hepworth acoustics

LAND ADJACENT TO NO. 1 ST JOHNS WOOD PARK, LONDON NW8

NOISE ASSESSMENT

On behalf of:

Almax Group Services

Report No: P18-492-R01
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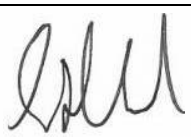

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1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Almax Group Services to carry out a noise assessment relating to a planning application for the proposed residential development of the vacant site located adjacent to No. 1 St Johns Wood Park, London NW8 6QS.

1.2 The site is bounded to the east by St Johns Wood Park. To the north and west are private garages, with the apartment blocks at Boydell Court beyond. To the south is a residential house at No. 1 St Johns Wood Park. The adjacent properties are residential. There are no commercial or business premises in the immediate vicinity. The site location plan is shown in Figure 1.

1.3 The proposed development is a six-storey building with basement, containing nine flats, with associated car parking, cycle parking, and bin storage. The design includes outdoor terraces on the upper level. There are external air-source heat pumps proposed for the building, which will be installed on the rooftop; these will potentially run at any time.

1.4 A plan indicating the proposed building line is shown in Figure 2. A 3D render showing the proposed building viewed from the opposite side of St Johns Wood Road is shown in Figure 3.

1.5 The site was formerly occupied by private garages, which have now been demolished. The site is currently open land, with no construction activity at the time of the assessment.

1.6 This assessment is based on the following drawings from Maccreanor Lavington Architects:

- MLUK-673-A-L-XX-0100, dated September 2018.
- MLUK-673-A-P-XX-1206, dated October 2018.

1.7 The various noise indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 ACOUSTIC CRITERIA

2.1 The *National Planning Policy Framework* (NPPF) 2012 provides some general guidance to local authorities on taking noise in to account in planning policies and decisions. This includes guidance that local authorities should '*aim to avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development'* and also '*recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established*.'

2.2 However, there is as yet no specific guidance on numerical acoustic assessment/design criteria for proposed new housing developments provided in the NPPF, accompanying Technical Guidance document, National Planning Practice Guidance 'Noise', nor the *Noise Policy Statement for England* (NPSE) 2010.

Camden Council

2.3 Camden Council has the following guidance in *Camden Planning Guidance: Amenity*, dated March 2018:

> *Developments proposing plant, ventilation, air extraction or conditioning equipment and flues will need to provide the system's technical specifications to the Council accompanying any acoustic report. 'BS4142 Method for rating Industrial and Commercial Sound'* [SIC] *contains guidance and standards which should also be considered within the acoustic report.*

2.4 The following additional guidance is included for industrial and commercial noise sources in *Appendix 3: Noise Thresholds* of the *Camden Local Plan 2017:*

> *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 (15 dB if tonal components are present) should be considered as the design criterion.*

2.5 BS 4142: 2014 '*Methods for rating and assessing industrial and commercial sound*' provides methods for rating and assessing sound of an industrial and/or commercial nature.

2.6 BS 4142 requires the 'rating' noise level for the operation to be compared with the background (L_{A90}) noise level in the absence of the operational noise being assessed.

2.7 The 'rating' level is derived based on the 'specific' L_{Aeq} noise level attributable to the operation with an *'acoustic feature'* penalty added for any noise sources which give rise to tonal, impulsive, intermittent, or other characteristics readily distinctive against the residual acoustic environment.

2.8 In the context of this development, we consider the guidance in BS 4142: 2014 to be appropriate so this will be adopted, along with Camden Council's 'Rating Level' criteria stated above.

BS 8233 and ProPG

2.9 To the best of our knowledge, Camden Council does not stipulate specific internal noise limits for residential developments. In lieu of this, we will refer to the guidance in ProPG: Planning & Noise '*Professional Practice Guidance on Planning & Noise'* 2017 and British Standard 8233: 2014 *Guidance on sound insulation and noise reduction for buildings*.

2.10 British Standard 8233: 2014 *Guidance on sound insulation and noise reduction for buildings,* which carries the full weight of an adopted British Standard, recommends guidance on design criteria for acceptable noise levels within residential accommodation. BS 8233 guidelines for the daytime (07:00 – 23:00) and night-time (23:00 – 07:00) periods are summarised in Table 1.

Table 1: BS 8233 Recommended Acoustic Design Criteria

Activity	Location	Internal Noise Levels	
		Daytime 07:00 – 23:00	Night-time 23:00 – 07:00
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

2.11 BS 8233 clarifies that the above guidance relates only to noise without specific character (e.g. such as that which has a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content) and that where such characteristics are present, lower noise limits might be appropriate.

2.12 BS 8233 states that if there is a reliance on closed windows to meet the guide values, "*there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level*". Further, it is stated that assessments should be based on a room with "*adequate ventilation provided (e.g. trickle ventilators should be open)*".

2.13 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of L_{Amax} values and these can be highly variable and unpredictable. ProPG: Planning & Noise '*Professional Practice Guidance on Planning & Noise'* 2017 states that "*in most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events*". This is broadly consistent with research described in WHO *Community Noise Guidelines* that states, "*for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times per night*".

2.14 Regarding outdoor living areas, BS 8233 states that "*it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB L_{Aeq}, which would be acceptable in noisier environments. However, it is recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas such as city centres or urban areas adjoining the strategic transport network, compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, developments should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited*".

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 A survey of prevailing environmental noise levels was carried out at the site at Location 1 indicated in Figure 1, at a position corresponding to the façade of the proposed building. Continuous noise monitoring was undertaken in sequential 5-minute samples from 14:40 on Monday 1st October to 17:00 on Tuesday 2nd October 2018. The noise measurements were taken in 'free-field' conditions with the microphone at approximately 3.5 metres above ground level.

3.2 The continuous noise monitoring measurements were undertaken using a Brüel & Kjær 2250 Type 1 Sound Analyser (serial no. 3011626) fitted with a windshield.

3.3 The daytime $L_{Aeq,16hr}$ and night-time $L_{Aeq,8hr}$ noise exposure values have been determined from the logarithmic average of all measured $L_{Aeq,5min}$ noise measurement samples over each of those periods.

3.4 The overall night-time L_{Amax} noise level has been determined for assessment purposes as the measured $L_{Amax,5mins}$ noise level exceeded no more than 5 times over the full night-time period. This accounts for possible occasions that multiple events exceed the given level during an individual 5-minute sample period.

3.5 The background noise has been determined based on the mode value for $L_{A90,5mins}$ over the night-time period, as this is when background noise levels are lowest and people are typically most sensitive to noise.

3.6 The measured levels at Location 1 are summarised in Table 2. The detailed results are presented in Appendix II in graph form.

Table 2: Overall Noise Levels at Location 1

Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)		
	dB $L_{Aeq,16hr}$	dB $L_{Aeq,8hr}$	dB $L_{Amax,f}$	dB $L_{A90,5mins}$
1	52	46	65	42

3.7 The dominant noise source was road traffic on the local highways.

3.8 The weather conditions throughout the noise survey were mild, dry, and overcast. Wind was from the west, with wind speeds below 5 m/s. These were considered suitable conditions for the survey.

3.9 Calibration checks were carried out on the meter before and after the survey using a Brüel & Kjær Type 4231 sound calibrator (serial no. 2412667). No variation in the calibration levels was observed.

4.0 NOISE ASSESSMENT

4.1 The overall road traffic noise levels set out in Table 2 are modest. Based on these levels, no specific acoustic mitigation is considered necessary, as adequate control of road traffic noise in accordance with BS 8233 and WHO guidelines for internal noise will be achieved using standard thermal double glazing (typically a system comprising two 4 mm thick standard panes with a minimum 12 mm air cavity, i.e. 4-12-4) with standard non-acoustic trickle ventilators.

4.2 Whilst the glazed areas are marked on the current plans, the specification of the surrounding external building fabric is not known at this stage. The fabric should be specified to provide a sufficient level of sound insulation to maintain the overall performance of the façade. This will be readily achievable using a variety of standard building materials and constructions, though the detailed proposals should be checked by an acoustic consultant at the detailed design stage to ensure that the internal noise criteria will be met.

4.3 The proposed outdoor amenity areas for use by residents are predicted to be exposed to daytime noise levels below the recommended upper limit of 55 dB L_{Aeq}. Based on this, no specific noise mitigation measures are required for these areas.

4.4 We recommend that the proposed rooftop heat pumps have a maximum rating level of 32 dB L_{Ar} determined in accordance with BS 4142: 2014 when assessed 1 metre outside the nearest noise-sensitive windows, which based on our site inspection are the bedroom windows to the house at No. 1 St Johns Wood Park. This is readily achievable using appropriately-specified heat pumps and standard noise control measures.

4.5 Based on the proposed location of the heat pumps on the rooftop, these are calculated to meet this noise requirement with units specified with a combined sound power level no more than 90 dB L_w with minimum 1.8 metre high acoustic screening on all sides of the condensers, sealed at the base. This can be a solid screen constructed from 12 mm thick marine-grade plywood, for example, finished as required. Ventilation and air flow requirements should be checked with the building services consultant or equipment supplier. If a solid screen is not compatible with the ventilation requirements for the units, we recommend installing a lightweight, louvered screen using acoustic louvers around the new condensers. We recommend using a 100 mm thick IAC Slimshield louver, or equivalent, with the same 1.8 m height noted above.

4.6 We recommend that the heat pumps are mounted on suitable vibration isolation mounts to control any structure-borne noise. All vibration isolators should be specified to achieved isolation efficiency of 0.95 at 125 Hz. Ductwork should be connected to the fans using flexible connectors.

4.7 The proposed roof construction is solid concrete, with suspended ceilings below. We recommend that the concrete is minimum 150 mm thick to provide sufficient airborne sound insulation performance to meet the internal noise limits stated in Table 2.

5.0 SUMMARY AND CONCLUSIONS

5.1 Hepworth Acoustics has undertaken a noise assessment for the proposed residential development on land adjacent to No. 1 St Johns Wood Park, London NW8 6QS.

5.2 A noise survey has been undertaken at the site and daytime and night-time noise levels have been determined.

5.3 The results of the noise survey demonstrate that the proposed development site is exposed to modest levels of noise.

5.4 Appropriate acoustic design criteria for the development have been adopted from BS8233: 2014, which will protect the amenity of the new residents. Based on an assessment of the noise survey results, it is considered that no specific noise mitigation measures are necessary at the proposed development in order to achieve the adopted acoustic design criteria.

5.5 Noise limits for the proposed rooftop heat pumps have been set based on complying with Camden Council's noise requirements, and outline noise mitigation measures have been provided to allow compliance.

5.6 By following the recommendations in this report, we anticipate that the development will satisfy the Local Authority's requirements for noise.

Figure 1 – Site plan

Figure 2 – Site layout to show building line

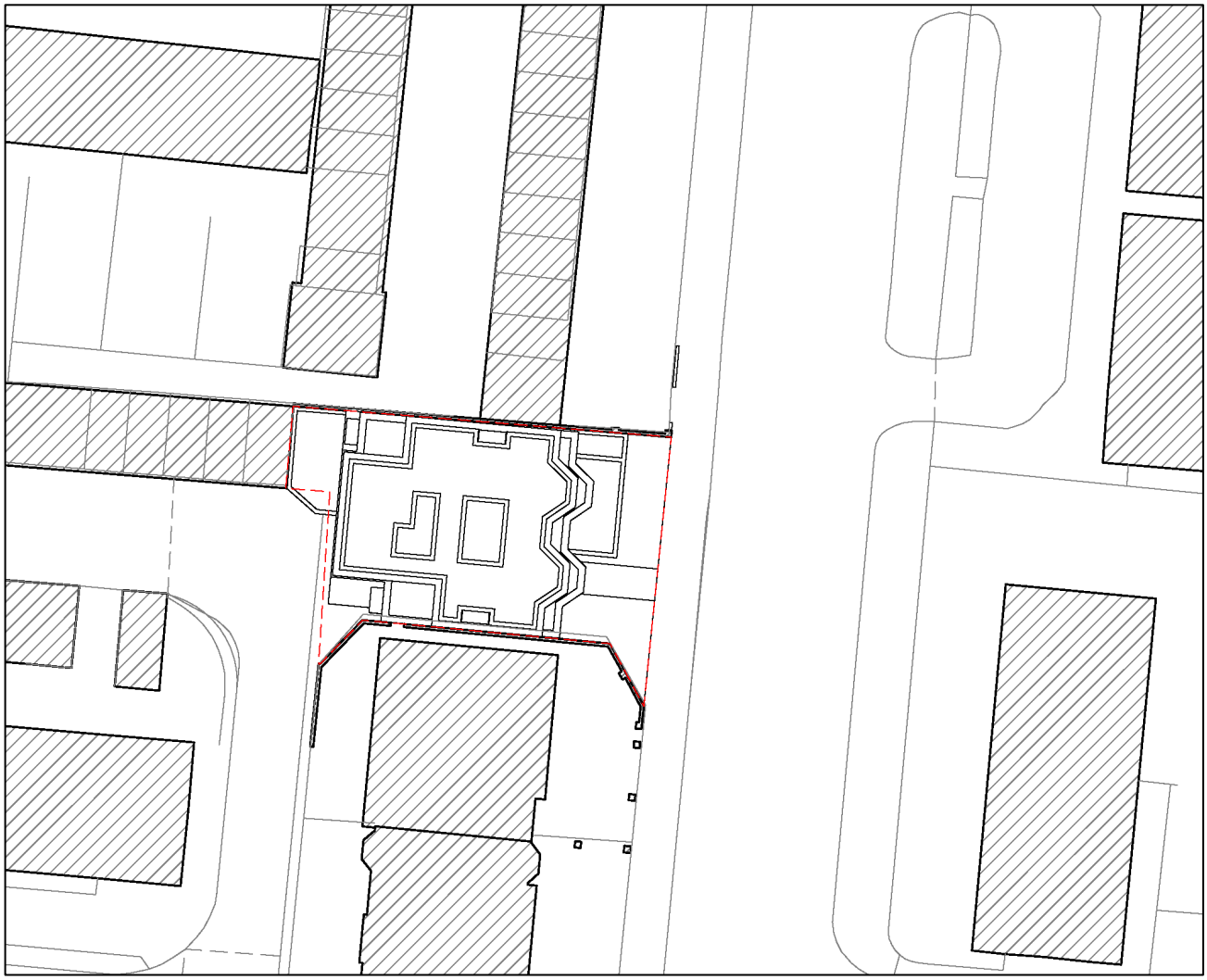

Figure 3 – 3D render of proposed building

Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

L_{Aeq} This is the A–weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, L_{Aeq} is the level of a continuous noise which has the same total (A–weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

L_{Amax} This is the maximum A-weighted noise level that was recorded during the monitoring period.

L_{A90} This is the A–weighted noise level exceeded for 90% of the time period. L_{A90} is used as a measure of background noise.

L_W This is the sound power level of a sound source, in decibels, which is 10 times the logarithm to the base 10 of the ratio of sound power radiated by the source to a reference power. The reference power is 1 picowatt (1×10^{-12} watt). The sound power level is the fundamental measure of the total sound energy radiated by a source per unit time.

Appendix II: Noise Survey Results

Equipment: Brüel & Kjær 2250 Type 1 Sound Analyser (serial no. 3011626) fitted with a windshield.

Weather: Dry, mild, wind speed below 5 m/s.

All levels in dB re 20 µPa.

Location 1