31 Southampton Row, London, WC1A 2RA

Planning Noise Assessment

April 2024

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Comments

Comments

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1. Introduction

Waterman Infrastructure & Environment Ltd (hereafter referred to as Waterman) was appointed by Hogarth Properties Sarl to undertake a noise assessment in relation to the proposed redevelopment of 31 Southampton Row, London, WC1A 2RA within the London Borough of Camden (LBC) *(hereafter referred to as the 'Site').* The Applicant intends to submit a planning application for the redevelopment of the Site, into a mixed-use development creating residential, retail and office spaces, hereafter referred to as the 'Development'.

This report establishes baseline noise levels at and in the vicinity of the Site based on noise survey data gathered during noise surveys conducted by Waterman in April 2024; The nearest sensitive receptors to the site have been identified and established baseline noise levels have been used to set noise limiting criteria for any external building services plant proposed as part of the development, when measured at the receptor location. Consideration has also been given to the suitability of the Site for residential use.

A glossary of the acoustic terminology used within this report is presented as **Appendix A**.

1.1 Site Description and Proposed Development

The Site lies within an urban area nearby Holborn Station. The surrounding land uses are predominantly commercial (office, retail, restaurants, and cafes), with the nearest residential use understood to be on Barter Street approximately 85 metres to the southwest of the Site with intervening buildings. The Site is bound by pedestrianised Sicilian Avenue to the southwest, Southampton Row to the east and Southampton Place to the northwest; as such, the predominant noise source at the Site is road traffic noise from Southampton Road and Southampton Place together with noise from patrons accessing adjacent commercial uses. **Figure 1-1** presents the Site Location Plan.

The proposed development comprise a refurbishment of internal areas providing retail at basement and ground floor level, office use first to fourth floor levels with residential use at 5th floor level. External alterations also comprise part of the proposed redevelopment.

Figure 1-1: Site Location Plan

2. Planning Policy, Guidance and Assessment Criteria

In preparation of this assessment regard has been given to the National Planning Policy Framework[1], Noise Policy Statement for England[2] and Noise Planning Practice Guidance[3].

2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) promotes '*good design*' as part of '*sustainable development*' and advocates '*preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of …….noise pollution…*'

Paragraph 191 of NPPF 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 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;'

Paragraph 193 of the NPPF introduces the '*agent of change principle*'. '*Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.*'

2.2 Noise Policy Statement For England

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development the Noise Policy Statement for England (NPSE) aims to:

- 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.

It introduces the concept of noise "*effect levels*" although it does not equate these to a specific level of noise as this is likely to be different for different noise sources, receptors and time of day. The effect levels are as follows:

- NOEL – No Observed Effect Level: Level below which no effect on health and quality of life due to noise can be detected;
- LOAEL – Lowest Observed Adverse Effect Level: Level above which adverse effects on health and quality of life can be detected;
- SOAEL – Significant Observed Adverse Effect Level: Level above which significant adverse effects on health and quality of life occur.

Predominantly, guidance is drawn from the World Health Organisation (WHO) when setting specific noise levels to the above effect levels, which essentially have been transposed into various British Standards, Policy and Guidance.

[1] Department for Levelling Up, Housing & Communities. (December 2023) National Planning Policy Framework. HMSO.
[2] Defra. (2010) *Noise Policy Statement for England.* Crown copyright.
[3] https://www.gov.uk/guidance/noise--2 (Accessed 4th July 2019) Note in process of being updated to reflect revised NPPF.

2.3 BS 4142:2014+A1:2019 – Methods for Rating and Assessing Industrial and Commercial Sound

When considering noise which is commercial in nature the primary source of guidance is BS 4142:2014+A1:2019[4]. BS 4142 states that the potential impact from industrial / commercial sound is based on the level difference between the source, known as the 'specific sound' level ($L_{Aeq,Tr}$), compared with the 'background sound' level ($L_{A90,T}$) that exists in the absence of the source in question. Where the sound contains any acoustic characteristics such as tonality, impulsiveness or intermittency, then the specific noise level is adjusted in-line with BS 4142 advice to determine the 'rating' level ($L_{Ar,Tr}$).

Typically, the greater the difference between the rating level and the background sound level, the greater the potential of an adverse impact. BS 4142 states:

- A difference of +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of +5dB or more is likely to be an indication of an adverse impact, depending on the context; and
- The lower the rating level is in relation to the background level, the less likely it is that a specific sound source with 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.

BS 4142 further states:

'Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.'

Context is an important consideration of a BS 4142 assessment, and the impact may require modification due to context, which may include:

- The absolute level of sound.
- The character and level of the residual sound compared to the character and level of the specific sound;
- Existing design measures at receptor locations (screening/façade design/ventilation); and
- The local attitude toward the Proposed Development.

The BS 4142 assessment methodology has been used to determine suitable noise limits for new external building services plant noise.

2.4 Residential Amenity

With regard to residential amenity and noise, the most relevant and credited guidance covering desirable levels of environmental noise for indoor and outdoor environments are the World Health Organisation (WHO), 1999 'Guidelines for Community Noise'[5], 2009 WHO 'Night Noise Guidelines for Europe[6]', BS 8233:2014[7] and ProPG 2017[8]. These documents set out guideline internal and external noise limits which should be met by all residential developments to ensure the critical effects of noise on sleep, annoyance and speech interference are guarded against. Further to this, ProPG advocates a holistic

[4] British Standard Institute (BSI) (2019) BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound. BSI.
[5] World Health Organisation (WHO) (1999); '*Guidelines for Community Noise'*, WHO, Geneva.
[6] World Health Organisation (WHO) (20099); '*Night Noise Guidelines for Europe''*, WHO
[7] BSI (2014) BS8233 '*Guidance on sound insulation and noise reduction in buildings'*. BSI.
[8] ProPG: (May 2017); Professional Practice Guidance on Planning & Noise. New Residential Development.

approach with good acoustic design being a key consideration which is not just reliant on achieving the required guideline noise limits.

In 2018 WHO published 'Environmental Noise Guidelines for the European Region[9], which provides advice based on the health effects of noise taking account of research done since the publishing of Guidelines for Community Noise and Night Noise Guideline for Europe. It recommends environmental noise guideline values based on individual transportation sources (road, rail and air) in terms of the L_{den} and L_{night} parameters. Although the 2018 WHO Environmental Noise Guidelines for the European Region supersedes the WHO's Guidelines for Community Noise and compliments WHO's Night Noise Guidelines for Europe, it recommends that all the indoor guideline values within Guidelines for Community Noise should remain valid. Notwithstanding this, the latest WHO guidance on external noise levels is yet to be transported into UK standards, policy or guidance.

Table 2-1 presents a summary of guideline values currently used in the assessment of residential amenity in England, drawn from BS8233:2014 and ProPG.

Table 2-1: Residential Amenity Noise Criteria

Activity	Location	Noise Level	
		Day time	Night-time
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedrooms	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$ 45 dB $L_{Amax,F}$ (note 1)
Relaxing, Enjoyment	Private gardens	50-55dB $L_{Aeq,16h}$	-

Note: ProPG guidance, not to be exceeded for more than 10 times within the night-time period.

When considering external amenity spaces such as gardens, balconies and terraces, the guidance provided in BS 8233 and reproduced in ProPG is:

"the acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50-55 dB $L_{Aeq,16h}$. These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited."

2.5 Requirements of London Borough of Camden

The London Brough of Camden (LBC) provides guidance in relation to the potential noise impacts of new items of fixed building services plant via their Supplementary Planning Guidance Document – Amenity (SPG-A)[10]. Chapter 6 of the document – entitled '*Noise and Vibration*' – outlines the LBC's approach to planning noise assessments for both noise sensitive and noise generating developments.

The SPG-A recommends the use of BS 4142 (summarised in Section 2.3) as the basis of any assessment relating to items of new fixed external building services plant. With regard to residential amenity SPG-A makes reference to BS8233 and NPPF.

[9] WHO. (2018); '*Environmental Noise Guidelines for the European Region'. WHO.*
[10] https://www.camden.gov.uk/documents/20142/4823269/Amenity+CPG+Jan+2021.pdf/91e9fd97-7b26-f98e-539f-954d092e45b6?t=1611580504893 [accessed 26/4/2024].

Appendix 3 of Camden's Local Plan[11] presents expected noise standards for proposed residential use in 'noisy' locations (Table B) and for the introduction of fixed external building services plant (Table C). These are reproduced as **Table 2-2** and **Table 2-3** below respectively.

Table 2-2: Noise Criteria For Residential Development (Table B, Camden Local Plan)

Dominant Noise Source	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAEL (Red)
Anonymous noise such as general environmental noise, road traffic and rail traffic	Noise at 1m from noise sensitive façade/free field	Day	<50dB $L_{Aeq,16h}$*	50dB to 72dB $L_{Aeq,16h}$*	>72dB $L_{Aeq,16h}$*
		Night	<45dB $L_{Aeq,8h}$ <40dB $L_{Aeq,8h}$**	45dB to 62dB $L_{Aeq,8h}$* >40dB L_{night}**	>62dB $L_{Aeq,8h}$*
	Inside a bedroom	Day	<35dB $L_{Aeq,16h}$	35dB to 45dB $L_{Aeq,16h}$	>45dB $L_{Aeq,16h}$
		Night	<30dB $L_{Aeq,8h}$ <42dB $L_{Amax,\ fast}$	30dB to 40dB $L_{Aeq,8h}$ 40dB to 73dB $L_{Amax,\ fast}$	>40dB $L_{Aeq,8h}$ >73dB $L_{Amax,fast}$
	Outdoor living space (free field)	Day	<50dB $L_{Aeq,16h}$	50dB to 55dB $L_{Aeq,16h}$	>55dB $L_{Aeq,16h}$

Note: *LAeq,T values specified for outside a bedroom window are façade levels. **Lnight values specified for outside a bedroom window are free field levels.

Table 2-3: Fixed External Plant Noise Criteria (Table C, Camden Local Plan)

Existing Noise Sensitive Receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAEL (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 57dB L_{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 88dB L_{Amax}.

Note: *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 both **Table 2-2** and **Table 2-3** correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. It is understood that the Council will take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

For 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)

[11] https://www.camden.gov.uk/documents/20142/3912524/Local+Plan+Low+Res.pdf/54bd0f8c-c737-b10d-b140-756e8beeae95 [accessed 29/4/2024]

may not afford the necessary protection, the Council generally also require a NR curve specification of NR35 or below, dependant on the room (based upon measured or predicted $L_{eq,5mins}$ noise levels in octave bands) 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area.

3. Baseline Environmental Conditions

3.1 Noise sensitive Receptors

The following potential noise sensitive receptors have been identified and are presented in **Table 3-1**

Table 3-1: Nearest Sensitive Receptors

Receptor	Type of Receptor	Description / Name	Approximate Distance to Site Boundary (m)
SR A	Commercial	Commercial Operations along Sicilian Avenue	Immediately adjacent Site
SR B	Commercial	Adjacent Commercial Operations along Southampton Row	Immediately adjacent Site
SR C	School	The Milton Keynes Academy Sicilian Ave, Greater, London WC1A 2QR	Approx 10m west of Site boundary
SR D	Hotel	L'oscar London 2-6 Southampton Row, London WC1B 4AA	Approx 70m south of Site boundary
SR E	Residential	Residential Dwellings along Barter Street	Approx. 85m southwest of Site boundary

There are a number of sensitive receptors located at greater distance to those presented in **Table 3-1**; however given their greater distance relative to the Site , it is considered that so long as noise impacts are adequately controlled at the nearest receptors presented in **Table 3-1**, receptors located at greater distance would not experience significant noise impacts.

3.2 Baseline Noise Survey – April 2024

A baseline environment noise survey was conducted by Waterman from Thursday 18th April until Tuesday 23rd April 2024 to establish the prevailing ambient noise levels. To allow continuous noise monitoring at a secure location, an unattended environmental noise logger was installed on the roof of 31 Southampton Row overlooking Vernon Place. The noise logger was strategically positioned to minimise potential contamination from the existing roof top plant.

Supplementary short term attended measurements were conducted on Monday 8th April 2024 in the centre of each façade at ground floor level of the building. Due to on-going construction works on Sicilian Avenue measurements along this façade were halted due to contamination caused by construction noise.

Noise monitoring locations are presented below in **Figure 3-1** with a summary of measure noise levels presented in **Table 3-2.**

Figure 3-1: Noise Monitoring Locations

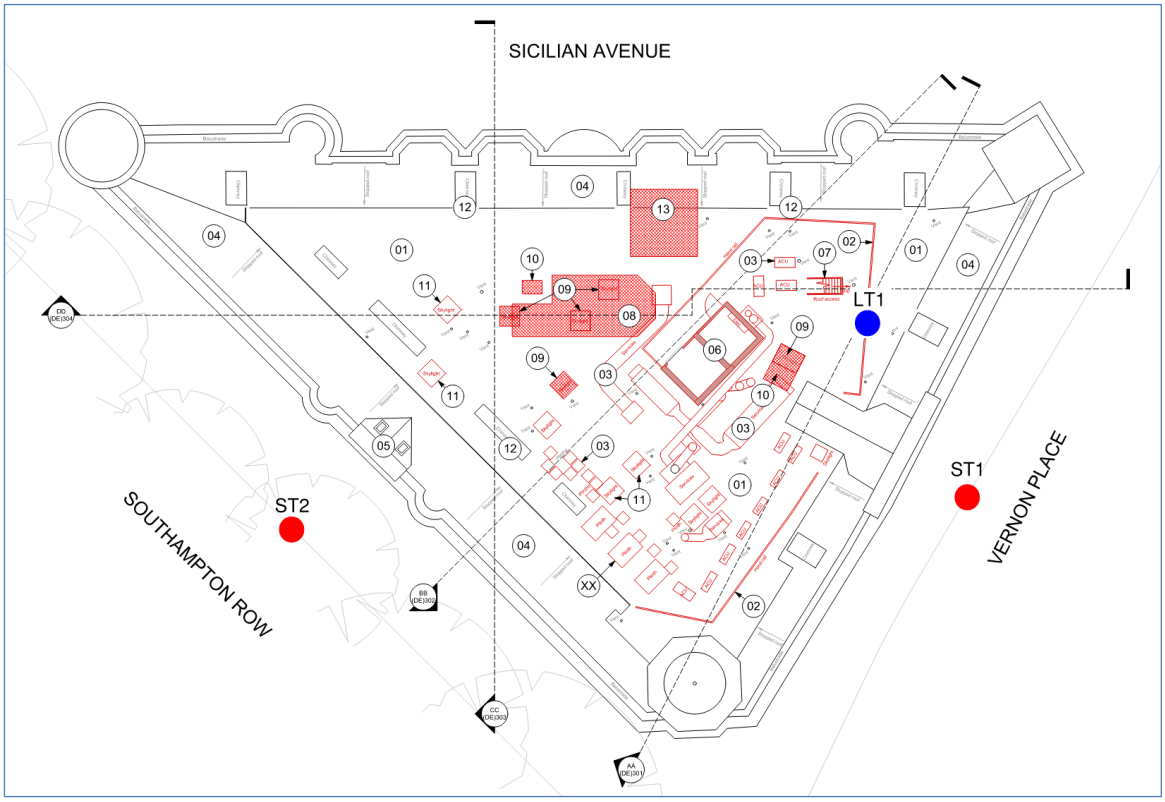


Table 3-2: Summary of Baseline Survey Results

ID	Description	Period	L_{Aeq}[1]	L_{AFmax}[2]	L_{A10}[3]	L_{A90}[4] [Minimum]
LT1	31 Southampton Row [Roof]	Day	64	85	63	58 [55]
		Eve	61	81	61	56 [50]
		Night	60	72	59	52 [45]
ST1	Vernon Place [Ground]	Day	73	89	73	65 [63]
ST2	Southampton Row [Ground]	Day	71	94	72	63 [61]

Note: [1] Logarithmic average. [2] 90th Percentile. [3] Arithmetic average. 4 Modal (most frequently occurring).

The weather conditions during the survey period were monitored remotely, weather station ID ILONDO533 at Covent Garden approximately 800m south of the Site. During the long-term survey there were periods of wind speeds above 5 m/s and rain. These data sets were not included in the data analysis.

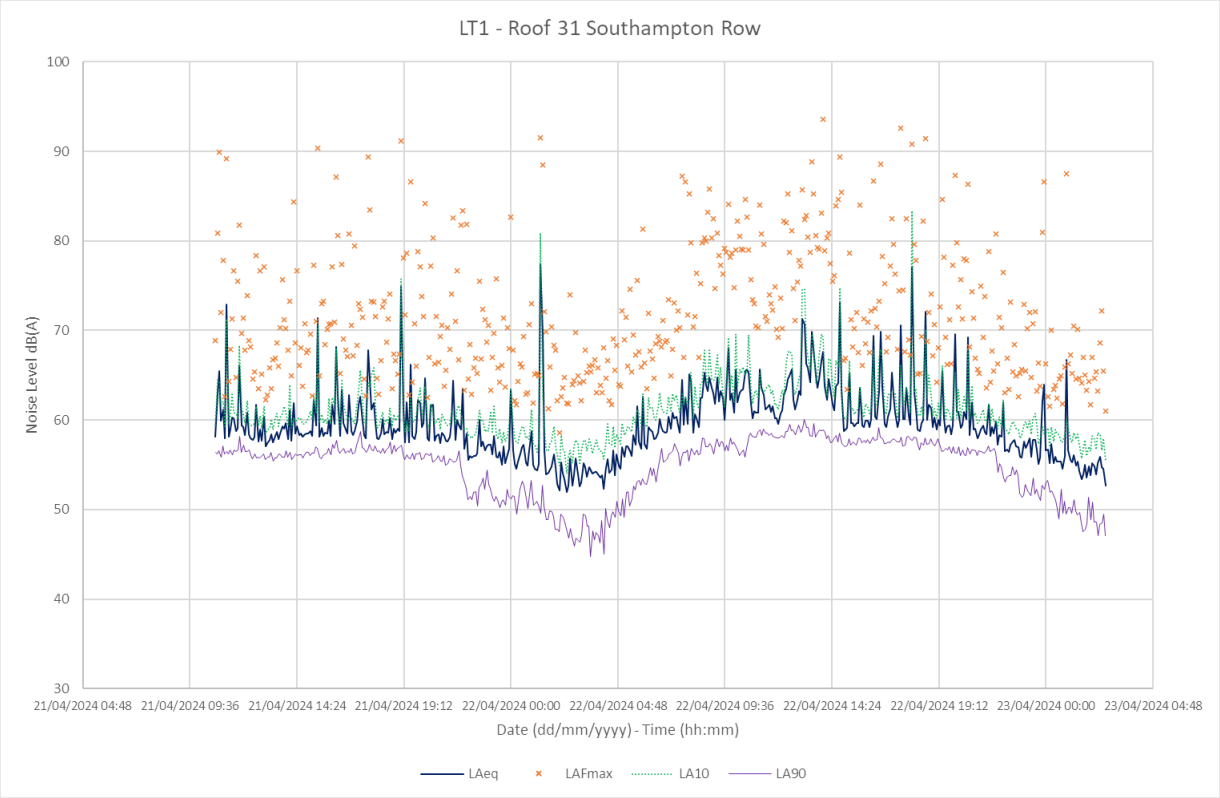
The noise climate around the site consisted predominantly of road traffic noise from the surrounding road network. Of the main roads proximate to the Site; namely, Vernon Place (A40), Southampton Row, Southampton Place and High Holborn (A40), Vernon Place(A40) subjectively was considered to be the dominant noise source in the area.

The influence of road traffic noise at the Site and surrounds is illustrated by the time history plot of LT1 as

presented in **Graph 3-1**, which illustrates a clear diurnal variation, with lower levels during the night-time period when vehicles on the roads reduce together with human activity. Also, the trend of the ambient noise levels closely follows that of the L_{A10} noise parameter, which is used in the assessment of road traffic noise.

Full details of the baseline survey are presented in **Appendix B**.

Graph 3-1: Time History Plot LT1



4. Assessment

4.1 Operational Noise Impacts

4.1.1 External Building Services Noise Emissions

As part of the operation of the development a replacement mechanical ventilation system has been proposed. Although the specific items of external building services plant are yet to be finalised. It is currently understood that all new building services plant would be located at rooftop level of the existing building.

To ensure that noise emissions from fixed mechanical plant are adequately controlled, noise level limits have been recommended based on the existing prevailing noise levels established through survey (dB L_{A90}, see **Table 3-2**) and the guidance provided in BS 4142:2014+A1:2019.

In the absence of specific industrial noise limiting criteria, it is recommended that the noise from fixed building services plant (Rating Level) is designed to a level of 10dB below the existing representative background sound level at a position 1m from the façade (adjusted to a free-field value) of the nearest SRs (i.e. $L_{Ar,Tr} = L_{A90,T}$ -10dB) with a minimum night-time value of 30dB $L_{Ar,Tr}$ where the prevailing background sound level is less than 40dB L_{A90}. A noise limit of this magnitude would adequately safeguard residential amenity when account is taken of the prevailing ambient noise levels.

Error! Reference source not found. presents the recommended plant noise limits.

Table 4-1: Recommended Plant Noise Limits At Sensitive Receptors[1]

Measurement Location	Period	Ambient Noise Level	Representative (Modal Average) Background Noise Level dB L_{A90}	Minimum Measured Background Sound Level dB $L_{A90,min}$	Rating Level Plant Noise Limit dB $L_{Ar,Tr}$
All Sensitive Receptors (night-time period only applicable to residential receptors)	Day (07:00-19:00)	64	58	55	≤48
	Evening (19:00-23:00)	61	56	50	≤46
	Night (23:00-07:00)	60	52	45	≤42

Note: [1] Based on LT1 measured noise levels.

Plant specification is sufficiently flexible as to ensure that suitably quiet, non-tonal plant can be procured and / or mitigation options such as screening (e.g. acoustic louvres) can be installed as necessary to ensure that guideline noise criteria set out in Error! Reference source not found. are met. Measures to control noise from fixed mechanical plant to within the above criteria should be inherent in the detailed design of the development and, as such, potential effects associated with fixed mechanical plant would be insignificant.

A full assessment of the potential noise impacts of the proposed building services plant should be carried out by a suitably qualified acoustician once selections have been finalised.

4.2 Residential Amenity

The prevailing noise levels established through survey indicate that when external facing windows are

open on the 5th floor, where residential use is proposed, BS8233 noise criteria is likely to be exceeded. Provided windows in the closed position together with ventilation to habitable rooms provide suitable sound insulation, BS8233 criteria would be satisfied. It should be noted that the 5th floor level does benefit from screening provided by the building edge due to its set-back location from the 4th floor façade. This would be finalised at subsequent RIBA acoustic design stages.

5. Conclusion

Waterman on behalf of the Applicant have prepared a noise and vibration assessment as part of their application to obtain planning permission for the proposed refurbishment works at 31 Southampton Row, London WC1A 2RA.

Waterman conducted baseline noise surveys consisting of short term attended noise measurements on 8th April 2024 at ground floor level together with a long-term unattended noise measurement from 18th – 23rd April on the roof of 31 Southampton Row to established prevailing baseline noise conditions.

To minimise the potential noise impacts of the proposed development, noise limits for any new items of fixed external building services plant have been set at the nearest sensitive receptors on the basis of the modal background noise levels established during the noise survey. The limits were set at 10 dB below the prevailing background noise level. This threshold is based on the guidance provided in BS 4142:2014+A1:2019 (summary provided as Section 2.3) and is therefore in line with the noise assessment guidelines within Chapter 6 of the London Borough of Camden's Supplementary Planning Guidance Document – Amenity and Camden's Local Plan.

BS8233 internal noise level criteria are likely to be exceeded when external facing windows are open on the 5th floor where residential use is proposed. Provided the windows and ventilation to habitable rooms provide suitable sound insulation, BS8233 criteria would be satisfied.

Overall, it is considered that with suitable noise mitigation measures in place to control the noise emissions of the proposed fixed mechanical plant items, the noise impacts of the development proposals would be negligible. A full assessment of the potential noise impacts of the proposed building services plant should be carried out by a suitably qualified acoustician once selections have been finalised.

APPENDICES

A. Glossary of Acoustic Terms

Ambient sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
A-weighting	A frequency weighting applied to measured or predicted sounds levels in order to compensate for the non-linearity of human hearing.
Background noise	Background noise is the term used to describe the noise measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L_{90} noise level (see below).
Broadband	Containing the full range of frequencies.
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. This instrument has been specifically developed to mimic the operation of the human ear. The human ear responds to minute pressure variations in the air. These pressure variations can be likened to the ripples on the surface of water but of course cannot be seen. The pressure variations in the air cause the eardrum to vibrate and this is heard as sound in the brain. The stronger the pressure variations, the louder the sound that is heard. The range of pressure variations associated with everyday living may span over a range of a million to one. On the top range may be the sound of a jet engine and on the bottom of the range may be the sound of a pin dropping. Instead of expressing pressure in units ranging from a million to one, it is found convenient to condense this range to a scale 0 to 120 and give it the units of decibels. The following are examples of the decibel readings of every day sounds: Four engine jet aircraft at 100m 120 dB Riveting of steel plate at 10m 105 dB Pneumatic drill at 10m 90 dB Circular wood saw at 10m 80 dB Heavy road traffic at 10m 75 dB Telephone bell at 10m 65 dB Male speech, average at 10m 50 dB Whisper at 10m 25 dB Threshold of hearing, 1000 Hz 0 dB
dB(A): **A-weighted decibels**	The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the 'A' filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.
Façade Noise Level	A noise level measured or predicted at the façade of a building, typically at a distance of 1m, containing a contribution made up of reflections from the façade itself (+3 dB).
L_{Amax} noise level	This is the maximum noise level recorded over the measurement period.
L_{Amin} noise level	This is the lowest level during the measurement period.
$L_{Aeq,T}$ noise level	This is the 'equivalent continuous A-weighted sound pressure level, in decibels' and is defined in British Standard 7445 as the 'value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time'. It is a unit commonly used to describe construction noise, noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise.
L_{A90} noise level	This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.
L_{A10} noise level	This is the noise level which is achieved for 10% of the monitoring period and is often used to describe road traffic noise.

Sound Reduction Index (R)	The sound reduction index is a single-number rating of the sound reduction through a wall or other building element. Since the sound reduction may be different at different frequencies, test measurements are subjected to a standard procedure which yields a single number that is about equal to the average sound reduction in the middle of the human hearing range.
Weighted Sound Reduction Index (R_w)	Single number rating used to describe the **laboratory** airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
C_{TR}	An adjustment to the Rw scale to take account of the lower performance against a typical spectrum of road traffic noise dominated by low frequencies.
$D_{ne,w}$	Weighted element normalised level difference.
VDV	This is the vibration dose value, a measure of vibration exposure; the fourth root of the integral, over the measurement period, of the fourth power of the frequency-weighted and time-varying acceleration.

B. Baseline Noise Survey:

Table B1 presents the equipment detail used for the baseline noise survey. The equipment was field calibrated before and on completion of the survey with no significant drift.

Table B1: Equipment Detail

Location	Description	Serial Number	Date of Last Calibration
LT1 31 Southampton Row [Roof]	Norsonic 140 Type 1 Sound Level Meter	1406409	6th June 2022 Certificate Number 41220 microphone, U41221 SLM
	Norsonic 1209 Pre-amplifier	20689	
	Norsonic 1225 Microphone	142557	
ST1, Vernon Place [Ground] ST2, Southampton Row [Ground]	Rion NL-52 Type 1 Sound Level Meter	632037	24th January 2023 Certificate Number TCRT23/1069
	Rion NH-25 Pre-amplifier	32065	
	Rion UC-59 Microphone	14750	
All	Acoustic Calibrator Rion NC-74	35173533	23rd January 2023 Certificate Number TCRT23/1064

During the survey period weather conditions were predominantly suitable for noise measurements. Data sets measured during periods of rain and wind speed above 5m/s were removed from subsequent analysis. Table B2 provides a summary of weather conditions during the survey acquired from weather station ILONDON533[12] at Covent Garden located approximately 800m south of the Site.

Table B2: Summary of Weather Conditions During Survey

Date	Day	Temp Avg oC	Wind Avg m/s	Wind High m/s	Wind >5 m/s Periods	Wind Direction	Rain	Rain Period
08/04/2024	Monday	13.8	<1.0	3.3	None	East	No	Not during survey
18/04/2024	Thursday	9.8	1.9	6.7	00:00-03:00,15:00-23:00 various time	NNE	Yes	17:00-00:00
19/04/2024	Friday	10.6	2.2	7.2	08:00-00:00 at various times	West	Yes	12:00-00:00
20/04/2024	Saturday	8.1	2.3	7.5	00:00-00:00 various times	NE	No	
21/04/2024	Sunday	8.4	2.6	8.1	10:45-13:05,16:30-17:00, 18:30-19:00	NE	No	-
22/04/2024	Monday	7.8	1.7	5.2	None	NE	No	-
23/04/2024	Tuesday	8.3	1.6	2.0	None	NNE	No	-

Note: Data not used

[12] https://www.wunderground.com/dashboard/pws/ILONDO533/graph/2024-04-21/2024-04-21/daily

We are Waterman, where every project matters

We deliver progressive, sustainability-driven environmental and engineering consultancy services across every sector. We think differently, and we're harnessing our collective expertise to deliver greener, healthier and well-connected communities, networks and built environments.

Based in strategic locations throughout the UK and Ireland, our team of specialists is at the forefront of tackling the climate emergency and forging a path to a Net Zero built environment.

UK & Ireland Office Locations