



**12 Queensmead
St John's Wood**

Plant Noise Assessment Report

30 September 2022

For
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SUMMARY

Two new air source heat pumps are proposed at 12 Queensmead in St John's Wood.

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

auricl has undertaken a noise assessment of the proposed plant, in relation to the Camden Council requirements.

Noise limits have been proposed for the new air source heat pumps, based on the measured background noise levels.

Our calculations indicate that noise emissions associated with the proposed air source heat pumps should not exceed the noise limits.

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1.0 Introduction

Two new air source heat pumps are proposed at 12 Queensmead in St John's Wood 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 carry out 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 acoustic assessment of the proposed plant.

The report is technical in nature, and as such, a summary of noise units and acoustic terminology are included in Appendix A for reference.

2.0 Description of Site and Proposals

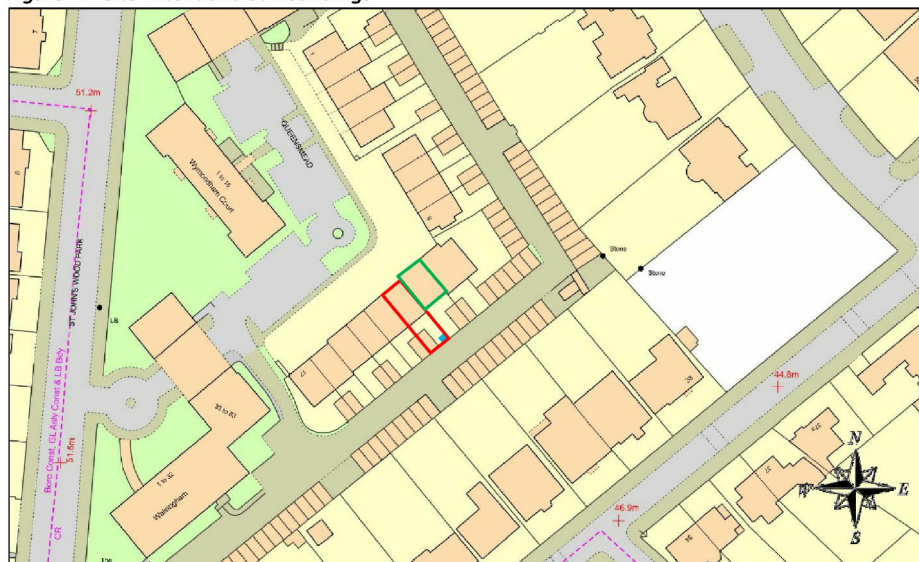
The site is located at 12 Queensmead towards the south-east of the Queensmead development in St John's Wood in London in a residential area.

Two air source heat pumps are proposed at the south-eastern end of the rear garden.

The nearest noise sensitive property to the proposed air source heat pumps is the adjacent residential property to the north-east at 11 Queensmead.

Figure 2.1 shows the approximate site extent in **red** and surrounding properties, with the approximate proposed location of the air source heat pumps indicated in **blue**, and the nearest noise sensitive property in **green**.

Figure 2.1 Site Extent and Surroundings



The proposed air source heat pumps unit will serve a residential property and therefore have the potential to operate at any time of the day or night.

3.0 Camden Council Requirements

Camden Council typically requires that the Rating Level for fixed external plant (determined in accordance with BS 4142), including any character corrections for tonality, impulsivity etc. are controlled to a level at least 10 dB less than the lowest measured L_{A90} background noise level (15 dB if tonal components are present) at a distance of 1m external to nearest noise sensitive premises.

The latest version of this standard, BS 4142: 2014+A1: 2019, provides guidance on the rating of noise from fixed installations and sources of a commercial nature. The standard provides a procedure for the measurement and rating of noise levels outside dwellings in mixed residential and commercial areas.

We have considered the above in our measurements and assessment, described in the following sections.

4.0 Noise Survey Methodology and Results

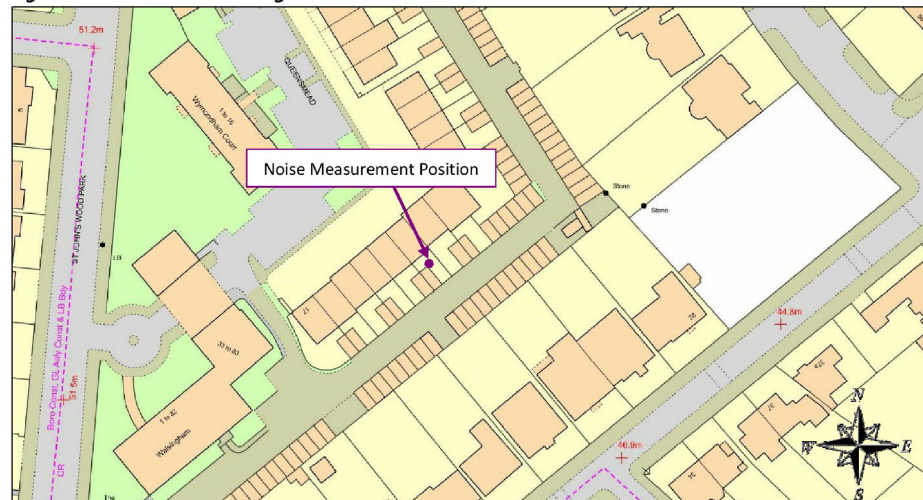
4.1 Methodology

An unmanned environmental noise survey was carried out over a 4-day period between Friday 9 September 2022 and Tuesday 13 September 2022 to determine existing background noise levels at a position considered to be representative of the nearest noise sensitive property during daytime and night-time, weekday and weekend periods when the proposed units are expected to be operational.

The measurement microphone was mounted in free-field on a tripod approximately 1.5m above the patio at the rear/south-east of 12 Queensmead. The measurement position is considered to be representative of the lowest background noise levels at the nearest noise sensitive property.

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

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	14145
Type 1 ½" microphone	GRAS 40CD	466815
Calibrator	01dB CAL31	87267

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

The noise monitoring equipment was calibrated before and after the survey. No significant change was found to have occurred.

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, cloudy conditions 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 period.

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 measured background noise level was 33 dB L_{A90} (1 hour) during the daytime and 28 dB L_{A90} (15 min) during the night-time.

Due to the nature of the unmanned noise survey, we are unable to comment on the exact noise climate throughout the entire survey period. However, at the beginning and end of the survey period, the daytime noise climate at the measurement position was dominated by distant road traffic using surrounding roads.

5.0 Plant Noise Assessment

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

5.1 Plant Noise Limit

Based on the measured background noise levels and the Camden Council requirements, the noise limit for the proposed plant would be 23 dB during daytime periods and 18 dB during night-time periods.

These are exceptionally low noise levels, therefore an alternative noise limit of 30 dB is proposed, based on the following:

- (a) A noise level of 30 dB at the nearest noise sensitive property would be no greater than the existing background noise level for much of the time. For example, the existing background noise level exceeded 30 dB for 95% of the daytime periods and 85% of the night-time periods.
- (b) The Camden Council plant noise requirement in Section 3.0 mentions BS 4142 – the latest version of this standard states that a noise level equal to the background noise level would be a “*low noise impact*” therefore the 30 dB limit would be unlikely to give rise to any complaints.
- (c) BS 8233: 2014 defines an acceptable noise level *inside* bedrooms of 30 dB. The proposed noise limit outside the nearest bedroom is 30 dB, which would reduce to approximately 20 dB inside the bedroom with an open window – this level is significantly less than the 30 dB limit recommended by BS 8233: 2014.
- (d) The noise level assessment will consider the manufacturer’s highest noise level i.e. worst-case, therefore there will be times when the noise level is lower.

The noise limit is to be achieved at the nearest noise sensitive property and applies to the total cumulative noise level with all relevant plant operating simultaneously.

5.2 Proposed Plant

The air source heat pumps are proposed at the south-eastern end of the rear garden of 12 Queensmead, as indicated on Figure 2.1.

The proposed units are Daikin Altherma 3 High Capacity Monobloc air source heat pumps and the manufacturer’s worst-case sound power level for each unit is stated as 62 dB L_{WA}.

The air source heat pumps are proposed in a sunken plant area at the south-eastern end of the rear garden of the property, to maximise distance and screening from the nearest noise sensitive properties.

In addition, the vertical surfaces of the sunken plant area around the air source heat pumps will be fitted with acoustically absorptive panels to reduce acoustic reflections.

The proposed unit is not expected to contain a tonal element, have impulsive characteristics, or be intermittent sufficient to draw attention, therefore no character corrections will be applied in the calculation.

5.3 Nearest Noise Sensitive Property

We have considered the nearest noise sensitive property to be the adjacent residential property to the north-east at 11 Queensmead as indicated on Figure 2.1, with the most affected window being at second-floor level at a distance of approximately 11m from the air source heat pumps.

5.4 Assessment

On the basis of the above, our calculations to predict the plant noise level at the nearest noise sensitive property are summarised in Table 5.1.

Table 5.1 Plant Noise Calculation Results

Element	Level (dB)	
	ASHP 1	ASHP 2
Unit Sound Power Level	62	62
Screening Attenuation	-10	-10
Distance Attenuation	-29	-29
Predicted Sound Pressure Level at Nearest Noise Sensitive Property	23	23
Total Predicted Sound Pressure Level at Nearest Noise Sensitive Property	26	
Noise Limit	30	

It can be seen that the total noise level associated with the proposed air source heat pumps is not predicted to exceed the proposed noise limit at the nearest noise sensitive property during both daytime and night-time periods.

Appendix A – Acoustic Terminology

Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing (20×10^{-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.
$L_{Aeq,T}$	<p>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).</p> <p>This is the sound level that is equivalent to the average energy of noise recorded over a given period.</p>
L_{A90}	The noise level exceeded for 90% of the time (also referred to as the background noise level).
$L_{A,r,T}$	<p>The rating sound level as described in BS 4142: 2014+A1: 2019.</p> <p>This is the specific sound level including corrections for acoustic features such as tonality, impulsivity, or intermittency, used in the assessment of industrial and commercial applications.</p>

Appendix B – Time History Graph

