

Architectural & Environmental Acousticians Noise & Vibration Engineers

NOISE IMPACT ASSESSMENT

OMNI HOUSE, 252 BELSIZE RD, NW6 4BT

SILVERSTONE PROPERTIES LIMITED

RP01-17338

## NOISE IMPACT ASSESSMENT

PROJECT:	OMNI HOUSE, 252 BELSIZE RD, NW6 4BT
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## 1. INTRODUCTION

- 1.1 Cass Allen Associates has been instructed by Silverstone Properties Limited to assess the noise impact of a proposed consolidation of mechanical plant systems at Omni House, 252 Belsize Rd, NW6 4BT in London.
- 1.2 The assessment has been carried out in accordance with relevant local and national planning guidance.
- 1.3 The aims of the assessment were to assess the potential impact of noise emissions from the proposed mechanical plant at the positions of existing sensitive receptors in the area.
- 1.4 This report contains technical terminology; a glossary of terms can be found at <u>www.cassallen.co.uk/glossary</u>.



## 2. PROJECT DESCRIPTION

- 2.1 The proposal is to consolidate the mechanical plant systems serving Omni House, 252 Belsize Road, NW6 4BT.
- 2.2 There are currently 32 condenser units which serve the site, many of which are old and approaching the end of their usable life. The intention is to remove the 32 existing units and replace them with 8 modern, high specification units.
- 2.3 The existing units are located in a courtyard area to the rear of the site; the proposal is to remove the existing metal platforms supporting the existing plant and locate the proposed units behind a new lower roof and raised parapet. The proposed roof and parapet will provide acoustic screening to the units and improve the visual appearance of the plant area.
- 2.4 The nearest residential receptor locations to this location are the two buildings directly to the south of the site which form part of the perimeter of the courtyard area. These buildings are understood to be used as short stay serviced apartments.
- 2.5 An annotated aerial photo of the site is shown in Figure 1 below.



#### Figure 1 Annotated Aerial Photo



## 3. PLANNING POLICY

#### **National Policy**

3.1 Outline guidance for the assessment of noise affecting new developments is given in the National Planning Policy Framework (NPPF). Section 109 of the NPPF states:

The planning system should contribute to and enhance the natural and local environment by...preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of...noise pollution.

and in section 123:

Planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce... other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- 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;
- and identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

#### Local policy

3.2 Camden Council's Policy A4 given in the Camden Local Plan (June 2017) states:

The Council will seek to ensure that noise and vibration is controlled and managed.

Development should have regard to Camden's Noise and Vibration Thresholds (Appendix 3). We will not grant planning permission for:

a. development likely to generate unacceptable noise and vibration impacts; or

*b.* development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.

We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development.

3.3 To address the requirements of the national and local policies, the impact of noise emissions from the proposed plant at the positions of existing sensitive receptors in the area has been assessed.



## 4. PLANT NOISE IMPACT ASSESSMENT

#### Design criteria – Mechanical plant noise

- 4.1 BS4142:2014 *Methods for rating and assessing industrial and commercial sound* (BS4142) can be used to assess the impact of noise from external industrial and/or commercial noise sources on nearby sensitive receptors.
- 4.2 The BS4142 assessment methodology can be summarised as follows:
  - Measure the existing background noise levels (LA90,T dB) at the locations of nearby noise sensitive receptors during the quietest periods when the noise source(s) under investigation will operate;
  - Predict or measure the noise emissions (LAeq,T dB) from the noise source(s) under investigation at the location(s) of the nearby sensitive receptors, including corrections for any distinguishable acoustic features (e.g. tones, whines, screeches, hisses etc);
  - 3. Subtract the measured background noise levels (item 1 above) with the measured or predicted rating noise levels (item 2 above) at each sensitive receptor. BS4142 states that:
    - a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) 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.

NOTE 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.

- 4.3 It is understood from guidance given in the document 'Camden Development Policies 2010-2025' that Camden Council consider a criterion of '10 dB below background' to be appropriate for any noise which does not have distinctive acoustic characteristics. It is also understood that a criterion of '15 dB below background' should be adopted for any mechanical plant which generates either tonal or impulsive noise.
- 4.4 In this case, the new plant items proposed are new air handling units which are not expected to generate tonal or impulsive noise. Therefore, a criterion of '10 dB below background' has been adopted for this assessment.
- 4.5 Background noise levels (LA90) at the site were measured as part of the site noise survey outlined in Appendix 1.



- 4.6 It can be seen from the measured noise levels shown in Appendix 1, Figure 2 that there was significant variation in the background noise levels during the night time period. This was investigated further and found to be the result of a condenser unit in close proximity to the measurement position operating intermittently. The lower range of measured noise levels have been taken to be representative of the background noise levels during the night time.
- 4.7 The measurement position was at the western end of the courtyard area to the rear of Omni House. This location was chosen because it was acoustically screened from the majority of the existing plant items.
- 4.8 A photograph of the measurement position is given in Figure 2 and a photograph of the principal plant area to the east of the courtyard area is shown in Figure 3.



#### Figure 2 Measurement Position





#### Figure 3 Principal Plant Area (Existing)

4.9 The existing condensers have been in situ for in excess of 17 years and are considered to be part of the existing acoustic environment at the site. BS4142 states the following regarding existing commercial noise sources:

. . . 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.

- 4.10 In this instance however, the circumstances are slightly more complex as the proposed plant items will replace the existing plant items; in other words, although the existing plant items constitute part of the existing noise environment and contribute to current background noise levels, they will not be present if the proposed development goes ahead.
- 4.11 In light of the above, it is considered appropriate to assess the noise impact of the proposed mechanical plant noise emissions by comparing the resultant change in mechanical plant noise levels in the courtyard. A decrease in noise levels would be a net benefit of the proposals.
- 4.12 For completeness, the impact of the noise has also been assessed in accordance with BS4142 based on background noise levels in the absence of noise emissions from the existing plant. However, due to the existing plant items often dictating the noise environment within the courtyard, this assessment is likely to overestimate the impact of the proposed plant items, given that it does not factor in noise generated by existing plant items.
- 4.13 The assessment of noise emissions from the proposed mechanical plant design (discussed in detail below) is based on all the proposed units operating at full load capacity. Therefore, to provide a fair



comparison, noise emissions from the existing units have also been calculated based on all the units operating at full load capacity.

- 4.14 During the attended survey only a small number of units were operational. Nearfield measurements were taken of one of the smaller single fan Daikin condenser units and seen to be 67 dB LAeq,T at a distance of half a metre. Given that it was not possible to measure noise emissions from all the exiting units, it has been assumed that noise emissions from this unit is representative of noise emissions from all the existing condensers. This is a conservative assumption given that a number of the existing condensers are significantly larger than the unit measured.
- 4.15 A 3D noise model was constructed of the existing plant design based on the development layout and noise emissions from the existing units measured during the site survey. Full details of the noise modelling process are given in Appendix 2.
- 4.16 Based on the above, noise emissions from the existing plant at the location of the worst affected receptor position was predicted to be 61 dB LAeq,T.
- 4.17 The measured background noise levels have been used to develop limits for plant noise emissions from the new development at the positions of the surrounding residential properties in accordance with the BS4142 assessment methodology (excluding noise from existing plant). The limits are shown in Table 1 below. It is noted that the calculated BS4142 noise limits are very low due to the location being acoustically screened from nearby transport noise sources.

Table 1	BS4142 Noise	Limits - I	Free-field Lev	vels
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Location	Period				
	Day-time/Evening (0700- 2300hrs)	Night-time (2300-0700hrs)			
Nearest residential property to mechanical plant	35 dB LAeq	27 dB LAeq			

#### Proposed mechanical plant design

- 4.18 The consolidated mechanical plant items proposed are as follows:
  - 1 x REYQ8T Daikin Condenser Unit
  - 1 x REYQ10T Daikin Condenser Unit
  - 1 x REYQ12T Daikin Condenser Unit
  - 1 x REYQ16T Daikin Condenser Unit
  - 2 x REYQ18T Daikin Condenser Unit
  - 2 x REYQ20T Daikin Condenser Unit
- 4.19 Manufacturer noise emission data for the above units is given in Appendix 3 to this report.
- 4.20 The location of the proposed units is shown in Figure 4 below. It can be seen from this diagram that the proposed units will be located behind a masonry wall which will provide acoustic screening between the units and the receptor positions.







4.21 The 3D noise model was used to predict noise emissions from the proposed plant at the locations of surrounding noise sensitive positions. The predictions assumed that all plant items were running simultaneously. The results of the predictions are shown in Table 2.

Table 2	Predicted Plant Noise Emissions from New Building - Free-field Levels

Location	Predicted Plant	Predicted Plant Noise Levels (existing plant) (LAeq)	BS4142 Criteria (LAeq)		
	Noise Levels (proposed) (LAeq)		Day-time/Evening (0700-2300hrs)	Night-time (2300- 0700hrs)	
Nearest residential property to mechanical plant	50 dBA	61 dB	35 dBA	27 dBA	

- 4.22 It can be seen from Table 2 that the predicted plant noise level at the nearest existing residential property is higher than the day and night-time BS4142 noise criteria, but lower than the predicted noise emissions from the existing plant items.
- 4.23 This is considered acceptable for the following reasons:
  - The proposed plant is significantly quieter than the existing plant and therefore can be considered a planning gain. A 10 dB decrease is generally considered to be a halving in subjective loudness.
  - The assessment assumes that all mechanical plant will be operational at once. This is unlikely to occur in practice; for example during the attended survey only two of the



existing thirty-two condenser were operational. Therefore, the noise levels likely to exist at the noise sensitive receptor positions are likely to be must lower than indicated for the majority of the time.

- As mentioned previously, the BS4142 assessment is based on background noise levels in the absence of the existing mechanical plant and is therefore likely to be an overestimation the impact of the proposed mechanical plant. This is because mechanical plant noise is an established part of the acoustic environment present at the site.
- 4.24 In light of the above, it is our view that the proposed consolidation of the mechanical plant systems at Omni House is acceptable from an acoustic perspective.



## 5. CONCLUSIONS

- 5.1 Cass Allen Associates was instructed by Silverstone Properties Limited to assess the suitability of the proposed consolidation of mechanical plant systems at Omni House, 252 Belsize Road, London from an acoustic perspective.
- 5.2 The assessment was carried out in accordance with relevant local and national planning guidance.
- 5.3 A noise survey was carried out at the site. Noise levels at the proposed location of the proposed plant were seen to be relatively quiet in the absence of noise emissions from the existing mechanical plant.
- 5.4 Noise emissions from the proposed mechanical plant were calculated and compared to noise emissions from the existing mechanical plant.
- 5.5 The predicted noise levels from the proposed plant are significantly lower than the predicted noise emissions from the existing plant. The proposed consolidation of plant items therefore represents a reduction in noise emissions.
- 5.6 In summary of the above it is our view that the proposed consolidation of mechanical plant systems is acceptable in terms of noise and vibration levels.

## Appendix 1 Survey Results

Survey Summary:	The survey comprised short-term operator attended noise measurements and longer-term unattended noise monitoring at the site. Noise levels at the site were generally dictated by road traffic on surrounding roads and noise emissions from the existing plant items.
Survey Period:	27/09/2017 to 29/09/2017
Survey Objectives:	<ul> <li>To identify noise sources that contribute to ambient noise levels at the site;</li> <li>To measure background noise levels at the site over a typical day and night-time period.</li> </ul>

Equipment Used (Appendix 1, Table 1):

Туре	Manufacturer	Model	Serial Number	
Sound level meter <sup>1</sup>	Bruel & Kjaer	2260	2217601	
Calibrator	Bruel & Kjaer	4231	2115551	
Sound level meter <sup>1</sup> (noise logger)	Rion	NL-32	00530374	
Note 1: All sound level meters were calibrated before and after measurement periods and no significant				

drift in calibration was found to have occurred. The results of the measurements are therefore considered to be representative.

#### Weather Conditions:

The observed weather conditions were acceptable for acoustic measurement throughout the attended survey periods (low-medium wind speeds and no rain). Weather records for the area confirmed that weather conditions were also generally acceptable for acoustic measurement during the unattended monitoring.

#### Measurement Positions (Appendix 1, Table 2):

Position (refer plan below)	Description
N1	Nearfield measurement of Daikin condenser unit, 0.5 metre distance
N2	Nearfield measurement of Daikin condenser unit, 0.5 metre distance
L1	Unattended noise logging position. 1.5 m above mezzanine roof level. Free-field.



#### Attended Noise Monitoring Results (Appendix 1, Table 3):

Date	Position	Time	Meas. Length	LAeq, dB	LAmax, dB	LA90, dB	Observations
27.09.17	N1	11:17	2 mins	68	70	67	Noise dictated by condenser unit
12.01.14	N2	11:30	1 min	67	68	66	Noise dictated by condenser unit

#### Unattended Noise Monitoring Results (Appendix 1, Table 4):

Meas. Period	Position	Daytime (07	700-2300hrs)	Nigh	t-time (2300-070	0hrs)
		LAeq,16hr, dB	LA90,1hr dB1	LAeq,8hr, dB	LA90,5mins, dB¹	LAmax, dB <sup>2</sup>
27.09.17 to 29.09.17	L1	52	45	45	43	62

**Note 1:** Typical lowest measured during the period shown.

Note 2: Highest typical maximum noise level during the night-time (not exceeded more than 10-15 times per night).

Unattended Noise Monitoring Results (Appendix 1, Figure 2):



# Appendix 2 3D Noise Modelling

Modelling Software:	CADNA/A 2017			
Modelled Scenarios:	Mechanical plant noise emissions from the existing mechanical plant systems Mechanical plant noise emissions from the proposed mechanical plant systems			
Data inputs:	<ul> <li>Manufacturer noise data for proposed plant</li> <li>Measured noise data for existing plant</li> <li>Development layout</li> </ul>			
Calculation Algorithms Used:	<ul> <li>ISO 9613-1:1993 Acoustics-Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere</li> <li>ISO 9613-2:1996 Acoustics-Attenuation of sound during propagation outdoors – Part 2: General method of calculation</li> </ul>			

Modelling Printout (Appendix 2, Figure 1):





Modelling Printout (Appendix 2, Figure 2):



Notes : 1. dBA = A-weighted sound power level (A scale according to IEC). 2. Reference acoustic intensity 0dB =  $\cdot 10E - 6\mu W/m^2$ . 3. Measured according to ISO 3744

3D079537B



Notes : 1. dBA = A-weighted sound power level (A scale according to IEC). 2. Reference acoustic intensity 0dB =  $\cdot 10E \cdot 6\mu W/m^2 \cdot$ 3. Measured according to ISO 3744

3D079908B



Notes : 1. dBA = A-weighted sound power level (A scale according to IEC).

2. Reference acoustic intensity 0dB = ·10E-6μW/m<sup>2</sup>.
 3. Measured according to ISO 3744

3D079909B



Notes :

1. dBA = A-weighted sound power level (A scale according to IEC).

2. Reference acoustic intensity 0dB =  $\cdot 10E - 6\mu W/m^2 \cdot$ 3. Measured according to ISO 3744

#### 3D079911B





Notes : 1. dBA = A-weighted sound power level (A scale according to IEC). 2. Reference acoustic intensity OdB =  $\cdot$ 10E-6µW/m<sup>2</sup>.

3. Measured according to ISO 3744

3D079912B



Notes : 1. dBA = A-weighted sound power level (A scale according to IEC). 2. Reference acoustic intensity 0dB =  $\cdot$ 10E-6 $\mu$ W/m<sup>2</sup>·

3. Measured according to ISO 3744

3D079913B

