auricl
acoustic consulting

26 Rosslyn Hill

London

Plant Noise Assessment

4 May 2022

For

Dynamic Energy Assessors

Contents

SUMMARY

A new air source heat pump is proposed as part of the redevelopment of 26 Rosslyn Hill, London into a residential property.

The local authority, Camden Council, has requirements in relation to building services noise emissions affecting noise sensitive properties.

auricl have been commissioned to undertake a noise assessment of the proposed plant in relation to the Camden Council requirements.

A noise limit has been proposed for external plant noise, based on the typical measured background noise level and the Camden Council requirements.

Results of the assessment indicate that the required noise limit should not be exceeded, thereby complying with the Camden Council requirements.

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1.0 Introduction

A new air source heat pump is proposed at 26 Rosslyn Hill in London.

The local authority, Camden Council, has requirements in relation to building services noise emissions affecting noise sensitive properties.

auricl has been commissioned to undertake a noise assessment of the proposed plant in relation to the Camden Council requirements.

This report presents the methodology and results of a noise survey to determine background noise levels that are representative of the nearest noise sensitive property, as well as an assessment of external noise from building services.

This report is technical by nature, therefore a glossary of acoustic terms is included in Appendix A.

2.0 Description of Site

The site is located at 26 Rosslyn Hill in Hampstead, London and is bounded by residential properties to on the north, south and east, and a disused police station to the west.

The development consists of the redevelopment of the existing grade II listed building into a residential purpose, which includes the instillation of an air source heat pump on a first-floor level roof.

Figure 2.1 shows the approximate site extent in **red** and surrounding properties with the approximate location of the proposed air source heat pump shown in **green**.

Figure 2.1 Site Extent and Surroundings

3.0 Camden Council Requirements

Camden Council's standard requirements for external building services noise emissions are understood to be as follows:

"Prior to commencement of the development, details shall be submitted to and approved in writing by the Council, of the external noise level emitted from plant/machinery/equipment and mitigation measures as appropriate. The measures shall ensure that the external noise level emitted from plant, machinery/ equipment will be lower than the lowest existing background noise level by at least 10dBA, by 15dBA where the source is tonal, as assessed according to BS4142:2014 at the nearest and/or most affected noise sensitive premises, with all machinery operating together at maximum capacity.

We have considered the above requirements in our measurement methodology and assessment.

4.0 Noise Survey

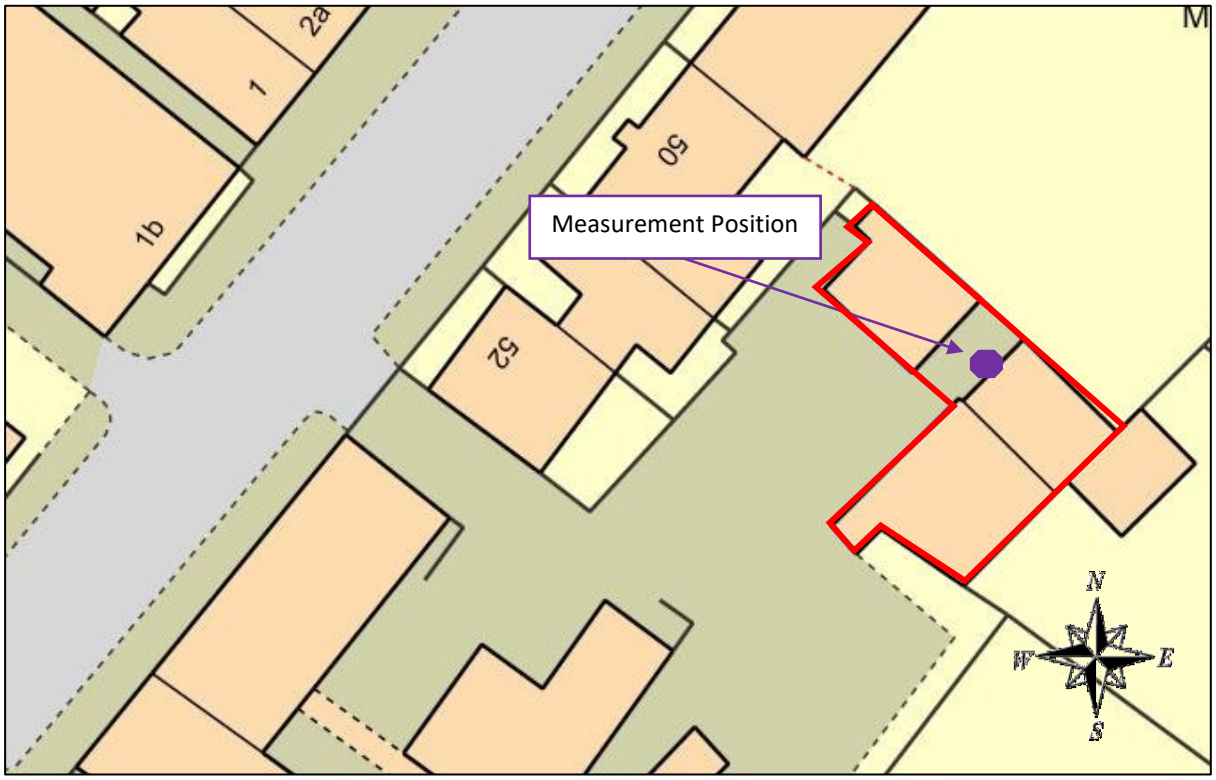
4.1 Methodology

An unmanned noise survey was carried out over a 3-day period between Friday 22 April 2022 and Monday 25 April 2022 to determine existing background noise levels at a position representative of the nearest noise sensitive properties.

The measurement microphone was positioned out a window on the first floor of the existing building, and approximately 1m from the nearest façade. The measurement position is considered to be representative of noise levels at the nearest noise sensitive property to the proposed external plant, which is considered to be the residential dwelling at 50 Downshire Hill to the north.

The approximate location of the measurement position is indicated on Figure 4.1 in **purple**.

Figure 4.1 Site Plan Indicating Noise Measurement Position



The equipment used for the noise survey is summarised in Table 4.1.

Table 4.1 Description of Equipment used for Noise Survey

Item	Make & Model	Serial Number
Type 1 automated logging sound level meter	01dB Fusion	12032
Type 1 ½" microphone	GRAS 40CE	330829
Calibrator	01 dB CAL21	87267

L_{Aeq} and L_{A90} sound pressure levels were measured throughout the noise survey over contiguous 15-minute intervals.

The noise monitoring equipment was calibrated before and after the survey. No significant change was found. Laboratory equipment calibration certificates can be provided upon request.

Due to the nature of the noise survey, i.e. unmanned, we are unable to comment on the weather conditions throughout the entire noise survey period, however at the beginning and end of the survey period, there was noted to be no rainfall, a clear sky and only light wind. These conditions are understood to be representative of the survey period and are considered appropriate for undertaking environmental noise measurements.

4.2 Results & Observations

Appendix B presents a time history graph showing the L_{Aeq} and L_{A90} sound pressure levels measured throughout the noise survey.

As the measurement microphone was located within 1m of an existing façade, the measurement results have been corrected by -2 dB to represent free-field conditions, as is standard practice in accordance with BS 8233 and BS 4142.

We would consider the levels measured to be reasonable, taking into account the location of the measurement position and the dominant nearby noise sources.

The lowest background noise levels measured during the noise survey, corrected to free-field, are presented in Table 4.2.

Table 4.2 Typical Background Noise Levels Measured

Daytime (07:00 – 23:00) Typical $L_{A90\ (1hour)}$ Background Noise Level (dB)	Night-time (23:00 – 07:00) Typical $L_{A90\ (15min)}$ Background Noise level (dB)
34	30

5.0 Plant Noise Assessment

This section presents our assessment and calculations of noise emissions associated with the proposed air source heat pump, in relation to the Camden Council requirements.

5.1 Proposed Plant

The proposed external air source heat pump is understood to be a Mitsubishi Ecodan R32 PUZ-WM60VAA(-BS).

The maximum operational sound power level of the unit is 58 dB L_{wA} (based on manufacturer's datasheet).

Noise from the unit is not expected to contain any tones or any impulsive characteristics.

The proposed air source heat pump will be located externally at first floor level.

The proposed air source heat pump is to be screened by a full height 50mm solid acoustic screen, so that there is no visual or acoustic line of sight between source and receive, as well as an acoustically absorptive lining on the building façade to attenuate acoustic reflections. The proposed location of the unit is indicated on Figure 2.1.

5.2 Plant Noise Limits

Noise from the air source heat pump is not expected to contain any tones or any impulsive characteristics, therefore the emitted noise level is required to be at least 10 dB L_{A90} less than the background noise level, at the nearest neighboring residential property.

We have considered the nearest neighboring residential property to be the dwelling at first floor level at 50 Downshire Hill, with the nearest windows located at first-floor level at a distance of approximately 20m from the proposed air source heat pump.

Based on the lowest measured background noise levels, and the above Camden Council requirements, the plant noise limits for daytime and night-time periods are presented in Table 5.1.

Table 5.1 Plant Noise Limits

Nearest Noise Sensitive Receptor	Plant Noise Limit $L_{Aeq,T}$ (dB)	
	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
50 Downshire Hill	24	20

5.3 Assessment

Our calculations to predict the air source heat pump noise level at the nearest noise sensitive windows are presented in Table 5.2.

Table 5.2 Plant Noise Calculation Results

Element	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Sound Power Level of Unit	58	58
Screening Attenuation	-5	-5
Distance Attenuation	-34	-34
Calculated Sound Pressure Level at Nearest Noise Sensitive Property	**19**	**19**
Noise Limit	**24**	**20**
Difference	**-5**	**-1**

It can be seen that the predicted plant noise level at the nearest noise sensitive window does not exceed the plant noise limits during daytime and night-time periods, in accordance with Camden Council's requirements.

Appendix A – Acoustic Terminology

Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing ($20x10^{-6}$ Pascals).
Sound Pressure Level (L_p)	The sound pressure level is the sound pressure fluctuation caused by vibrating objects relative to the threshold of hearing.
A-weighting (L_A or dBA)	The sound level in dB with a filter applied to increase certain frequencies and decrease others to correspond with the average human response to sound.
L_{Amax}	The A-weighted maximum noise level measured during the measurement period.
$L_{Aeq,T}$	The A-weighted equivalent continuous noise level over the time period T (typically T= 16 hours for daytime periods, T = 8 hours for night-time periods). This is the sound level that is equivalent to the average energy of noise recorded over a given period.
$L_{A90\ (15\ min)}$	The noise level exceeded for 90% of the time (also referred to as the background noise level), measured over a 15-minute period

Appendix B – Time History Graph