Noise Impact Assessment

Site Address: 8-11 Upper Woburn Pl, London, WC1H 0JW

Client Name: Assured CMS

Project Reference: NP-012342

Authorisation and Version Control		
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01	07/03/2025	First issue
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Delivering sustainable development by promoting good health and well-being through effective management of noise.

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1. Introduction

NOVA Acoustics Ltd has been commissioned to prepare a noise impact assessment for the relocation of 4 No. Air Source Heat Pumps ('ASHPs') ('the proposed development') at 8-11 Upper Woburn Pl, London, WC1H 0JW ('the site').

The acoustic assessment has previously been provided for an application regarding the installation of the units to the front of the site (ref. 9874/FD, Acoustic Consultants Ltd). This application was accepted on noise grounds.

However, it is understood that the units require relocation due to visual impacts. This report has been prepared to accompany an updated application and is suitable for submission to the Local Planning Authority ('LPA'), Camden Council.

This report details the existing background sound climate at the closest Noise Sensitive Receptors ('NSRs') and the predicted noise emissions associated with the proposed development. Measures required to mitigate noise impact from the proposed development have been recommended where necessary and assessed in accordance with the relevant performance standards, legislation, policy and guidance.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

1.1 Standards, Legislation, Policy & Guidance

The following performance standards, legislation, policy and guidance have been considered to ensure good acoustic design in the assessment:

- The Local Planning Authorities (LPA) technical guidance, specifically; *Camden Council 'Camden Local Plan' – 2017 – Appendix 3: Noise Thresholds – Industrial and Commercial Noise Sources.*
- National Planning Policy Framework (2024).
- Noise Policy Statement for England (2010).
- BS4142:2014+A1:2019 – 'Methods for rating and assessing commercial and industrial sound'.

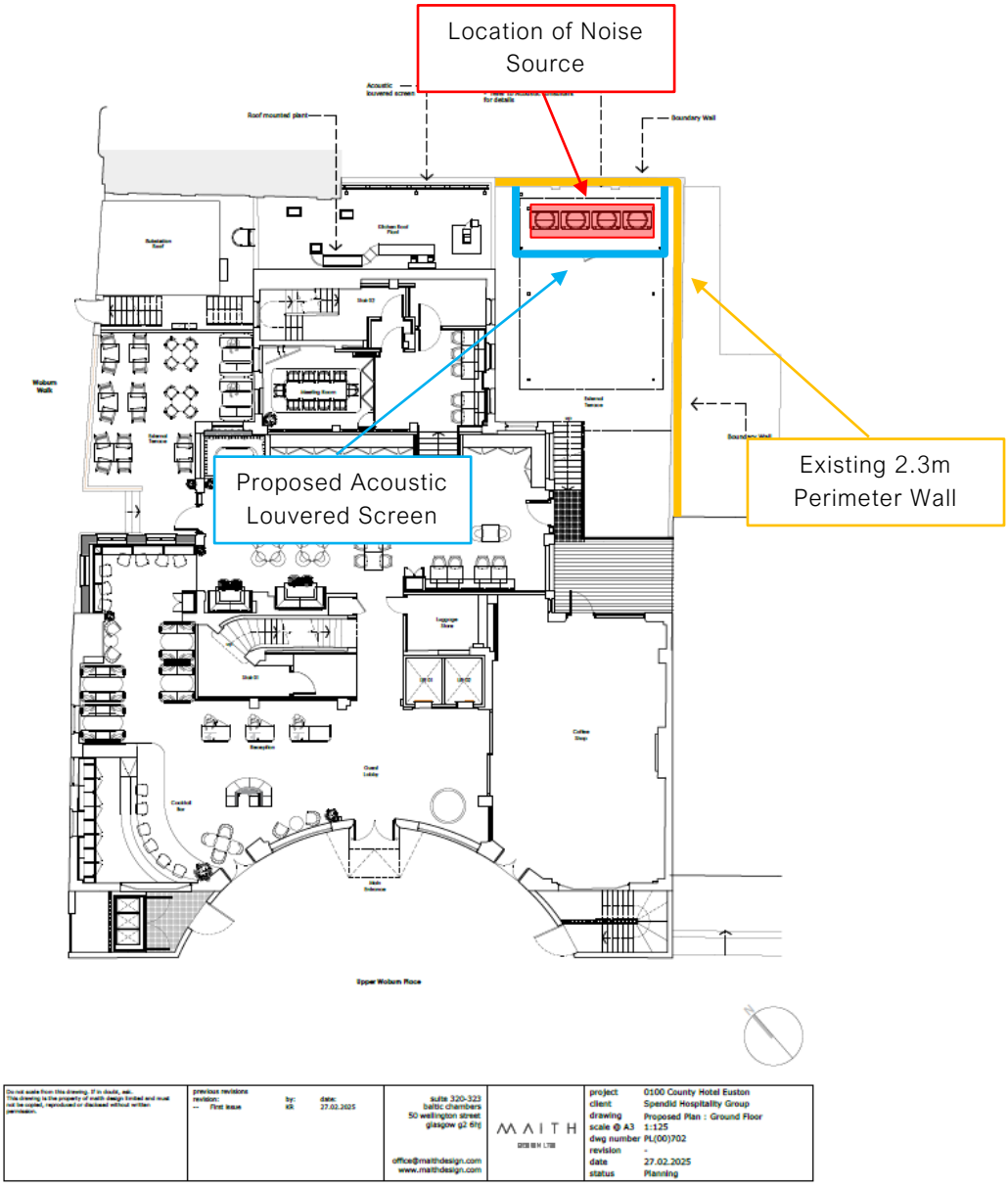
Further information on the legislation can be found in Appendix B.

1.2 Background and Proposal Brief

The building has operated as a hotel since opening in 1940. The hotel has recently undergone a comprehensive redevelopment, including full internal and external upgrades to provide a contemporary destination hotel. As part of the significant environmental upgrades, air source heat pumps have been incorporated to support the sustainability of the hotel for future use.

The applicant is proposing to relocate 4 No. ASHP units (Mitsubishi QAHV-N560YA-HPB) to the existing external terrace. It is understood that the existing perimeter walls have a height of 2.2 – 2.3m. In addition, the section of existing glass roof directly above the proposed ASHP location, currently used as a patron area, will be retained.

NOVA Acoustics has been informed that the proposed units may operate indistinctively during both day and night-time. The figure below shows the proposed development.



Drawing from 'Maith Design'

Figure 1 – Proposed Development

1.3 Local Planning Authority & Background

The Camden Council 'Camden Local Plan' – 2017 – Appendix 3: Noise Thresholds – Industrial and Commercial Noise Sources.

"A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion)."

The table below (Table C from the Local Plan) shows the noise levels applicable to proposed industrial can commercial development (including plant and machinery).

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dBL_{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L_{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88dBL_{Amax}

*"*10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.*

***levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises. The periods in Table C correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The Council will take into accountthe likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration. There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS:4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require a NR curve specification of NR35 or below, dependant on the room."*

2. Environmental Noise Survey

2.1 Measurement Methodology

An enviromental noise survey was carried out by Acoustic Consultants Ltd between the 21st and 22nd September 2022 as part of Acoustic Consultant Ltd's original assessment. Two long-term monitoring were carried out, one at the front of the site and one at the rear, where the plant is proposed.

The figure below outlines the site surroundings and measurement locations:

Imagery ©2025, Map data ©2025

Figure 2 – Measurement Locations and Site Surroundings

2.1 Context & Subjective Impression

The County Hotel sits within the West End district of Bloomsbury, London and is centrally located in relation to the key transport hubs of Euston Station, King's Cross Station and St Pancras Station. The site is bounded to the northwest by a row of detached houses which have rear windows facing the proposed plant location. Considering the proximity to the proposed ASHP location, these are considered the closest and most exposed residential receptors (NSR1). To the southwest, the site is adjoined by the British Medical Association, a large trade union that also has windows facing the proposed plant location. These windows are deemed as the closest and most exposed non-residential receptor (NSR2).

2.2 Environmental Noise Survey Results

Background Sound Level Analysis

The following section outlines the background sound levels that were measured by Acoustic Consultants Ltd. These levels are used as the baseline for the subsequent BS4142 noise assessment.

Location	Period	Background Sound Level $L_{A90,T}$ (dB)	
		Range	Mode
L1	Day: 07:00 – 23:00	59 – 64	62
	Evening: 19:00 – 23:00	59 – 63	61
	Night: 23:00 – 07:00	51 – 63	53
L2	Day: 07:00 – 23:00	48 – 56	**49**
	Evening: 19:00 – 23:00	50 – 56	54
	Night: 23:00 – 07:00	46 – 48	**46**

Table 1 – Background Sound Level Results Summary

3. Noise Impact Assessment

In the following section of the report, the impact of the noise emissions generated by the proposed development is assessed.

3.1 Noise Modelling Data & Specific Sound Levels

Sound Power Levels of External Noise Sources

The following table shows the 1/1 octave frequency band sound power levels of the proposed ASHPs that will be used in the subsequent calculations. Sound power level has been taken from the loudest operation period (winter). Manufacturer's data sheets can be found in Appendix D.

Description	1/1 Octave Frequency Band (Hz, L_w dB)								Overall L_w (dBA)
	63	125	250	500	1k	2k	4k	8k	
Mitsubishi QAHV-N560YA-HPB (L_w)	85	72	74	74	67	62	58	53	73

Table 2 – Sound Power Levels of External Noise Sources

Noise Modelling

The noise model is based on the following settings and assumptions:

The following assumptions have been made within the SoundPlan 9.0 noise modelling software:

- To accurately model the land surrounding the site, the topographical data has been taken from the EA's 'National LIDAR Programme' on the DEFRA Data Services Platform.
- For the purpose of the assessment, the ground between the source and receivers is considered a mixture of acoustically 'hard' and 'soft' surfaces that have been modelled according to the ground type.
- Octave band noise data was used to facilitate noise modelling in accordance with ISO 9613-2. ISO 9613-2 assumes a 'downwind' model to the NSRs.
- The sound map grid height has been set to 4m, however, the noise levels used in the assessment has been taken from the most exposed point of each façade.
- The site and all other buildings and any intervening objects have been modelled according to measurements taken on-site, with Google Maps and those provided by the LIDAR data.
- The sound power levels shown in Table 2 have been inputted into the model.
- All fixed sources have been modelled as point source emitters at a 1.8m height (the height of the fan element).

The proposal also includes louvres sections around the sides of units. However, this will only affect the noise levels incident on non-residential receptors at lower grounds, with the top being left open for airflow. As the performance data for the louvre are not known, this is not included within the model.

The sound maps showing the specific sound levels emission from the site can be seen in the following figures.

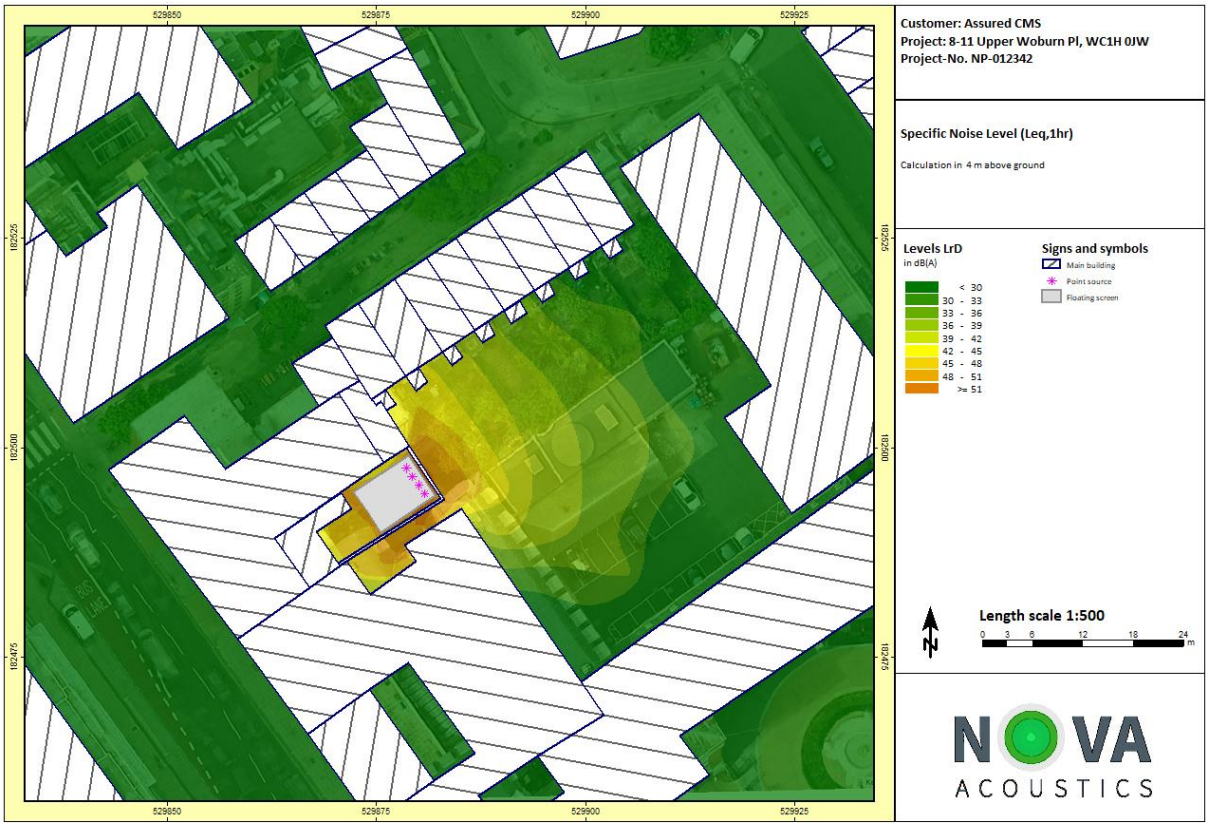


Figure 3 – Specific Sound Level Map

3.2 BS4142 Noise Impact Assessment

The BS4142 noise impact assessments are conducted at the most affected residential dwellings (NSR1) in the table below.

Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Specific Sound Level at NSR1 (L_{eq})	56	41	40	39	34	34	30	24	41
Acoustic Feature Correction	No acoustic feature corrections are deemed applicate as the specific sound level falls below the lowest measured background sound level.								+0
Rating Sound Level ($L_{Ar,Tr}$)	Specific Sound Level + Rating Penalties								41
Background Sound Level (Night)									46
Exceedance	$L_{Ar,Tr} - L_{A90,15min}$								-5
BS4142 Assessment Outcome	Low Impact, dependent on context.								
LPA Criteria (Section 1.3)	Between Lowest Observed Effect Level ('LOAEL') and Significant Observed Adverse Effect Level ('SOAEL').								
Mitigation measures are required to reduce noise impact.									

Table 3 – Noise Impact Assessment – NSR1

3.3 Recommendations & Mitigation Measures

As seen above, the predicted levels exceed the LPA's criteria at the nearest residential receptors. Accordingly, recommendations and mitigation measures are required to reduce the noise impact from the proposed development are defined.

The results of the noise modelling have shown that the most affected NSRs are those upper windows facing the proposed plant location.

It is advised to install a bolt-on acoustic kit on each of the proposed ASHP units. An example of acoustic kit is the shown in Appendix D from Ambient Acoustics. However, any acoustic kit / enclosure providing the insertion loss ('IL') shown in the table below could be installed.

1/1 Octave Frequency Band (Hz, IL dB)							
63	125	250	500	1k	2k	4k	8k
3	4	6	8	9	4	10	7

Table 4 – Insertion Loss from Acoustic Kit

The sound maps showing the specific sound level emissions considering the proposed mitigation measures can be seen in the figures below.

Figure 4 – Specific Sound Level Map (Post-Mitigation)

The BS4142 noise impact assessments considering the proposed mitigation measures can be seen in the table below.

Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Specific Sound Level at NSR1 (L_{eq})	53	37	34	32	26	31	21	18	36
Acoustic Feature Correction	No acoustic feature corrections are deemed applicate as the specific sound level falls below the lowest measured background sound level.								+0
Rating Sound Level ($L_{Ar,Tr}$)	Specific Sound Level + Rating Penalties								36
Background Sound Level (Night)									46
Exceedance	$L_{Ar,Tr} - L_{A90,15min}$								-10
BS4142 Assessment Outcome	Low Impact, dependent on context.								
LPA Criteria (Section 1.3)	Below the Lowest Observed Effect Level ('LOAEL').								

Table 5 – Noise Impact Assessment – Post-Mitigation – NSR1

As can be seen in the assessment above, the proposed mitigation measures are predicted to reduce the rating sound level to **36dBA** at NSR1, which is 10dB below the existing $L_{A90.15min}$. Therefore, the predicted levels achieve the LPA's criteria, indicating a low likelihood of adverse impact and is considered to be below the LOAEL.

3.4 Non-Residential Receptors

An assessment at non-associated receptors is also included. As previously stated, it is anticipated that the office spaces will only be operation during the daytime. Due to the reduced sensitivity of non-residential receptors, it is proposed that the specific sound level associated with the plant does not exceed the existing background sound level. The table below outlines the predicted levels at NSR2, after implementation of the above mitigation strategy.

Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Specific Sound Level at NSR2 (L_{eq})	62	48	46	43	39	43	34	31	48
Background Sound Level (Day)									49
Exceedance	$L_{Ar,Tr} - L_{A90,15min}$								-1

Table 6 – Noise Impact Assessment – Post-Mitigation – NSR2

As the noise level outside the nearest office spaces is below the daytime background sound level, a low likelihood of adverse impact is expected.

In addition, the noise level from the units is approximately 52dB outside the nearest associated hotel bedrooms. Given the existing ambient level ranges between 47 – 51 dB L_{Aeq}, this is considered acceptable.

As previously stated, these calculations do not include the attenuation provided from the louvre sections. At lower floor levels, this is anticipated to provide approximately 5dB additional attenuation (depending on the final specification).

4. Conclusion and Action Plan

The proposed development has been assessed against the requirements of BS4142 and the LPA criteria. A mitigation scheme has been provided to reduce the noise impact from the site.

It is recommended that an acoustic attenuation kit is installation on the units to reduce noise emissions.

Providing the mitigation measures are adhered to, the cumulative BS4142 rating sound level is predicted to be 10dB below the existing background sound level. Therefore, relocating the ASHPs will reduce noise levels at the nearest residential receptors by 14dB, representing a substantial improvement.

This achieves the LPA's criteria and is therefore considered to be below the Lowest Observed Adverse Effect Level ('LOAEL').

In addition, predictions to the nearest non-associated, non-residential receptors are provided. The outcomes indicate that the cumulative specific sound level from the units will not exceed the existing daytime background sound level. Given the reduced sensitivity of non-residential receptors, this is considered acceptable and will result in a low likelihood of adverse impact.

The findings of this report will require written approval from the Local Authority prior to work commencing.

Appendix A – Acoustic Terminology

A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure given by the following formula in decibels (dBA). $L_{pA} = 10 \log_{10} (pA/p_0)^2$. Where: pA is the A-weighted sound pressure in pascals (Pa) and $p0$ is the reference sound pressure (20 µPa)
Background Sound	Underlying level of sound over a period, T, which might in part be an indication of relative quietness at a given location
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T, has the same mean-squared sound pressure as the sound under consideration that varies with time
Facade level	Sound pressure level 1 m in front of the facade
Free-field level	Sound pressure level away from reflecting surfaces
Indoor ambient noise	Noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants
Noise Criteria	Numerical indices used to define design goals in a given space
Noise Rating (NR)	Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves
Octave Band	Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit
Percentile Level, $L_{AN,T}$	A-weighted sound pressure level obtained using time-weighting “F”, which is exceeded for N% of a specified time interval
Rating Level, $L_{Ar,Tr}$	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise
Reverberation time, T	Time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped
Sound Pressure, p	root-mean-square value of the variation in air pressure, measured in pascals (Pa) above and below atmospheric pressure, caused by the sound
Sound Pressure Level, L_p	Quantity of sound pressure, in decibels (dB), given by the formula: $L_p = 10\log_{10}(p/p_0)^{2.}$ Where: p is the root-mean-square sound pressure in pascals (Pa) and $p0$ is the reference sound pressure (20 µPa)
Weighted sound reduction index, R_w	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies

Appendix B – Standards, Legislation, Policy, and Guidance

This report is to be primarily based on the following standards, legislation, policy and guidance.

B.1 – National Planning Policy Framework (2024)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2024. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 187e, it states:

Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;

Paragraph 198 states:

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 impact 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.*

B.2 – Noise Policy Statement for England (2010)

Paragraph 198 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

To achieve this vision the Statement identifies the following three aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life;
- Where possible, contribute to the improvement of health and quality of life.

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that "significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development".

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: "all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur."

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. This can be related to the third aim above, which seeks: "where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."

This is further expanded using the updated "Noise Exposure Hierarchy Table" which includes an additional level of impact referred to as the 'No Observed Adverse Effect Level' ('NOAEL'). It is stated that at this level: *"noise can be heard, but does not cause any change in behaviour, attitude or other physiological response"*. In addition, noise at this level *"can slightly affect the acoustic character of the area but not such that there is a change in the quality of life".*

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

B.3 – BS4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound'

Overview

BS4142 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ 'specific sound level', immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{Ar,Tr}$ 'rating sound level'. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

Rating Penalty

Section 9 of BS4142 describes how the rating sound level should be derived from the specific sound level, by deriving a rating penalty.

BS4142 states:

"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level. This can be approached in three ways:

a) subjective method;
b) objective method for tonality;
c) reference method."

Due to the nature of the development the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142:2014, which states:

"Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed. Correct the specific sound level if a tone, impulse or other characteristics occurs, or is expected to be present, for new or modified sound sources."

BS4142 defines four characteristics that should be considered when deriving a rating penalty, namely; tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

a) Tonality

A rating penalty of +2 dB is applicable for a tone which is "just perceptible", +4 dB where a tone is "clearly perceptible", and +6 dB where a tone is "highly perceptible".

b) Impulsivity

A rating penalty of +3 dB is applicable for impulsivity which is "just perceptible", +6 dB where it is "clearly perceptible", and +9 dB where it is "highly perceptible".

c) Other Sound Characteristics

BS4142 states that where "the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distance against the residual acoustic environment, a penalty of +3 dB can be applied."

d) Intermittency

BS4142 states that when the "specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time ... if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied."

Background Sound Level

The background sound level is the underlying level of sound over a period, T, and is indicative of the relative quietness at a given location. It does not reflect the occurrence of transient and/or higher sound level events and is generally governed by continuous or semi-continuous sounds.

To ensure the background sound level values used within the assessment are reliable and suitably represent both the particular circumstance and periods of interest, efforts have been made to quantify a 'typical' background sound level for a given period. The purpose has not been to simply select the lowest measured value. Diurnal patterns have also been considered as they can have a major influence on background sound levels, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night time period for sleep purposes.

Since the intention is to determine a background sound level in the absence of the specific sound that is under consideration, it is necessary to understand that the background sound level can in some circumstances legitimately include industrial and/or commercial sounds that are present as separate to the specific sound.

Assessment of Impact

BS4142 states: "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". An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

- "Typically, the greater this difference, the greater the magnitude of the impact."
- "A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."
- "A difference of around +5dB 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.

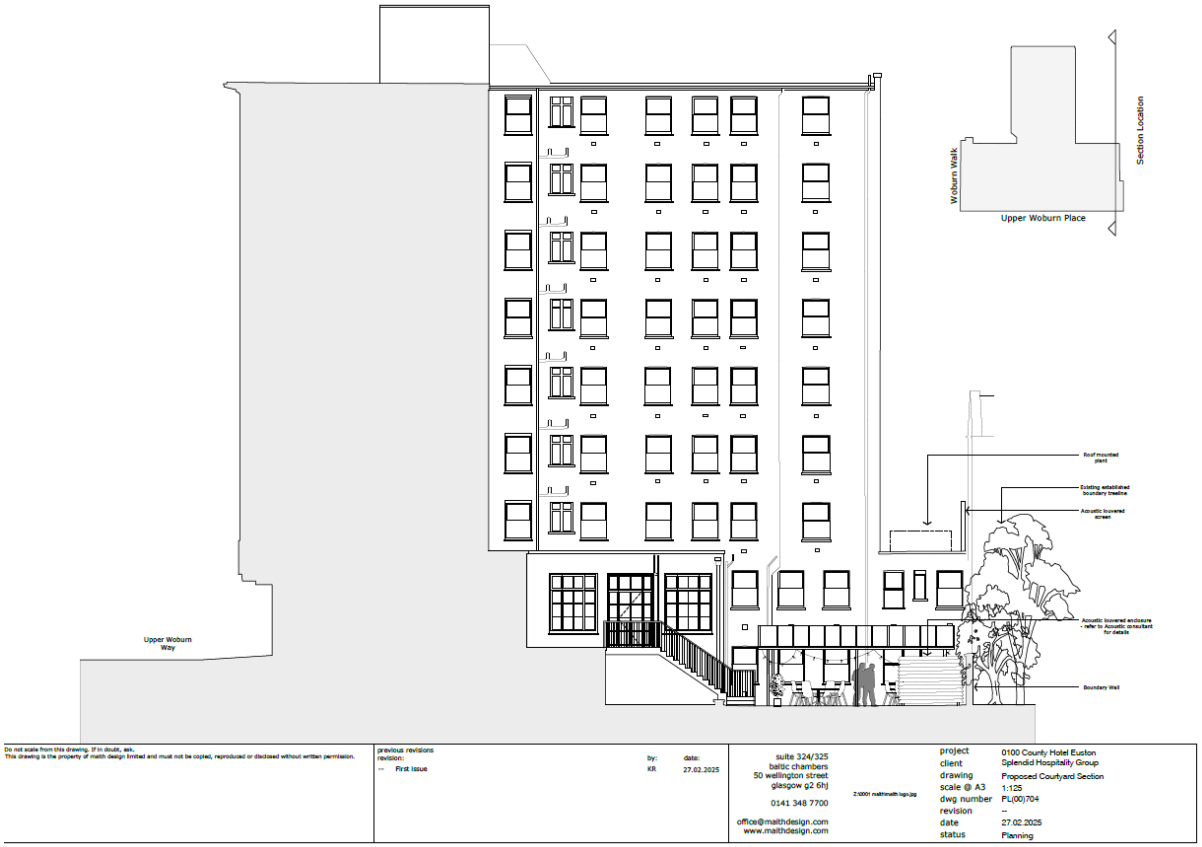
Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

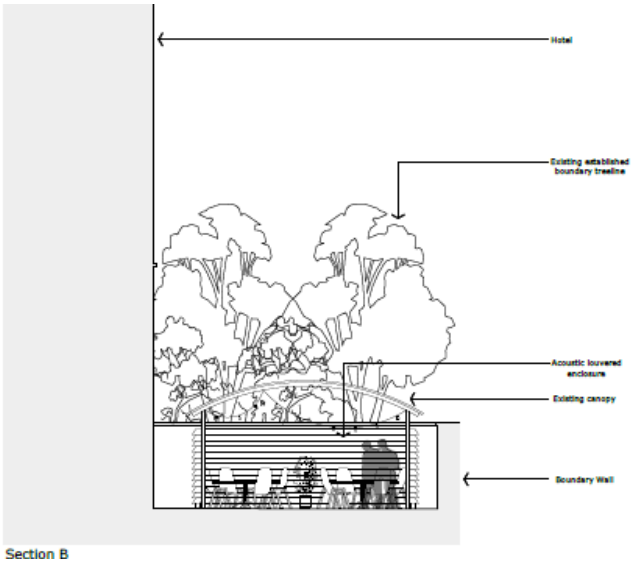
Interpreting the guidance given in BS4142, with consideration of the guidance given in the NPSE and NPPG Noise, an estimation of the impact of the rating sound is summarised in the following text:

- A rating sound level that is +10 dB above the background sound level is likely to be an indication of a Significant Observed Adverse Effect Level;
- A rating sound level that is +5 dB above the background sound level is likely to be an indication of a Lowest Observed Adverse Effect Level;
- The lower the rating sound 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 sound level does not exceed the background sound level, this is an indication of the specific sound source having a low impact and would therefore classified as No Observed Adverse Effect Level.

During the daytime, the assessment is carried out over a reference time period of 1-hour. The periods associated with day or night, for the purposes of the Standard, are 07.00 to 23.00 and 23.00 to 07.00, respectively.

Appendix C – Site Plans





Section B

Appendix D – Manufacturer's Data Sheets

Noise Level

QAHV-N560YA-HPB

High Temperature Heat Pump for Sanitary Hot Water

Sound Pressure Level - Winter Condition								
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)
71	58	59.5	56	52	48	44	38	58

Sound Pressure Level - Spring & Autumn Condition								
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)
71	58	56	54	48.3	47.3	44	38	56

Sound Power Level - Winter Condition								
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)
85	72	73.5	71	66.7	62	58	53	72.5

Sound Power Level - Spring & Autumn Condition								
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)
85	72	70.5	68.5	63	62	58	53	70.5

CAHV R450YA-HPB
BOLT-ON ACOUSTIC KIT

AMBIENT ACOUSTICS

This full acoustic kit is capable of reducing the noise emissions from the Mitsubishi CAHV-R450 Air Source Heat Pump by up to 7dBA without any impact on the unit performance due to the low airflow resistance design of the kit components. Ambient Acoustics kits have been tested in Mitsubishi's own test facilities, both in the UK and in Japan and are approved for use with their products.

Key Features

- Mitsubishi Electric UK Tested and Approved
- Up to 7dBA Noise Level Reduction
- Simple to Install design
- No warranty issues*
- No negative impact on machine performance*

* provided units and kits are spaced and installed in accordance with Mitsubishi Electric and Ambient Acoustics recommendations.

63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
-3	-4	-6	-8	-9	-4	-10	-7

To achieve the maximum noise reduction performance as above, it is necessary for all the components of the Full Kit to be fitted but in applications where limited space does not permit the fitting of the air inlet acoustic louvres, the Top Only Kit can still be fitted to achieve a noise reduction of approximately 4dBA.

Options of FULL KIT or TOP ONLY KIT available

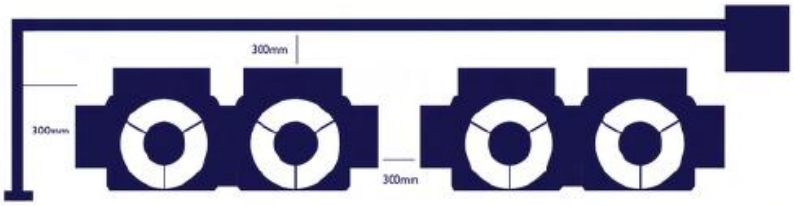
FULL KIT

Consists of left, right and rear acoustic air inlet louvres plus top air discharge attenuator box

TOP ONLY KIT

Consists of top discharge attenuator box only

The acoustic kit will increase the overall footprint of the unit by 500mm on width and 250mm front to back while overall height will be increased by 360mm. The weight of a Full Kit is approximately 215kg.



When spacing multiple CAHV units, allowance must be made for the air inlet acoustic louvres which are all 250mm deep. One full kit per CAHV unit is required unless Top Only Kit is specified in which case, units can be spaced in accordance with Mitsubishi recommendations.

AMBIENT ACOUSTICS
www.ambientacoustics.co.uk

Please contact Ambient Acoustics directly for supply and installation costs. Installation costs will vary depending on location and quantity of units.

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