ACOUSTIC CONSULTANTS LTD

Plant Assessment

County Hotel Refurbishment
8-11 Upper Woburn Place

Reference: 9874/FD

Client:
Splendid Hospitality Group LLP

Document Control

Version:	Revision Description:	Date:	Author:	Reviewed by:	Approved by:
1.0	First Issue	27/06/24	Fergal Denman, TechIOA	Blake Lucas, MIOA	Blake Lucas, MOA
2.0	Client comments	03/09/24	Blake Lucas, MIOA	Blake Lucas, MIOA	Blake Lucas, MOA
3.0	Amending typos	13/09/24	Blake Lucas, MIOA	Blake Lucas, MIOA	Blake Lucas, MOA

The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the noise, acoustic, and vibration aspects as included in this report. We provide advice only in relation to noise, vibration and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and, on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

Table of Contents

1. Introduction

Splendid Hospitality Group LLP appointed Acoustic Consultants Limited to provide noise and acoustic advice for the proposed hotel refurbishment development at County Hotel, 8-11 Upper Woburn Place, London, WC1H 0JW. This report provides a noise assessment of units serving the development on the nearby sensitive receivers (NSR) around the site.

The noise impact assessment has been undertaken in accordance with the guidance in the National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE), Planning Practice Guidance (PPG), British Standard 4142:2014 (BS4142) and British Standard 8233:2014 (BS8233).

The author of this report is a Member of the Institute of Acoustics (MIOA) with a recognised acoustic qualification and over 5 years of experience within the field of noise.

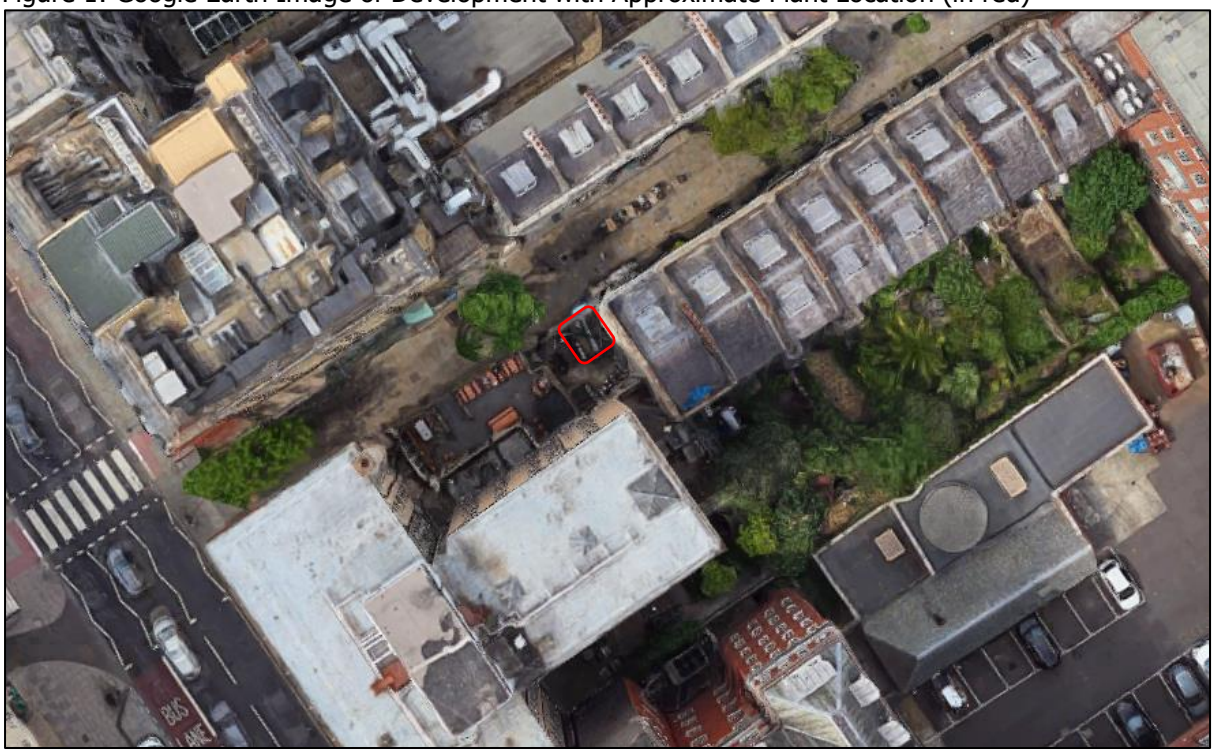
2. The Site & Development

The development site is located at County Hotel, 8-11 Upper Woburn Place, London, WC1H 0JW. The proposal is for the refurbishment of the existing hotel. 8-11 Upper Woburn Place is situated in the Bloomsbury district of central London – a mixed-use area featuring a combination of residential and commercial.

Directly to the north lies Tavistock Square Gardens. The adjacent Tavistock House, a notable historical building, houses various offices. To the east of the site is Woburn Walk, a pedestrian street lined with shops, cafes, and restaurants. Immediately to the south is Euston Road, a major throughfare in London. The road is a significant source of road traffic noise with regular buses, taxis and private vehicles. To the west of the site, Upper Woburn Place continues towards the intersection with Euston Road. This area features a mix of office buildings and hotels, such as the Hilton London Euston.

The NSR to the site will be the dwellings opposite to the 1st floor plant location along Woodburn Walk. A google earth image of the site can be seen below with an approximate plant location:

Figure 1: Google Earth Image of Development with Approximate Plant Location (in red)



3. Planning and Noise

3.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF) was published in March 2012 and revised in December 2023. Section 15 entitled 'Conserving and enhancing the natural environment' addresses noise as a requirement of planning. Paragraph 180 states:

"180. Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) 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; and f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate."

Paragraph 191 states:

"191. 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. "

The document does not prescribe any assessment methodology or criteria to assess the adverse effect of noise and refers you to the NPSE.

3.2. Noise Policy Statement for England

The NPPF refers to the Noise Policy Statement for England (NPSE). This was published in March 2010 and aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion and applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise.

The NPSE sets out the long term vision of Government noise policy. This long term vision is supported by three noise policy aims as follows:

"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; and*
- *where possible, contribute to the improvement of health and quality of life."*

The NPSE introduces the concept of "Significant adverse" and "Adverse" impacts of noise which relate to the noise policy aims. These are applied as follows:

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.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

The Noise Policy Statement for England (NPSE) states that noise levels above the Lowest Observed Adverse Effect Level are acceptable in planning where reduced to a minimum.

With regard to where there is potential for noise impact it states the following in relation to the second noise policy aim:

"The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur."

The NPSE does not provide any assessment criteria for the noted effect levels and each case must be considered on its merits.

The NPSE does, however, emphasise that in dealing with noise Local Planning Authorities are required to take a balanced approach in considering the benefits of development as against any adverse effects which arise. Paragraph 2.18 of the NPSE is particularly relevant in this respect and states:

"There is a need to integrate consideration of the economic and social benefits of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focusing solely on the noise impact without taking into account other related factors."

The planning need is outside the scope of noise and acoustics and will need to be addressed by others.

3.3. Planning Practice Guidance, Noise

The Planning Practice Guidance (PPG) on noise referred to here is based on the current version (January 2019) as provided on the Planning Guidance Website. It states that, *"Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment."*

It provides generic guidance on how to determine the noise impact and what factors could be a concern.

It includes the option types to mitigate any adverse effects of noise stating that there are four broad types of mitigation. These are engineering, layout, using planning conditions or obligations and noise insulation.

Paragraph 5 of the PPG provides a table identifying the effect level and examples of effect relating to the impact effect levels provided in the NPSE. The table is duplicated below:

Table 1: PPG Noise – Perception of Effect Levels

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The table does not provide any objective assessment which equates to the noted effect levels. However, the PPG identifies that where noise is audible, it is not necessarily intrusive. The effect and impact on people are based primarily on the level of noise.

4. Noise & Acoustic Criteria

For commercial noise, the most relevant guidance is provided within British Standard 4142:2014+A1:2019. The methods described in the British Standard use outdoor sound levels to assess the likely effects of sound upon people who might be inside or outside a dwelling or other premises used for residential purposes.

The initial estimate principle is that of establishing the 'difference' between the 'rating level' and the 'background sound level'. The 'rating level' is the 'specific sound level' of the source over a period of one hour during the day (07:00 to 23:00 hours) and over a period of 15 minutes during the night (23:00 to 07:00 hours). Clause 9 entitled 'Rating Level' 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."

An acoustic character correction should be added to the 'specific sound level' if it exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. The value of the character correction varies, dependent on the prominence of the character of the sound source at the assessment location. In Clause 11 of the Standard, entitled 'Assessment of the Impacts', it states:

"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9), and consider the following.

- *Typically, the greater this difference, the greater the magnitude of the impact.*
- *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."*

Camden typically apply a criterion of 10 dB below the background sound level.

5. Baseline Noise Survey

A noise monitoring exercise was undertaken starting on Wednesday 21st September and ending on Thursday 22nd September 2022.

5.1. Equipment

Sound Pressure Levels were measured using Class 1 sound level meters with a half-inch condenser microphone, using the 'fast' setting. The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards. This equipment was checked and calibrated as noted below and the certificates are available for inspection.

Table 2: Monitoring Equipment

Equipment Description / Manufacturer / Type	Serial Number	Date of Calibration	Calibration Certification Number
SLM, NTI, XL2	A2A-19376-E0	19/07/2021	UK-21-064
Pre-Amp, NTI, MA220	8322	19/07/2021	UK-21-064
Microphone, NTI, MC230A	A20671	19/07/2021	UK-21-064
Larson Davies, CAL 200	18914	04/07/2022	44362
SLM, NTI, XL2	A2A-17200-E0	10/05/2022	UK-22-029
Pre-Amp, NTI, MA220	8848	10/05/2022	UK-22-029
Microphone, NTI, MC230A	A22973	10/05/2022	UK-22-029
Calibrator, CEL-284/2	3-02716829	28/10/2021	39311

The measuring systems were checked for calibration before and after the tests and no significant drift was detected.

5.2. Weather Conditions

Conditions during the survey were dry and clement, with an average temperature approximately 19 degrees Celsius and wind speeds of 6 mph to the north.

5.3. Monitoring Procedure

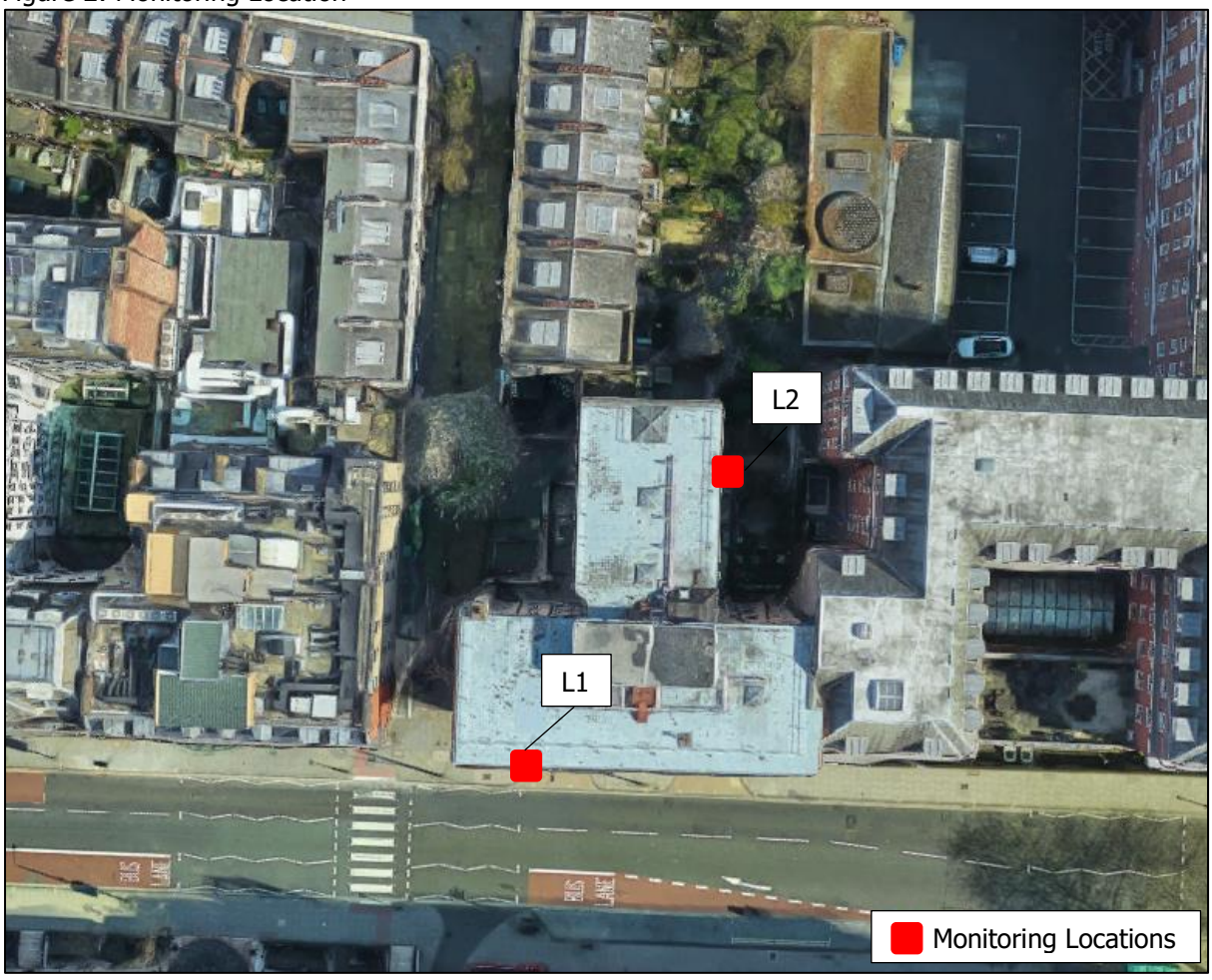
A partially attended survey was conducted on the site to determine the existing ambient and background noise climate at the site.

While on site, the noise climate consisted predominantly of road traffic noise from the A4200 and some aircraft noise.

Two sets of long-term monitoring equipment were installed, the first one on the second level of the front façade and the second set located on the second level within the hotel backyard.

The monitoring locations are displayed below in the figure below.

Figure 2: Monitoring Location

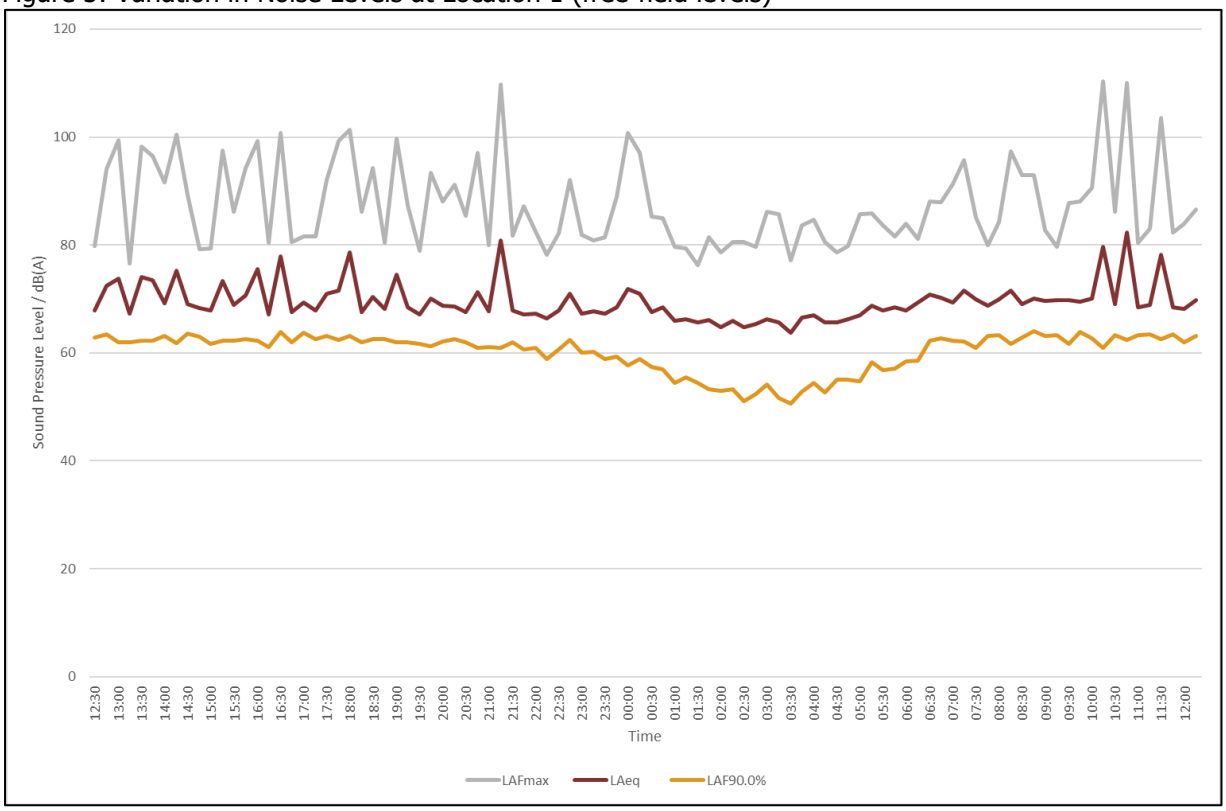


5.4. Measured Baseline Noise Levels

Location 1

The 15-minute A-weighted baseline background sound levels and equivalent noise levels at location 1 are provided in the chart below:

Figure 3: Variation in Noise Levels at Location 1 (free-field levels)



The tabulated octave band data from this location is given below.

Table 3: Logarithmically averaged noise data at Location 1

Period	Parameter	Sound Pressure Level per Octave Band / dB								dB(A)
		63	125	250	500	1000	2000	4000	8000	
Day	L_{eq16hr}	75	70	67	65	68	68	60	52	73
Night	L_{eq8hr}	70	65	64	62	64	61	53	45	68
	L_{Fmax}	92	90	89	84	83	80	75	68	88

The variation in noise levels is provided in table below:

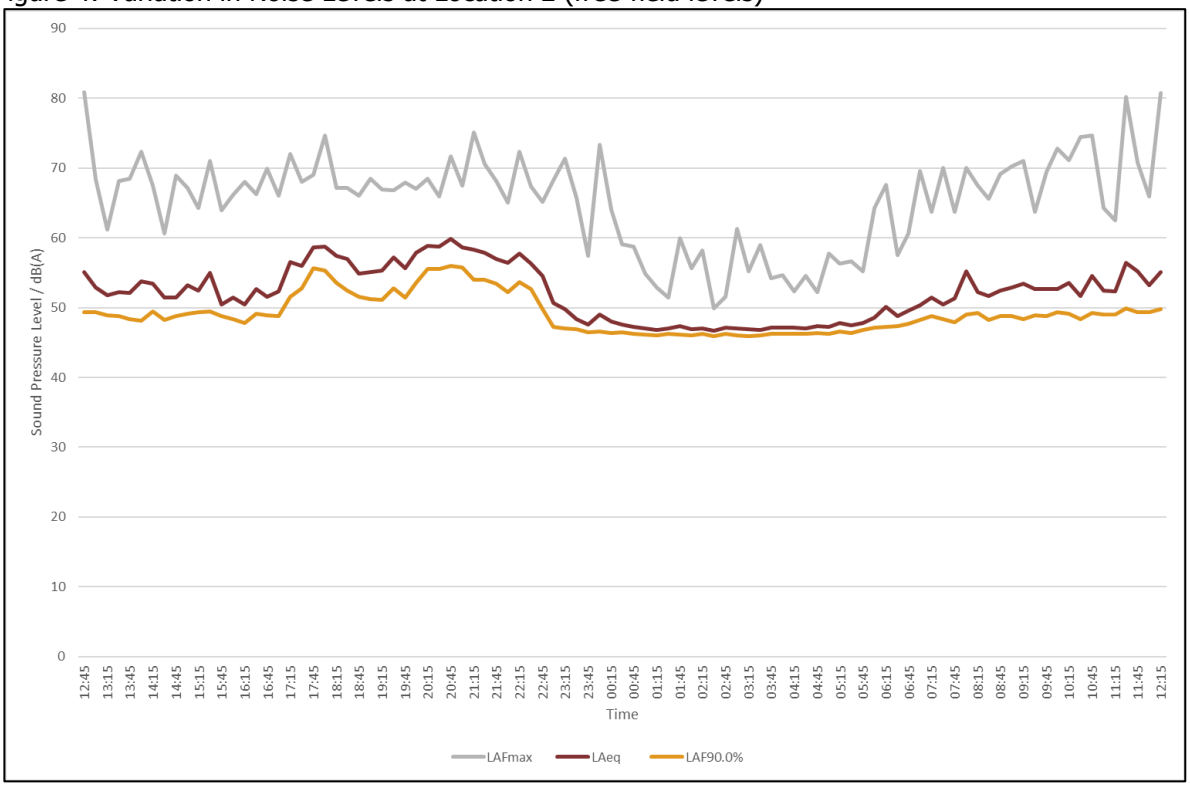
Table 4: Variation in Noise Levels at Location 1 (free-field levels)

Period	$L_{A90,15min}$		$L_{Aeq,15min}$	
	Range	Mode	Range	Mode
Day (07:00 - 23:00)	59 - 64	62	66 - 82	68
Evening (19:00 – 23:00)	59 - 63	61	66 - 81	68
Night (23:00 - 07:00)	51 - 63	53	64 - 72	66

Location 2

The 15-minute A-weighted baseline background sound levels and equivalent noise levels at location 2 are provided in the chart below:

Figure 4: Variation in Noise Levels at Location 2 (free-field levels)



The tabulated octave band data from this location is given below.

Table 5: Logarithmically averaged noise data at Location 2

Period	Parameter	Sound Pressure Level per Octave Band / dB								dB(A)
		63	125	250	500	1000	2000	4000	8000	
Day	L_{eq16hr}	59	56	53	53	50	47	40	31	55
Night	L_{eq8hr}	54	52	49	46	43	39	30	24	48
	L_{Fmax}	74	70	68	64	63	61	51	48	68

The variation in noise levels is provided in table below:

Table 6: Variation in Noise Levels at Location 2 (free-field levels)

Period	$L_{A90,15min}$		$L_{Aeq,15min}$	
	Range	Mode	Range	Mode
Day (07:00 - 23:00)	48 - 56	49	50 - 60	52
Evening (19:00 – 23:00)	50 - 56	54	55 - 60	58
Night (23:00 - 07:00)	46 - 48	46	47 - 51	47

6. Plant Noise Predictions

6.1. Proposed Plant

We have been informed that the plant to be serving the development will consist of 4 high temperature heat pumps (QAHV-N560YA-HPD). The below figure details the noise levels presented in manufacturers technical data:

Figure 5: Plant Noise Data

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

We have been informed the units are to sit on 1st floor roof, to the rear of the development, approximately 8m away from the NSR.

6.2. Noise Predictions

Based on the above, the predicted noise levels due to the external plant, at the façades of the noted NSRs are as follows.

Table 7: Predicted Play Area Noise Levels at NSRs

Source Level per Unit	Source Level Cumulative	Distance Correction (8 metres away)	Predicted Façade Level / dB $L_{Aeq,T}$
73 L_{WA}	79 L_{WA}	-23 dB	56 dB

7. BS4142 Assessment

A British Standard 4142:2014+A1:2019 assessment has been undertaken at the sensitive receivers on the site.

7.1. Background Sound Level

Based on the measured data, the typical background sound level at the NSR is 49 dB $L_{A90,\ 1hour}$ during the daytime and 46 dB $L_{A90,\ 15min}$ during the nighttime.

7.2. Predicted Specific Sound Level

The cumulative specific sound level at the proposed worst-case receiver is 50 dB $L_{Aeq(15minutes)}$ (free-field level).

7.3. Character Corrections

Character corrections should be added to the 'specific sound level' if it exhibits any *tonality, impulsivity, other specific characteristics and/or intermittency* at the assessment location. Based on our site visit and knowledge of such heating units, corrections to be applied are as follows:

- *Tonality* – We have not been provided with the 1/3 octave band data for the proposed units, and no correction is applied.
- *Impulsivity* – Plant such as this is not normally impulsive.
- *Intermittency* – a +3dB correction has been applied for intermittency.
- *Other Sound Characteristics* – a +3dB correction has been applied for other sound.

7.3.1. Initial Estimate

Therefore, the BS4142 initial estimate at the most sensitive location is as follows:

Table 8: BS4142 initial estimate for NSR

Parameter	Day	Night
Background Sound Level, $L_{A90,\ (T)}$	49 dB	46 dB
Specific Sound Level, $L_{Aeq,\ (T)}$	50 dB	50 dB
Character Correction	+6 dB	+6 dB
Rating Level, $L_{Ar,\ 15min}$	56 dB	56 dB
Excess of rating over background level	+7 dB	+10 dB

This means that the plant rating noise level at the nearest noise sensitive receiver will be of an adverse impact during the day and night period.

7.4. Summary of Assessment

As can be seen above, it is clear that plant noise will be of an adverse impact.

We understand the client will be installing mitigation, after this installation the plant will be resurveyed and reassessed.

8. Summary and Conclusions

Splendid Hospitality Group LLP appointed Acoustic Consultants Limited to provide noise and acoustic advice for the proposed hotel refurbishment development at County Hotel, 8-11 Upper Woburn Place, London, WC1H 0JW. This report provides a noise assessment of units serving the development on the nearby sensitive receivers (NSR) around the site.

This report provides a noise assessment of associated plant units serving the development on the nearby sensitive receivers around the site.

The noise impact assessment has been undertaken in accordance with the guidance in the National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE), Planning Practice Guidance (PPG), British Standard 4142:2014 (BS4142) and British Standard 8233:2014 (BS8233).

As can be seen above, it is clear that plant noise will be of an adverse impact.

We understand the client will be installing mitigation, after this installation the plant will be resurveyed and reassessed.

9. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure pA – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network.

A-weighted sound pressure level, L_{pA} - quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$L_{pA} = 10 \log_{10} (p_A/p_0)^2$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
p_0 is the reference sound pressure (20 µPa)

Background sound level, $L_{A90,T}$– A-weighted sound pressure level that is exceeded by the residual sound assessment location for 90% of a given time interval, T, measured using weighting F and quoted to the nearest whole number of decibels

Break-in - noise transmission into a structure from outside.

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = t2 – t1, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{AeqT} = 10\lg_{10}\left\{(1/T)\int_{t_1}^{t_2}[p_A(t)^2/p_0^2]dt\right\} \quad (1)$$

where:

p_0 is the reference sound pressure (20 µPa); and

$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example, third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in Pascals (Pa), typically from 20 micro-Pascals to 100 Pascals, but commonly simplified onto the decibel scale.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,Tr}$ – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.

Rating level, $L_{Ar,Tr}$ – Specific sound level plus any adjustment for the characteristic features of the sound.

Reverberation Time, T – The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T20 (time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, eVDV – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

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. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).

Head Office: 194 West Street, Bedminster, Bristol, BS3 3NB
T: 0117 986 2956

www.acoustic-ltd.co.uk

Registered Office: 194 West St, Bristol, BS3 3NB Registered No: 8544901