



REPORT

NOISE IMPACT ASSESSMENT OF MECHANICAL PLANT

SITE ADDRESS

STREATHAM ICE AND LEISURE CENTRE,  
390 STREATHAM HIGH ROAD, LONDON SW16 6HX



REFERENCE

HA/AF433/V2

**HEALTHY ABODE ACOUSTICS**  
BUILDING ACOUSTICIANS & ENVIRONMENTAL NOISE CONSULTANTS

**Our Ref** HA/AF433/V2  
**Site Address** Streatham Ice and Leisure Centre, 390 Streatham High Road, London SW16 6HX  
**For** Cenergist Limited  
**Client Address** 8 Bede House, Glover Industrial Estate, Washington, Tyne and Wear NE37 2SH  
**Date of Report** 22 September 2023  
**Author** Miss Josie Nixon MSc BA (Hons) MIOA  
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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 (2) RHOSS WinPOWER ECO THAEQU 5520 air source heat pumps to the front flat roof at Streatham Ice and Leisure Centre, 390 Streatham High Road, London SW16 6HX.
- 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 rear façade of a residential premises located off Streatham High Street, at approximately 14m from the proposed plant location, to the south. NSR2 is the façade of a residential property located to the north-west of the proposed plant location, at approximately 50m. NSR3 and NSR4 are the side façades of a residential properties located to the east, beyond the A23 main road, off Albert Carr Gardens at approximately 63m.
- 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 2<sup>nd</sup> August 2023 – Friday 4<sup>th</sup> August 2023 at a fixed monitoring position, located at the rear of the site to the north boundary.
- The operation of the mechanical plant shall be as required, 06:00 – 18:00 hours Monday to Friday and 08:00-13:00 hours Saturday and Sundays.
- The typical operational background noise level has been calculated at 45dB  $L_{A90,T}$  at NMP1 and at 52dB  $L_{A90,T}$  at NMP2. The noise criteria has been set 5 dB below background at 40dB  $L_{A,r,Tr}$  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 rating level, with mitigation as suggested, has been calculated at NSR1 at 46 dB(A), at NSR2 at 35 dB(A), and at NSR3 and NSR4 at 24dB(A).
- 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.

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## 1. INTRODUCTION

- 1.1. Cenergist Limited instructed Healthy Abode Ltd t/a HA Acoustics to undertake a noise impact assessment at Streatham Ice and Leisure Centre, 390 Streatham High Road, London SW16 6HX for submission as part of documentation to be provided to the Local Authority, London Borough of Lambeth.
  
- 1.2. Streatham Ice and Leisure Centre, 390 Streatham High Road, London SW16 6HX is proposing to install two (2) RHOSS WinPOWER ECO THAEQU 5520 Air Source Heat Pumps (ASHP's) to the front of the site upon the flat roof 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. Streatham Ice and Leisure Centre, 390 Streatham High Road, London SW16 6HX (hereafter referred to as 'the site') is a commercial premises located in an urban area, comprising commercial and residential premises. The proposal is to install two RHOSS WinPOWER ECO THAEQU 5520 air source heat pumps to the flat roof at the front of the premises.
- 2.2. Site plans (SP1-SP2) can be found in appendix A, showing the layout, surrounding area and proposed plant location.
- 2.3. The site is located off the A23 (Streatham High Road), which borders the site to the east. Located adjacent to the North is Streatham URC Church and a Tesco Extra. Residential premises are located to the south and west of the site.
- 2.4. The nearest noise sensitive receptor (NSR) located to the proposed plant location is noted to be the rear façade of a residential premises located off Streatham High Street, at approximately 14m from the proposed plant location, to the south. NSR2 is the façade of a residential property located to the north-west of the proposed plant location, at approximately 50m. NSR3 and NSR4 are the side façades of a residential properties located to the east off Albert Carr Gardens at approximately 63m. 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.
- 2.5. At the time of installation and collection of the monitoring equipment, the dominant noise sources emanated from road traffic, overhead airplane movements and some commercial and residential activity noise. 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.
- 2.5.1. The noise monitoring location was undertaken to the rear of the site in line with the original proposal to install the air source heat pumps at the rear. This position is likely to be quieter than the proposed new location, which is likely to have a higher noise climate due to the proximity of Streatham High Road, the A23.

### 3. EXTERNAL NOISE EMISSION CRITERIA

#### 3.1. Local Authority

3.2. The proposed site lies within the jurisdiction of the Local Authority, London Borough of Lambeth. 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 hours and Saturday-Sunday 08:00-13:00 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 47dB  $L_{A,T,r}$  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. Unattended Environmental Noise Survey

4.2. An unmanned environmental noise survey was undertaken at two measurement locations at the rear of the site. The survey was undertaken between 12:00 hours on Wednesday 2<sup>nd</sup> August 2023 and 08:30 hours on Friday 4<sup>th</sup> August 2023.

4.3. The sound level meter (SLM) was mounted approximately 1.5 metres above ground floor level and is considered to be positioned in 'free-field' conditions. The monitoring position is identified in Appendix A.

4.3.1. The noise monitoring position (NMP) is broadly considered to be representative of background noise levels at the nearest identified NSR. The noise monitoring location was undertaken to the rear of the site in line with the original proposal to install the air source heat pumps at the rear. This position is likely to be quieter than at the nearest NSRs to the revised location, which are likely to have a higher noise climate due to the proximity of Streatham High Road, the A23.

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

Equipment	Description	Quantity	Serial Number
Larson Davis LxT SE	Class 1 automated logging sound level meter	1	0004960
377B02 microphone	Class 1 ½" microphone	1	168839
Larson Davis LxT SE	Class 1 automated logging sound level meter	1	0005445
377B02 microphone	Class 1 ½" microphone	1	177077
Larson Davis CAL200	Class 1 Calibrator	1	20159
Svantek SV36	Class 1 Calibrator	1	109944

Table 4.1 Description of Equipment used for Noise Survey

4.5. 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.

4.6. 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*'.

4.7. 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.

#### 4.8. **Weather Conditions**

4.9. Weather conditions were noted to be:

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

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

4.9.3.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).

4.10. 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 in table 5.1 and have been based on an analysis of the monitoring data.

5.2. The time histories can be seen in Appendix B (TH1-TH2).

	Ambient Noise Level $L_{Aeq,T}$	Typical Background Noise Level $L_{A90,T}$
Day (07:00 – 23:00)	57 dB	52 dB
Night (23:00 – 07:00)	51 dB	44 dB
Operating Hours (Monday – Friday 06:00-18:00 Saturday – Sunday 08:00-13:00)	57 dB	52 dB

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.

5.3.1. The noise monitoring location was undertaken to the rear of the site in line with the original proposal to install the air source heat pumps at the rear. This position is likely to be quieter than the proposed new location, which is likely to have a higher noise climate due to the proximity of Streatham High Road, the A23.

### 5.4. Noise Criteria

5.5. It is understood that the plant will be operational Monday – Friday 06:00-18:00 hours and Saturday-Sunday 08:00-13:00 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 47dB  $L_{A,r,Tr}$  at the NSR.

## 6. NOISE IMPACT ASSESSMENT

6.1. It is proposed to install two (2no) RHOSS WinPOWER ECO THAEQU 5520 Air Source Heat Pumps (ASHP's) externally to the roof of the east end of the 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 power level. Manufacturer's specifications are provided in Appendix C.

Plant Make/Model	Reference Sound Power Level	Quantity
RHOSS WinPOWER ECO THAEQU 5520 ASHP's	88 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 THAEQU 5520	105	100	87	82	80	75	71	63

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.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 as the plant could have tonal elements. Penalty additions have not been applied for impulsiveness or any other unusual characteristics as plant of this type generally do not generate such features.

6.5. In order to meet the noise criteria of 47 dB(A) at the NSR's, 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							
	LZFreq 63	LZFreq 125	LZFreq 250	LZFreq 500	LZFreq 1000	LZFreq 2000	LZFreq 4000	LZFreq 8000
Acoustic enclosure	15	17	23	34	47	55	57	57

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 1metre from the NSR's are given in Appendix D. The rating noise level at NSR1 with mitigation is predicted to be **46dB L<sub>Ar,Tr</sub>** and **6dB(A) below** the assessed background operational noise level (52dB L<sub>A90,T</sub>). The rating noise level at NSR2 with mitigation is predicted to be **35dB L<sub>Ar,Tr</sub>** and **17dB(A) below** the assessed background operational noise level (52dB L<sub>A90,T</sub>). The rating noise level at NSR3 and NSR4 with mitigation is predicted to be **24dB L<sub>Ar,Tr</sub>** and **28dB(A) below** the assessed background operational noise level (52dB L<sub>A90,T</sub>). 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 known, 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 31 dB(A) at NSR1, 20dB(A) at NSR2, 11 dB(A) at NSR3 and NSR4. NSR1 exceeds the night-time criteria by 1dB, NSR2-NSR4 meets the acceptable internal noise level as seen under BS 8233: 2014 and all are significantly lower than the assessed background noise level, measured in a location considered sheltered from the main road.



## 7. UNCERTAINTY

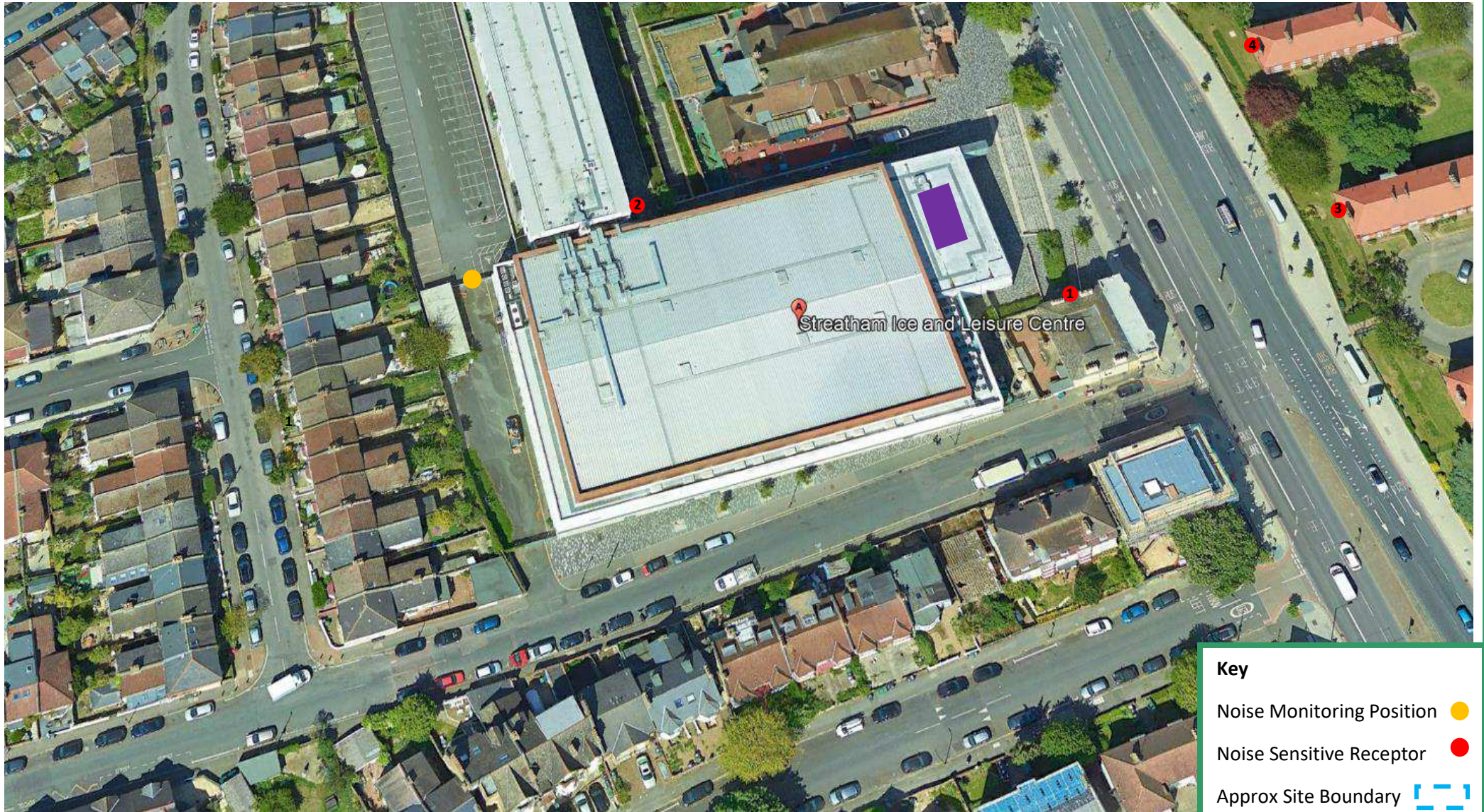
- 7.1. The levels of uncertainty in the data and calculations are considered to be low given the robust exercise undertaken in noise monitoring and the confidence in the statistical analysis.
- 7.2. All measurements taken on-site by instrumentation are subject to a margin of uncertainty. This is relatively small, with a sound level meter manufacturer's margin of uncertainty at  $\pm 1.1$ dB. 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 Streatham Ice and Leisure Centre, 390 Streatham High Road, London SW16 6HX. 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 plant at NSR1 are predicted to be **46dB L<sub>Ar,Tr</sub> at NSR1, 35dB L<sub>Ar,Tr</sub> at NSR2 and 24dB L<sub>Ar,Tr</sub> at NSR3 and NSR4**. BS 4142: 2014 +A1: 2019 assessment methodology shows that, with mitigation as proposed herein, the rating noise level from the proposed ASHP's is predicted to be **6dB(A) below** the typical operational background noise level of **52dB L<sub>A90,T</sub>** at NSR1, **17dB(A) below** the typical operational background of **52dB L<sub>A90,T</sub>** at NSR2 and **28dB(A) below** the typical operation background of **52dB L<sub>A90,T</sub>** at NSR3 and NSR4. In accordance with BS 4142:2014, noise levels from the plant ***“is an indication of the specific sound source having a low impact”***.
- 8.4. 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)

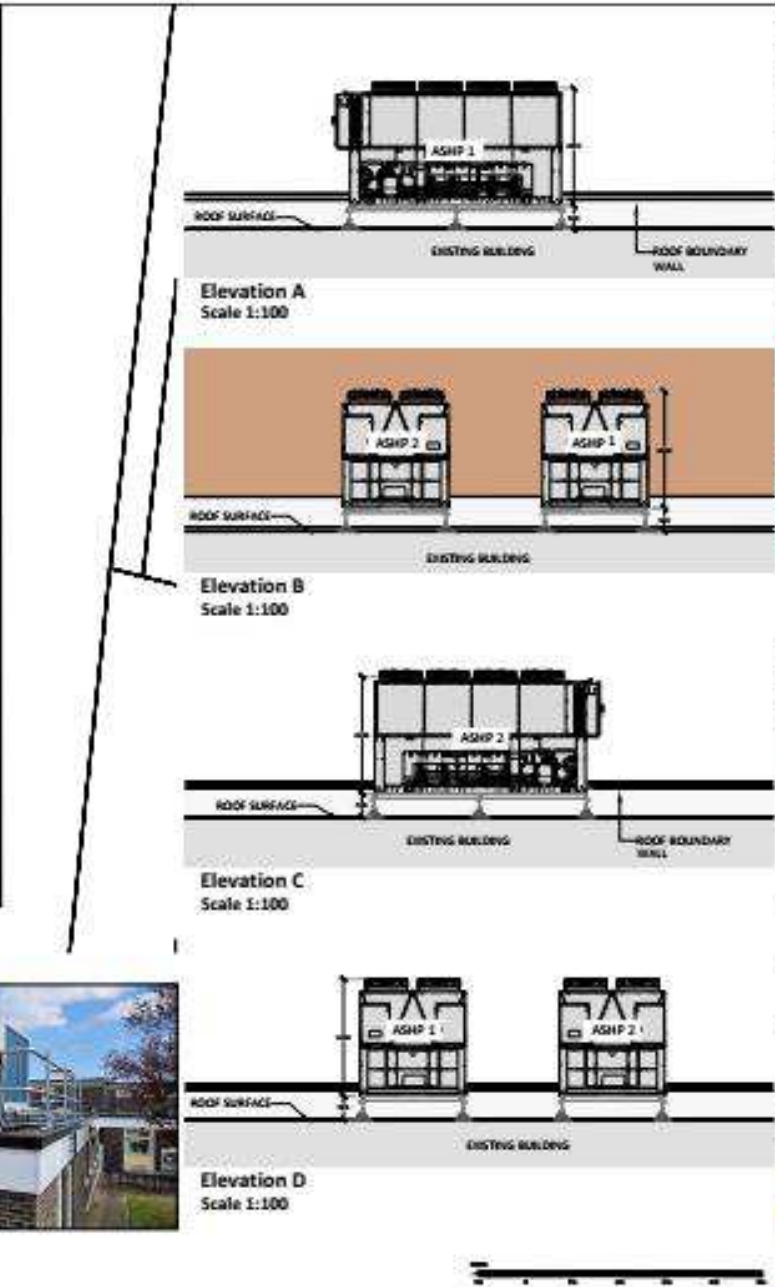
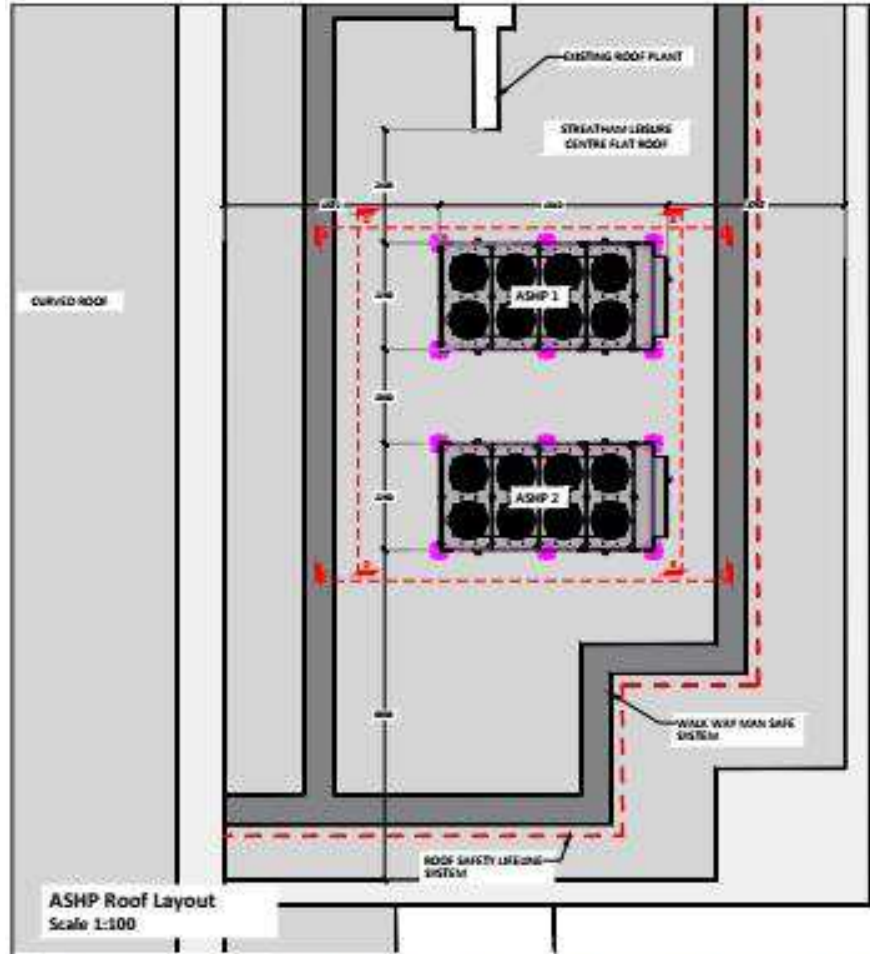
Source: Google Earth



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

**Appendix A – Site Plan (SP2)**

Provided by Client



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ALL WORKS TO BE DONE IN ACCORDANCE WITH THE LATEST BRITISH STANDARDS CODES OF PRACTICE AND RELEVANT REGULATIONS AND REGULATIONS IN THE JURISDICTION.

**NOTES TO BE CONFIRMED**  
 ASHP UNITS OVER CASING - YES

Acoustic enclosure detail to be incorporated in line with planning's acoustic requirements once confirmed.

CD1	Construction Issue	Scale	1:100000
PD	Pre-Design	Scale	1:100000
PD	Pre-Design	Scale	1:100000
PD	Pre-Design	Scale	1:100000

**STAGE 3**



Project Name: LAMBETH P90538

Project Title: STREATHAM LEISURE CENTRE ASHP ENCLOSURE LAYOUT & ELEVATIONS

Client: C01  
 Date: 13/03/2023  
 Scale: 1:100  
 Author: AMK  
 Checker: BE

Head Office: Unit 15, 13 Spring Road Industrial Estate, Spence Heath, Barking, Essex, SS11 2JQ  
 Tel: +44 (0) 20 477 7776 Fax: +44 (0) 20 477 7768  
 www.alternativeheat.co.uk

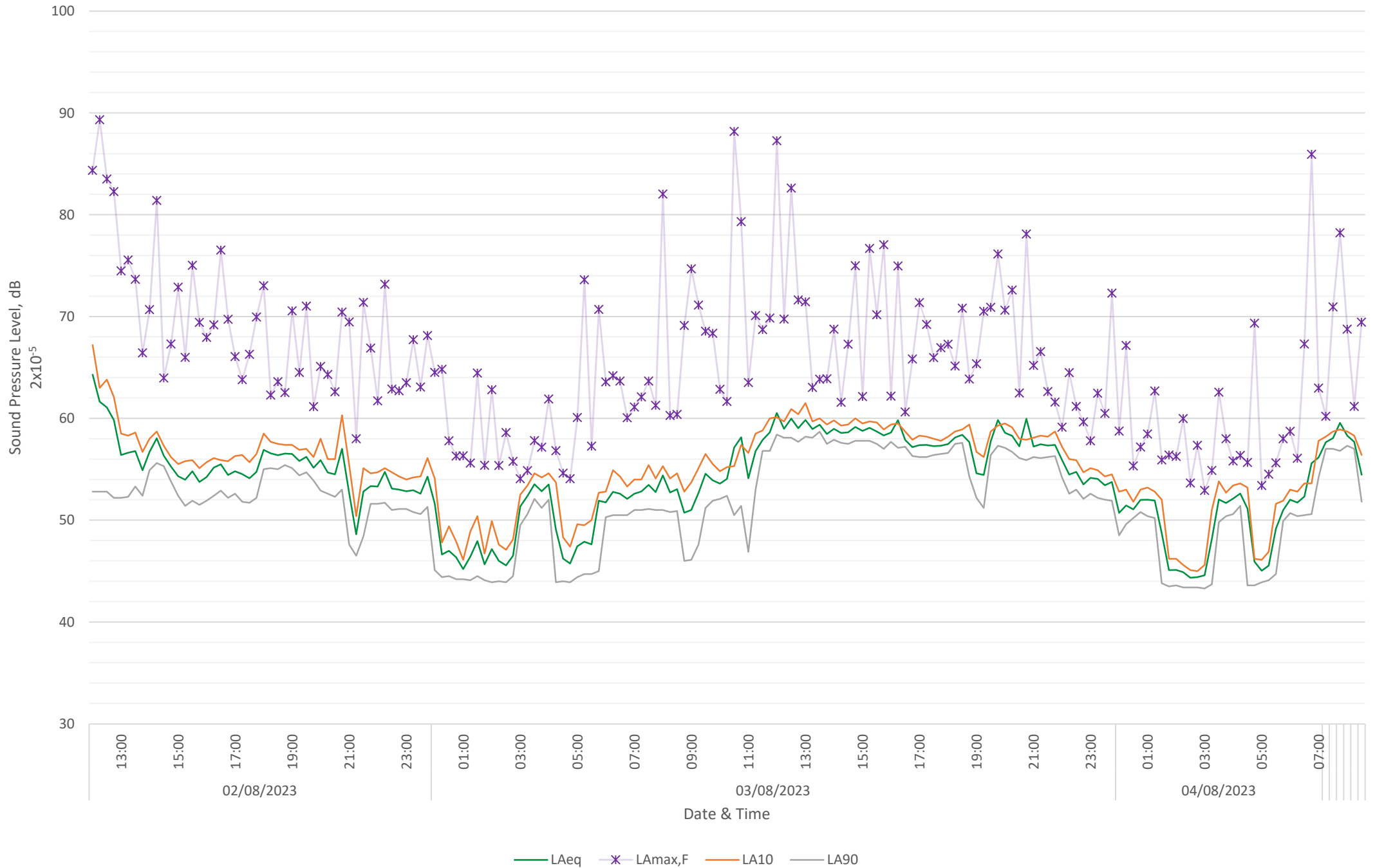


ASHP Enclosure Location




Typical Rooftop ASHP & Enclosure





## Appendix C – Plant Manufacturer’s Specifications

### RHOSS WinPOWER ECO THAEQU 5520

<p><b>AIR SOURCE HEAT PUMP</b> [CLICK HERE FOR APPENDIX 01]</p>	<p><b>ASHP</b>  <b>Manufacturer:</b> Rhoss  <b>Model:</b> WinPOWER ECO - THAEQU 5520 P1</p> <p>Packaged air-cooled reversible heat pump with axial fans. Range with hermetic Scroll compressors and R454B refrigerant gas.</p> <p>Q - Super-silenced version with soundproofed compressors and low fan speed</p> <p>P1 - Installation with pump</p> <p><b>Key Features:</b></p> <ul style="list-style-type: none"> <li>- Efficient and eco-friendly range in R454B</li> <li>- SEER up to 5.38 with FIEC accessory (EC fans)</li> <li>- B version compact chillers also for replacement markets.</li> <li>- Extended operating limits</li> <li>- Up to 6 capacity steps</li> <li>- Integrated MASTER/SLAVE control</li> </ul>	
	<p><b>Sound Data:</b>  <b>Calculated sound power: 88dB(A)</b>  <b>Sound pressure Level at 10m: 55.5 dBA</b></p> <p><b>Electric Data:</b>  <b>Electrical Supply:</b> 400V - 50Hz  <b>Phase:</b> 3PH  <b>Nominal Current:</b> 270A  <b>Maximum Current:</b> 367A  <b>Starting Current SFS:</b> 503A</p> <p><b>Dimansions:</b>  <b>Width:</b> 5940 mm  <b>Depth:</b> 2260 mm  <b>Height:</b> 2480 mm</p>	

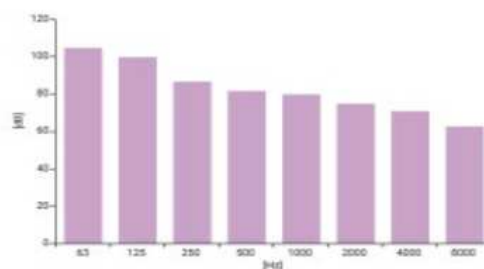
#### Noise

##### Unit without options

Sound Power level (1)	[dBA]	88
Sound Pressure level (10m) (2)	[dBA]	55.5
Sound Pressure level (1m) (2)	[dBA]	67

(Performance given without pump)

[Hz]	[dB]
63	105
125	100
250	87
500	82
1000	80
2000	75
4000	71
8000	63



##### Unit with options

Sound Power level (1)	[dBA]	87
Sound Pressure level (10m) (2)	[dBA]	54.5

with the following options

CAC - COMPR. SOUNDJACKET

(Performance given without pump)

## Noise Sensitive Receiver 1

	Frequency Spectral Data (Hz)								
	63	125	250	500	1000	2000	4000	8000	dB(A)
RHOSS WinPOWER ECO THAEQU 5520 Lw	105	100	87	82	80	75	71	63	<b>88</b>
RHOSS WinPOWER ECO THAEQU 5520 Lw	105	100	87	82	80	75	71	63	<b>88</b>
<b>Calculated Cumulative Plant SPL*</b>	<b>97</b>	<b>92</b>	<b>79</b>	<b>74</b>	<b>72</b>	<b>67</b>	<b>63</b>	<b>55</b>	<b>80</b>
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 (14m)	-23	-23	-23	-23	-23	-23	-23	-23	
Enclosure	-15	-17	-23	-34	-47	-55	-57	-57	
<b>Calculated rating level at NSR1</b>	<b>67</b>	<b>60</b>	<b>41</b>	<b>25</b>	<b>10</b>	<b>-3</b>	<b>-9</b>	<b>-17</b>	<b>46</b>

<b>Noise Criteria</b>	<b>47</b>
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## BS8233: Internal Night Time Levels

	Frequency Spectral Data (Hz)								
	63	125	250	500	1000	2000	4000	8000	dB(A)
Calculated level at NSR	67	60	41	25	10	-3	-9	-17	46
Partially Open Window Attenuation	-15	-15	-15	-15	-15	-15	-15	-15	
<b>Calculated level in Internal Receiver</b>	<b>52</b>	<b>45</b>	<b>26</b>	<b>10</b>	<b>-5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>31</b>

<b>BS8233 Night Time Criteria</b>	<b>30</b>
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## Noise Sensitive Receiver 2

	Frequency Spectral Data (Hz)								
	63	125	250	500	1000	2000	4000	8000	dB(A)
RHOSS WinPOWER ECO THAEQU 5520 Lw	105	100	87	82	80	75	71	63	<b>88</b>
RHOSS WinPOWER ECO THAEQU 5520 Lw	105	100	87	82	80	75	71	63	<b>88</b>
<b>Calculated Cumulative Plant SPL*</b>	<b>97</b>	<b>92</b>	<b>79</b>	<b>74</b>	<b>72</b>	<b>67</b>	<b>63</b>	<b>55</b>	<b>80</b>
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 (50m)	-34	-34	-34	-34	-34	-34	-34	-34	
Enclosure	-15	-17	-23	-34	-47	-55	-57	-57	
<b>Calculated rating level at NSR2</b>	<b>56</b>	<b>49</b>	<b>30</b>	<b>14</b>	<b>-1</b>	<b>-14</b>	<b>-20</b>	<b>0</b>	<b>35</b>

<b>Noise Criteria</b>	<b>47</b>
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## BS8233: Internal Night Time Levels

	Frequency Spectral Data (Hz)								
	63	125	250	500	1000	2000	4000	8000	dB(A)
Calculated level at NSR	56	49	30	14	-1	-14	-20	0	35
Partially Open Window Attenuation	-15	-15	-15	-15	-15	-15	-15	-15	
<b>Calculated level in Internal Receiver 2</b>	<b>41</b>	<b>34</b>	<b>15</b>	<b>-1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>20</b>

<b>BS8233 Night Time Criteria</b>	<b>30</b>
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### Noise Sensitive Receiver 3

	Frequency Spectral Data (Hz)								
	63	125	250	500	1000	2000	4000	8000	dB(A)
RHOSS WinPOWER ECO THAEQU 5520 Lw	105	100	87	82	80	75	71	63	<b>88</b>
RHOSS WinPOWER ECO THAEQU 5520 Lw	105	100	87	82	80	75	71	63	<b>88</b>
<b>Calculated Cumulative Plant SPL*</b>	<b>97</b>	<b>92</b>	<b>79</b>	<b>74</b>	<b>72</b>	<b>67</b>	<b>63</b>	<b>55</b>	<b>80</b>
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 (63m)	-36	-36	-36	-36	-36	-36	-36	-36	
Enclosure	-15	-17	-23	-34	-47	-55	-57	-57	
<b>Calculated rating level at NSR3</b>	<b>54</b>	<b>47</b>	<b>28</b>	<b>12</b>	<b>-3</b>	<b>-16</b>	<b>0</b>	<b>0</b>	<b>33</b>

<b>Noise Criteria</b>	<b>47</b>
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### BS8233: Internal Night Time Levels

	Frequency Spectral Data (Hz)								
	63	125	250	500	1000	2000	4000	8000	dB(A)
Calculated level at NSR3	54	47	28	12	-3	-16	0	0	33
Partially Open Window Attenuation	-15	-15	-15	-15	-15	-15	-15	-15	
<b>Calculated level in Internal Receiver 3</b>	<b>39</b>	<b>32</b>	<b>13</b>	<b>-3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>18</b>

<b>BS8233 Night Time Criteria</b>	<b>30</b>
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### Noise Sensitive Receiver 4

	Frequency Spectral Data (Hz)								
	63	125	250	500	1000	2000	4000	8000	dB(A)
RHOSS WinPOWER ECO THAEQU 5520 Lw	105	100	87	82	80	75	71	63	<b>88</b>
RHOSS WinPOWER ECO THAEQU 5520 Lw	105	100	87	82	80	75	71	63	<b>88</b>
<b>Calculated Cumulative Plant SPL*</b>	<b>97</b>	<b>92</b>	<b>79</b>	<b>74</b>	<b>72</b>	<b>67</b>	<b>63</b>	<b>55</b>	<b>80</b>
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 (63m)	-36	-36	-36	-36	-36	-36	-36	-36	
Enclosure	-15	-17	-23	-34	-47	-55	-57	-57	
<b>Calculated rating level at NSR4</b>	<b>54</b>	<b>47</b>	<b>28</b>	<b>12</b>	<b>-3</b>	<b>-16</b>	<b>0</b>	<b>0</b>	<b>33</b>

<b>Noise Criteria</b>	<b>47</b>
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### BS8233: Internal Night Time Levels

	Frequency Spectral Data (Hz)								
	63	125	250	500	1000	2000	4000	8000	dB(A)
Calculated level at NSR	54	47	28	12	-3	-16	0	0	33
Partially Open Window Attenuation	-15	-15	-15	-15	-15	-15	-15	-15	
<b>Calculated level in Internal Receiver 4</b>	<b>39</b>	<b>32</b>	<b>13</b>	<b>-3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>18</b>

<b>BS8233 Night Time Criteria</b>	<b>30</b>
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