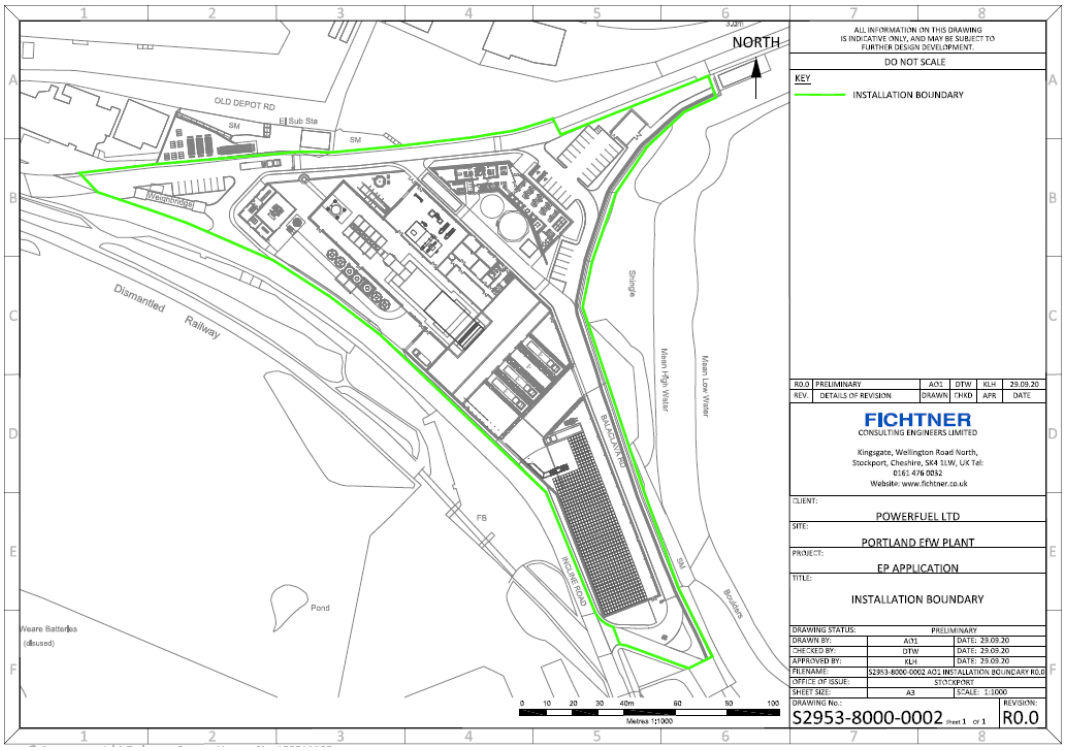


Figure 1 ERF installation boundary

Figure 2 ERF installation boundary and the nearest noise sensitive receptors (reassessment receptors in red)

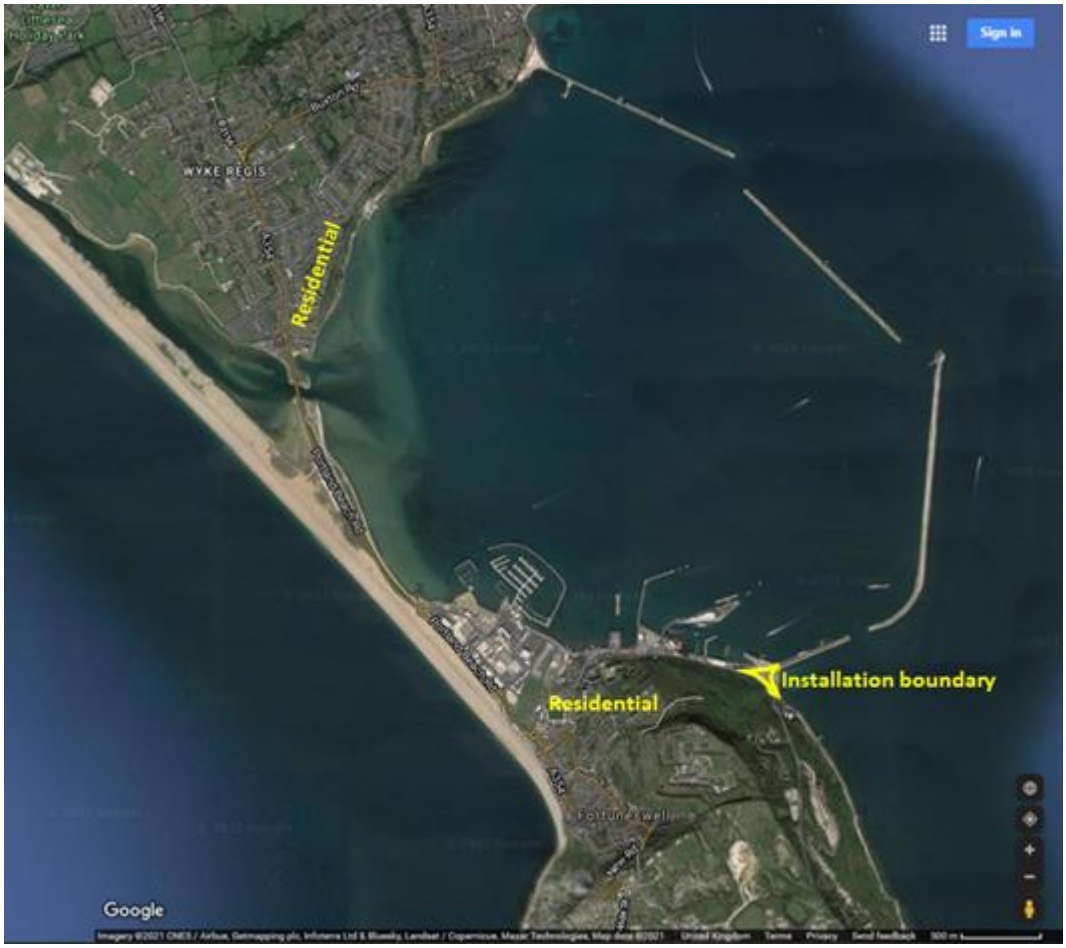


Figure 3 ERF installation boundary in the context of the wider area

2.1 Proposed site activities

The proposed development (see Figure 4 and Figure 5) is envisaged to comprise an ERF that will treat up to approximately 202,000 tonnes per annum of non-hazardous, residual waste material, with a nominal capacity of 183,000 tonnes per annum. Waste will be in the form of residual waste including RDF (refuse derived fuel). It will be a mass burn facility, using boiler and moving grate technology.

The building will enclose all elements of the RDF bale storage area in the fuel hall and waste bunker, tipping hall, cranes, conveyors, feed hopper, furnace, boiler, condenser units and turbine / generator.

The ERF will normally operate 24 hours a day, seven days a week. Residual waste for the facility will be delivered by road lorry in a baled or loose format. It could also be delivered in baled form only by ship. The road traffic noise assessment has assumed the 'worst case' traffic noise impact based on all waste inputs arriving by road during daytime. The speed limit on site is 20mph. Deliveries by sea will be unloaded via an existing berth in the port, normally the berth closest to the site, then brought up to the site from the berth by road vehicle. Vehicles servicing the ERF will operate on roads already used by other vehicles related to the port activities.

Figure 4 Visualisation of proposed ERF viewed from north east

In addition to the activities within the installation boundary, the planning application also includes associated infrastructure, including the substations and facilities required to provide electricity for ships alongside at berth. These were included in the assessment reported in report reference AAc/267701-15/R01 and made little contribution to the overall sound levels at the noise sensitive receptors.

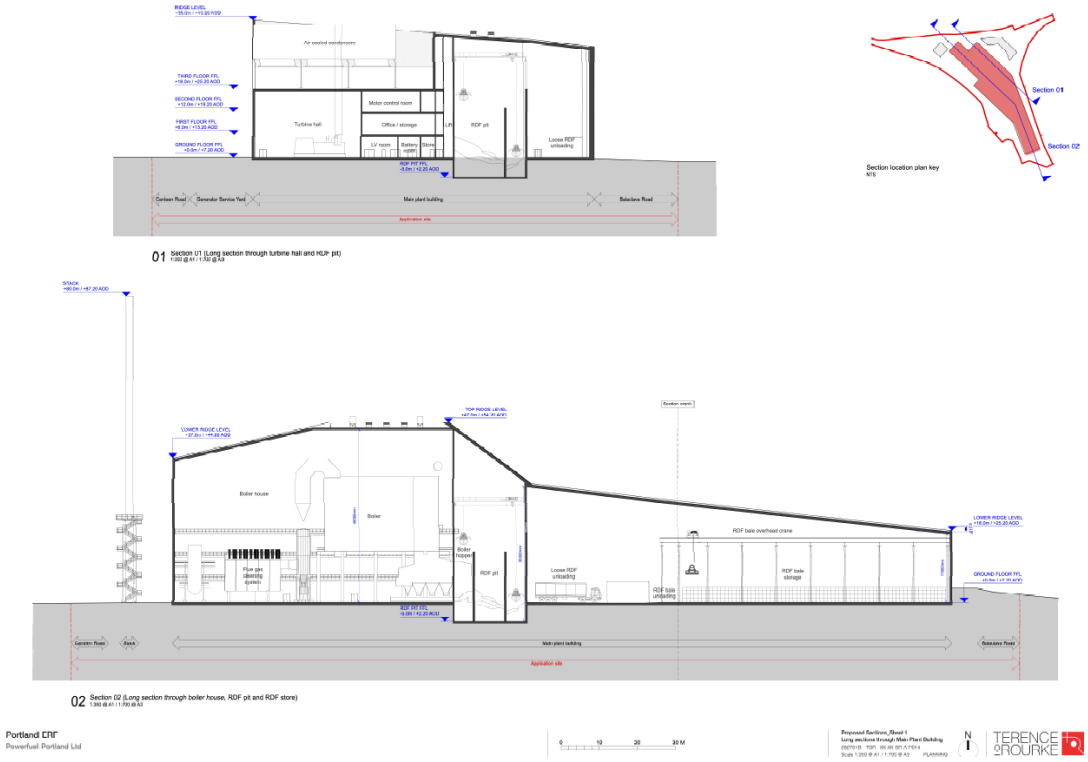


Figure 5 Long sections through the proposed ERF

2.2 Sensitive receptors

Assessment of noise from the site has been carried out for:

- Dwellings to the west of the site, on Beel Close, Leet Close, East Weare Road and Ayton Drive;
- Bibby Stockholm, the Bibby Marine Ltd accommodation vessel moored at Portland port;
- Dwellings at the top of Verne Common Road;
- Crabbers' Wharf holiday apartments;
- His Majesty's Prison (HMP) The Verne;
- Dwellings and businesses on Castletown;
- Portland Harbour moorings; and
- Residences on the north west side of the harbour at Wyke Regis and surrounding area.

3 Baseline sound surveys

In the 2021 sound survey, short-term measurements were made at residential areas across the far side of Portland Harbour. These were to enable noise impacts to be assessed at dwellings where sound propagation from the ERF would be across open water. These locations are over 3km from the Bibby Stockholm vessel and the ERF site, where changes in the baseline are low risk to this assessment.

Continuously logging sound level meters were installed as near as possible to the three closest residential properties: Leet Close, 3 Verne Common Road (Verne House), and at the port adjacent to the Bibby Stockholm accommodation vessel. These loggers collected data from Wednesday 13 to Thursday 21 September 2023 to capture sound levels during both weekdays and over a weekend. Details of the sound survey are given in Appendix C with the locations of the loggers shown in Figure C1.

At present, three generators provide the electrical power for the Bibby Stockholm vessel. Under normal operation of the vessel, two of these three will be running continuously throughout the day and night. These generators will be used throughout the 18 month contracted period that the Bibby Stockholm will be present in the port. However, in the event the vessel remains for a much longer period, they would be replaced by 'shore power' provided from the ERF. At the time of the measurements, two of the generators were running, but were they to be replaced by a grid connection the measured levels at this location and potentially at other locations near to the vessel will be lower. In order to understand how much these generators contribute to the current sound levels around the port, near-field spot measurements were taken around the generators at distances of less than 5m. Measurements this close ensure that the generator noise is dominate and allow calculations to be made of the likely levels of generator noise experienced at other locations away from the port.

Baseline levels were not measured at dwellings and businesses on Castletown as these locations would be more screened from the ERF and are already exposed to higher sound levels from the port. Control of the ERF to comply with levels at the closer receptors where baseline sound was measured will therefore ensure compliance at receptors on Castletown.

The baseline sound levels, including those measured in 2021 at residential areas across the far side of Portland Harbour, are summarised in Table 1 and Appendix C. For the short duration measurements, the mean average was taken as the representative level.

For the continuously logged data, a histogram was produced to illustrate the distribution of measured background (L_{A90}) sound levels (see Figure 10, 12, 14, Appendix C). The ambient (L_{Aeq}) and maximum ($L_{Amax,F}$) levels are also shown. The representative baseline level was determined by inspection following the method described in BS4142[1] as the point above which most of the measured sound levels occur. The histograms help to illustrate where outliers exist, which

[1] BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.

are those levels considered infrequent enough not to be representative of typical conditions.

Table 1 Representative baseline sound levels (day 07.00-23.00; night 23.00-07.00)

Location	Representative receptors	Background level $dBL_{A90,15min}$	
		Day	Night
1	Residences at East Weare Road, Leet Close, Beel Close	33	33
2	Bibby Stockholm	41	40
3	Residences at the top of Verne Common Road	32	31
A (2021)	Wyke Regis (Castle Cove area)	39	32
B (2021)	Wyke Regis (south)	40	33

All three loggers were placed in very close proximity to the nearest noise sensitive locations and are therefore representative of the typical baseline sound levels they would experience.

Since the ERF will operate 24 hours a day, the rating noise level from its operation will be compared against the lower of the day and night baseline sound levels presented in Table 1.

4 Noise modelling

Noise impacts were calculated using a 3D representation of the ERF and surrounding topography built with SoundPlan modelling software. This is a proprietary software package commonly used in environmental noise assessment and implements the calculation methodology described in ISO 9613-2[2]. This method allows the calculation of sound levels at distance from the source(s) and takes account of factors including geometrical spreading, air absorption, ground properties, screening effects of buildings and topography.

The main factors required for the assessment are given below and full details required by the Environment Agency[3] are in Appendix B and Appendix C.

[2] ISO 9613-2, Acoustics – Attenuation of sound during propagation outdoors, Part 2, General method of calculation, 1996.
[3] Environment Agency 2019. Noise impact assessments involving calculations or modelling. Noise impact assessments involving calculations or modelling - GOV.UK (www.gov.uk). Accessed 12 October 2023

4.1 Noise sources

Table 2 provides the assumed sound levels used in the noise model, which are taken from data provided by the client team for permitted facilities elsewhere with similar noise-producing elements.

Table 2 Representative sound levels for ERF site plant

Plant	Sound power level (SWL) / Sound pressure level (SPL), dB(A)
Waste unloading, waste pit, bale store, control room, boiler room (reverberant level)	85 (SPL)
Flue stack (top)	95 (SWL)
Turbine hall	95 (SPL)
Air cooled condenser	92 each of 3 fans (SWL)

Operation of the facility is expected to require up to 80 HGV movements per day on the public highway, which represents 40 HGVs at the ERF over the course of a day. This figure is a conservative worst case as incinerator bottom ash will be exported by ship (reducing HGV numbers). Within the port, these will operate on existing roads already used by other vehicles relating to the port activities. Unloading of HGVs will be within the enclosed unloading hall.

4.2 Noise from the ERF

The building envelope design and materials have been included in the calculated noise emission levels based on profiled steel sheet cladding with louvres to the lower 6m of the walls. Whilst plants of this type do operate without cladding in some locations, profiled steel is a standard design which provides reduced noise emissions compared to the more exposed basic design. Transmission loss data assumed in the modelling of noise from the ERF have been taken from Arup's database are shown in Table 3.

Table 3 Building envelope transmission loss data, dB

Material	Rating Rw, dB	Octave band centre frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Profiled metal	23	12	18	20	21	21	25	25	25
Louvred walls	14	5	7	11	12	13	14	12	9

The air cooled condensers (ACCs; No. 7 shown on Figure 4) are the main significant source but would be screened from the closest residential properties to the west and those on Verne Common Road by the ERF building. There will also be screening breaking the line of sight to all other noise sensitive receptors. The ACCs are therefore not a dominant noise source at the offsite noise sensitive receptors: the modelling results showed the source contributing most to the total noise level was the stack flue for most receptors.

4.3 Noise from the Bibby Stockholm generators

As described previously, the generators currently powering the accommodation vessel are planned to serve it throughout its 18 month contracted stay. However, were the vessel to remain in the port for a long time, they would be replaced by shore power generated from the ERF.

To understand how the generators affect the baseline measurements at Leet Close and Verne Common Road, the near-field generator measurements were used to validate a noise prediction model for just generator noise. The result of this generator only modelling are presented in Figure 6. The modelling shows that the levels of generator noise are more than 10dB below the lowest measured baseline level and therefore do not contribute significantly at the noise sensitive locations other than the Bibby Stockholm.

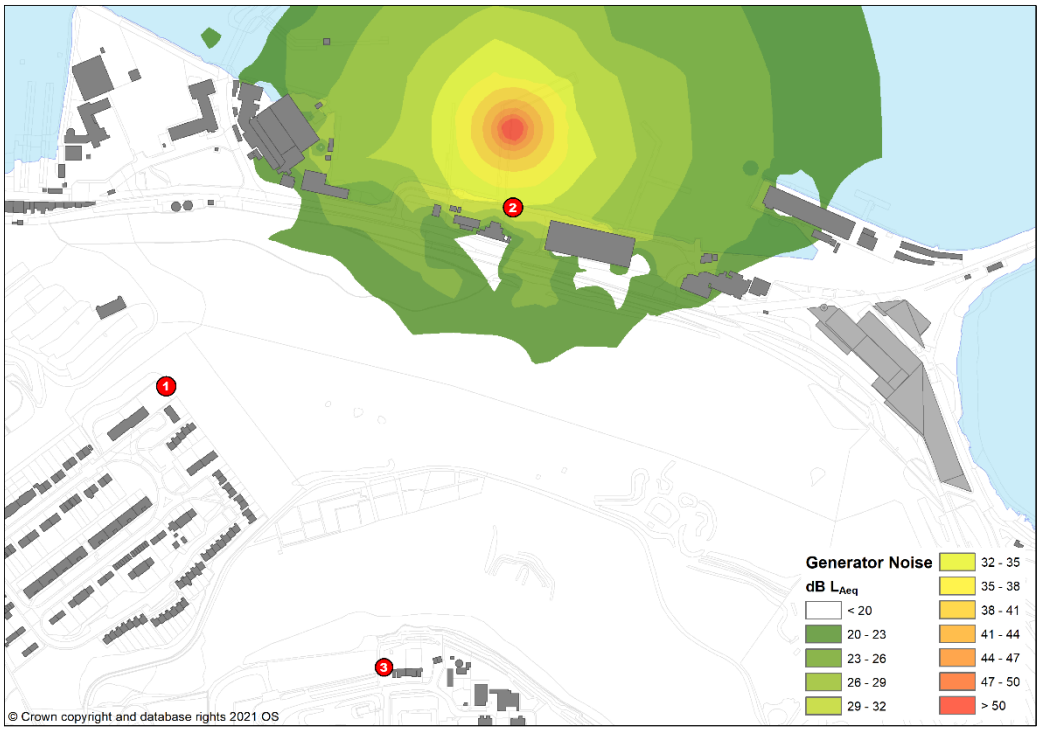


Figure 6 Bibby Stockholm generator only noise model results

Consequently, were the Bibby Stockholm to switch to shore power from the ERF, the baseline levels would only change in the immediate vicinity of this vessel, where the vessel itself is the only residential, noise sensitive receptor. The following assessment has been made considering scenarios both with generators and with grid connection.

4.4 Modelling results

The model was used to calculate sound pressure levels at various receptors in addition to those for which the baseline was measured. These are summarised in

Table 4, which presents the highest level calculated for each receptor.

A contingency of +3dB has been added to account for uncertainty in the calculations. This also provides an allowance for any tonality in the specific sound (i.e. that from the ERF). BS4142:2014+A1:2019 section 9.2 describes the subjective method of assessment which gives a penalty of 2dB for a tone which is just perceptible at the receptor to 4dB where it is clearly perceptible. Given the low predicted sound levels, 3dB is an appropriate overall allowance. This also allows for the Environment Agency environmental permitting requirement[4] that '*Where neither tonal nor impulsive corrections apply, the environment agencies will generally expect a +3dB 'other' correction to be applied for readily distinguishable industrial noise, unless you can demonstrate this is not justified*'.

Table 4 Predicted rating sound levels from the ERF (with 3dB contingency/penalty)

Location	**Predicted rating sound level, $dBL_{Ar,Tr}$**
Ayton Drive	30
Bibby Stockholm	43
Castletown	34
Coronation Road	27
Crabbers' Wharf holiday apartments	36
East Weare Drive/ Leet Close	33
4 Verne Common Road	33
HMP The Verne	39
Portland Hospital	27
Portland Marina (moorings)	34

[4] Noise and vibration management: environmental permits, updated 31 January 2023 https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits/noise-and-vibration-management-environmental-permits (accessed 12 October 2023)

5 Assessment

British Standard BS 4142 provides a methodology for rating and assessing the likely impacts of sound of an industrial or commercial nature on residential receptors. This includes sound from mobile plant and vehicles that are an intrinsic part of the overall sound emanating from the site.

The methodology is based on comparing the background sound level (measured as L_{A90}) at a receptor with the level of noise from the source being assessed, including penalties for characteristics such as tonality and impulsivity (known as the rating level $L_{Ar,Tr}$). The following advice is provided in BS4142 for determining the significance of impacts:

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

Table 5 compares the predicted rating sound levels with the measured baseline levels. Figure 7 compares spectra for the measured baseline background levels with the predicted specific sound level from the ERF.

Table 5 Summary of BS4142 assessment (day 07.00-23.00; night 23.00-07.00). The predicted rating level includes +3dB penalty for tonality and uncertainty.

Receptor	**Baseline sound level, dBL_{A90}**		**Predicted rating level, dB$L_{Ar,Tr}$**		**BS4142 Assessment (dB$L_{Ar,Tr}$ – dBL_{A90})**	
	Day	**Night**	**Day**	**Night**	**Day**	**Night**
Residences at East Weare Road, Leet Close, Beel Close	33	33	33	33	0	0
Bibby Stockholm (with generators)	43	42	43	43	0	+1
Bibby Stockholm (with shore power connection)	41	40	43	43	+2	+3
Residences at the top of Verne Common Road	32	31	35	34	+3	+3
Wyke Regis (Castle Cove area)	39	32	< 30	< 30	< -9	< -2
Wyke Regis (south)	40	33	< 30	< 30	< -10	< -3

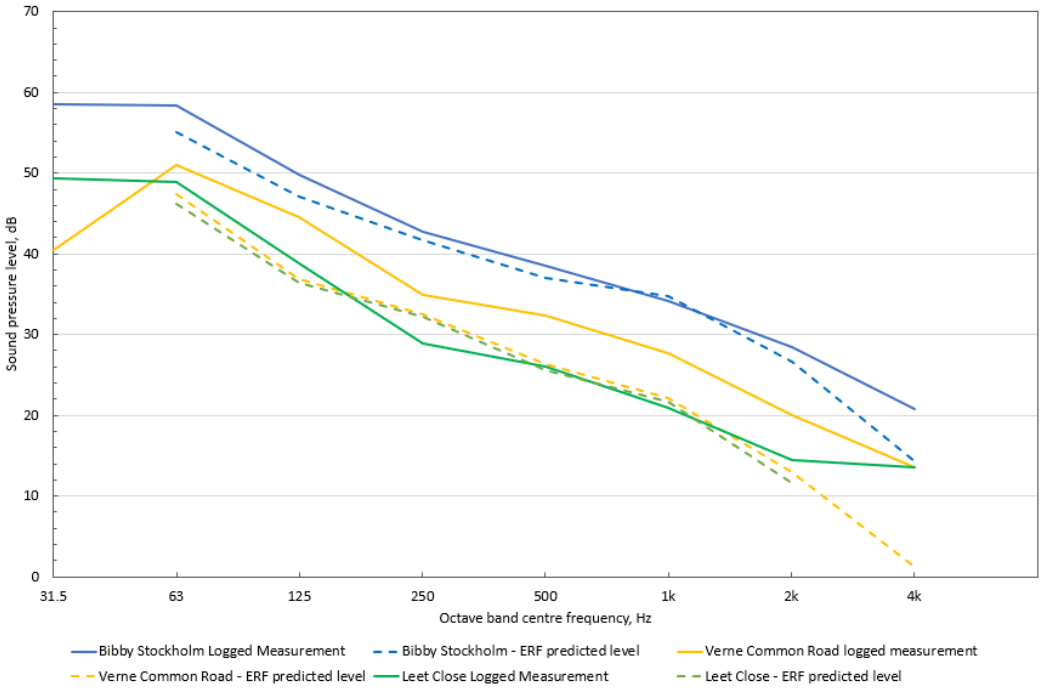


Figure 7 Comparison between measured background, L_{90}, at survey Locations 1 and 3 (solid lines) with the modelled specific sound level, L_{eq}, for the ERF (broken lines).

The assessment shows the predicted rating levels to be below or just above the representative background sound level at all the locations assessed. At the Bibby Stockholm and at the residences at the top of Verne Common Road the predicted rating level exceeds the background sound level by around 3dB, which is below the +5dB difference at which the rating level is likely to result in an adverse impact, according to BS4142. To achieve no exceedance of background levels, additional mitigation measures would be required to reduce the overall noise emission of the ERF.

At the residences on Verne Common Road, the assessment indicates that the stack will be the dominant contributor of noise from the ERF and would therefore require additional mitigation.

For the scenario where the Bibby Stockholm is directly connected to the shore power, the assessment identifies the stack, boiler room and the turbine hall (including a louvred opening) are dominant noise sources. It is therefore recommended that, in addition to the attenuation applied to the stack, further mitigation is applied to the facade of the boiler room and turbine hall to ensure the impact of the ERF on the Bibby Stockholm remains low.

In absolute terms the levels are also low, indicating that, with further mitigation measures applied to the stack, boiler room and the turbine hall facades, the impact would be negligible and the effect of the ERF would be not significant.

5.1 Noise mitigation measures

The ERF will be designed to incorporate mitigation to ensure that overall sound levels from operation of the whole development comply with the required limits at sensitive receptors. During commissioning, sound level monitoring of the plant will be undertaken to ensure compliance with these limits.

The assessment of operational sound levels from the site have identified a requirement to mitigate the stack, the western façade of the boiler room and the northern façade of the turbine hall, including the louvre.

In terms of the stack, 5dB additional mitigation is required at the source. This can be done by locating in-line attenuators after the induced draft (ID) fans and just prior to the stack, with a suitably designed splitter configuration to attenuate across broadband frequencies but also designed to mitigate the blade passage frequency.

For the western façade of the boiler room and the northern façade of the turbine hall, the cladding requires upgrading to an R_w 30 cladding panel. The louvre on the façade of the turbine hall should also be upgraded to an R_w 24 acoustic louvre. There would be no change to the external dimensions and appearance compared to the application drawings resulting from these upgrades to each of the stack and building facades. The following transmission loss data has been applied to the noise model in these areas.

Table 6 Enhanced building envelope transmission loss data, dB

Material	**Rating Rw, dB**	**Octave band centre frequency (Hz)**							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Wall Cladding	30	14	20	26	28	26	38	54	54
Acoustic Louvre (600mm)	24	7	8	12	21	28	30	28	27

With these additional mitigation measures in place, the predicted rating noise level from the operation of the ERF site will be below the background noise levels.

The results of the model with the mitigation measures in place are presented in Table 7.

Table 7 Summary of BS4142 assessment with mitigation measures (day 07.00-23.00; night 23.00-07.00). The predicted rating level includes +3dB penalty for tonality and uncertainty.

Receptor	Baseline sound level, dBL_{A90}		Predicted rating level, $dBL_{Ar,Tr}$		BS4142 Assessment ($dBL_{Ar,Tr} - dBL_{A90}$)	
	Day	Night	Day	Night	Day	Night
Residences at East Weare Road, Leet Close, Beel Close	33	33	29	29	-4	-4
Bibby Stockholm (with generators)	43	42	40	40	-3	-2
Bibby Stockholm (with on shore connection)	41	40	40	40	-1	0
Residences at the top of Verne Common Road	32	31	30	30	-2	-1
Wyke Regis (Castle Cove area)	39	32	< 30	< 30	< -9	< -2
Wyke Regis (south)	40	33	< 30	< 30	< -10	< -3

6 Conclusions

Responding to Environment Agency's letter dated 08 September 2023 in relation to Environmental Permit reference EPR/AP3304SZ/A001; this report has presented a BS4142 noise impact assessment for the proposed Powerfuel Portland ERF.

At this stage in the development process, the analysis is necessarily made on representative plant and associated noise emissions and the installation is assumed to operate 24 hours, except for deliveries by road. The same predicted levels of sound from the ERF have therefore been applied to both the day and night assessment.

Without additional mitigation, the predicted rating noise levels from operation of the proposed ERF, whilst only a low impact / minor effect, would exceed the measured background level at the residences on Verne Common Road and at the Bibby Stockholm accommodation vessel (when the vessel has a direct connection to shore power and is not operating on generators).

Additional mitigation applied to the flue immediately after the ID fans to reduce the stack source emission by at least 5dB, along with upgrading the cladding to R_w 30 on the western façade of the boiler room and northern façade of the turbine hall, and the louvre to R_w 24 in the turbine hall will result in ERF noise emissions that do not exceed the measured background level at any of the assessed receptors, indicating that any effect of sound from the ERF would be not significant. These mitigation measures will not change the external dimensions or appearance of the buildings compared to the application drawings.

Appendix A

Environment Agency's letter dated 08.09.2023 in relation to Environmental Permit reference EPR/AP3304SZ/A001

Notice of request for more information

The Environmental Permitting (England & Wales) Regulations 2016

Mr Giles Frampton
Director
Powerfuel Portland Limited
2nd Floor Regis House
45 King William Street
London
EC4R 9AN

Application number: EPR/AP3304SZ/A001

The Environment Agency, in exercise of its powers under paragraph 4 of Part 1 of Schedule 5 of the above Regulations, requires you to provide the information detailed in the attached schedule. The information is required in order to determine your application for a permit duly made on 18th May 2021.

Send the information to either the email or postal address below by 20th October 2023. If we do not receive this information by the date specified then we may treat your application as having been withdrawn or it may be refused. If this happens you may lose your application fee.

Email address: psc@environment-agency.gov.uk.

Postal address:
Permitting and Support Centre
Quadrant 2
99 Parkway Avenue
Parkway Business Park
Sheffield
S9 4WF

Name	Date
Principal Permitting Officer	08/09/2023

Authorised on behalf of the Environment Agency

Notes

These notes do not form part of this notice.

Please note that we charge £1,200 where we have to send a third or subsequent information notice in relation to the same issue. We consider this to be the first notice on the issues covered in this notice.

The notes in italics that appear after information requests in the attached schedule do not form part of the notice. The notes are intended to assist you in providing a full response.

Schedule

The Bibby Stockholm ("the barge") is now moored within 500 metres of the proposed installation. The barge is considered to be an additional sensitive receptor and as such it needs to be taken into consideration.

Noise

1. Submit an updated noise assessment report to account for the barge. This must be undertaken by an experienced and suitably qualified person in accordance with BS 4142.

   This will involve updating the noise modelling, background sound survey and BS 4142 assessment.

   New background sound data should be obtained which is representative of the barge. The installation is proposed to operate 24/7, so this should be representative of a day and night period, ideally to cover a weekend.

   In support of this noise assessment you will need to provide raw background sound level measurements in an Excel spreadsheet format and accompanying computer modelling files or calculation spreadsheets to BS 4142.

2. If the noise assessment report shows that noise could have a significant adverse impact at the barge, submit a noise management plan which includes proposals for the further attenuation and/or management of noise.

Odour

3. Submit an updated odour risk assessment and management plan to consider potential impacts at the barge.

   This must include controlling the risk of odour during both normal operation and shutdown periods. For this you will need to consider and provide justification for proposing/not proposing the options set out in BAT Conclusion 21 of the BAT conclusions for waste incineration or co-incineration, published December 2019.

Appendix B

Acoustic Terminology

Background sound level, $L_{A90,T}$

A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting, F, and quoted to the nearest whole number of decibels.

Decibel (dB)

The ratio of sound pressures which we can hear is a ratio of 10^6:1 (one million: one). For convenience, therefore, a logarithmic measurement scale is used. The resulting parameter is called the 'sound pressure level' (L) and the associated measurement unit is the decibel (dB). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply.

dB(A)

The unit used to define a weighted sound pressure level, which correlates well with the subjective response to sound. The 'A' weighting follows the frequency response of the human ear, which is less sensitive to low and very high frequencies than it is to those in the range 500Hz to 4kHz.

In some statistical descriptors the 'A' weighting forms part of a subscript, such as L_{A10}, L_{A90}, and L_{Aeq} for the 'A' weighted equivalent continuous noise level.

Frequency

Frequency is the rate of repetition of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the hertz (Hz), which is identical to cycles per second. A 1000Hz is often denoted as 1kHz, e.g. 2kHz = 2000Hz. Human hearing ranges approximately from 20Hz to 20kHz. For design purposes, the octave bands between 63Hz to 8kHz are generally used. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For more detailed analysis, each octave band may be split into three one-third octave bands or narrow frequency bands.

Maximum sound level

The maximum noise level identified during a measurement period. Experimental data has shown that the human ear does not generally register the full loudness of transient sound events of less than 125ms duration and fast time weighting (F) has an exponential time constant of 125ms which reflects the ear's response. Slow time weighting (S) has an exponential time constant of 1s and is used to allow more accurate estimation of the average sound level on a visual display.

The maximum level measured with fast time weighting is denoted as $L_{Amax,F}$. The maximum level measured with slow time weighting is denoted $L_{Amax,S}$.

Rating sound level, $L_{Ar,Tr}$

Specific sound level plus any adjustment for the characteristic features of the sound, specified over the reference time interval, Tr.

Sound pressure level, L

The sound power emitted by a source results in pressure fluctuations in the air, which are heard as sound.

The sound pressure level (L) is ten times the logarithm of the ratio of the measured sound pressure (detected by a microphone) to the reference level of $2x10^{-5}$Pa (the threshold of hearing).

Thus L (dB) = 10 log $(P1/P_{ref})^2$ where P_{ref}, the lowest pressure detectable by the ear, is 0.00002 pascals (i.e. $2x10^{-5}$ Pa).

The threshold of hearing is 0dB, while the threshold of pain is approximately 120dB. Normal speech is approximately 60dBL_A and a change of 3dB is only just detectable. A change of 10dB is subjectively twice, or half, as loud.

Sound reduction index, R

The sound reduction index (or transmission loss) of a building element is a measure of the loss of sound through the material, ie its attenuation properties. It is a property of the component, unlike the sound level difference which is affected by the common area between the rooms and the acoustic of the receiving room. The weighted sound reduction index, Rw, is a single figure description of sound reduction index which is defined in BS EN ISO 717-1: 1997. The Rw is calculated from measurements in an acoustic laboratory. Sound insulation ratings derived from site (which are invariably lower than the laboratory figures) are referred to as the R'w rating.

Specific sound level, L_s

Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.

Statistical noise levels

For levels of noise that vary widely with time, it is necessary to employ an index which allows for this variation. The L_{p10} is the level exceeded for 10% of the time period under consideration. The L_{90} is the level exceeded for 90% of the time.

A weighted statistical noise levels are denoted L_{A10}, dBL_{A90} etc. The reference time period (T) is normally included, e.g. dB$L_{A10,\ 5min}$ or dB$L_{A90,\ 8hr}$.

Typical levels

Noise Level, dB(A)	Example
130	Threshold of pain
120	Jet aircraft take-off at 100m
110	Chain saw at 1m
100	Inside disco
90	Heavy lorries at 5m
80	Kerbside of busy street
70	Loud radio (in typical domestic room)
60	Office or restaurant
50	Domestic fan heater at 1m
40	Living room
30	Theatre

Appendix C

Baseline sound survey

C1 Measurement procedure

The most recent baseline sound survey was undertaken by logging continuously from Wednesday 13 to Thursday 21 September 2023. This was supported by attended near-field measurements of the generators associated with the Bibby Stockholm accommodation vessel. In addition, measurements made in 2021 at residential areas across the far side of Portland Harbour are presented as Location A, for Wyke Regis, Castle Cove area and Location B for Wyke Regis south.

C1.1 Measurement locations

The measurement locations were chosen to provide typical baseline sound levels closest to sensitive (residential) receptors around the proposed development and at the Bibby Stockholm accommodation vessel moored in the port.

Figure 8: Measurement locations (in red)

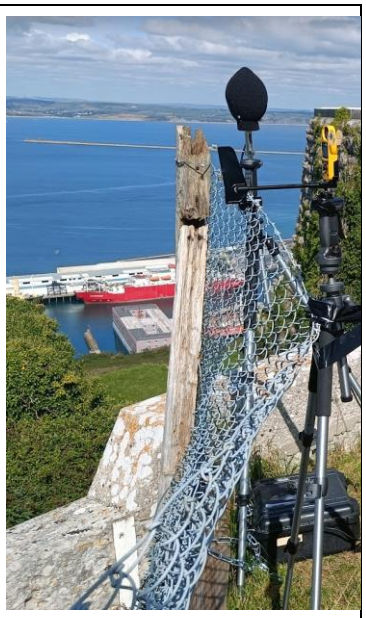
Location 1 was adjacent to the external space associated with the Islanders Club on Leet Close.

Location 2 was on-shore at the dock close to the Bibby Stockholm vessel. The generators were located at the furthest end of the vessel away from the shore. This measurement location was chosen as it would experience the lowest levels of generator noise while still being representative of the vessel accommodation.

Location 3 was in the garden of 3 Verne Common Road, adjacent to the northwest corner of the property.

Logger 1 location

Logger 2 location



Logger 3 location

Location A

Location B

C1.2 Survey methodology

The measurements were made with the microphone mounted using a tripod 1.2m – 1.5m above ground level under acoustically free field conditions (i.e. at least 3.5m from any acoustically reflecting surface other than the ground).

The measurement locations were chosen to provide typical baseline sound levels at representative noise sensitive receptors around the site of the proposed development.

The weather conditions during the time of the representative baseline measurements were within the limits specified in BS7445-1:2003. The weather was generally dry, with minimal cloud cover day and night.

C1.2.1 Attended survey methodology

The sound level meter was set to record sound levels over 15 minute periods during the daytime (07:00-23:00) and 5 minute periods during the night-time (23:00-07:00). For each attended measurement, the sound climate, weather conditions and the measured sound levels were all recorded. The sound level meter was set to store the L_{A90} required for the BS4142 assessment and additionally the L_{Aeq}, L_{Amin}, L_{Amax} and L_{A10} indices. Measurements were made with a fast (0.125s) time constant.

C1.2.2 Unattended survey methodology

Unattended measurements were taken using a logger set to record sound levels over five-minute intervals. The meter was set to store the L_{Aeq}, L_{A10}, L_{A90} and L_{Amax} indices. Measurements were made with a fast (0.125s) time constant. The loggers recorded measurements from 13th to 21st September 2023.

C1.3 Measurement equipment

Measurements were carried out using equipment as detailed in Table B1. The sound level meters and microphones are Class 1, conforming to BS EN 61672-1: 2013. The calibration of the sound level meters, pre-amplifier and microphone chains were checked before and after use, to confirm that there was no significant drift in meter response at the calibrator frequency and level. All Arup's sound level meters are regularly calibrated and this calibration is traceable to international standards.

Measurement Equipment	Manufacturer	Type Number	Serial Number
Sound level meter (logger)	Rion	NL-52	002631670
Microphone (logger)	Rion	UC-59	12921
Pre-amplifier (logger)	Rion	NH-25	21614
Field calibrator (logger)	Rion	NC-74	34336007
Sound level meter (logger)	Rion	NL-52	00120480
Microphone (logger)	Rion	UC-59	03152
Pre-amplifier (logger)	Rion	NH-25	10479
Field calibrator (logger)	Rion	NC-74	35015346
Sound level meter (logger)	Rion	NL-52	00264534
Microphone (logger)	Rion	UC-59	09682
Pre-amplifier (logger)	Rion	NH-25	64659
Field calibrator (logger)	Rion	NC-74	34667800
Sound level meter (attended)	Rion	NL-52	00231670
Microphone (attended)	Rion	UC-59	12921
Pre-amplifier (attended)	Rion	NH-25	21614
Field calibrator (attended)	Rion	NC-74	34336007

Table B8: Measurement equipment used for the survey

C2 Measurement results

The following provides time history graphs of the logger data and a histogram of the occurrence of sound levels in 1dB bins used to identify the representative background sound levels. The histograms only consider the period up to September 18, after which the weather conditions become outside of that valid for a BS4142 assessment. The individual measurement data for the attended locations measured across the far side of Portland Harbour in April 2021 are tabulated in the tables in C2.1 and C2.2.

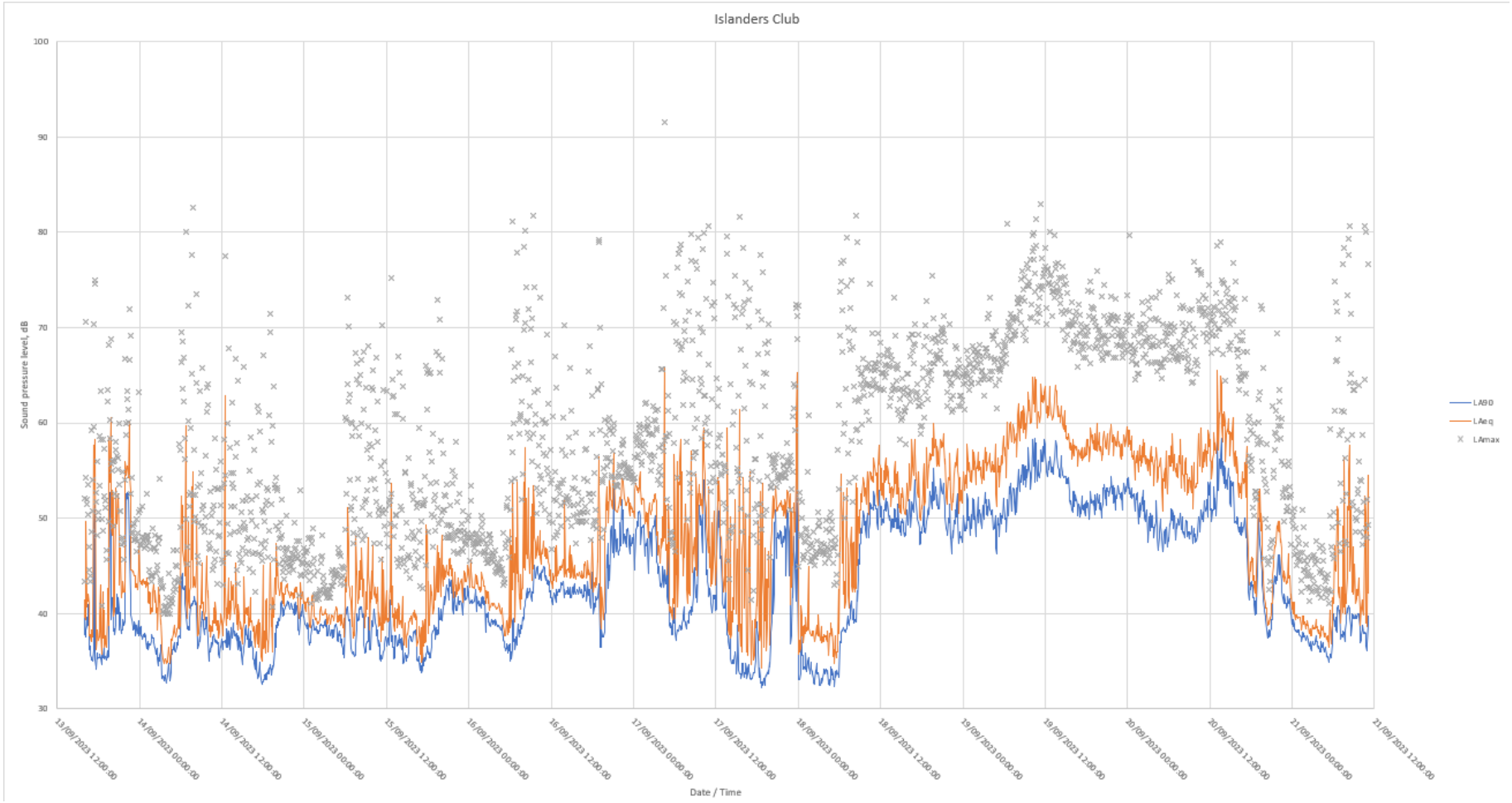


Figure 9: Unattended 5-minute measurement results – Logger 1

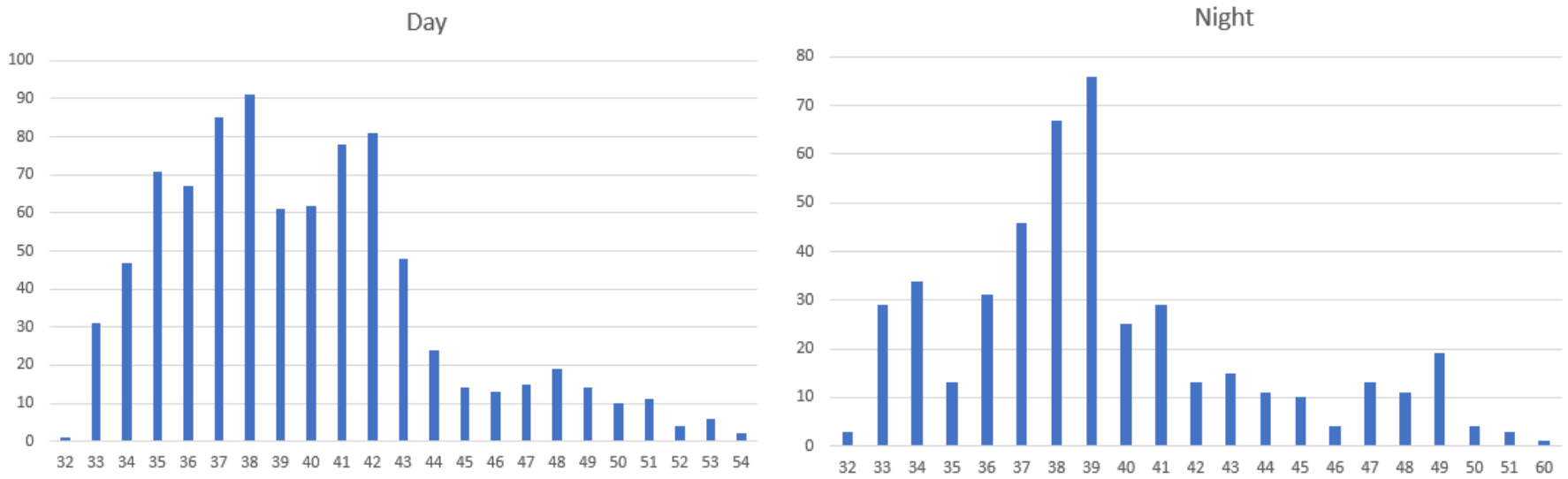


Figure 10: Histograms of day (07:00-23:00) and night (23:00-07:00) baseline background sound levels ($dBL_{A90,15min}$) at logger 1 until September 18, 2023.

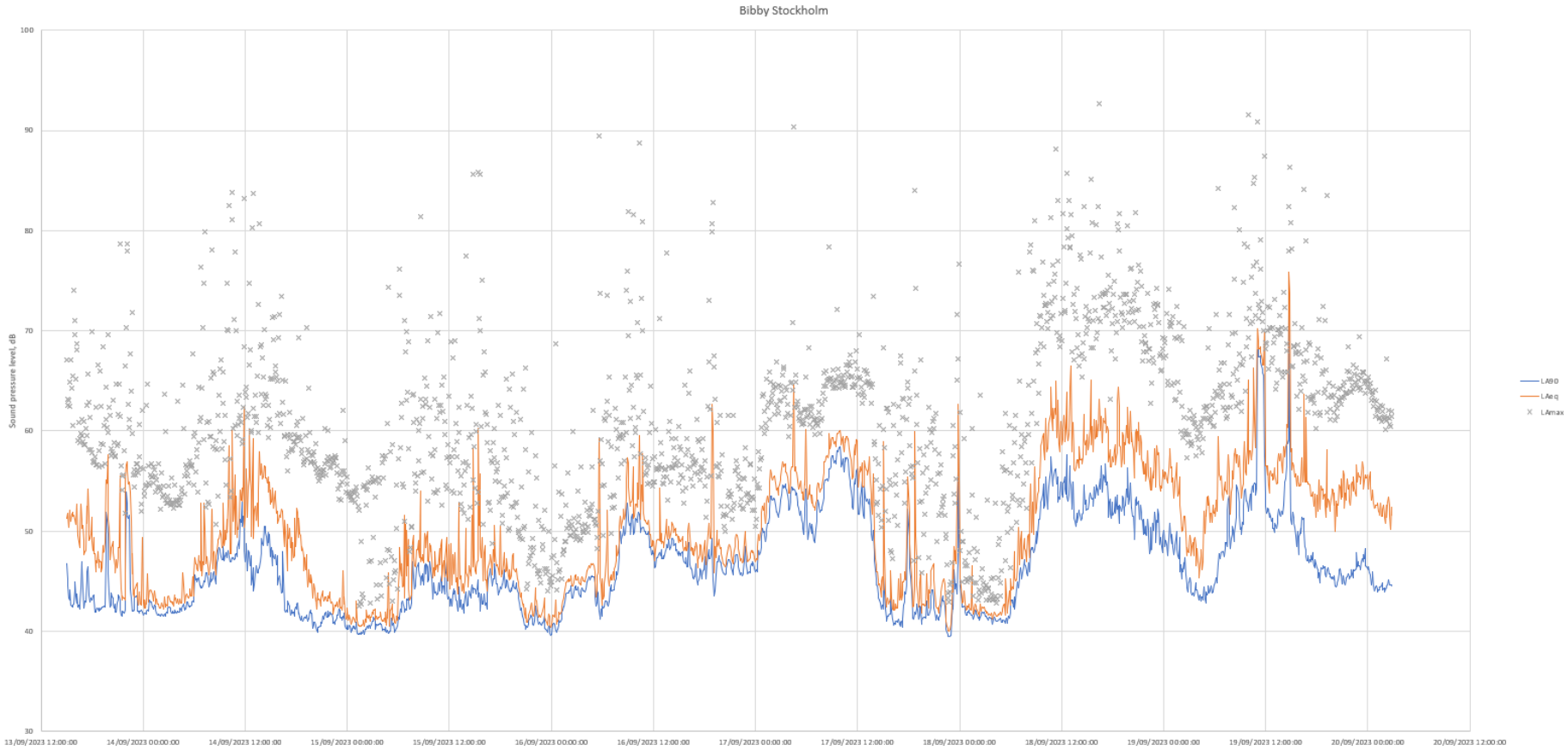


Figure 11: Unattended 5-minute measurement results – Logger 2

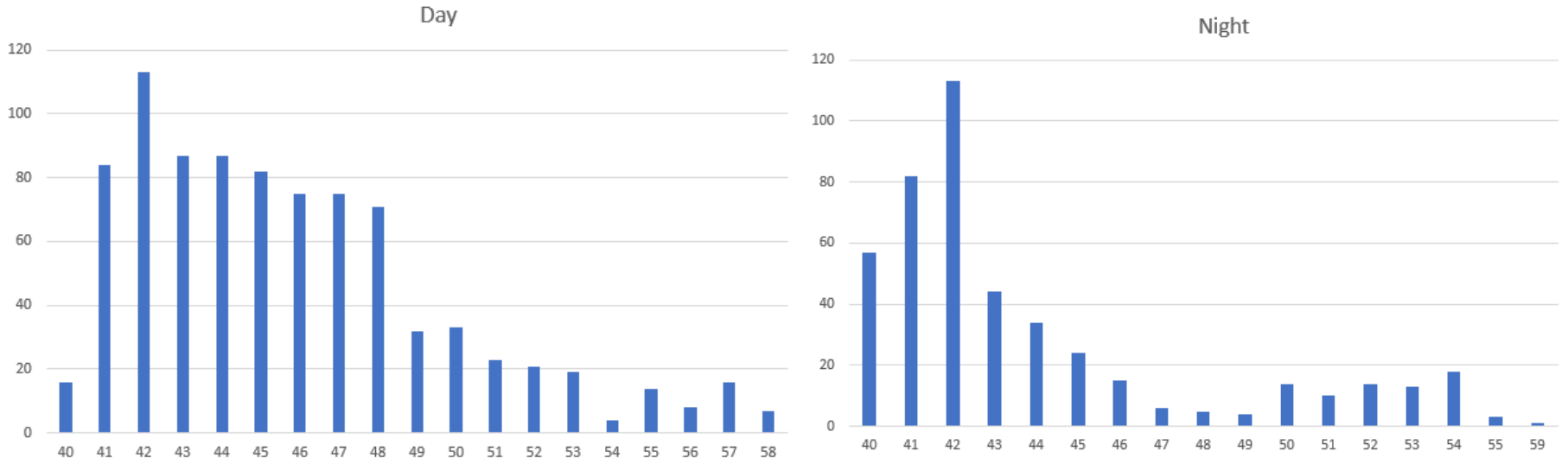


Figure 12: Histograms of day (07:00-23:00) and night (23:00-07:00) baseline background sound levels ($dBL_{A90,15min}$) at logger 2 until September 18, 2023.

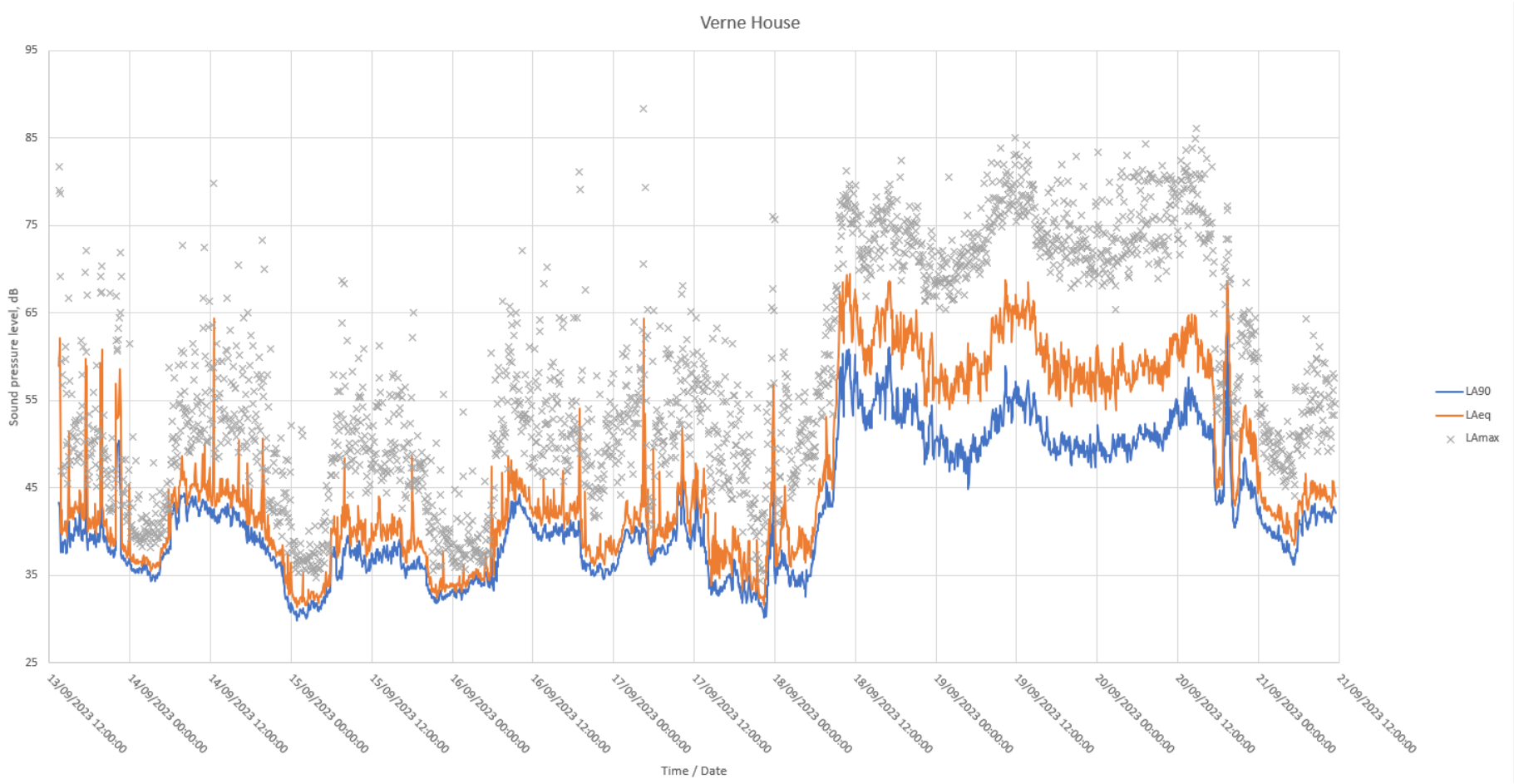


Figure 13: Unattended 5-minute measurement results – Logger 3

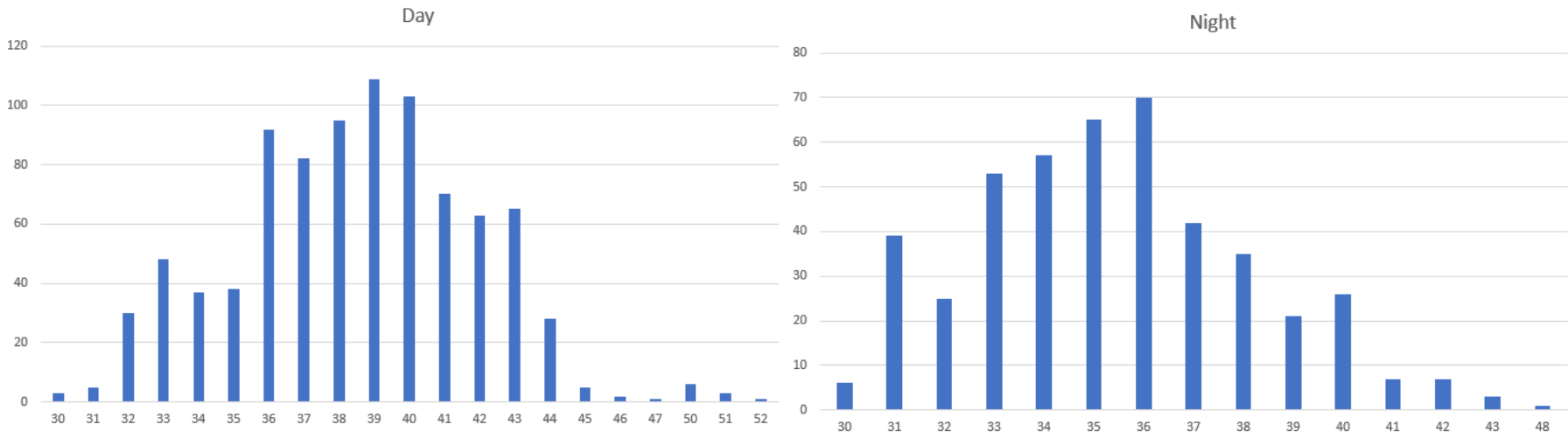


Figure 14: Histograms of day (07:00-23:00) and night (23:00-07:00) baseline background sound levels ($dBL_{A90,15min}$) at logger 3 until September 18, 2023.

C2.1 Location A

A summary of the attended measurements made across the far side of Portland Harbour at Wyke Regis / Castle Cove area in April 2021.

Date/time	Duration (minutes)	Time period	Wind speed ms^{-1}	Wind direction (from)	dBL_{Aeq}	$dBL_{Amax,F}$	dBL_{A90}	Comments
2021/04/19 13:52:02	15	Day	0-1.5	East	48.9	74.4	38.0	Primary continuous noise source is low frequency noise from moored ships. Main other noise sources were people using the beach, and cars arriving and departing the car park.
2021/04/19 15:24:47	15	Day	0	N/A	46.0	62.4	38.9	
2021/04/19 16:54:51	15	Day	0	N/A	46.1	67.2	38.8	Primary continuous noise source is low frequency noise from moored ships. Main other noise sources were people using the beach, cars arriving and departing the car park, and a helicopter overflight.
2021/04/20 01:44:57	5	Night	0	N/A	32.6	44.6	31.0	Low frequency ship noise dominant. Noise from distant birds and from ropes hitting boat masts audible.
2021/04/20 02:37:48	5	Night	0	N/A	48.4	72.3	33.7	Low frequency ship noise dominant. Noise from distant birds and from ropes hitting boat masts audible. One close car pass-by.
2021/04/20 02:44:27	5	Night	0	N/A	33.0	44.6	31.5	Low frequency ship noise dominant. Noise from distant birds and from ropes hitting boat masts audible.

C2.2 Location B

A summary of the attended measurements made across the far side of Portland Harbour at Wyke Regis south in April 2021.

Date/time	Duration (minutes)	Time period	Wind speed ms-1	Wind direction (from)	dBL$_{Aeq}$	dBL$_{Amax,F}$	dBL$_{A90}$	Comments
2021/04/19 14:20:58	15	Day	1-2	East	47.3	67.8	40.3	The dominant noise source was road traffic on the road to Portland. Low frequency noise from moored ships was also audible. The other main noise sources were people using the footpath.
2021/04/19 15:55:54	15	Day	2	East	56.3	89.8	40.2	
2021/04/19 17:26:59	15	Day	1-3	East	48.8	79.3	41	
2021/04/20 02:01:24	5	Night	1	East	34.4	44.9	32.5	Low frequency ship noise dominant. Other noise was mainly from occasional car pass-bys.
2021/04/20 03:00:34	5	Night	1	East	36.5	53.9	33.9	

Appendix D

Noise modelling assumptions

D1 Noise model data

The noise modelling information required by EA is a very large quantity of data which it is impracticable to tabulate fully. It is therefore provided separately as zipped shape files, accessible with GIS, and with a brief summary below.

D1.1 Fixed and mobile plant

Geometry and location of substation plant are included in the industrial building and area source shapefiles. Input source data can be taken from Table 2.

D1.2 Noise emitting buildings

Geometry and location of the main site building are included in the industrial building and area source shapefiles, along with the floating screens shapefile, included to accurately bring in the sloped roofs of the main site building. Input source data can be taken from Table 2.

D1.3 Site traffic

Geometry and location of site roads are included in the road traffic shapefile. 80 heavy goods vehicle movements throughout the day on site, relating to the ERF operation, have been assumed, at 20 miles per hour. The resultant sound level at the receptors was calculated in SoundPlan.

D1.4 Buildings

Any off site buildings in Portland and the remainder of the site have been modelled, and their geometry, heights and locations can be found in the building shapefile.

D1.5 Receptors

Receptors locations were modelled with point receptors at each storey of the representative nearest noise sensitive receivers. The location of these receptors is provided in the receiver shapefile and can be cross referenced with the results below giving the highest octave band sound levels at each receptor.

Receptor	Location	Facade	Coordinates			Octave band sound pressure level, dB							dBA	Dominant source of sound at the receptor
			X	Y	Z	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz		
1 F4	Ayton Drive	8	368764.9	74294.2	36.5	44.2	35.8	30.6	24.5	20.2	9.0	-15.4	27.5	Stack flue top; boiler room west; boiler room west
3 F4	Castletown	7	368887.6	74359.8	17.0	47.0	40.0	34.2	28.2	24.2	14.0	-7.7	31.2	Stack sides; Stack flue top; boiler room west louvre
4 F4	Coronation Road	11	368703.9	74079.9	48.1	41.3	32.8	27.8	21.4	16.9	5.2	-19.9	24.4	Stack flue top; Boiler room west; boiler room west
5 F4	Crabbers Wharf	6	368735.9	74413.5	15.9	47.1	41.6	35.9	29.7	25.5	14.4	-10.4	32.6	Stack sides; Turbine Room North Facade louvre; Stack flue top
7 F4	East Weare Drive	5	368989.9	74140.1	70.3	46.7	38.0	33.5	27.0	23.0	12.8	-6.8	30.1	Stack flue top; Boiler room west; boiler room west
9 F4	Jailhouse	4	369289.6	73880.5	160.9	51.8	43.3	38.1	33.4	30.9	22.5	7.5	36.3	Boiler room west; boiler room west; boiler room west
12 F4	Portland Hospital	10	368590.8	74157.3	32.5	41.0	32.5	27.2	20.9	16.4	4.7	-20.5	24.0	Stack flue top; Boiler room west; Boiler room roof
13 F1	Portland Marina	12	368441.9	74828.2	4.5	45.9	40.7	34.4	28.5	24.1	10.9	-19.2	31.4	Turbine Room North Facade louvre; Stack sides; Turbine Hall East Facade Louvre
14 F1	Ayton Drive	8	368764.9	74294.2	36.5	44.2	35.8	30.6	24.5	20.2	9.0	-15.4	27.5	Stack flue top; Boiler room west; boiler room west