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EXTERNAL CONDENSER UNIT ACOUSTIC ASSESSMENT REPORT

Project: 29 Lonsdale Road, Barnes, London SW13

Client: Vanessa Dausch

Date: 8th November 2024

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1. INTRODUCTION

1.1 A noise survey has been carried out at 29 Lonsdale Road, Barnes, London SW13. The property is being refurbished and a part of the refurbishment works includes the installation of Air Conditioning (AC) systems which will serve the main living spaces within the property. The noise survey and assessment report are required to accompany a Planning Application for the installation of the external equipment which is to be located at the property. Two external AC units are required. Both the proposed units are to be located in an acoustic enclosure installed in the side passage between 29 and 31 Lonsdale Road. The acoustic enclosure will have 150mm deep acoustic louvres on the intake and supply sections. The proposed location is screened from neighbouring property 31 Lonsdale Road.

1.2 The measurements and assessment have shown that the London Borough of Richmond-upon-Thames acoustic criterion is met and therefore the proposed installation is unlikely to give rise to noise complaints from the adjacent properties. The site location and surroundings are presented in Figure 1:

Figure 1: Site Location (© Google Maps)

2. NOISE MEASUREMENTS

2.1 Environmental noise measurements were carried out from Friday 25th till Monday 28th August 2023. Sound level measurement equipment was installed in the front garden of 29 Lonsdale Road and used to log noise levels over the four-day period. The measurement equipment is listed below in Table 1.

Table 1. Environmental Noise Measurement Instrumentation

No	Description
1	Larson Davis Model LxT Class 1 Sound Level Meter with Model 377B02 ½" Diameter Condenser Microphone
2	Larson Davis Model CAL200 Sound Level Meter Calibrator.

2.2 All acoustic equipment conforms to the relevant parts of BS EN 60651:1994 (equivalent to BS 5969:1981) for the requirements of Type 1 acoustic accuracy. Additionally, the relevant equipment conforms to the specifications contained within BS EN 60804:1994 (equivalent to BS 6698:1976) for integrating sound level meters.

2.3 In order to verify the correct operation of the equipment on site, an acoustic calibrator was applied during the course of the measurements. A maximum change of 0.1 dB(A) was noted, this can be considered as an insignificant change. The calibrator complies with the specifications of IEC 942:2003. The instrumentation was previously factory calibrated in September 2022.

2.4 Fast meter response was used for all measurements carried out during the course of the survey.

2.5 Noise levels are expressed in terms of continuous equivalent noise levels (L_{Aeq}) over an appropriate time period. The use of L_{Aeq} allows non-steady and non-continuous noise to be assessed and compared to the existing

noise climate. L_{Aeq} is referred to as the ambient noise level. In addition to this background noise levels have also been measured and are expressed as L_{A90}. A full explanation of terminology commonly used in the measurement and assessment of noise levels is given in Appendix B at the end of this report.

3. RESULTS

3.1 Noise level measurements were carried out at 15-minute intervals during the survey period. Ambient (L_{Aeq}) and background (L_{A90}) noise levels were measured. Minimum noise levels for the daytime (0700 to 1900 hrs), evening time period (1900 to 2300 hrs) and night time period (2300 to 0700 hrs) have been determined.

Table 2: Summary Results – Mean Noise Levels

	Day	Evening	Night
L_{Aeq}	58.9	57.8	52.3
L_{A90}	52.7	50.4	38.1(34.0)*

Note: The lowest background noise level of 34.0 dB ($L_{A90,15mins}$) was measured at 2.45 am on the morning of Saturday 26th August 2023.

3.2 Although the survey was not attended on a full-time basis, it was noted that during site visits the dominant noise source was from traffic on the surrounding roads; noise from aircraft flyovers was also audible. A full listing of 15-minute interval data, together with day/evening/night data for the period is given in the graph at the end of this report (Figure A1 in Appendix A). A photograph showing the noise monitor in position for the survey is shown in Figure A2.

3.4 Noise level data for the proposed AC equipment is given in Figure A3. The proposed external AC units are Daikin RXYSCQ6TV1 with a sound pressure level at 1m of 52 dB(A) each[1]. The equipment may run during any time of the day or night. Further details, showing the proposed locations with respect to the neighbouring properties are also given in Figure A4 at the end of this report. To reduce noise levels the equipment will be located behind an acoustic louvred screen/enclosure[2].

3.5 Calculated noise levels are as follows:

Front Façade windows – 31 Lonsdale Road

		63	125	250	500	1k	2k	4k	8k	A
1. Daikin RXYSCQ6TV1										
1.1	SPL at 1m	56	53	50	47	46	43	38	27	
	2x units	3	3	3	3	3	3	3	3	
		59	56	53	50	49	46	41	30	
A-weighting		-26	-16	-9	-3	0	1	1	-1	
		33	40	44	47	49	47	42	29	54
Acoustic Enclosure		-3	-3	-5	-8	-13	-15	-15	-13	
Screening via 31 Lonsdale Rd		-11	-11	-12	-13	-15	-15	-13	-11	
Distance Correction	4m	-12	-12	-12	-12	-12	-12	-12	-12	
Resultant SPL dB(A)		**7**	**14**	**15**	**14**	**9**	**5**	**2**	**0**	**20**

3.6 The London Borough of Richmond-upon-Thames criteria for noise emissions are that the 'A' weighted sound pressure level from the plant, when operating at its noisiest, shall not at any time exceed a value of 10 dB below the minimum external background noise, at a point 1 metre outside any window of any residential property. As such, the criterion to meet is 24.0 dB(A) at the nearest affected areas/neighbouring windows.

[1] See product technical data sheets shown in Figure A3 at the end of this report.
[2] See manufacturer's equipment technical data sheet shown in Figure A5

3.7 It therefore follows that the required noise criterion is met for both daytime/evening and night-time periods.

4. CONCLUSION

4.1 A noise measurement survey and assessment has been carried out for the proposed external Air Conditioning plant to be installed as a part of the works to be carried out at 29 Lonsdale Road, Barnes, London SW13. The assessment is required as part of the application for planning consent.

4.2 The assessment has shown noise levels from the proposed units meet the London Borough of Richmond-upon-Thames acoustic criteria. To reduce noise levels, the proposed installation will incorporate an acoustic enclosure.

APPENDIX A: GRAPHS AND FIGURES.

Figure A1: Environmental Noise Measurement Data – 29 Lonsdale Road, Barnes, London SW13

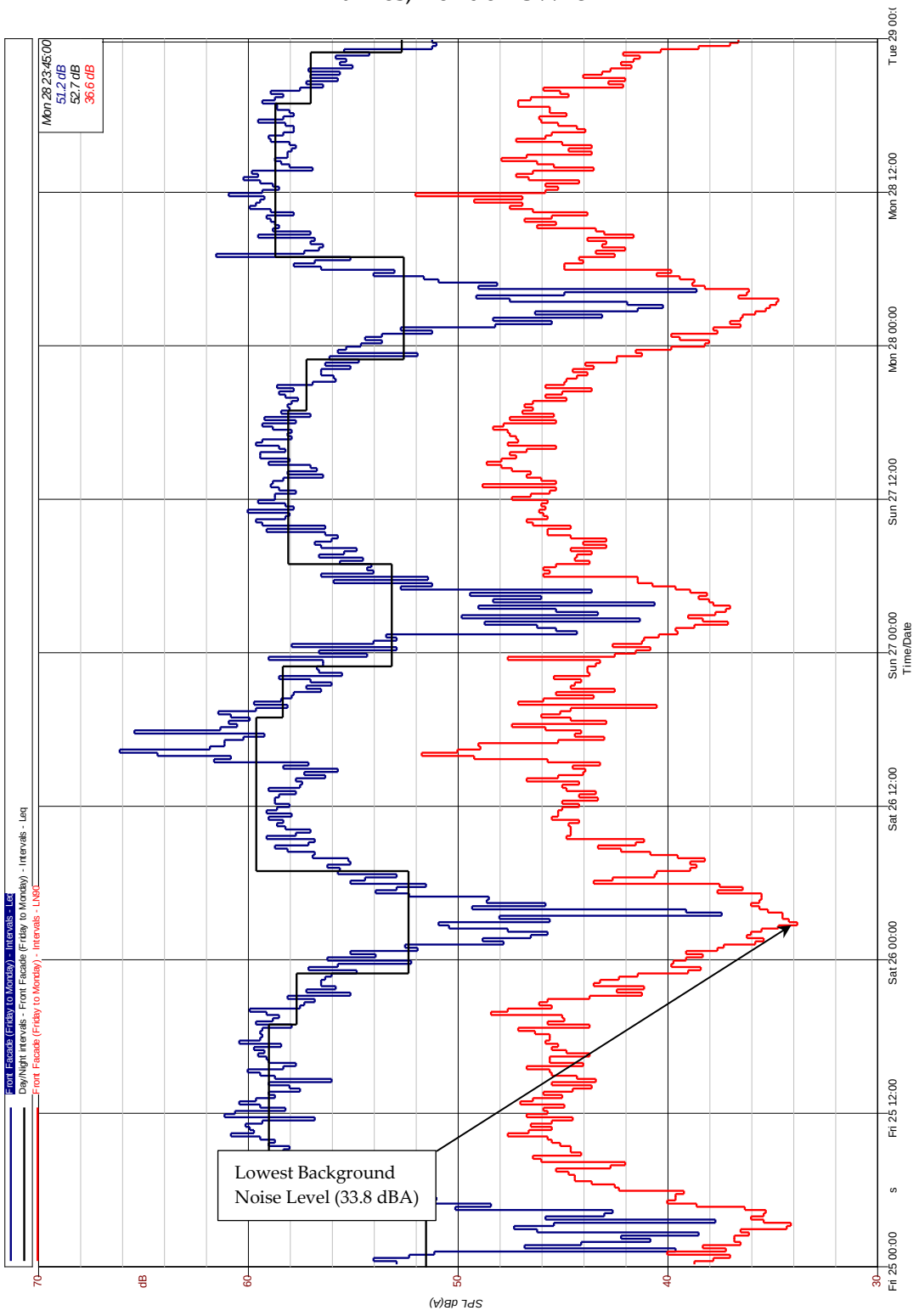
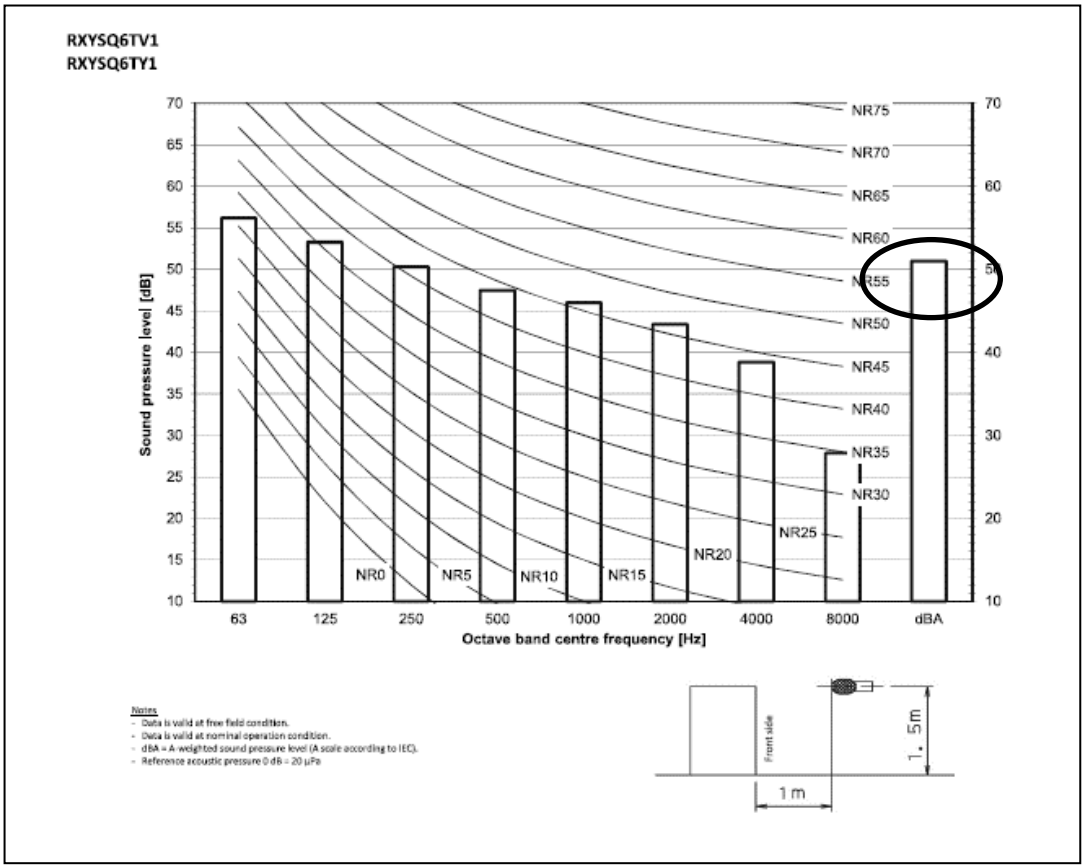


Figure A2: Noise Monitoring Equipment positioned at 29 Lonsdale Road, London SW13

Figure A3: Equipment Noise Data

Daikin RXYSCQ6 External Condenser Unit



A4: Proposed Layout Drawing

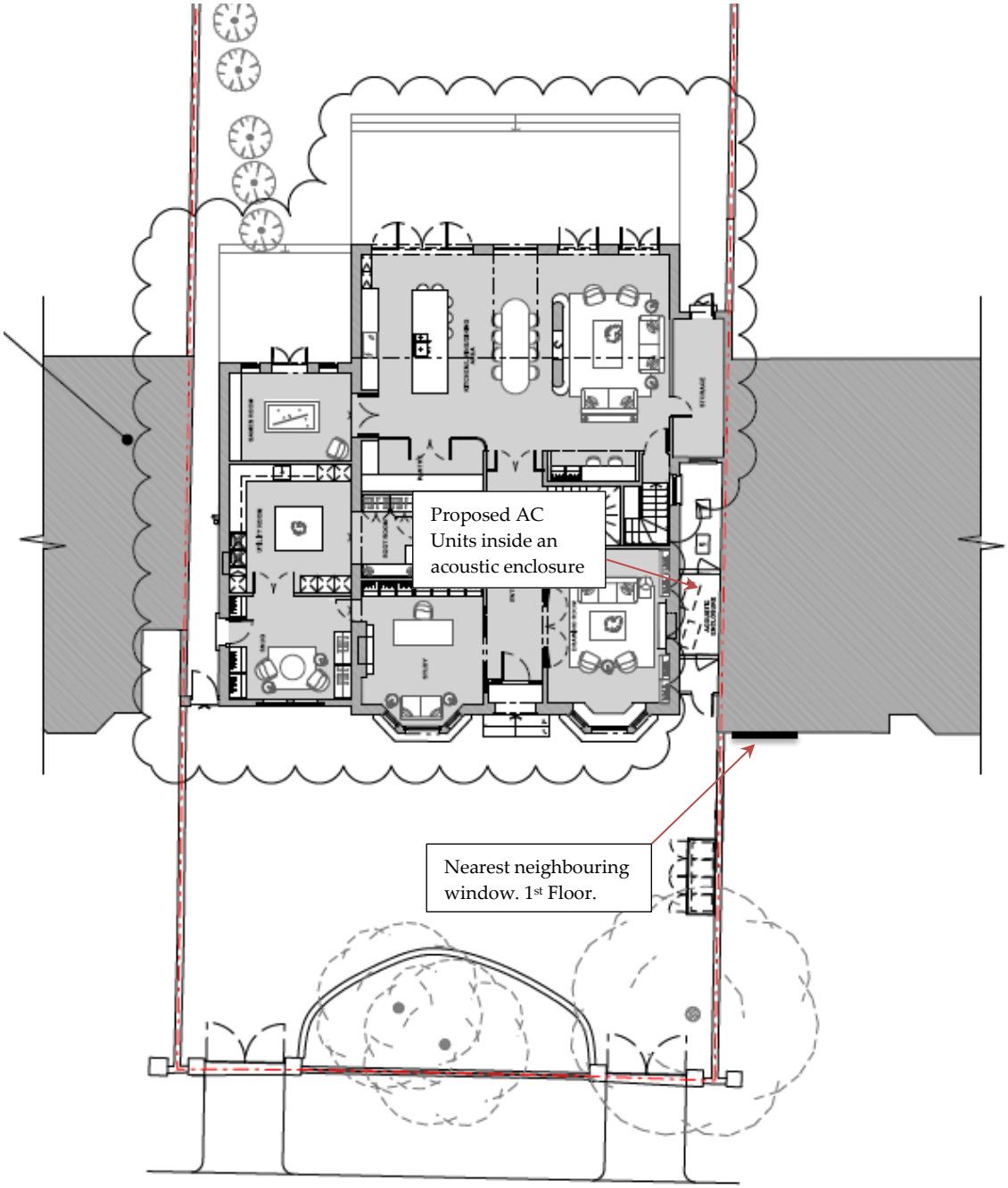


Figure A5: Acoustic Louvre Technical Data Sheet

Conabeare Acoustics

Quality Noise Control Solutions

INTRODUCTION

Type **WSD150 (150mm Deep)** Acoustic Louvre System has been developed to provide acoustic properties to penetrations through the fabric of a building and combines a visually pleasing aesthetic appearance, with an excellent level of weathering performance.

The **WSD150** Acoustic Louvre is typically used for projects that require a moderate level of attenuation of Building Services noise, whilst allowing forced or natural ventilation through a terminal device.

The **WSD150** can be supplied to suit particular applications, with different finishes and options as required.

All louvres are designed to suit your individual project, and our Team of Sales Engineers can assist with the design of the louvre package for the optimum product selection.

PERFORMANCE DATA

Type **WSD150** Acoustic Louvre has the following Acoustic Performance

	Sound Reduction Index (dB) at Octave Band Centre Frequencies (Hz)							
Type	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1000Hz**	**2000Hz**	**4000Hz**	**8000Hz**
WSD150	3	3	5	8	13	15	15	13
WSD150V	5	6	8	14	20	25	23	20

Figure 1 - Acoustic Louvre Modules

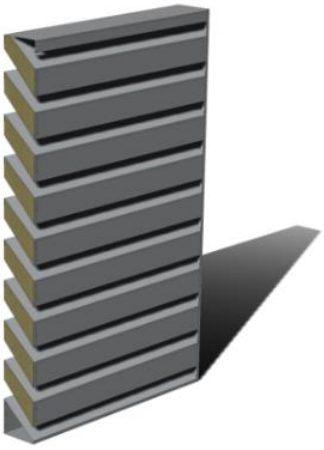


Figure 2 - Acoustic Louvre Module

APPENDIX B: GLOSSARY OF NOISE TERMS AND UNITS.

1.0 Noise

1.1 The sounds that we hear are as a result of successive air pressure changes. These air pressure changes are generated by vibrating sources, such as train engines or wheels, and they travel to a receiver, i.e. the human ear, as air pressure waves.

1.2. The human ear is capable of detecting a vast range of air pressures, from the lowest sound intensity that the normal ear can detect (about 10^{-12} watts/m^2) to the highest that can be withstood without physical pain (about 10 watts/m^2). If we were to use a linear scale to represent this range of human sensitivity it would encompass more than a billion units. Clearly this would be an unmanageable scale yielding unwieldy numbers.

1.3. The scale can be compressed by converting it to a logarithmic or Bel scale, the number of Bels being the logarithm to the base 10 of one value to another (as applied by Alexander Graham Bell to measure the intensity of electric currents). The Bel scale gives a compressed range of 0 to 12 units which in practice is a little too compressed. A more practical operating range of 0 to 120 is obtained by multiplying by 10, ie. 10 x Bel, which produces the scale units known as decibels or dB.

1.4. Examples of typical sound intensity levels within the decibel range of 0 to 120 dB are listed below:

Commercial four-engine jet aircraft at 100m	120dB
Riveting of steel plate at 10m	105dB
Pneumatic drill at 10m	90dB
Circular wood saw at 10m	80dB

Heavy road traffic at 10m	75dB
Male speech, average, at 10m	50dB
Whisper at 10m	25dB
Threshold of hearing, 100Hz	0dB

1.5. Due to this logarithmic scale noise levels have to be combined logarithmically rather than arithmetically. For example, two equal sound sources of 70 dB each, when operated simultaneously, do not produce a combined level of 140 dB but instead result in a level of 73 dB, ie. A rise of 3dB for each doubling of sound intensity. Subjectively, a 3dB change does not represent a doubling or halving of loudness; to make a sound appear twice as loud requires an increase in sound pressure level of about 10dB.

1.6. The subjective loudness of noise can be measured by applying a filter or weighting which equates to the frequency response of the human ear. This is referred to as an A-weighting and when applied results in noise levels expressed as dB(A).

1.7. dB(A) noise levels can be measured using a variety of noise indices. The index which correlates best with human response due to machinery noise is the L_{Aeq} this is the A-weighted L_{eq} which is referred to as the 'equivalent continuous noise level' and is a measure of the total sound energy generated by a fluctuating sound signal within a given time period.