



Coed Darcy Phase 2
Llandarcy, Skewen, Neath

Noise Impact Assessment

9th June 2025
First Issue



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Revision History

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First Issue	First issued version of the report	Patrick Shuttleworth Senior Acoustic Consultant BSc (Hons) MIOA	Chris Parker-Jones Director and Acoustic Consultant BSc (Hons) MSc MIOA	9th June 2025

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Executive Summary and Conclusions

ParkerJones Acoustics Limited (PJA) has been instructed to undertake a Noise Impact Assessment to accompany a planning application for the proposed residential development at Coed Darcy Phase 2, Llandarcy, Skewen, Neath. A number of external air source heat pumps (ASHPs / “the proposed plant”) are to be installed to serve the proposed new dwellings.

The assessment is based on manufacturer laboratory test data, input into CadnaA® 3D noise modelling software to predict plant noise levels at nearby receptor locations. These predictions have been assessed in accordance with BS 4142:2014+A1:2019, with context provided by BS 8233:2014 and WHO Environmental Noise Guidelines.

PJA believes that the Local Planning Authority will require that the rating level of plant noise does not exceed the background sound level, as defined in BS 4142. To ensure a robust and precautionary assessment, conservative background levels of 27 dB L_{A90} during the day and 23 dB L_{A90} at night have been adopted.

The highest predicted specific noise level is low, at just 23 dB(A), and already falls within the external amenity thresholds of BS 8233 and WHO guidelines. No character corrections have been applied to the specific sound levels in accordance with BS 4142:2014+A1:2019. This is primarily because the predicted specific sound levels are very low, with the highest level across the site only reaching 23 dB $L_{Aeq,15min}$. At such low levels, the likelihood of any acoustic features such as tonality, impulsiveness, or intermittency being perceptible — particularly in the context of residual ambient sounds — is greatly reduced.

As such, no acoustic corrections under BS 4142 have been applied, with the rating level taken to be equal to the specific level in all cases. On this basis — with the rating level falling 4 dB below daytime background levels and matching nighttime levels — the Local Authority’s requirement (as outlined in **Section 3.1**) that the rating level does not exceed the background sound level is satisfied. No further mitigation is necessary in this regard.

Section 6.0 of this report also sets out requirements to minimise the risk of structure-borne vibration. All ASHP units—whether wall- or floor-mounted—should be installed using appropriate anti-vibration mountings, such as rubber isolation feet or washers. This is particularly important in semi-detached dwellings, where structural connections between properties could otherwise allow vibration to transmit. Provided that standard good practice installation methods are followed, the risk of perceptible vibration is considered to be very low.

Contents

Executive Summary and Conclusions	3
1.0 Introduction.....	5
2.0 Site and Development Description.....	6
3.0 Relevant Guidelines	9
3.1 Local Authority Criteria	9
3.2 BS 4142:2014.....	9
3.3 BS 8233:2014	10
3.4 World Health Organisation (WHO) Environmental Noise Guidelines.....	10
4.0 Baseline Noise Survey	11
4.1 Methodology.....	11
4.2 Results	12
5.0 Noise Assessment.....	16
5.1 Background Sound Levels.....	16
5.2 Proposed Plant	17
5.3 Predicted Noise Emissions	17
6.0 Vibration Assessment.....	18
Appendix A – Acoustic Terminology and Concepts.....	19
Appendix B – Noise Survey Methodology	20
Appendix C – Calculations	22
Appendix D – Manufacturer Noise Data.....	25

1.0 Introduction

ParkerJones Acoustics Limited (PJA) has been instructed to undertake a Noise Impact Assessment to support a planning application for the proposed residential development at Coed Darcy Phase 2, Llandarcy, Skewen, Neath. A number of external air source heat pumps (ASHPs / “the proposed plant”) are to be installed to serve the new dwellings.

This report assesses the potential risk of noise impact from the operation of the proposed plant on nearby residential properties, once fully installed and operational.

The objective is to ensure that noise emissions from the plant will not result in internal ambient noise levels exceeding those typically considered acceptable for good living and sleeping conditions. In doing so, the report aims to determine whether there is a risk of adverse noise impact, and if so, to provide appropriate recommendations for mitigation.

This assessment has been carried out with reference to the following guidance documents:

- BS 4142:2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’;
- BS 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’; and
- the WHO Environmental Noise Guidelines for the European Region.

Every effort has been made to ensure the report is understandable to readers without a background in acoustics. However, due to the technical nature of the subject, some sections contain specialist terminology. A glossary of acoustic terms is provided in Appendix A for reference.

2.0 Site and Development Description

The site is located approximately 450 metres west of the M4 motorway at Llandarcy, Skewen, Neath, as shown in **Figure 2.1**. The surrounding area is predominantly residential in character, with the Llandarcy Park sports complex located to the east and a mix of commercial uses further to the southwest.

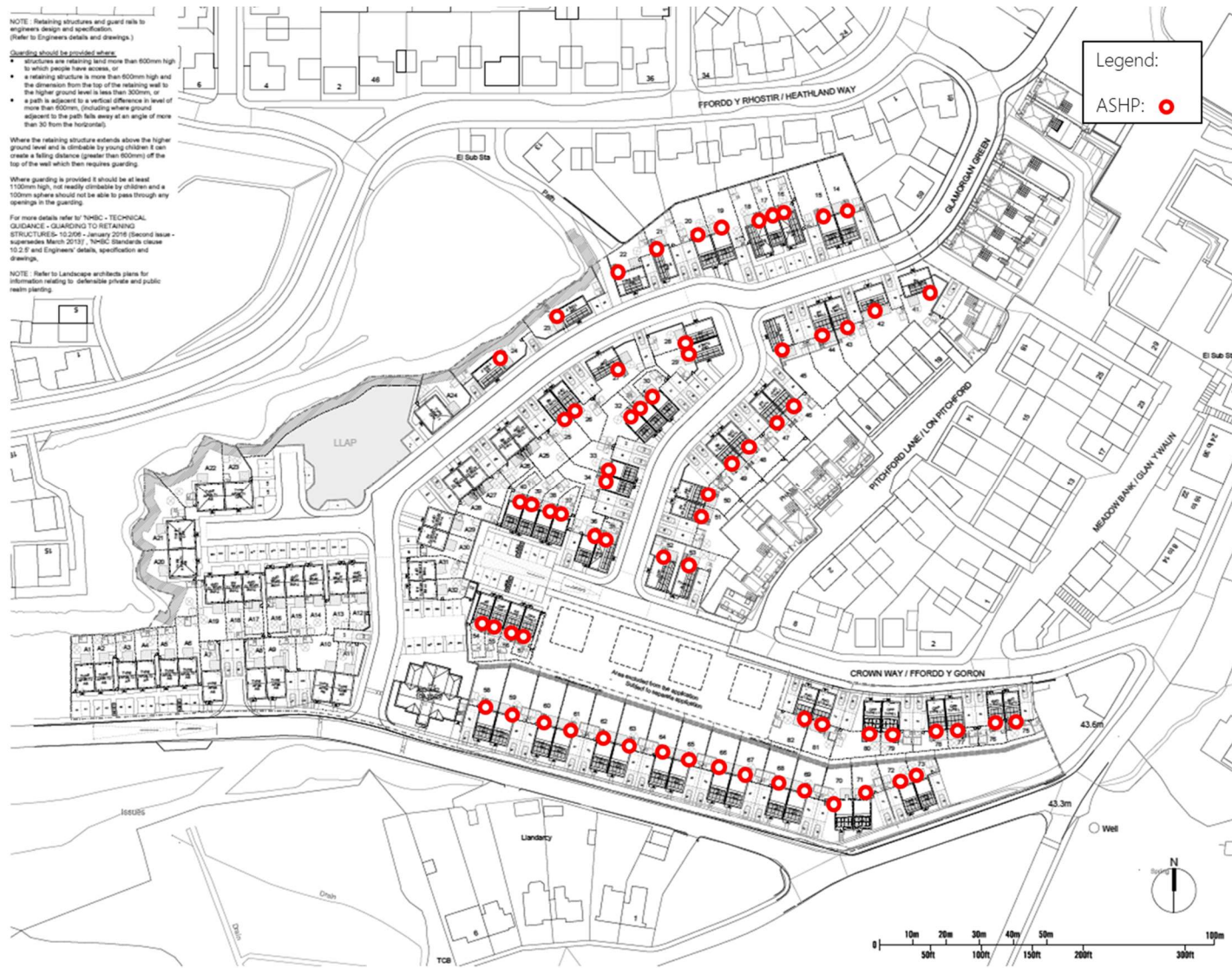
The proposals assessed in this report relate to the development of new residential dwellings, comprising both houses and apartments. The proposed site layout is shown in **Figure 2.2**. A total of 68 air source heat pump (ASHP) units are to be installed, serving dwellings located in the northeastern and southeastern parts of the site.

The nearest noise-sensitive receptors are the existing residential properties surrounding the development, as well as the proposed new dwellings within the site that will not be served by ASHPs—primarily those in the western portion of the development. The noise modelling software used in this assessment inherently predicts noise levels at all relevant receptor locations, including windows and private garden areas.

Figure 2.1 – Aerial view of site, Baseline monitoring positions (P1 and P2)



Figure 2.2 – Proposed site plan, ASHP locations



3.0 Relevant Guidelines

3.1 Local Authority Criteria

Based on a review of local planning policy and historic planning applications within Neath Port Talbot County Borough Council, it is seen that the following typical planning condition will be applicable to the proposed development;

"The applicant is to submit a noise impact assessment for the proposed development. The noise rating level emitted from external plant serving the approved use shall not be greater than the existing background noise level. The noise levels shall be determined at the nearest noise-sensitive premises or at another location that is deemed suitable by the Local Planning Authority. Measurements and assessments shall be made in accordance with 'BS 4142:2014 Method for rating and assessing industrial and commercial sound.'"

The typical planning condition requires that the rating level of the mechanical plant installation does not exceed the existing background noise levels. PJA assumes that similar requirements would be set for the proposals assessed herein.

3.2 BS 4142:2014

BS 4142:2014 'Methods for rating and assessing industrial and commercial sound' is intended to be used to assess the potential adverse impact of sound of an industrial and/or commercial nature, at nearby noise-sensitive receptor (NSR) locations (i.e., residential windows) within the context of the existing sound environment.

The method is based upon assessing the predicted noise emissions from plant/equipment against the existing background sound levels at NSRs, the latter of which is determined by a noise survey conducted at the site.

The predicted noise emissions are termed as a 'rating level', which is the 'specific sound level' from plant (the actual measurable noise level), plus 'penalties' which account for whether the noise has distinguishing characteristics such as tonality, intermittency, impulsivity, or is generally distinguishable from the ambient noise environment. Such features may attract attention and be considered annoying, hence sounds with these qualities should be penalised over sounds at the same specific noise level which is less intrusive.

The general aim is for the 'rating level' (plant noise emissions) to not exceed the existing background sound levels outside of residential windows. BS 4142:2014 states that *"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 impact 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."*

3.3 BS 8233:2014

BS 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' suggests appropriate criteria and limits for different situations. This includes internal noise criteria for residential developments. The limits with BS 8233:2014 are similar to those in the WHO's 'Guidelines for Community Noise and Night Noise Guidelines for Europe' document.

Table 4 of BS 8233:2014 provides internal ambient noise level (IANL) limits for dwellings from "steady external noise sources". These are summarised in **Table 3.1** below.

Table 3.1 – BS 8233:2014 internal ambient noise level (IANL) upper limits

Activity	Location	Daytime (07:00 – 23:00)	Nighttime (23:00 – 07:00)
Resting	Living Room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

Annex G.1 of BS 8233:2014 suggests that "if partially open windows were relied upon for background ventilation, the insulation would be reduced to approximately 15 dB". Therefore, a noise limit directly outside of the nearest residential windows could be set based on the values above plus 15 dB. Therefore, to meet internal noise targets in nearby residential dwellings, noise from the proposed plant should not exceed 50 dB L_{Aeq} during the daytime and 45 dB L_{Aeq} during the nighttime when measured/calculated directly outside of a bedroom or living room window.

3.4 World Health Organisation (WHO) Environmental Noise Guidelines

The WHO document *Guidelines for Community Noise 1999* has recently been superseded by the *Environmental Noise Guidelines for the European Region*. However, the updated guidance states that 'all WHO guidelines for community noise (CNG) indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid'.

The document sets out guidance as to noise levels at which there will be an unacceptable impact on the local community. WHO guidelines state:

- To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady, continuous noise.
- To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB L_{Aeq} .

Therefore, noise from the proposed plant should not exceed 50 dB L_{Aeq} during the daytime when measured or calculated within a residential garden, patio, or balcony.

4.0 Baseline Noise Survey

4.1 Methodology

PJA has attended the site to conduct a baseline noise survey across several days between Wednesday the 26th of March and Tuesday the 1st of April 2024. The results have been used to determine a representative background sound level at positions representative of nearby residential receptors.

Two fixed monitoring positions were employed, with P1 located in the centre of the site and P2 located at the north eastern corner. The locations of the monitoring positions are shown in **Figure 2.1 (Section 2.0)**.

The sound level meters were set to log noise levels over continuous 15-minute averaging periods with a 1-second time history rate. The monitoring equipment was left unattended for the majority of the survey with the exception of a short period around the installation and collection of the equipment.

The following noise indices were recorded (amongst others):

- $L_{Aeq,T}$: The A-weighted equivalent continuous noise level over the measurement period T. This parameter is typically considered as a good representation of the average ambient sound level;
- $L_{AFmax,T}$: The maximum A-weighted noise level during the measurement period T and the best representation of short high noise levels 'events' – i.e., emergency services sirens; and
- $L_{A90,T}$: The A-weighted noise level that is exceeded for 90% of the measurement period T. This parameter is often considered as the 'average minimum level' and is therefore used in determining the representative background noise level – or noise levels from continuous noise sources such as plant.

Appendix B contains further information on the methodology of the survey, including photographs taken from site and the equipment used.

4.2 Results

4.2.1 Position P1

A graph of the measured noise levels across the monitoring period at P1 is given in **Figure 4.1**. **Table 4.1** summarises the results across the daytime (07:00 – 23:00) and nighttime (23:00 – 07:00) periods. The most relevant parameter in terms of the ‘representative background sound level’ is the $L_{A90,15min}$. **Figure 4.2** presents histograms of the $L_{A90,15min}$ values for day and night. It is noted that construction noise has affected the measured levels during the day.

Table 4.1 – Summary of measured noise levels – position P1

Period	Parameter	Maximum	Minimum	Logarithmic Average	Mean Average	Modal Average	Median Average
Daytime (07:00 – 23:00)	$L_{Aeq,15min}$ (dB)	74	33	57	49	45	48
	$L_{AFMax,15min}$ (dB)	104	46	N/A	70	75	71
	$L_{A90,15min}$ (dB)	54	31	N/A	42	40	41
Nighttime (23:00 – 07:00)	$L_{Aeq,15min}$ (dB)	66	28	50	43	43	44
	$L_{AFMax,15min}$ (dB)	91	36	N/A	60	57	60
	$L_{A90,15min}$ (dB)	55	25	N/A	37	38	37

Figure 4.1 – Graph of measured noise levels – position P1

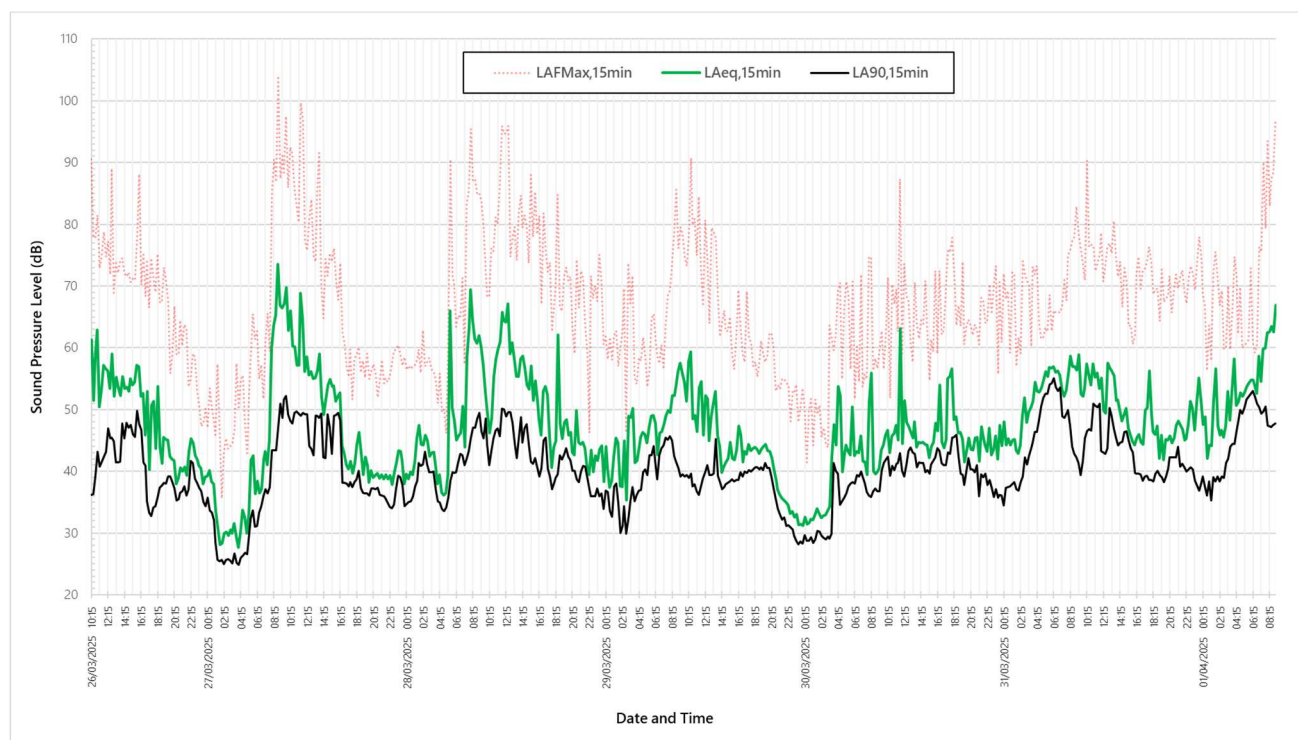
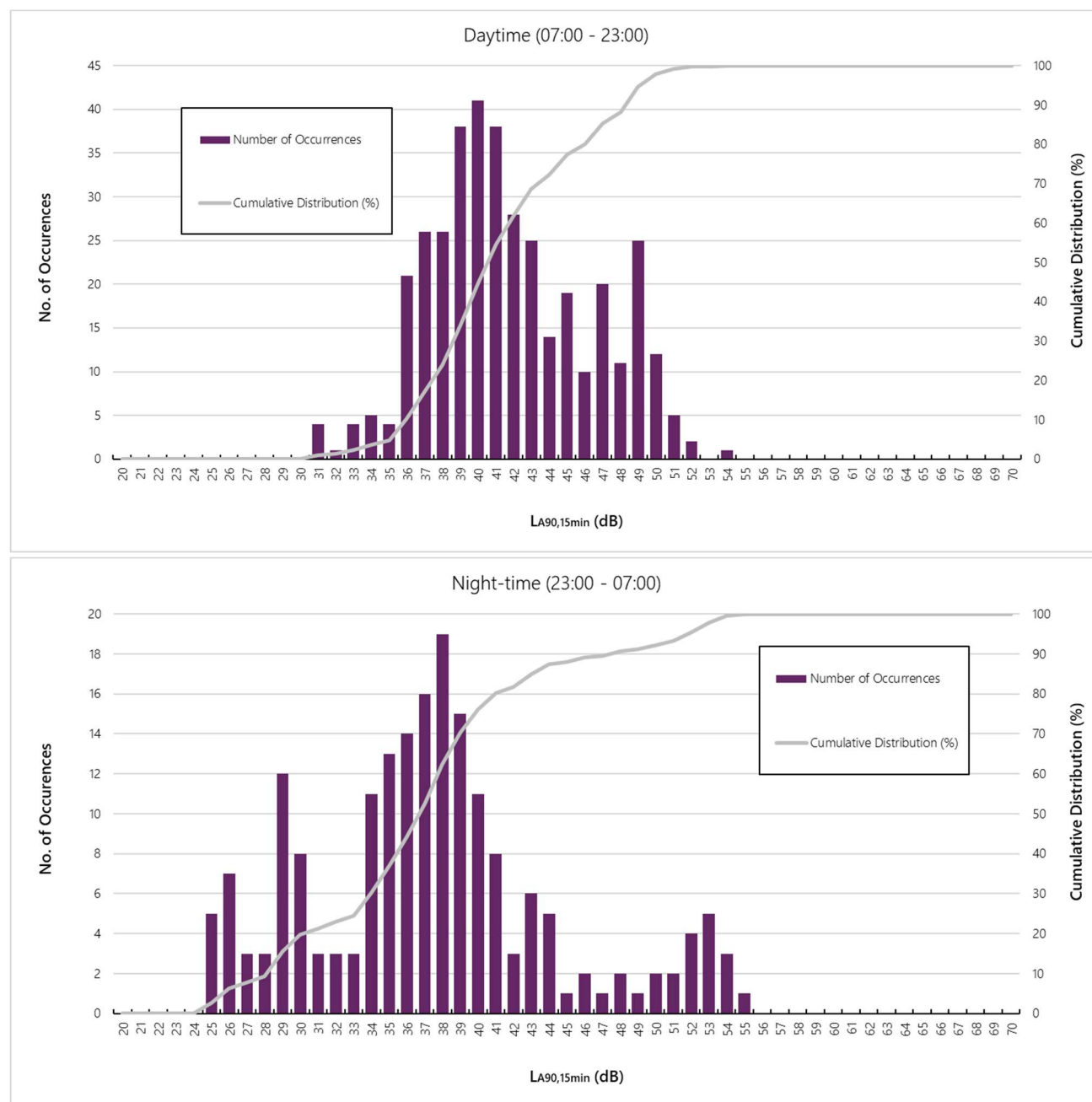


Figure 4.2 – Histogram of measured $LA_{90,15min}$ values – position P1



4.2.2 Position P2

A graph of the measured noise levels across the monitoring period at P2 is given in **Figure 4.3**. **Table 4.2** summarises the results across the daytime (07:00 – 23:00) and nighttime (23:00 – 07:00) periods. **Figure 4.4** presents histograms of the $L_{A90,15min}$ values for day and night. As at P1, construction noise has affected noise levels during the day at P2.

Table 4.2 – Summary of measured noise levels – position P2

Period	Parameter	Maximum	Minimum	Logarithmic Average	Mean Average	Modal Average	Median Average
Daytime (07:00 – 23:00)	$L_{Aeq,15min}$ (dB)	69	30	54	47	43	46
	$L_{AFMax,15min}$ (dB)	96	41	N/A	65	55	65
	$L_{A90,15min}$ (dB)	59	27	N/A	40	38	40
Nighttime (23:00 – 07:00)	$L_{Aeq,15min}$ (dB)	57	25	46	40	42	41
	$L_{AFMax,15min}$ (dB)	80	32	N/A	54	54	54
	$L_{A90,15min}$ (dB)	54	23	N/A	36	38	35

Figure 4.3 – Graph of measured noise levels – position P2

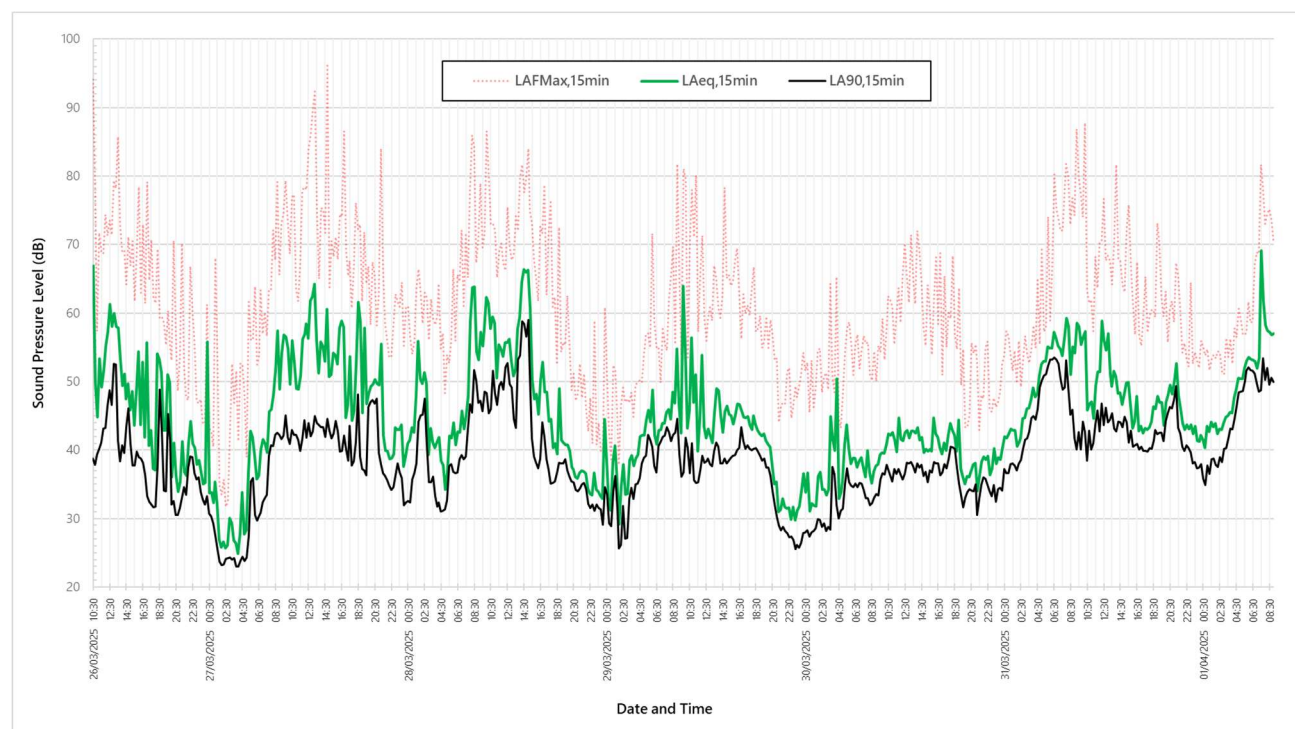
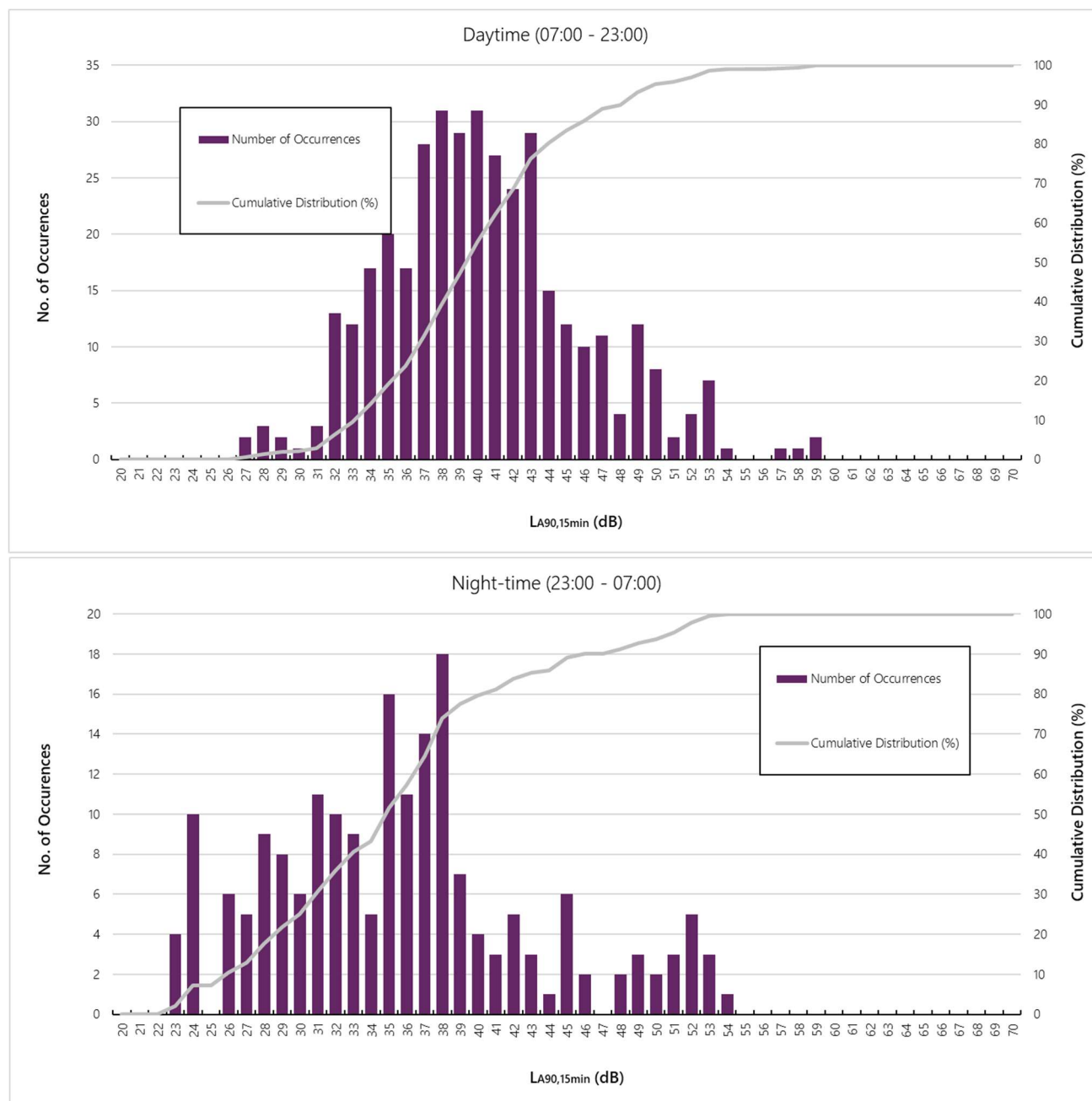


Figure 4.4 – Histogram of measured $LA_{90,15min}$ values – position P2



5.0 Noise Assessment

5.1 Background Sound Levels

In accordance with BS 4142:2014, the predicted rating level should be assessed against a 'representative' background sound level.

BS 4142:2014 states that *"in using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods."* BS 4142:2014 further states that *"a representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either minimum or modal value"*.

In this case, in order to provide the most robust assessment, PJA has used the lowest recorded background noise level at P2, which is applied to all receptor locations. Using the minimum value is seen to be appropriate because it represents a conservative position and reflects the quietest conditions likely to be experienced at the site.

This approach is especially important given that construction activity in the area would have influenced the average background values during parts of the survey period, whereas the minimum measured levels occurred outside of construction hours and are therefore more representative of the true residual baseline conditions.

Table 5.1 – Derived representative background sound level $L_{A90,T}$ at nearby residential NSRs

Noise-Sensitive Receptor (NSR)	Period	Representative Background Sound Level $L_{A90,T}$ (dB)
1m outside of neighbouring residential windows	Daytime (07:00 - 23:00)	27
	Nighttime (23:00 - 07:00)	23

5.2 Proposed Plant

All of the proposed ASHP units will be a Vaillant aroTHERM plus 5 kW model ¹ with dimensions of 1100mm wide x 765mm high x 449mm deep. The modelled source noise emission data (based on manufacturer datasheets ² - see **Appendix D**) indicates a sound power level of 48 dB(A).

It is assumed that in a worst-case 1-hour daytime or 15-minute nighttime period the unit could operate at the maximum output level.

No octave band data is provided by the manufacturer. In PJA's experience of assessing ASHPs, such units generally do not contain tonal qualities and are characterised by a broadband style noise, as the fan runs at a relatively low RPM and thus a low blade passing frequency, which is perceived as a low hum/broadband style noise rather than a defined mid-to-high frequency tone.

5.3 Predicted Noise Emissions

The noise predictions within this report have been undertaken using the proprietary software CadnaA® by DataKustik, a 3D noise mapping package that implements a wide range of national and international standards, guidelines, and calculation algorithms, including those set out in ISO 9613-2:1996. A full explanation of the noise modelling is provided in **Appendix C**, along with images and noise maps/results from the model.

Figure C.2 in **Appendix C** shows the predicted plant noise levels ($L_{Aeq,15min}$) at the receptor locations. In summary, the predicted plant noise emissions are seen to exceed the existing background sound levels in some areas of the site. It is noted that the highest predicted specific noise level is 23 dB $L_{Aeq,15min}$.

Measured background sound levels are 27 dB L_{A90} during the day and 23 dB L_{A90} at night.

No character corrections have been applied to the specific sound levels in accordance with BS 4142:2014+A1:2019. This is primarily because the predicted specific sound levels are very low, with the highest level across the site only reaching 23 dB $L_{Aeq,15min}$. At such low levels, the likelihood of any acoustic features such as tonality, impulsiveness, or intermittency being perceptible — particularly in the context of residual ambient sounds — is greatly reduced.

In addition, the types of ASHP assessed are not typically associated with distinct tonal or impulsive noise emissions when installed and operated in accordance with manufacturer guidelines. The modelling also assumes that all units are operating simultaneously, representing a worst-case scenario.

As such, no acoustic corrections under BS 4142 have been applied, with the rating level taken to be equal to the specific level in all cases. On this basis — with the rating level falling 4 dB below daytime background levels and matching nighttime levels — the Local Authority's requirement (as outlined in **Section 3.1**) that the rating level does not exceed the background sound level is satisfied.

1 - <https://professional.vaillant.co.uk/for-installers/products/arootherm-plus-air-source-heat-pump-5kw-146560.html#downloads>

2 - <https://professional.vaillant.co.uk/downloads/aproducts/renewables-1/arootherm-plus/arootherm-plus-tech-sheet-nov-2024-2965654.pdf>

6.0 Vibration Assessment

While air source heat pumps (ASHPs) are not typically significant sources of structure-borne vibration, standard good practice installation methods should be applied to minimise the potential for vibration transmission into buildings—particularly where units are fixed to structural elements.

Where ASHPs are wall-mounted, anti-vibration fixings and rubber isolation washers should be used on all mechanical connections (e.g. screws and bolts) to prevent vibration from transferring into the wall and radiating into the building. These fixings are typically made from resilient materials such as rubber or neoprene and are usually provided by the manufacturer as part of standard installation kits.

For floor-mounted ASHPs—whether on a concrete plinth, paved area, or steel frame—anti-vibration feet should be installed beneath the base of the unit. These feet are specifically designed to absorb low-frequency vibration and decouple the unit from the supporting surface. They are essential for minimising the transmission of vibration through the ground or any attached structure, particularly in lightweight or suspended floor scenarios.

The use of such isolation measures is especially important in semi-detached properties or where structural connections to neighbouring dwellings exist, as it reduces the risk of structure-borne vibration becoming perceptible inside adjacent properties.

Provided that suitable anti-vibration mountings—whether wall fixings or base feet—are used in accordance with manufacturer guidance, the residual risk of perceptible vibration is considered to be very low. No additional assessment or specific mitigation is considered necessary.

Appendix A – Acoustic Terminology and Concepts

A.1 – Glossary

Table A.1 – Glossary of acoustic terminology

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio of the root-mean-square pressure of the sound and a reference pressure (2×10^{-5} Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e., 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Frequency	Sound can occur over a range of frequencies extending from the very low, such as the rumble of thunder, up to the very high such as the crash of cymbals. Sound is generally described over the frequency range from 63Hz to 4000Hz (4kHz). This is roughly equal to the range of frequencies on a piano.
$L_{Aeq,T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period. This parameter is typically considered as a good representation of the 'average' overall noise level. It is referred to technically as the A-weighted equivalent continuous sound level and is a dB(A) as defined above.
$L_{A90,T}$	The A-weighted noise level that is exceeded for 90% of the measurement period T. This parameter is often considered as the 'average minimum level'.
$L_{AFmax,T}$	The maximum A-weighted noise level during the measurement period T.

A.2 – Subjective Changes in Noise Level

Table A.2 – Subjective loudness from an increase or decrease in sound pressure level

Change in sound pressure level	Relative change in sound power energy (multiplier)		Change in apparent subjective loudness (for mid-frequency range)
	Decrease	Increase	
3 dB	1/2	2	'Just perceptible'
5 dB	1/3	3	'Clearly noticeable'
10 dB	1/10	10	'Half or twice as loud'
20 dB	1/100	100	'Much quieter, or louder'

Appendix B – Noise Survey Methodology

B.1 – Survey Equipment

The monitoring equipment used for the baseline noise survey is detailed in the table below. The sound level meter was calibrated before and after the survey, with no significant drifts of greater than 0.5 dB observed. The sound level meter has been calibrated to a traceable standard within the 24 months preceding the survey, and the calibrators have been calibrated to a traceable standard within the 12 months preceding the survey. The equipment complies with the standards of as BS EN 60942:2003 Class 1 device.

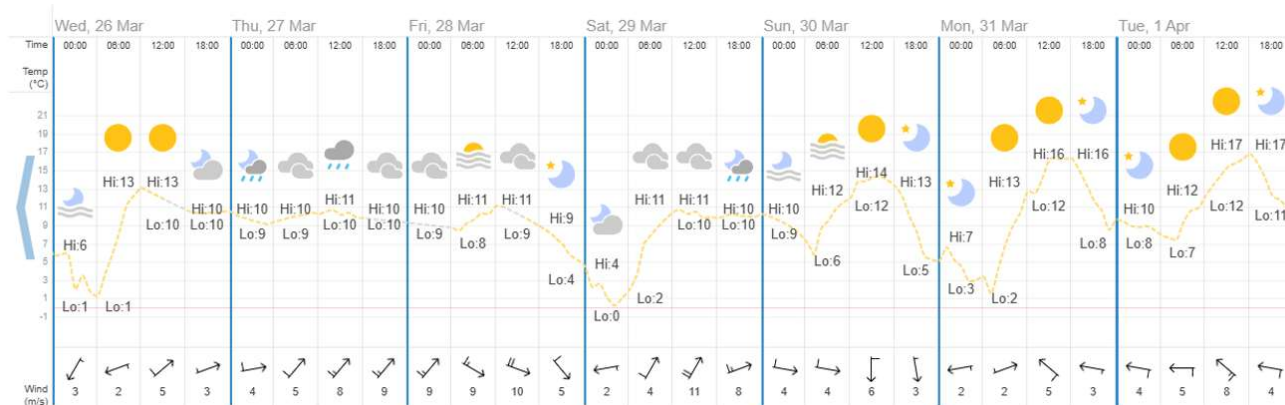
Table B.1 – Equipment used for the noise survey

Name	Serial Number	Last Calibrated	Calibration Due
SVAN 949 Class 1 Sound Level Meter	9720	Dec-23	Dec-25
SV22 Class 1 Microphone	4012386	Dec-23	Dec-25
Cirrus CRL511E Class 1 Acoustic Calibrator	035235	May-24	May-25

B.2 – Meteorological Conditions

During the survey, weather conditions were variable with wind speeds of 2 - 11 ms⁻¹ (the microphone was fitted with a weather protection kit/windshield). The weather conditions were mostly suitable for the measurement of environmental noise in accordance with BS 7445 'Description and Measurement of Environmental Noise'. The weather data below has been sourced from <https://www.timeanddate.com/weather/uk/london/historic>.

Figure B.1 – Meteorological conditions during the survey



B.3 – Photos

Figure B.2 – Noise monitoring photographs



Appendix C – Calculations

The noise predictions within this report have been undertaken using the proprietary software CadnaA® by DataKustik, a 3-D noise mapping package that implements a wide range of national and international standards, guidelines, and calculation algorithms, including those set out in ISO 9613-2:1996.

All of the objects within the model (buildings, roads, barriers, foliage, etc) have been imported from OpenStreetMap. The heights of the buildings and roads have been based upon Google Earth Pro, using the 3D view to be able to measure the elevation heights at the tops of objects, and then inserting this manually into the model. Where OpenStreetMap contains little or inaccurate information, the objects have been drawn manually. The scaled site plan, floor plan, and elevation for the proposed development have been accounted for in the model.

The noise model has been used to predict the resulting L_{Aeq} noise emissions from the proposed plant.

The noise model has assumed:

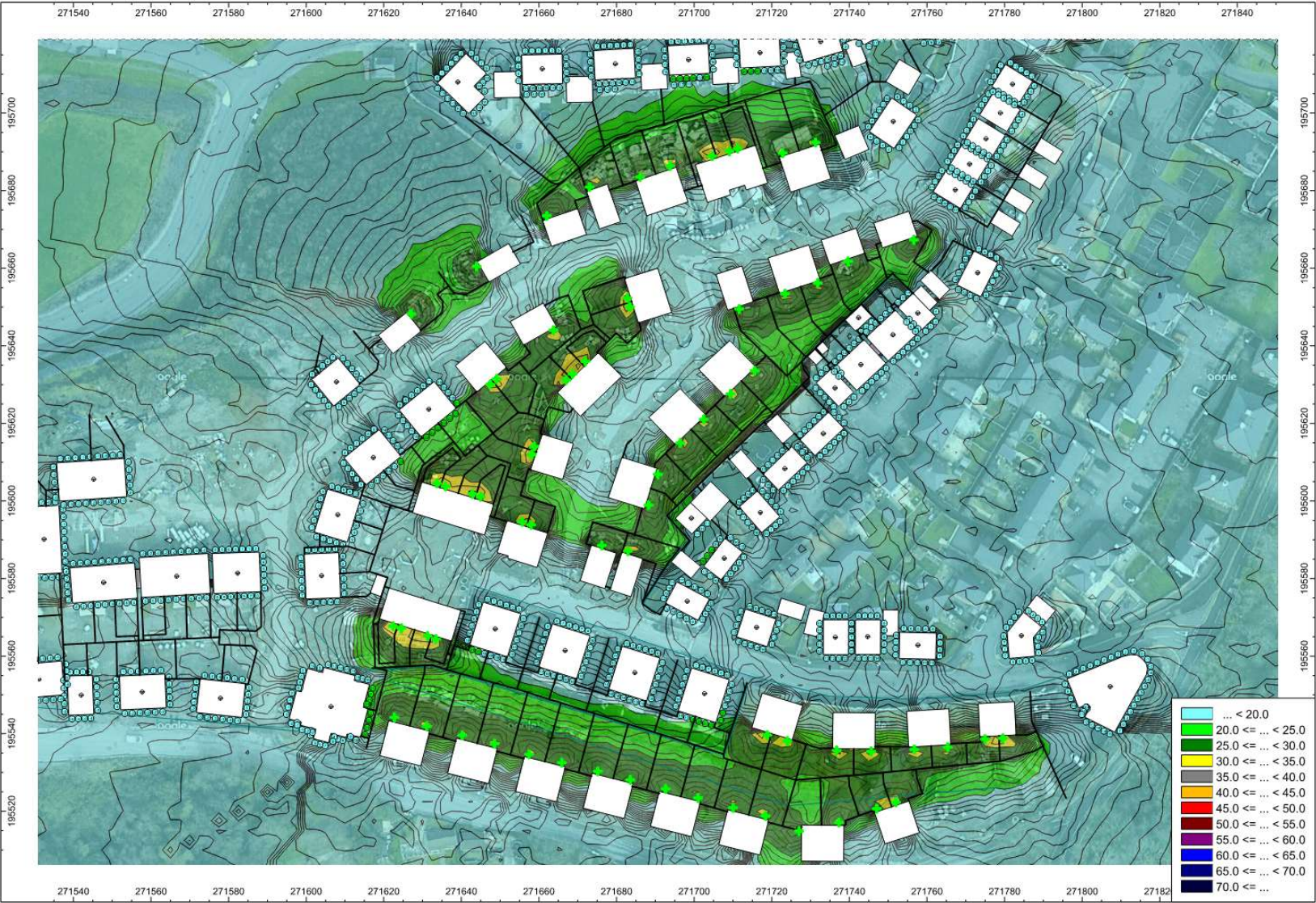
- downwind propagation, i.e., a wind direction that assists the propagation of sound from source to receptor, as a worst-case;
- a maximum reflection factor of two where buildings and barriers are assumed to have a 'smooth' reflective façade, as a worst-case;
- a ground absorption factor of 0 to represent hard, reflective ground as a worst-case;
- receptor points on the façade at ground floor (2m) and 1st floor (4.5m) window heights, placed at 1m outside of elevations which contain windows;
- atmospheric sound absorption based upon a temperature of 10°C and a humidity level of 70%, as per Table 2 of ISO 9613-2:1996

The images on the following pages contain the results of the mapping.

Figure C.1 – 3D view of the model setup



Figure C.2 – Predicted specific noise levels (dB LAeq)



Appendix D – Manufacturer Noise Data

Technical data	Unit	3.5kW	5kW	7kW	10kW (230v)	12kW (230v)	10kW (400v)	12kW (400v)
General								
Weight, ready for operation	kg	114		128	194		210	
Connection, heating circuit		G 1 1/4"						
Rated voltage		230 V (+10%/- 15%), 50 Hz, 1~/N/PE						400 V (+10%/-15%), 50 Hz, 3~/N/PE
Rated current, maximum	A	14.3		15.0	23.3		15	
Fuse size	A	16			25		16	
Fuse type		Characteristic C, slow-blow, singlepole switching						
RCD type		Type B rated to 20kHz or greater and with a minimum trigger point of 150mA above 1kHz						
eBUS (2-core communication cable)	mm²	0.75						
Maximum length eBUS cable (polarity sensitive)	m	50						
IP rating		IP 15 B						
Fan power consumption	W	40			50			
Fan quantity		1			2			
Fan air flow, maximum	m³/h	2300			5100			
Heating pump, power consumption	W	2 - 50			3 - 87			
Heating circuit								
Heating water temperature, minimum/maximum	°C	20 - 75						
Basic length of the heating water pipe, maximum, between the outdoor unit and indoor unit	m	20						
Maximum static height difference between outdoor unit and the highest point in the heating system	m	18			13			
Minimum operating pressure	bar	3.0			2.5			
Maximum operating pressure	bar	20						
Minimum volume flow	l/h	400		540	995			
Maximum volume flow	l/h	860		1205	2065			
Water volume, in the outdoor unit	l	1.5		2.0	4.5			
Minimum open water volume	l	15		20	45			
Refrigerant circuit								
Fluid type		R290						
Fluid fill quantity	kg	0.6		0.9	1.3			
Refrigerant, Global Warming Potential (GWP)		3						
CO ₂ equivalent	t	0.0018		0.0027	0.0039			
Permissible operating pressure	bar	31.5						
Compressor type		Rotary piston			Scroll compressor			
Compressor oil type		Specific polyalkylene glycol (PAG)						
Compressor, control		Electronic						
Noise emissions, heating mode								
Sound power, EN 12102, EN 14511 LWA, A7/W35	dB(A)	48		49	51			
Sound power, EN 12102, EN 14511 LWA, A7/W55	dB(A)	48		49	51			
Efficiency								
Energy efficiency class 35°C	(A+++ to F)	A++		A+++				
Energy efficiency class 55°C	(A+++ to F)	A+		A++				
Combination with uniTOWER								
Energy efficiency class	(A+++ to F)	A+		A++				
Energy efficiency class, hot water	(A+ to F)	A		A				

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