HEPWORTH
ACOUSTICS
Noise and Vibration Consultants

**ROKEBY HOUSE, LONDON WC1N**

**NOISE ASSESSMENT OF PROPOSED AIR CONDITIONING CONDENSER**

**On behalf of:**
**AHP Architects & Surveyors Ltd**

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# ROKEBY HOUSE, LONDON WC1N

## NOISE ASSESSMENT OF PROPOSED AIR CONDITIONING CONDENSER

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## 1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd has been commissioned by AHP Architects & Designers Ltd to carry out a noise impact assessment of the proposed air conditioning condensers at Rokeby House, Lamb's Conduit Street, London WC1N 3LX.

1.1 The assessment is required in connection with the planning application for the proposed plant in line with the requirements of London Borough of Camden.

1.2 This assessment has considered the most noise-sensitive time during the proposed operational period of the plant.

1.3 The assessment has included:

- A site inspection to identify the location of the nearest residence;
- A background noise survey at a location representing the nearest noise sensitive window;
- An assessment of the noise impact from proposed plant at the nearest noise sensitive window; and
- Outline recommendations for noise control measures where necessary.

1.4 Noise levels referred to in the text of this report have been rounded to the nearest decibel, as fractions of decibels are imperceptible. A description of noise units and noise characteristics is provided in Appendix I.

## 2.0 SITE DESCRIPTION

2.1 Rokeby House is located on the junction between Lamb's Conduit Street and Long Yard. The building is approximately T shaped in plan, with the part overlooking Lamb's Conduit Street extending to 4th floor level and the other extending to 3rd floor level. The building is mainly occupied by residential properties, with the exception of part of the ground floor level which is occupied by a restaurant.

2.2 The proposal is for a new roof-level penthouse extension, which will be serviced by a new air conditioning system of which the condenser is proposed to be installed on the roof of the proposed extension, attached to the existing Tank Room.

2.3 The surrounding area is residential and commercial in use. The nearest sensitive properties to the proposed condenser are at 4th floor of Rokeby House, of which some are approximately 5m from the proposed condenser, although screened by the Tank Room.

2.4 We have been informed by the client that the proposed condenser item is a Mitsubishi PUHZ-W50VHA. Manufacturer's noise data is referenced on the manufacturer's technical manual to be 45 dB(A) sound pressure level at 1m.

2.5 It is anticipated that the proposed condenser will have the potential to operate at any time of day or night.

## 3.0 BACKGROUND NOISE SURVEY

3.1 Background noise levels at the site were measured on the 4th floor flat roof at a location representative of the nearest dwellings, at the location shown in Figure 1.

3.2 Continuous noise monitoring was undertaken over 24 hours from 1130 hours on Thursday 29 March 2012. Noise levels were measured in sequential fifteen-minute sample periods for the entire duration of the survey.

3.3 The continuous noise monitoring was carried out using a Rion NL-31 Type 1 sound level meter (serial no. 01120844). The calibration level of the meter was checked before and after the surveys with a Bruel & Kjaer Type 4203 sound calibrator (serial no. 2528310) with no variation in level observed. All noise measurements were recorded with the microphone fixed on a tripod at a height of approximately 1.5m above ground level in free-field conditions. A windshield was fitted to the microphone during all noise measurements.

3.4 The weather conditions throughout the survey were dry, with little or no wind.

3.5 The noise survey results are detailed in Appendix II and are summarised in Table 1 below:

**Table 1 – Summary of measured background noise levels (dB)**

| Date | | Noise level | | |
|---|---|---|---|---|
| | | $L_{Amax}$ | $L_{Aeq}$ | $L_{A90}$ |
| 1130 hrs Thursday 29 March 2012 – 1130 hrs Friday 30 March 2012 | Range | 54-84 | 43-60 | 41-54 |
| | Mean | 73 | 54 | 49 |

3.6 The measured noise levels were influenced by local road traffic, aircraft and plant associated with other properties.

3.7 The lowest background noise level measured during the survey was 41 dB $L_{A90}$.

## 4.0 ACOUSTIC CRITERIA

4.1 A copy of Table E of Appendix 2 of the London Borough of Camden Unitary Local Development Framework, Pre-adoption version September 2010, which establishes noise levels from plant and machinery at which planning permission will not be granted, is presented in Table 2 below:

**Table 2 – Noise levels from plant and machinery at above which planning permission will not be granted (apart from residential includes offices, workshops and open spaces)**

| Noise description and location of measurement | Period | Time | Noise level |
|---|---|---|---|
| Noise at 1 metre external to a sensitive façade | Day, evening and night | 00:00-24:00 | 5dB(A)<$L_{A90}$ |
| Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade | Day, evening and night | 00:00-24:00 | 10dB(A)<$L_{A90}$ |
| Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade | Day, evening and night | 00:00-24:00 | 10dB(A)<$L_{A90}$ |
| Noise at 1 metre external to sensitive façade where $L_{A90}$>60dB | Day, evening and night | 00:00-24:00 | 55dB $L_{Aeq}$ |

4.2 The proposed units are not expected to have distinguishable discrete continuous notes nor distinct impulses. Thus, to comply with the Camden's policy, the $L_{Aeq}$ noise level from the proposed plant is required to be 5 dB below the lowest measured background noise level $L_{A90}$ of 41 dB, i.e. 36 dB $L_{Aeq}$.

## 5.0 NOISE ASSESSMENT

5.1 Noise level from the proposed condenser has been predicted at the nearest adjoining residential windows. This has been compared with the lowest measured $L_{A90}$ background noise to assess potential noise impact in accordance with the Local Authority's criterion.

5.2 Predicted condenser noise level takes account of attenuation provided by distance, i.e. 5m, screening by the intervening building, assumed to be a conservative 5 dB, and a +3 dB correction for reflections from the building facade.

5.3 The calculation of the predicted condensers noise level at the nearest noise sensitive location is set out in Table 3.

**Table 3: Calculation of proposed condenser noise level at nearest sensitive location**

| | |
|---|---|
| A) Sound pressure level @ 1m | 45 dB(A) |
| B) Distance | 5 m |
| C) Distance attenuation = 20*log(B/1) | 14 dB |
| D) Screening from intervening structures | 5 dB |
| E)Facade reflection | 3 dB |
| Noise level at residential (=A-C-D+E) | 29 dB |

5.4 The predicted plant noise level at the nearest residential window is 29dB $L_{Aeq}$, which is 12 dB below the lowest measured background noise level $L_{A90}$ of 41dB.

5.5 Therefore, the predicted plant noise level will be in compliance with the London Borough of Camden's criteria.

## 6.0 SUMMARY AND CONCLUSIONS

6.1 This report has assessed the noise impact of the proposed condenser unit at Rokeby House, Lamb's Conduit Street, London WC1N 3LX.

6.2 A site noise survey has been undertaken at a location representing the nearest residences.

6.3 The predicted noise level from the proposed condenser has been assessed at the nearest residential windows.

6.4 The predicted plant noise level has been compared with the lowest measured background noise level to assess compliance with London Borough of Camden acoustic criteria.

6.5 The assessment has demonstrated compliance with the London Borough of Camden's criteria.

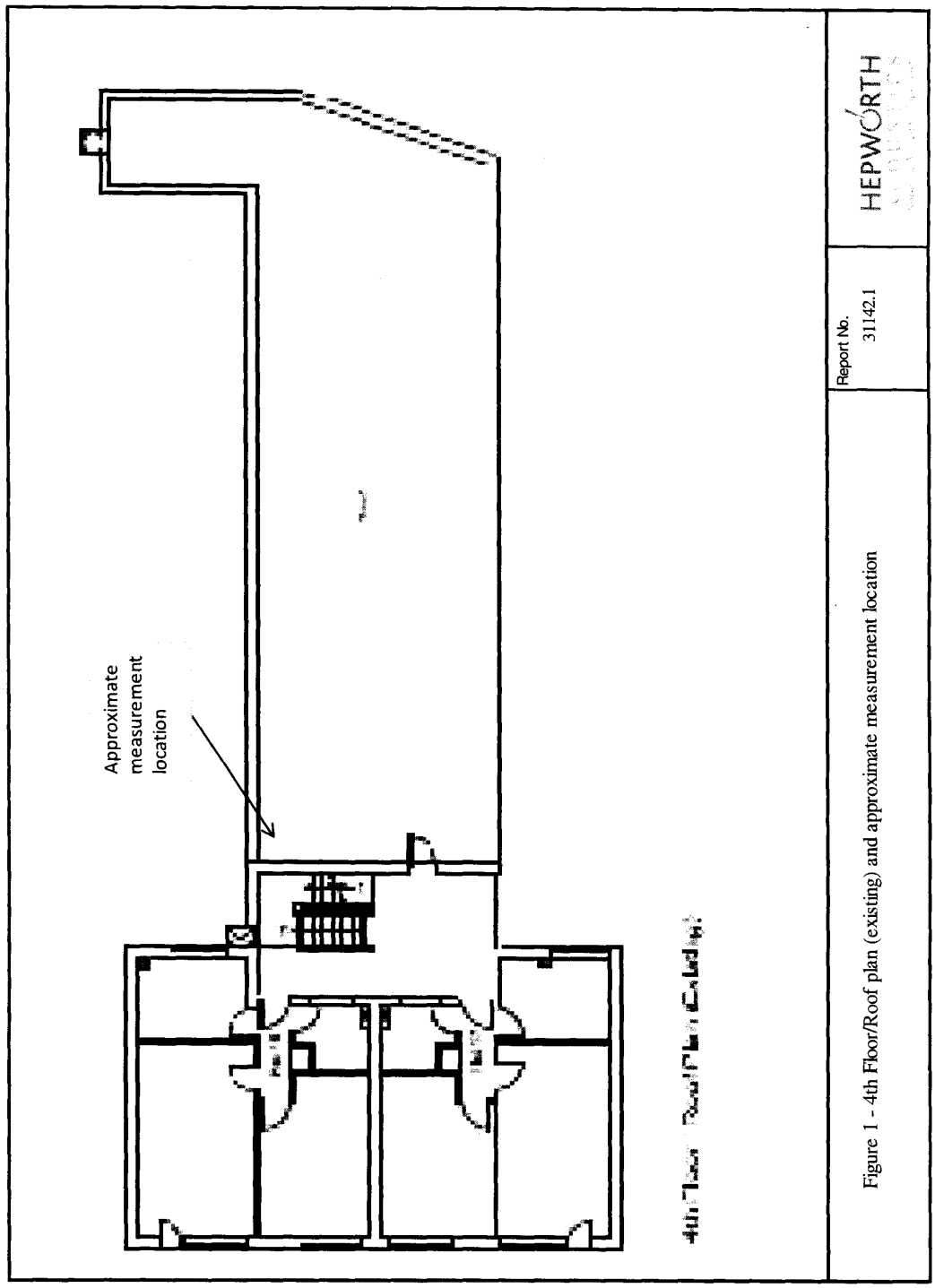


Figure 1 - 4th Floor/Roof plan (existing) and approximate measurement location

## Appendix I – Noise units and indices

### a) Sound Pressure Level and the decibel (dB)

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).

### b) 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 20,000 Hz. However, the upper frequency limit gradually reduces as a person gets older.

### c) Glossary of Terms

When a noise level is constant and does not fluctuate over time, 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, including statistical parameters, are 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, LAeq 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.

**Appendix II – Results of noise surveys**

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| Dates: | Thursday 29 – Friday 30 March 2012 |
| Equipment: | Rion NL-31 Type 1 integrating sound level meter |
| Weather: | Dry with little or no wind. |