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PROJECT LONDON

**2A ELEANOR
GROVE, LONDON.
SW13 OJN**


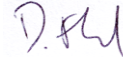
**PLANT NOISE
ASSESSMENT**

27 AUGUST 2024

3035-AF-00001-01

**PROJECT LONDON
541 HOLLOWAY ROAD, LONDON.
PLANT NOISE ASSESSMENT**

DOCUMENT REFERENCE: 3035-AF-00001-01

REVIEW AND AUTHORISATION			
Authored by Adrian Finn	Position Director	Signature 	Date 27/08/2024
Reviewed by Daniel Flood	Position Senior Consultant	Signature 	Date 27/08/2024

AMENDMENT HISTORY			
Issue	Status	Description	Date
01	Draft	Report issued as draft	27/08/2024

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1. INTRODUCTION

1.1.1 Project London has commissioned AF Acoustics Ltd. to undertake a plant noise assessment for two new condenser units to be installed on the roof area of 2A Eleanor Grove, London.

1.2 Brief and Scope

1.2.1 The brief is to undertake a plant noise assessment for two new condenser units to be installed on the roof area of 2A Eleanor Grove, London.

1.2.2 If the plant creates an adverse impact, or the noise levels at the nearest residential receptor do not meet the local authority guidance, then recommendations will be given to reduce the noise from the plant, so that the plant complies with the relevant guidance.

2. SITE DESCRIPTION

2.1 Location

2.1.1 The plant is to be located on the roof area of 2A Eleanor Grove, London. The site is shown in Figure 2.1. 2A Eleanor Grove is located in the jurisdiction of the London Borough of Richmond-upon-Thames.

2.1.2 The site is located in a residential location. The noise profile at the measurement location consisted mainly of noise from local road traffic and planes overhead.



FIGURE 2.1: LOCATION MAP

3. GUIDANCE

3.1 British Standard 4142:2014

3.1.1 BS 4142:2014 'Methods for rating and assessing industrial and commercial sound' describes methods for rating and assessing sound from "fixed installations which comprise mechanical and electrical plant and equipment", amongst other sources of noise.

3.1.2 The methodology contained within BS 4142:2014 uses outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

3.1.3 A summary of the approach set out within BS 4142:2014 is set out below:

- establish the specific sound level of the source(s);
- measure the representative background sound level, typically by measurement close to the receptor location;
- rate the specific sound level to account for any distinguishing characteristics;
- estimate the impact by subtracting the background sound level from the rating level; and
- consider the initial estimate of impact, in the context of the noise and its environment.

3.1.4 An initial estimate of the impact of the specific sound is obtained by subtracting the background sound level from the rating level. Using this approach, BS 4142 states:

*"Typically, the greater this difference, the greater the magnitude of impact
A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context*

A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the 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 a 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."

3.1.5 Certain acoustic features can increase the significance of the impact over that expected from a basic comparison between specific sound level and the background sound level. These features include tonality and impulsivity, as well as additional characteristics and intermittency of the sound.

3.1.6 If appropriate, a subjective assessment of the plant features can be adopted. Where the plant noise contains tonal elements, the following corrections can be made depending on how perceptible the tone is at the noise receptor.

3.1.7 The specific sound level is rated to account for distinguishing characteristics by using the penalties below:

- 0 dB where the tone is not perceptible
- 2 dB where the tone is just perceptible
- 4 dB where the tone is clearly perceptible
- 6 dB where the tone is highly perceptible

3.1.8 Where the plant noise is impulsive, the following corrections can be made depending on how perceptible the impulsivity is at the noise receptor.

- 0 dB where the impulse is not perceptible
- 3 dB where the impulse is just perceptible
- 6 dB where the impulse is clearly perceptible
- 9 dB where the impulse is highly perceptible

3.1.9 For noise which is equally both impulsive and tonal, then both features can be taken into account by linearly summing the corrections for both characteristics.

3.1.10 If the plant has other distinctive characteristics, such as intermittency, then a 3 dB correction can be made.

3.1.11 If a subjective assessment is not appropriate then an objective assessment can be made. A noise source is deemed to be tonal if the time averaged sound pressure level in a one-third octave band exceeds the level in adjacent one-third octave bands by the level differences given below:

- 15 dB in the low frequency one-third octave bands (25 Hz to 125 Hz)
- 8 dB in the mid frequency one-third octave bands (160 Hz to 400 Hz)
- 5 dB in the high frequency one-third octave bands (500 Hz to 10000 Hz)

3.1.12 If an objective assessment identifies the plant noise to be tonal then a 6 dB correction must be made.

3.2 London Borough of Richmond upon Thames

3.2.1 The Supplementary Planning Document (SPD), ‘Noise Generating and Noise Sensitive Development’ gives the following guidance about noise from new noise generating industrial and commercial developments.

3.2.2 The SPD states that BS4142:2014 should be followed in calculating the rating and assessing sound from plant.

3.2.3 The SPD states that Richmond upon Thames will seek to achieve the external noise standards detailed in Table 3.1 below

Noise Impact From Relevant Proposed Industrial Or Commercial Premises Or Plant	Development Outcome
Rating Level ($L_{Ar,Tr}$) is at least 5 dB(A) below the Background Level L_{A90}	Normally acceptable
Rating level ($L_{Ar,Tr}$) is no more than 5 dB(A) above the Background Level L_{A90}	Acceptable only if there are overriding economic or social reasons for development to proceed
Rating level ($L_{Ar,Tr}$) is more than 5 dB(A) above the Background Level L_{A90}	Normally unacceptable

TABLE 3.1: NEW INDUSTRIAL AND COMMERCIAL DEVELOPMENT - EXTERNAL NOISE STANDARDS

4. NOISE SURVEY AND MEASUREMENTS

4.1 Unattended Noise Survey

- 4.1.1 An unattended noise survey was undertaken by Adrian Finn of AF Acoustics with the sound level meter located at the rear garden of the property.
- 4.1.2 The microphone was mounted on a tripod at a height of 1.6m. The measurement position is considered representative of the noise levels affecting the nearest noise sensitive receptor, especially at night time when the measured noise levels are the quietest and less affected by road traffic. Due to access arrangements it was not possible to measure on the roof or at the front of the house.
- 4.1.3 The duration of the survey was between 13:20 on Thursday 20 June and 14:30 on Friday 21 June 2024. This measurement location is labelled as LT1 in Figure 4.1. The measured noise levels are considered free façade levels. The microphone was protected with a windshield during the noise survey. Measurements were carried out in accordance with the requirements of BS 7445-2:1991 and ISO 1996-2:1987.



FIGURE 4.1: MEASUREMENT LOCATION

- 4.1.4 The sound level meter had calibration checks before and after the measurement surveys to generate a calibration level of 114 dB at 1 kHz. The equipment calibration was verified before and after the survey and no calibration drift was observed. The microphone was fitted with a windshield.
- 4.1.5 The equipment used is shown in Table 4.1.

Name	Serial Number	Last Calibrated
NTI Audio XL2-TA Class 1 Sound Level Meter	A2A-17402-E0	February 2024

Name	Serial Number	Last Calibrated
NTI Audio MA220 Pre-amplifier	8850	February 2024
NTI Audio MC230A Microphone	A18347	February 2024
Larson Davis Calibrator	18295	January 2024

TABLE 4.1: MEASUREMENT EQUIPMENT - UNATTENDED

4.2 Measurement Weather Conditions

4.2.1 The weather during the unattended measurements was mainly dry and clear. The temperature ranged from 12 to 20°C. Average wind speeds remained below 3 ms⁻¹. The weather is deemed to have caused no significant effect during the measurement period.

4.3 Results – Unattended Monitoring

4.3.1 The results of the continuous noise monitoring survey are presented in graphical form in Figure A1 of Appendix A and summarised in Table 4.2.

4.3.2 The L_{A90} background noise level has been derived from the typical measured 1 hour period during the day and 15 minute period at night.

Time period	Measured Noise Levels (dB re 2.0 x 10 ⁻⁵ Pa)		
	L _{Amax,F}	L _{Aeq,T}	L _{A90,T}
Daytime (07:00 – 23:00)	86	58	43
Nighttime (23:00 – 07:00)	76	52	32

TABLE 4.2: SUMMARY OF UNATTENDED NOISE MEASUREMENTS, LT1

5. PLANT NOISE ASSESSMENT

5.1 Noise Rating Limit

5.1.1 The table below presents the maximum noise rating level which must not be exceeded at the nearest noise sensitive receptor. The proposed plant has the potential to operate 24 hours a day.

Measurement Period	Assessed Background Noise Level dB L_{A90}	Noise Rating Level Design Criteria	Plant Noise Rating Level Limit dB $L_{Ar,Tr}$
24 hours	32 (night time)	5 dB below the external background noise level	27

TABLE 5.1: TARGET BACKGROUND NOISE LEVEL

5.2 Plant Noise Levels

5.2.1 One Daikin RXYSCQ5TV1 and one Daikin RXYSCQ6TV1 condenser units are to be installed on the roof area. The plant has the potential to operate 24 hours a day. The manufacturer's noise levels are set out in Table 5.2.

Plant	Parameter	Sound Level (dB) at Octave band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Daikin RXYSCQ5TV1	L_p at 1m	51	53	52	53	46	41	32	27
Daikin RXYSCQ6TV1	L_p at 1m	54	55	52	53	48	43	37	29

TABLE 5.2: PLANT NOISE LEVELS

5.2.2 Table 5.3 provides a summary of the calculated plant noise at the nearest residential receptors.

5.2.3 The nearest window to the plant is the 2nd floor window of 113 White Hart Lane at the front of the property, 4.9m from the proposed plant. The plant is shielded from the residential window and there is a 50cm path length difference between the window and the plant which is taken into consideration in the calculations. The noise calculation sheet is presented in Appendix B.

Property	Assessment Period	Target Plant Noise Rating Level dB $L_{Ar,Tr}$	Plant Specific Sound Level dB $L_{Aeq,Tr}$	Actual Noise Rating Level dB $L_{Ar,Tr}$
113 White Hart Lane	24 hrs	27	27	27

TABLE 5.3: PREDICTED NOISE LEVEL AT NEAREST RESIDENTIAL RECEPTOR

5.2.4 No correction factors have been added in accordance with BS4142:2014. There are no tones or other acoustic characteristics present from the proposed plant.

5.2.5 The proposed plant noise levels achieve the target plant noise limits and the requirements of the London Borough of Richmond upon Thames.

5.2.6 Furthermore, in accordance with the wording of BS4142, the assessment indicates little likelihood of adverse impact at the nearest residential receptor.

6. VIBRATION CONTROL

6.1.1 To limit the transfer of structure-borne noise we recommend that all plant is isolated from the supporting structure by either steel spring isolators or rubber footings. For particularly sensitive locations, or when on lightweight structures, the mounts should ideally be caged and be of the restrained type.

6.1.2 It is important that the isolation is not “short-circuited” by associated pipework or conduits. To this end, any conduits should be looped and flexible connectors should be introduced between the condenser and any associated pipework. Pipework should be supported by brackets containing neoprene inserts.

7. CONCLUSION

- 7.1.1 Project London has commissioned AF Acoustics Ltd. to undertake a plant noise assessment for two new condenser units to be installed on the roof area of 2A Eleanor Grove, London.
- 7.1.2 The measurement position was located at the rear of the property due to access arrangements. The measurement position is considered representative of the noise levels affecting the nearest noise sensitive receptor, especially at night time when the measured noise levels are the quietest and less affected by road traffic.
- 7.1.3 Plant noise emission criteria have been set at the nearest receptor based on the results of the noise survey and in conjunction with the national and local guidance.
- 7.1.4 Noise calculations based on the measured plant were undertaken to the nearest noise-sensitive receptor.
- 7.1.5 The results of the assessment have been used to assess the impact of noise from the proposed plant to the nearest noise-sensitive receptors. The calculations show that the proposed plant meets the requirements of the local authority, that the plant is 5dB below the background noise level. As per semantics of BS4142:2014, the assessment indicates little likelihood of adverse impact from the proposed plant at the nearest residential receptor.

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APPENDIX A: FIGURES

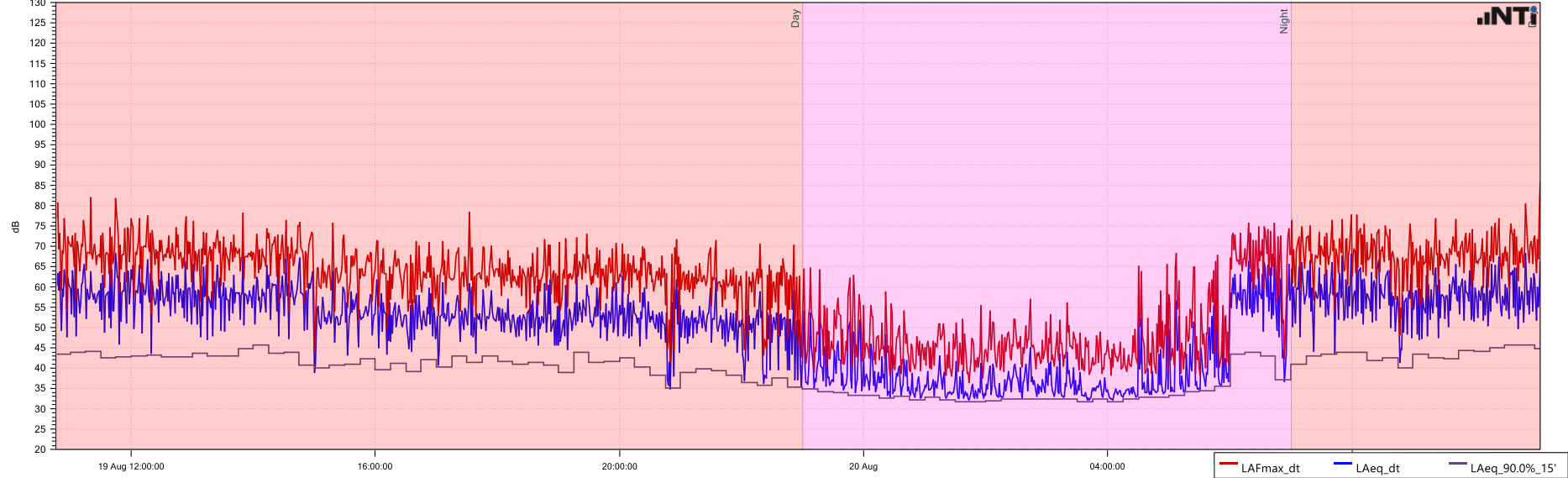
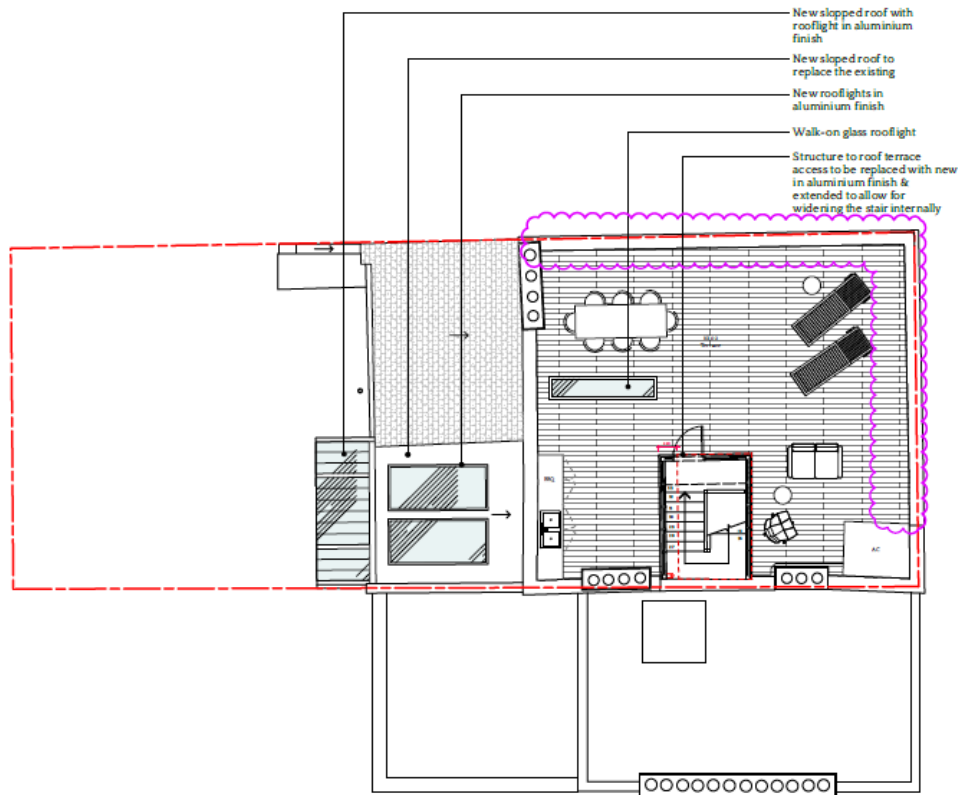


FIGURE A1: NOISE MEASUREMENT RESULTS



- New sloped roof with rooflight in aluminium finish
- New sloped roof to replace the existing
- New rooflights in aluminium finish
- Walk-on glass rooflight
- Structure to roof terrace access to be replaced with new in aluminium finish & extended to allow for widening the stair internally



Key - Planning

- Property Boundary
- Existing
- Proposed
- Existing neighbour section hatch
- Existing glazing
- Existing obscure glazing
- Proposed glazing
- Proposed obscure glazing
- Existing cornice
- Proposed cornice

These drawings are for planning purposes only. Drawings not to be used for construction. All dimensions are to be checked on site. These are subject to changes based on building control feedback and other consultants.

P4	25/07/2024	Planters omitted as suggested by planning consultant	MH
P3	16/07/2024	Amendments following meeting with clients	NG
P2	04/07/2024	Revisions following meeting with clients	NG
REV	DATE	REVISION NOTE	BY



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STATUS: **PLANNING**
1 Dimension in steel are in millimetres unless specifically noted otherwise.
 2 Do not rely upon lines scaled directly from printed drawings. Contractors to ensure full size colour printed copies of this drawing are made available on site and to all relevant subcontractors required.
 3 Drawing prepared solely for the use of the client and is not to be used by any third party without permission.
 Where any drawing is to be used in conjunction with another including specialist, the two drawings shall be cross-checked and any discrepancies reported to the architect before the work is put in hand.

ORIGINAL SHEET SIZE: **ISO A3**
 PROJECT ADDRESS: **Project White Hart**
2a Eleanor Grove, SW13 0JN

DRAWING TITLE: **Proposed - Roof Plan - Option 1**

SCALE	DATE CREATED	DESIGNED	CHECKED
1:100	13/06/2024	NG	KM
PROJECT NUMBER	DRAWING NUMBER	REVISION	
2405	04-04A	P4	

1 Roof Plan
Scale: 1:100

FIGURE A2: PROSPED PLAN

APPENDIX B: TABLES



Job No.	Job Title			
3035	2a Eleanor Grove, London			
Date Created	By	Date Revised	Rev	Sheet
20 Aug 2024	AF	21 Aug 2024	7	3
Date Reviewed	By	Review Type	Review Status	
21 Aug 2024	AF	Self Check	No Comments	

Calculation Title

Item / Description	Rating/Broadband/Input	Rating		dB(A)	Octave Band Centre Frequency, Hz								
		Rating	dB		31.5	63	125	250	500	1k	2k	4k	8k
‡ Daikin RXYSCQ5TV1	Lw					51.0	53.0	52.0	53.0	46.0	41.0	34.0	27.0
‡ Daikin RXYSCQ6TV1	Lp					54.0	55.0	52.0	53.0	48.0	43.0	37.0	29.0
= Logarithmic Sum				56 (A)		55.8	57.1	55.0	56.0	50.1	45.1	38.8	31.1
Ratio of Distances - Point Source		1.0 m	4.9 m		-13.8	-13.8	-13.8	-13.8	-13.8	-13.8	-13.8	-13.8	-13.8
Lpath length difference	20cm					-7.7	-9.4	-11.8	-14.7	-17.6	-20.6	-23.6	-26.7
Sum at nearest residential receptor				27 (A)		34.3	33.9	29.4	27.5	18.7	10.7	1.3	-9.3

TABLE B1: PLANT CALCULATIONS

APPENDIX C: TERMINOLOGY RELATING TO NOISE

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level	The sound level is the sound pressure relative to a standard reference pressure of 20_{μ}Pa (20×10^{-6} Pascals) on a decibel scale.
Sound Power Level (L_w)	is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1 / s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20_{μ}Pa .
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
$L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level. The value of the A-weighted sound pressure level of a continuous steady sound that, within a measurement time interval T, has the same A-weighted sound energy as the actual time-varying sound
$L_{90,T}$	L_{90} is the noise level exceeded for 90% of the period T (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
Specific Noise	The noise source under investigation for assessing the likelihood of complaints.
Rating Level	The specific noise level plus any adjustment for the characteristic features of the noise.
Free field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m.
Façade	At a distance of 1m in front of a large sound reflecting object such as a building façade.

APPENDIX D: LIMITATIONS TO THE REPORT

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The findings and opinions expressed are relevant to the dates of the site works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations AF Acoustics Ltd reserves the right to review the information, reassess any new potential concerns and modify our opinions accordingly.