



**89 Wokingham Road
Reading**

Plant Noise Assessment Report

12 August 2021

For
SN Electronics

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SUMMARY

New ventilation fans are proposed at 89 Wokingham Road in Reading.

Reading Borough Council has external noise requirements for new items of building services plant, requiring a background noise survey and plant noise assessment to be undertaken.

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

An external plant noise limit has been proposed, to be achieved at the nearest residential properties, based on the noise survey data and the Reading Borough Council requirements.

A noise assessment has been undertaken to predict noise emissions associated with the proposed ventilation fans at the nearest noise sensitive property.

The total predicted noise level associated with the proposed ventilation fans does not exceed the noise limit during the proposed operating hours.

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1.0 Introduction

New ventilation fans are proposed at 89 Wokingham Road in Reading. Reading Borough Council has external noise requirements for new items of building services plant, requiring a background noise survey and plant noise assessment to be undertaken.

auricl has been instructed to undertake a background noise survey and acoustic assessment of noise emissions from the new roof plant, in relation to the Reading Borough 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 properties, as well as an acoustic assessment of the proposed plant to address the Reading Borough Council requirements.

2.0 Description of Site and Proposals

The site is located on the north-eastern side of Wokingham Road in East Reading and is occupied by a commercial unit at ground floor level and a residential property at first floor level.

Similar commercial and residential properties are located adjacent to the site to the south-east and north-west.

A supply fan and extract fan are proposed on the first-floor level roof at the rear/north-east of the building. The fans are proposed to operate between 12:30 – 22:45 hours, 7 days a week.

Figure 2.1 shows the approximate site extent in **red**, the proposed plant locations in **green** and the nearest noise sensitive properties in **blue**.

Figure 2.1 Existing Site Extent, Proposed Plant Location and Nearest Noise Sensitive Properties



3.0 Reading Borough Council Requirements

Reading Borough Council's standard requirements relating to external noise emissions from building services plant are as follows:

"No mechanical plant shall be installed until a noise assessment of the proposed mechanical plant has been submitted and approved by this Council. The assessment shall be carried out in accordance with the relevant recommendations of appropriate British Standards or other recognised Codes of Good Practice. The predicted rating level, $L_{A,T,r}$ (specific sound level plus any adjustment for the characteristic features of the sound) as measured at a point 1 metre external to sensitive facades shall be at least 10dB below the existing background sound level, $L_{A90,T}$ when all plant/equipment (or any part of it) is in operation. The plant shall only be installed in accordance with the assessment and shall thereafter be maintained so that it operates to the same standard".

4.0 Noise Survey Methodology

An unmanned environmental noise survey was undertaken at the site between Thursday 22 July 2021 and Monday 26 July 2021, to assess existing background noise levels at the nearest noise sensitive properties to the proposed plant.

L_{Aeq} and L_{A90} sound pressure levels were measured throughout the noise survey over 1-second intervals.

Noise levels were measured at one position at first-floor roof level approximately 1m from the first-floor residential kitchen window, as indicated in **purple** on Figure 4.1.

Figure 4.1 Site Plan Indicating Measurement Location



The measurement position is considered to be representative of background noise levels at the nearest noise property to the proposed plant.

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	01 dB FUSION	12078
Type 1 ½" microphone	GRAS 40 CD	331906
Calibrator	01 dB CAL21	86020

The noise monitoring equipment was calibrated before and after the noise survey period. 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 of the survey period, there was noted to be very little cloud with dry, still and clear conditions. These conditions are understood to be representative of the majority of the survey period and are considered 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.

The lowest background noise level measured during the proposed operating hours (12:30 – 22:45 hours) was **53 dB L_{A90} (1 hour)**.

We would consider the measured levels 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 period, the daytime noise climate at the measurement position was noted to be affected by road traffic noise emanating from Wokingham Road and building services plant serving neighbouring properties.

6.0 Plant Noise Emissions

This section presents our assessment and calculations of noise emissions from the proposed plant, in relation to the Reading Borough Council requirements.

6.1 Noise Limit

Based on the measured background noise levels and the Reading Borough Council requirements, the external plant noise limit is **43 dB $L_{A,T,r}$** during the proposed operating hours (12:30 – 22:45 hours).

6.2 Proposed Plant

A supply fan and extract fan are proposed to be located at first-floor roof level to the north-east of the site. The supply fan and extract fan are to be located approximately 7m and 2.5m from the nearest residential window, respectively.

The fan manufacturer's in-duct sound power levels for the atmospheric side of the fans are shown in Table 6.1.

Table 6.1 Manufacturer's Noise Data for Proposed Fans

Fan	Sound Power Level (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1K	2K	4k	8K
Supply	75	75	79	71	67	68	67	64
Extract	69	83	75	60	57	55	50	50

The fans will be fitted with in-duct acoustic attenuators on the atmospheric side, achieving the minimum insertion losses presented in Table 6.2.

Table 6.2 Proposed Attenuator Insertion Losses

Fan	Minimum Dynamic Insertion Loss (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1K	2K	4k	8K
Supply	7	11	14	25	40	45	44	32
Extract	9	16	24	37	48	50	50	38

In addition, each fan will be fitted with high performance acoustic lagging (e.g. Muftilag P/H 50mm 10kg/m², SuperLag Original 10).

The acoustic lagging will cover the entirety of the fan casing and atmospheric ductwork, up to and including the atmospheric attenuators, as well as the roomside ductwork, between the fan and roof penetration.

Each fan is to be fitted with suitable vibration isolation mounts and flexible ductwork connectors, to control transmission of vibration to the building.

6.3 Nearest Noise Sensitive Properties

We have considered the kitchen window of the first-floor residential property, as described in Section 2.

6.4 Plant Noise Predictions

Our plant noise emission calculations are presented in Table 6.3 to 6.6 and summarised in Table 6.7.

Table 6.3 Plant Noise Calculations – Supply Inlet

Element	Level (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1K	2K	4k	8K
In-Duct Sound Power Level	75	75	79	71	67	68	67	64
Attenuator Insertion Loss	-7	-11	-14	-25	-40	-45	-44	-32
Grille End Reflection	-5	-2	-1	0	0	0	0	0
Directivity	+4.5	+5	+5.5	+5.5	+6	+6	+6	+6
Distance Attenuation	-24	-24	-24	-24	-24	-24	-24	-24
Predicted Sound Pressure Level at Nearest Noise Sensitive Property	44	43	46	28	9	5	5	14
	37							

Table 6.4 Plant Noise Calculations – Extract Outlet

Element	Level (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1K	2K	4k	8K
In-Duct Sound Power Level	69	83	75	60	57	55	50	50
Attenuator Insertion Loss	-9	-16	-24	-37	-48	-50	-50	-38
Grille End Reflection	-5	-2	-1	0	0	0	0	0
Directivity	-3	-3	-5	-6	-6	-6	-6	-6
Distance Attenuation	-21	-21	-21	-21	-21	-21	-21	-21
Predicted Sound Pressure Level at Nearest Noise Sensitive Property	31	41	24	<0	<0	<0	<0	<0
	26							
Feature Correction – Tonality	+4							
Rating Level	30							

* Correction for clearly perceptible tone at 125Hz, based on BS 4142: 2014 guidance

Table 6.6 Plant Noise Calculations – Fan Casings

Element	Supply Fan	Extract Fan
Fan Sound Pressure Level at 3m	43	37
Acoustic Lagging Reduction	-9	-4
Acoustic Reflections	+3	+3
Distance Correction	-7	+2
Predicted Sound Pressure Level at Nearest Noise Sensitive Property	30	38

Table 6.7 Plant Noise Calculations – Summary

Noise Source	Level (dB)
Supply Fan – Inlet	37
Supply Fan – Casing	30
Extract Fan – Outlet	30
Extract Fan – Casing	38
Total Noise Level/Rating Level	41
Noise Limit	43

It can be seen that the total predicted noise level associated with the proposed ventilation fans does not exceed the noise limit during the proposed operating hours.

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.
$L_{Aeq,T}$	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

