



**9 Lyndhurst Terrace
London**

Plant Noise Assessment Report

10 October 2023

For
David Smith

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SUMMARY

A new air source heat pump is proposed at 9 Lyndhurst Terrace in London.

The local authority, London Borough of Camden, has requirements in relation to plant noise emissions affecting existing noise sensitive properties.

A noise survey has been undertaken to determine background noise levels that are representative of the nearest noise sensitive properties.

A noise assessment has subsequently been undertaken to predict noise emissions associated with the proposed air source heat pump at the nearest noise sensitive property.

The predicted noise levels comply with the local authority requirements at the nearest noise sensitive property during the proposed operational periods.

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Report Produced by	Nicholas Jones BEng(Hons) CEng MIOA	T: 07739 715411 E: njones@auricl.com	
auricl Limited www.auricl.com hello@auricl.com	107 Cheapside London EC2V 6DN	9 Greyfriars Road Reading RG1 1NU	Registered Company 09824075

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1.0 Introduction

A new air source heat pump is proposed at 9 Lyndhurst Terrace in London.

The local authority, London Borough of Camden, has requirements in relation to plant noise emissions affecting existing noise sensitive properties.

This report presents the methodology and results of a noise survey to determine background noise levels that are representative of the nearest noise sensitive properties, as well as an assessment to address the planning condition requirements.

2.0 Description of Site and Proposals

The site is located at 9 Lyndhurst Terrace and is occupied by a residential property in a predominantly residential area.

An air source heat pump is proposed in a lightwell at garden level at the front/east of the site on the southern site boundary.

The nearest noise sensitive property to the proposed air source heat pump is noted to be the adjacent residential house at 7 Lyndhurst Terrace.

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

Figure 2.1 Existing Site Extent and Surroundings



3.0 Local Authority Requirements

It is understood that the London Borough of Camden typically requires that external noise levels from new plant or machinery when assessed in accordance with BS 4142: 2014+A1: 2019, should not exceed 10 dB less than the $L_{A90,T}$ background noise level at the boundary with the nearest residential property, or 15 dB less than the $L_{A90,T}$ background noise level where the source is tonal.

British Standard (BS) 4142: 2014+A1: 2019 is the current industry standard for assessing noise from commercial and industrial sources including machinery and building services equipment, and provides a procedure for the measurement and rating of these noise levels. A methodology for predicting the likelihood of adverse impact is provided in the document.

The rating level ($L_{Ar,Tr}$) is defined in BS 4142 and is used to rate the industrial source (known as the specific noise source) at the assessment location. This level is obtained by adding a correction of between 0 and 6 dB, for tonal noise sources, and a correction of between 0 and 9 dB for impulsive sources. Additionally, corrections of 3 dB can be made for other sound characteristics and intermittency of the noise source.

The rating level is assessed in terms of $L_{Ar,Tr}$, where 'T' is a reference period of one hour during the daytime period (07:00 - 23:00) and fifteen minutes during the night-time period (23:00 – 07:00).

The method for predicting the likelihood of complaints is based on differences between the rating level and the background $L_{A90,T}$ noise level. The standard states that:

- a) *“Typically, the greater this difference, the greater the magnitude of the impact.*
- b) *A difference of around +10dB 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 context.*

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 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.”

We have therefore considered the above in our noise survey methodology and plant noise assessment.

4.0 Noise Survey Methodology

An unmanned environmental noise survey was undertaken over a 4-day period between Friday 29 September 2023 and Tuesday 3 October 2023. This measurement period was selected to assess background noise levels during typical periods when the plant is proposed to be operational.

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

Table 4.1 Description of Equipment used for Noise Survey

Item	Make & Model	Serial Number
Type 1 sound level meter	01dB Fusion	12032
Type 1 ½” microphone	GRAS 40CE	330829
Calibrator	01 dB CAL31	87267

L_{Aeq} and L_{A90} sound pressure levels were measured throughout the noise survey over contiguous 125-millisecond intervals.

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

The measurement position was located with the measurement microphone attached to a balcony at the front/east of the existing house at ground floor level, approximately 1m from the existing building façade.

The measurement position is indicated on Figure 4.1.

Figure 4.1 Site Plan Indicating Approximate Location of Measurement Position



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, weather conditions were noted to consist of clear and sunny skies, light wind and dry conditions. These conditions are considered to be appropriate for undertaking environmental noise measurements.

5.0 Noise Survey Results

Appendix B presents a time history graph showing the L_{Aeq} and L_{A90} sound pressure levels measured throughout the noise survey (shown as 15-minute intervals).

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

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, the daytime noise climate at the measurement position was noted to be affected by road traffic using distant surrounding roads and general domestic noise sources.

The typical (modal) background noise levels were measured to be **39 dB L_{A90} (1 hour)** during daytime hours (07:00-23:00) and **31 dB L_{A90} (15 min)** during night-time hours (23:00 – 07:00 hours).

6.0 Plant Noise Assessment

This section presents our assessment and calculations of noise emissions from the proposed air source heat pump, in relation to the planning condition requirements.

6.1 Plant Noise Limits

Based on the measured background noise levels and the local authority requirements, the plant noise limits are **29 dB L_{Ar,Tr}** during daytime hours (07:00-23:00) and **21 dB L_{Ar,Tr}** during night-time hours (23:00-07:00), when measured at the nearest noise sensitive properties.

6.2 Proposed Plant

An air source heat pump is proposed at garden level in a lightwell towards the front/east of the house on the southern site boundary, as indicated approximately on Figure 2.1.

The manufacturer's data for the air source heat pump states a normal operating sound pressure level of 53 dB L_{pA} at 1m which is considered to be representative of daytime periods.

At night, the unit will operate in low noise mode, with noise emissions reducing to 46 dB L_{pA} at 1m.

In addition, the lightwell walls will be acoustically lined to attenuate acoustic reflections and the air source heat pump will be fitted with acoustic attenuation capable of reducing the above noise levels by 5 dB.

6.3 Nearest Noise Sensitive Properties

The nearest noise sensitive property to the proposed air source heat pump is noted to be the residential property to the south at 7 Lyndhurst Terrace as indicated on Figure 2.1, with the nearest windows being approximately 5m from the location of the proposed air source heat pump.

6.4 Plant Noise Predictions

Our calculations to predict the total plant noise level at the nearest noise sensitive properties are presented in Table 6.1 for daytime and night-time periods, and include corrections for distance and the screening effect of intervening structures and buildings.

Table 6.1 Plant Noise Emission Calculations – 26 Palace Road

Element	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
Unit Sound Pressure Level (dB L _{pA} at 1m)	53	46
Unit Attenuation	-6	-6
Distance Attenuation (dB)	-14	-14
Screening Attenuation (dB)	-5	-5
Predicted Noise Level at Nearest Noise Sensitive Receptor (dB)	28	21
Noise Limit (dB) during Relevant Period	29	21

It can be seen that the predicted noise levels associated with the proposed air source heat pump do not exceed the daytime and night-time noise limits.

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.
$L_{Aeq,T}$	<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} (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
$L_{Ar,Tr}$	<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

