



REPORT

NOISE IMPACT ASSESSMENT
OF AIR SOURCE HEAT PUMPS

SITE ADDRESS

FENSTANTON PRIMARY SCHOOL, ABBOTS PARK, LONDON SW2 3PW

REFERENCE

HA/AF432/V1

HEALTHY ABODE ACOUSTICS
BUILDING ACOUSTICIANS & ENVIRONMENTAL NOISE CONSULTANTS

Our Ref HA/AF432/V1
Site Address Fenstanton Primary School, Abbots Park, London, SW2 3PW
For Cenergist Limited
Client Address 8 Bede House, Glover Industrial Estate, Washington, Tyne and Wear NE37 2SH
Date of Report 16 August 2023
Author Miss Josie Nixon MSc BA (Hons)
Checked by Mr Mark Speed BSc (Hons) MIOA MIIInstP MIEEnvSc



Healthy Abode Ltd
Company No. 07429355 (England & Wales)
Office Address: Healthy Abode, Office F9, Allen House Business Centre, The Maltings, Station Road, Sawbridgeworth, Essex CM21 9JX
Registered Business Address: Abacus House. 68a North Street, Romford, London, RM1 1DA
E-mail: info@HA-acoustics.co.uk
Website: www.HA-acoustics.co.uk
Telephone: (Chelmsford) 01245 206 250

This report has been prepared by Healthy Abode Limited t/a HA Acoustics with all reasonable expertise, care and diligence. The survey and report has been undertaken in accordance with accepted acoustic consultancy principles, it takes account of the services and terms and conditions agreed verbally and in writing between HA Acoustics and our client. Any information provided by third parties and referenced is considered to have undergone suitably thorough third-party checks to ensure accuracy. We can accept no liability for errors with a third-party data. This report is confidential to our client and therefore HA Acoustics accepts no responsibility whatsoever to third parties unless formally agreed in writing by HA Acoustics. Any such party relies upon the report at their own risk.

SUMMARY

- Cenergist Limited instructed Healthy Abode Ltd t/a as HA Acoustics to undertake a noise impact assessment for the proposed installation of two Rhoss WinPOWER ECO-THAETU 6600 P1 Air Source Heat Pumps at Fenstanton Primary School, Abbots Park, London SW2 3PW.
- HA Acoustics has undertaken an environmental noise survey at the site in order to determine prevailing background noise levels that are representative of the nearest noise sensitive receptors (NSR). The nearest NSR to the proposed plant installation is the east façade of a residential property located off Abbots Park at approximately 45m from the proposed plant location.
- A baseline noise survey and assessment has been undertaken in line with the guidance contained in BS 4142: 2014 +A1: 2019, measurements being taken over continuous 15-minute periods. The unattended survey was conducted on Wednesday 2nd August 2023 – Friday 4th August 2023, at two fixed monitoring points, located to the north-west of the site.
- The operation of the mechanical plant shall be as required, 06:00 – 18:00 hours Monday to Friday and 08:00-13:00 Saturday to Sundays.
- The typical background noise level has been calculated at 43dB $L_{A90,T}$. The noise criteria has been set 5 dB below background at 38dB $L_{A,r,T,r}$ in line with the local authority's requirements
- Noise calculations of the proposed plant have been undertaken using all available details and plans provided by the client and obtaining manufacturers' specifications. The resultant sound pressure level with mitigation has been calculated at the NSR at 35dBA.
- In accordance with BS 4142:2014 +A1: 2019 guidance, the noise impact from the operation of the mechanical plant ***"is an indication of the specific sound source having a low impact"*** at the NSR.

TABLE OF CONTENTS

SUMMARY	3
1. INTRODUCTION	5
2. SITE DESCRIPTION.....	6
3. EXTERNAL NOISE EMISSION CRITERIA.....	7
4. ENVIRONMENTAL NOISE SURVEY METHODOLOGY	11
5. NOISE SURVEY RESULTS.....	13
6. NOISE IMPACT ASSESSMENT	14
7. UNCERTAINTY	17
8. CONCLUSION	18

Appendices

Appendix A – Site Plans (SP1-SP2)

Appendix B – Time Histories (TH1-TH2)

Appendix C – Plant Manufacturer’s Specification

Appendix D – Acoustic Calculations

1. INTRODUCTION

- 1.1. Cenergist Limited instructed Healthy Abode Ltd t/a HA Acoustics to undertake a noise impact assessment at Fenstanton Primary School, Abbots Park, London, SW2 3PW for submission as part of documentation to be provided to the Local Authority, London Borough of Lambeth.

- 1.2. Fenstanton Primary School, Abbots Park, London, SW2 3PW is proposing to install 2 Rhoss WinPOWER ECO-THAETU 6600 P1 Air Source Heat Pumps to the roof of the premises to service the commercial property, the noise from which could have the potential to affect existing noise sensitive properties nearby.

- 1.3. The purposes of this report are:
 - 1.3.1. To determine prevailing environmental noise levels affecting surrounding properties due to nearby noise sources (e.g. road traffic, commercial plant etc.);

 - 1.3.2. Based on the above, to present noise emission limits in accordance with the requirements of BS 4142: 2014 +A1: 2019, and

 - 1.3.3. To undertake an assessment to demonstrate compliance with the Local Authority noise requirements.

2. SITE DESCRIPTION

- 2.1. Fenstanton Primary School, Abbots Park, London, SW2 3PW (hereafter referred to as 'the site') is a primary school. The proposal is to install two Rhoss WinPOWER ECO-THAETU 6600 P1 Air Source Heat Pumps to the roof of the premises to service the school.
- 2.2. The site is located in an urban area and is predominantly surrounded by residential properties. The A205 runs to the south of the site. City Heights E ACT Academy is located adjacent to the east of the site.
- 2.3. The nearest noise sensitive receptor (NSR) located to the proposed plant location is noted to be the east façade of a property located approximately 45 metres to the west from the proposed plant. It can be confidently assumed that if the noise impact assessment indicates that the specific sound source has a low impact at this premises then it can be safely assumed it will be met at other properties of equal distance and/or those further away.
- 2.4. At the time of installation and collection of the monitoring equipment, the dominant noise sources emanated from road traffic and the occasional pedestrian children walking to kids camp. These noise sources are considered normal to the site location. No significant abnormal noise sources were identifiable. It is considered that the measured noise levels are reasonable given the location of the measurement position.

3. EXTERNAL NOISE EMISSION CRITERIA

3.1. Local Authority

3.2. The proposed site lies within the jurisdiction of the Local Authority, Runnymede Borough Council. An acoustic report is required to support a planning application. The local authority have provided the following wording:

“For larger air source heat pumps, we want to see a maximum noise rating level at least 5dB below the representative background noise level as determined in accordance with BS4142.

The background noise at each location will vary due to the differing locations, proximity of noise sensitive receptors etc and therefore so will the target value for plant and machinery noise.

Any assessment will need to determine the background noise level, distance to sensitive receptors and other weighting factors for each location. An appropriate target limit for each location can then be derived using the methodology in BS4142.

In terms of mitigation:

- *Really big plant like the ones for swimming pools can have three operating levels- the quieter ones are power setbacks- Less power less noise.*
- *The other issue is the hours of operation background noise levels are typically lowest from midnight to 04:30. This varies from site to site but if the building can cope with the installation operating from say 06:00 to 22:00 then the environmental noise levels can be a lot higher and this reduces the scale of the impact*

Therefore, a combination of power setback and electronic control can mitigate a fair bit of impact without resorting to expensive and tricky mitigation that can create issues with performance of the plant.

As a first step, you are recommended to identify the kit needed and the specifications and then establish what operating hours will be required and then see if you can trim some noise off with a setback on the machine settings. These will all have to be electronically controlled.”

3.3. It is understood that the plant will be operational Monday – Friday 06:00-18:00 and Saturday – Sunday 8:00-13:00 hours. The noise criteria will therefore be set 5dB below the typical background operational

levels. In this case the criteria to be met is a maximum rating noise level of 38dB $L_{Ar,Tr}$ measured at the NSR.

3.4. National Planning Policy Framework (2021)

3.5. In March 2012, the National Planning Policy Framework (NPPF) came into force and was revised in 2019 and 2021. This document replaces a great many planning guidance documents, which previously informed the planning system in England.

3.6. The NPPF (2021) sets out the Government's economic, environmental and social planning policies for England and these policies articulate the Government's vision of sustainable development.

3.7. The Noise Policy Statement for England (NPSE) published 2010 applies to '*all forms of noise, including environmental noise, neighbour noise and neighbourhood noise*'.

3.8. Paragraph 185 of the NPPF (2021) considers noise, stating:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."*

3.9. National Planning Policy is guided by the NPPF. With regard to noise, the terms 'significant adverse impact' and 'other adverse impacts' are defined in the explanatory notes of the 'Noise Policy Statement for England' (NPSE). These state that there are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

- ‘NOEL – No Observed Effect Level, this is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise, and
- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.

3.10. Extending these concepts for the purpose of this NPSE leads to the concept of SOAEL - significant observed adverse effect level. This is the level above which significant adverse effects on health and quality of life occur’. However, no specific noise limits for LOAEL and SOAEL have been defined. Therefore, guidance from other acoustic standards must be employed to determine suitable levels within the overall principal of the National Planning Policy Framework; such as BS 8233:2014.

3.11. **BS 4142: 2014 +A1: 2019**

3.12. BS 4142: 2014 +A1: 2019 “Methods for Rating and Assessing Industrial and Commercial Sound” presents a method for assessing the significance and possible adverse impact due to an industrial or commercial noise source, based on a comparison of the source noise levels and the background noise levels, both of which are measured or predicted at a noise sensitive receiver e.g. a residential property.

3.13. The specific noise level due to the source is determined, with a series of corrections for tonality, impulsivity, intermittency or any other unusual characteristic. This can result in a maximum total correction of +21dB being added if the new noise source demonstrates all the above characteristics. The background noise level is then subtracted from the rating level and a comparison made.

3.14. The significance of the new noise source and the likelihood of any adverse impact is determined in accordance with the following advice:

“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.

- *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.*
- *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.”

4. ENVIRONMENTAL NOISE SURVEY METHODOLOGY

4.1. An unmanned environmental noise survey was undertaken at two measurement locations to the north-west of the site. The survey was undertaken between 09:45 hours on Wednesday 2nd August 2023 and 09:00 hours on Friday 4th August 2023.

4.2. The sound level meters (SLMs) were mounted approximately 1.5 metres above ground level. Noise monitoring position 1 (NMP1) was mounted in ‘free-field’ conditions. NMP2 was considered not to be mounted in free-field conditions therefore acoustic corrections of -3dB have been applied to the measurements. The position is considered to be representative of background noise levels at the nearest identified NSR. The monitoring positions are identified in Appendix A.

4.3. The equipment used for the noise survey is summarised in Table 4.1.

Equipment	Description	Quantity	Serial Number
NTi XL2	Class 1 automated logging sound level meter	1	A2A-13627-E0
MA220 microphone	Class 1 ½" microphone	1	7072
Svantek 977	Class 1 automated logging sound level meter	1	46457
ACO Pacific 7052E	Class 1 ½" microphone	1	64237
Larson Davis CAL200	Class 1 Calibrator	1	20159
Svantek SV336	Class 1 Calibrator	1	109944

Table 4.1 Description of Equipment used for Noise Survey

4.4. Ambient, background and maximum noise levels (L_{Aeq} , L_{A10} , L_{A90} and L_{AmaxF} respectively) were measured throughout the noise survey in consecutive 15-minute periods.

4.5. The noise survey and measurements were conducted, wherever possible, in accordance with BS7445-1:2003 ‘Description and measurement of environmental noise. Guide to quantities and procedures’. Measurements were made generally in accordance with ISO 1996-2:2017 ‘Acoustics – Description,

measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels’.

4.6. The noise monitoring equipment was calibrated before and after the noise survey period. No significant drift was recorded. Equipment calibration certificates can be provided upon request.

4.7. **Weather Conditions**

4.8. Weather conditions were noted to be:

4.8.1. during installation - mild (approximately 19° Celsius), generally dry, with cloudy skies (approximately 70% cloud cover) and a light wind (<5m/s).

4.8.2. during collection - mild (approximately 18° Celsius), dry, with cloudy skies (approximately 50-90% cloud cover) and a light wind (<5m/s).

4.8.3. throughout the entire noise survey period - mild (approximately 14-21° Celsius), generally dry, with cloudy skies (approximately 40-100% cloud cover) and a light wind (<5m/s).

4.9. These weather conditions were checked against and confirmed by the use of the Met Office. These conditions were maintained throughout the whole survey period and are considered reasonable for undertaking environmental noise measurements.

5. NOISE SURVEY RESULTS

5.1. The ambient and background noise levels at the measurement position as seen in Appendix A are provided below and have been based on an analysis of the monitoring data.

5.2. A summary of the data results is provided in Table 5.1. The time history can be seen in Appendix B (TH1).

	Ambient Noise Level $L_{Aeq,T}$	Typical Background Noise Level $L_{A90,Tn}$
Position 1		
Day (07:00 – 23:00)	52 dB	46 dB
Night (23:00 – 07:00)	48 dB	39 dB
Operating Hours (Monday – Friday 06:00-18:00, Saturday - Sunday 08:00-13:00)	52 dB	46 dB
Position 2*		
Day (07:00 – 23:00)	49 dB	43 dB
Night (23:00 – 07:00)	44 dB	38 dB
Operating Hours (Monday – Friday 06:00-18:00, Saturday - Sunday 08:00-13:00)	49 dB	43 dB

*includes -3dB facade noise correction

Table 5.1 Summary of typical noise measurement data

5.3. These noise levels are considered normal to the site location. No significant abnormal noise sources were identifiable during installation or collection of the equipment. It is considered that the measured noise levels are reasonable given the location of the measurement position.

6. NOISE IMPACT ASSESSMENT

6.1. It is proposed to install two (2no.) Rhoss WinPOWER ECO-THAETU 6600 P1 Air Source Heat Pump externally to the roof of the main building. Calculations have been undertaken to gain the specific noise level of the plant using information provided by the client and from manufacturer specifications.

6.2. Table 6.1 lists the proposed plant to be installed and its operational maximum sound pressure level. Manufacturer's specifications are provided in Appendix C.

Plant Make/Model	Reference Sound Power Level	Reference Sound Pressure Level @10m	Quantity
Rhoss WinPOWER ECO-THAETU 6600 P1 Air Source Heat Pump	97 dB(A)	64 dB(A)	2

Table 6.1 Proposed plant

6.3. Table 6.2 lists the sound power spectral data for the plant.

	Frequency Spectral Data (Hz) at 1m							
	LZFeq 63	LZFeq 125	LZFeq 250	LZFeq 500	LZFeq 1000	LZFeq 2000	LZFeq 4000	LZFeq 8000
Rhoss WinPOWER ECO-THAETU 6600 P1 Air Source Heat Pump	112	108	96	92	90	85	78	68

Table 6.2 Spectral sound data

6.4. Detailed calculations to predict the noise level of the plant at 1metre from the NSR are given in Appendix D. The following factors have been taken into account during the assessment and within the calculations:

6.4.1. Mitigation due to the distance between the proposed plant location and NSR's has been taken into account.

6.4.2. There is only a partial line of sight between the plant and the NSR. This screening is conservatively estimated to provide 5dB noise attenuation. This will be accounted for in the calculations.

6.4.3.A 'penalty' addition has been added to the fans for intermittency as the operation is considered to be such that it could attract attention at the NSR. A 'penalty' addition has been added to the fans for tonality at the plant could have tonal elements.

6.5. In order to meet the noise criteria of 38 dB(A) at the NSR, the proposed plant requires mitigation. It is recommended that an acoustic enclosure is installed around the plant. Table 6.3 gives recommendations of an enclosure that should be suitable to achieve this.

	Frequency Spectral Data (Hz) at 1m							
	LZFeq	LZFeq	LZFeq	LZFeq	LZFeq	LZFeq	LZFeq	LZFeq
	63	125	250	500	1000	2000	4000	8000
Acoustic enclosure	14	16	23	30	37	39	38	39

Table 6.3 Proposed Mitigation

6.6. The proposed plant installation with acoustic enclosure would be expected to meet the requirements of the proposed criteria.

6.7. Detailed calculations to predict the noise level of the plant at the NSR are given in Appendix D. The rating noise level at NSR1 with mitigation is **35dB L_{Ar,Tr}** and **3dB(A) below** the noise criteria and **8dB(A) below** the assessed background noise level (43dB L_{A90,T}). In accordance with BS 4142:2014 guidance, the rating noise **"is an indication of the specific sound source having a low impact. The lower the rating level is relative to the measured background level, the less likely it is that the specific sound source will have an adverse impact."**

6.8. Vibration from plant is not expected. However, as a precaution, all plant should be installed with anti-vibration isolators. Anti-vibration mounts are widely available from system suppliers/installers and shall need to be installed in accordance with the type, make and model of the mechanical plant specified. Anti-vibration mounts are often in pedestal rubber mountings. Examples of these are MPO and MP1, and ISL Maxi pedestal vibration mounts. These types of anti-vibration and shock isolators are industry standard and commonplace on air conditioning and ventilation systems. They are designed to provide medium to high frequency isolation from vibration and noise via high resilience rubber. Once type, location, manufacturer make and model of proposed mechanical plant is confirmed, the M+E contractor shall be able to advise upon the specific anti-vibration isolators required to ensure no adverse impact occurs.

6.9. As BS 4142:2014 advises, the impact must be considered within the context of the site and the surrounding acoustic environment. The following must, therefore, also be taken into consideration when determining the potential impact that may be experienced:

6.9.1. The assessment is undertaken at the most affected existing residential windows. The impact on all other nearby residential windows will be lower due to screening and distance attenuation.

6.9.2. It should be noted that the above assessment is based on the plant operating simultaneously and at maximum duty. Given that the plant will not operate simultaneously at maximum capacity all of the time, the above assessment is considered to be representative of the worst case.

6.10. British Standard 8233:2014 'Sound insulation and noise reduction for buildings – Code of Practice' gives recommendations for acceptable internal noise levels in residential properties. Assuming worst case conditions, of the closest window being for a bedroom, BS8233:2014 recommends 30dB(A) as being acceptable internal resting/sleeping conditions during night-time. According to BS8233:2014, the façade of a residential dwelling; with a window partially open for ventilation offers 10-15 dB attenuation. Therefore, taking into account this reduction for a partially open window the internal noise level with the plant operating would be 25dB(A) which is lower than the acceptable internal noise level as seen under BS 8233: 2014; and significantly lower than the background.

7. UNCERTAINTY

- 7.1. The levels of uncertainty in the data and calculations are considered to be low given the robust exercise undertaken in noise monitoring and the confidence in the statistical analysis.
- 7.2. All measurements taken on-site by instrumentation are subject to a margin of uncertainty. This is relatively small, with a sound level meter manufacturer's margin of uncertainty at +/-1.1dB. It is due to the tolerances associated with the Class 1 sound level meter and calibrator equipment used to measure background.
- 7.3. The meter and calibrator used have a traceable laboratory calibration and were field calibrated before and after the measurements.
- 7.4. Manufacturers' data for the plant is likely to be robust. Detailed calculations and resultant noise levels at the residential location are considered to be confidently predicted.
- 7.5. Uncertainty in the calculated impact has been reduced by the use of a well-established calculation method.

8. CONCLUSION





- 8.1. A noise assessment has been undertaken at Fenstanton Primary School, Abbots Park, London, SW2 3PW. The noise survey was undertaken at two fixed monitoring points, representative of the nearest noise sensitive receptor.
- 8.2. Following on-site measurement of pre-existing noise levels, calculations have been made of the noise rating level of the proposed plant at the NSR. From this assessment, together with information from the plant manufacturer, the potential noise impact has been determined.
- 8.3. Noise levels from the proposed plant with mitigation at the NSR is predicted to be **35dB L_{Ar,Tr}**.
- 8.4. BS 4142: 2014 +A1: 2019 assessment methodology shows that the rating noise level from the proposed 2x Rhoss WinPOWER ECO-THAETU 6600 P1 Air Source Heat Pumps, with mitigation as suggested, is predicted to be **8dB(A) below** the typical background of **43 dB L_{Ar,Tr}** at the NSR. In accordance with BS 4142:2014, noise levels from the plant ***“is an indication of the specific sound source having a low impact”***.
- 8.5. Considering the results of the noise survey, the illustrative layouts and the calculations, the predicted resultant noise levels from the proposed plant are predicted to meet appropriate and reasonable guidance and the relevant noise criteria. Therefore, an adequate level of protection against noise for occupants of the nearest noise sensitive receptor is afforded; including when factoring in potential uncertainty.

Appendix A – Site Plan (SP1)

Source: Google Earth



Key

- Noise Monitoring Position 
- Noise Sensitive Receptor 
- Approx Site Boundary 
- Proposed ASHP 

Appendix A – Site Plan (SP2)

Source: As provided by Client

Understood plant location for ASHP to be re-located here



THIS DRAWING IS COPYRIGHT © OF ALTERNATIVE HEAT LTD. THIS DRAWING MAY NOT BE COPIED OR REPRODUCED WITHOUT THE CONSENT OF ALTERNATIVE HEAT LTD. THIS DRAWING IS FOR USE ON THIS PROJECT ONLY AND IS CONTRACTUALLY OTHERWISE STATED.

DO NOT SCALE THIS DRAWING (PRINTED OR ELECTRONICALLY). THIS DRAWING IS FOR VISUAL CO-ORDINATION PURPOSES ONLY. ALL EXISTING AND NEW SERVICES FOR ALLTYPING OUT AND MUST CHECK ALL LEVELS AND DIMENSIONS PRIOR TO INSTALLATION / CONSTRUCTION.

ALL OTHER DESIGN COMMENTS, WHERE INDICATED, HAVE BEEN INCORPORATED. FOR A CONSULTANT'S DRAWINGS AND SERVICES SHOULD BE MADE TO THE RELEVANT CONSULTANT DRAWINGS FOR EXACT DIMENSIONS & CO-ORDINATIONS PRIOR TO ON SITE INSTALLATION.

SEARCHED AND APPROVED WITHIN DRAWING ARE A REPRESENTATIVE SAMPLES. MUST BE REPORTED AND DETAIL TO ALTERNATIVE HEAT LTD. FOR CLARIFICATION BEFORE PROCEEDING WITH INSTALLATION.

ALL WORK IS TO BE COMPLETED IN ACCORDANCE WITH THE LATEST BRITISH STANDARDS AND CODES OF PRACTICE UNLESS SPECIFICALLY DIRECTED OTHERWISE IN THE SPECIFICATION.

- BUILDING OUTLINE WITHIN SCOPE
- BUILDING OUTLINE OUTSIDE SCOPE
- UNDERGROUND SERVICES TRENCH
- ABOVE GROUND SERVICES
- UNDERGROUND ELECTRICAL SUPPLY
- ABOVE GROUND ELECTRICAL SUPPLY
- EXISTING PLANTROOM
- PROPOSED ASHP LOCATION
- SITE BOUNDARY

Rev	Description	Date	By	Check	Issue
P01	Final Issue	10/01/2023			

PRELIMINARY



Project No: LEEDS P5053B

Drawing title: FENSTANTON PRIMARY SCHOOL SITE OVERVIEW LAYOUT

Drawing no: DN2302-ALT-FEN-KK-DR-Z-1005 P01

Scale: 1:500

Drawn by: [initials] Checked by: [initials]

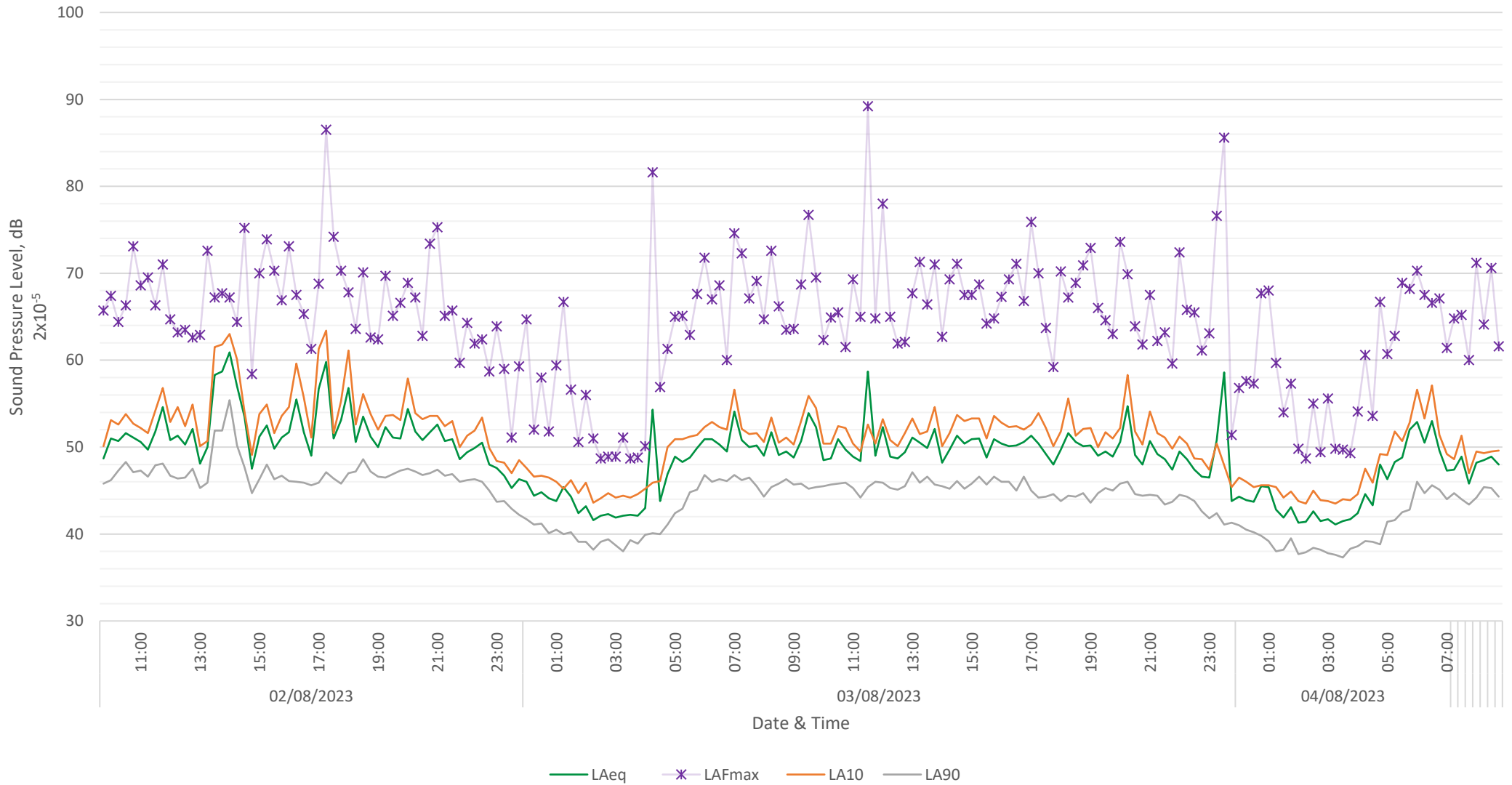
Commercial Energy Solutions

Head Office: Unit 1E - 19 Central Road Industrial Estate
 (near the Food Warehouse, Co. Down, BT32 3JG)
 Tel: +44 (0) 28 437 5100 Fax: +44 (0) 28 437 2504
 Email: info@alternativeheat.co.uk

Site Overview Layout
Scale 1:500

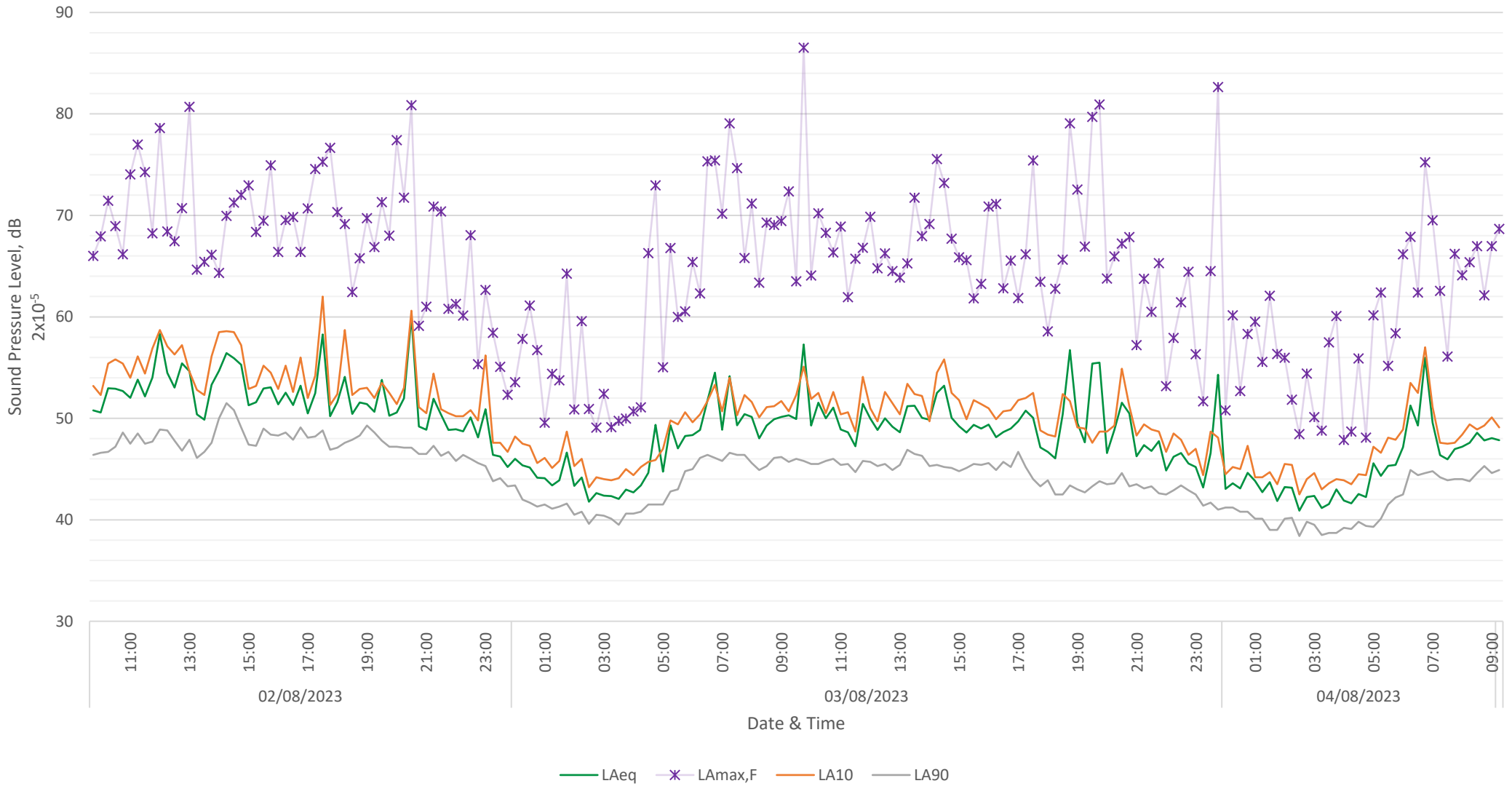
Appendix B - Time History 1

Fenstanton Primary School, Abbots Park, London
Wednesday 2 August 2023 - Friday 4 August 2023
Position 1



Appendix B - Time History 2 (TH2)

Fenstanton Primary School, Abbots Park, London
Wednesday 2 August 2023 - Friday 4 August 2023
Position 2



Appendix C – Plant Manufacturer’s Specifications

Rhoss WinPOWER ECO THAETU 6600 P1 Air Source Heat Pump (ASHP)

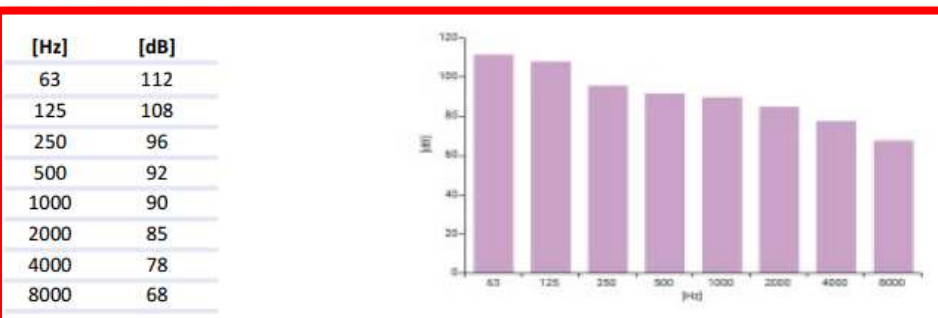
<p>AIR SOURCE HEAT PUMP [CLICK HERE FOR APPENDIX 01]</p>	<p>ASHP Manufacturer: Rhoss Model: WinPOWER ECO - THAETU 6600 P1</p> <p>Packaged air-cooled reversible heat pump with axial fans. Range with hermetic Scroll compressors and R454B refrigerant gas.</p> <p>T - High temperature/efficiency version</p> <p>P1 - Installation with pump</p> <p>Key Features:</p> <ul style="list-style-type: none"> - Efficient and eco-friendly range in R454B - SEER up to 5.38 with FIEC accessory (EC fans) - B version compact chillers also for replacement markets. - Extended operating limits - Up to 6 capacity steps - Integrated MASTER/SLAVE control <p>Sound Data: Calculated sound power: 97dB(A) Sound pressure Level at 10m: 64 dBA</p> <p>Electric Data: Electrical Supply: 400V - 50Hz Phase: 3PH Nominal Current: 308A Maximum Current: 430A Starting Current SFS: 566A</p> <p>Dimansions: Width: 7100 mm Depth: 2260 mm Height: 2480 mm</p>	
--	---	---

Noise

Unit without additional options for noise reduction

Sound Power level (1)	[dBA]	97
Sound Pressure level (10m) (2)	[dBA]	64
Sound Pressure level (1m) (2)	[dBA]	76

(Performance given without pump)



Unit with additional options for noise reduction

Sound Power level (1)	[dBA]	92
Sound Pressure level (10m) (2)	[dBA]	59

Appendix D - HA Calculations



Noise Sensitive Receiver 1

	Frequency Spectral Data (Hz)								
	63	125	250	500	1000	2000	4000	8000	dB(A)
Rhoss WinPOWER ECO-THAETU 6600 P1 Lw	112	108	96	92	90	85	78	68	97
Rhoss WinPOWER ECO-THAETU 6600 P1 Lw	112	108	96	92	90	85	78	68	97
Calculated Cumulative Plant SPL	104	100	88	84	82	77	70	60	89
BS4142 Penalty for Intermittency	3	3	3	3	3	3	3	3	
BS4142 Penalty for Tonality	2	2	2	2	2	2	2	2	
Reflections	3	3	3	3	3	3	3	3	
Distance propagation (45m)	-33	-33	-33	-33	-33	-33	-33	-33	
Partial line of Sight	-10	-10	-10	-10	-10	-10	-10	-10	
Enclosure	-14	-16	-23	-30	-37	-39	-38	-39	
Calculated rating level at NSR	55	49	30	19	10	3	0	0	35

Noise Criteria	38
No Observed Effect Level	

BS8233: Internal Daytime Levels

	Frequency Spectral Data (Hz)								
	63	125	250	500	1000	2000	4000	8000	dB(A)
Calculated level at NSR	55	49	30	19	10	3	0	0	35
Partially Open Window Attenuation	-10	-10	-10	-10	-10	-10	-10	-10	
Calculated level in Internal Receiver	45	39	20	9	0	-7	-10	-10	25

BS8233 Night Time Criteria	30
-----------------------------------	-----------



HEALTHY ABODE ACOUSTICS

BUILDING ACOUSTICIANS & ENVIRONMENTAL NOISE CONSULTANTS

PHONE

EAST ANGLIA 01245 206 250
LONDON & NATIONAL 0203 371 980
SOUTH-WEST 01752 426 118

WEB WWW.HA-ACOUSTICS.CO.UK

EMAIL INFO@HA-ACOUSTICS.CO.UK

HEAD OFFICE

HA ACOUSTICS, OFFICE F9, ALLEN HOUSE,
THE MALTINGS, STATION ROAD, SAWBRIDGEWORTH CM21 9JX



MEMBER OF THE FEDERATION
OF SMALL BUSINESSES



10263

UKAS accredited laboratory
for Sound Insulation Testing

