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Noico Limited
Landmark House
Station Road
Hook
RG27 9HA

Tel: 01256 766207
Email: sales@noico.co.uk
www.noico.co.uk

REPORT No. 2504053-4A

15 Chalcot Road
Primrose Hill
London
NW1 8YA

ENVIRONMENTAL NOISE SURVEY & PLANT NOISE ASSESSMENT REPORT

PREPARED: 8th May 2025
REVISED: 14/05/25 AN

Presented by:
Amanda North TechIOA

Checked by:
Fraser Roskilly AMIOA

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1.0 Introduction

1.1 Bridget Smith has commissioned Noico Ltd to conduct an environmental noise survey at 15 Chalcot Road, Primrose Hill, London NW1 8YA with the respect to the new external mechanical plant installation proposal.

1.2 The purpose of the survey is to collect statistical noise data and determine the background noise levels at the property. Based on the survey results, noise criteria will be established to limit emissions from the proposed mechanical plant installations serving the premises. These criteria will be set in accordance with the requirements of the local planning authority (Camden Council) for residential receptors.

1.3 An environmental noise survey was carried out at a location that closely resembles the background noise likely to be experienced at the residential properties closest to, and most likely to be affected by noise transmission from the proposed mechanical plant installations.

1.4 The development site comprises of residential properties located in the area of Primrose Hill. It is understood as part of the development plans, new items of mechanical plant are to be installed externally in the rear garden of 15 Chalcot Square.

1.5 The site is surrounded by residential properties (primarily three and four storey Victorian terraced town houses) with the rear elevations facing onto the development site: The closest residential properties to the new plant (and hence noise sensitive) being as follows:

No's 16 Chalcot Square directly next door, to the northeast
No's 29/30 Chalcot Road to the southwest.

2.0 Instrumentation:

2.1 The noise monitoring equipment used for the survey was a precision grade Norsonic 140 'Type 1' Integrating Sound Level Meter. This was equipped with a Norsonic outdoor microphone protection kit Nor-1212 and LEMO extension cable. The instrument was powered by an external battery and stored in a weatherproof case.

2.2 The instruments were calibrated prior, and after use, with no calibration drift recorded.

2.3 Equipment serial numbers and calibration certification can be found in the table below.

Equipment reference	Equipment type	Serial number	Calibration Certificate ref.	Calibration Date
140 Green	Norsonic Type 140 sound level meter	1404895	47722	140 Green
	Norsonic Type 1225 microphone	151323	47721	
	Norsonic Type 1209A preamplifier	14369	47722	

Table-1: Equipment list including calibration certificate

3.0 Survey details

3.1 Measurement location: The environmental noise analyser microphone was located externally in the rear garden on a small terrace attached to the terrace railings and raised 1.5 metres above, and positioned approximately 2 metres from the façade of the building and any reflecting surfaces. This location was chosen as it was considered to be representative of the background noise environment that exists at the nearest noise-affected properties and gardens/terraces in Chalcot Square and Chalcot Road, and is shown in Figure A1 at the end of this report.

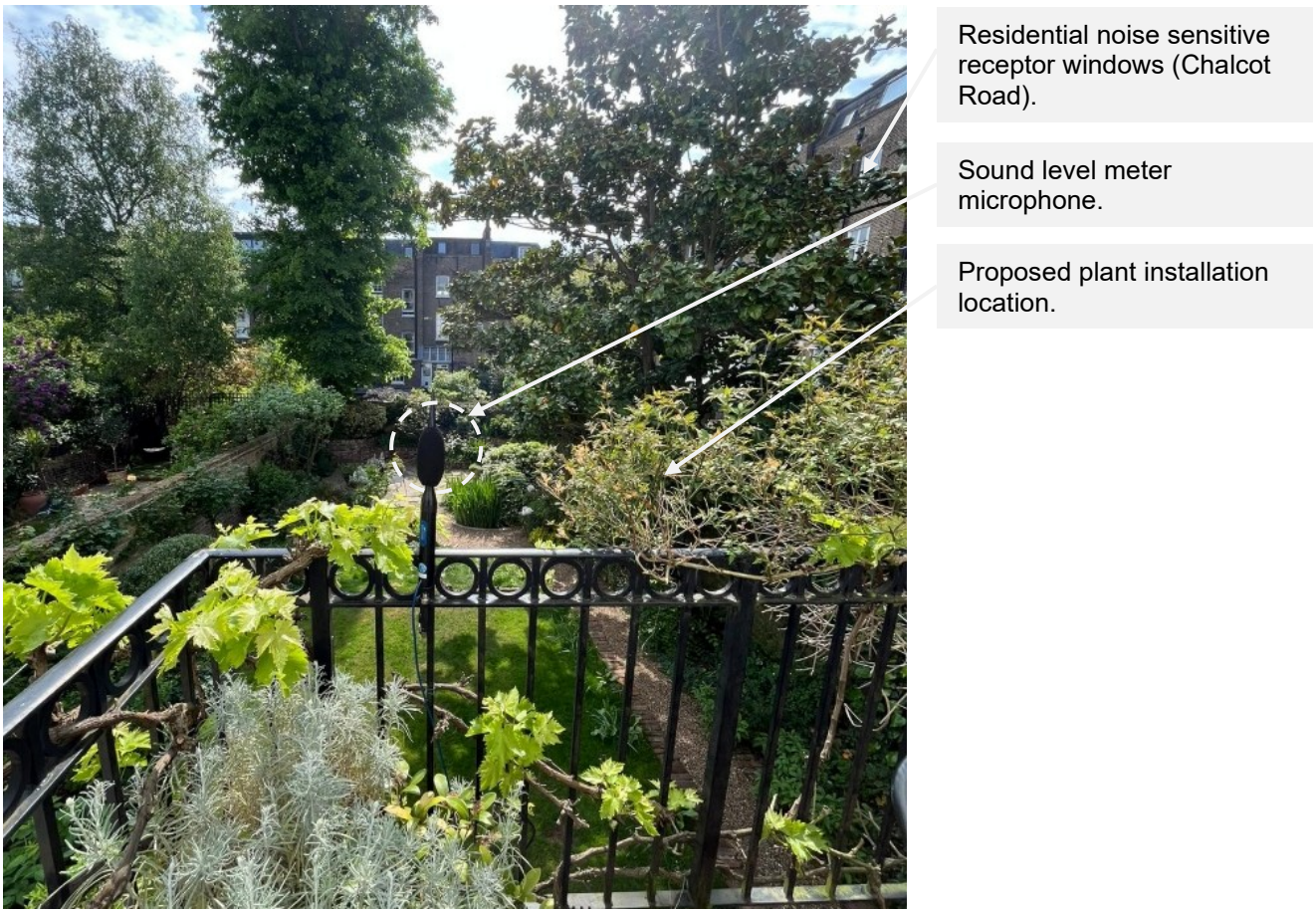


Figure-1: Photograph of the development site annotated with noise monitoring equipment position, nearby noise sensitive receptor windows and proposed plant installation location.

3.2 Survey Period: Noise monitoring was carried out continuously from approximately 11.00 hrs on 2nd May 2025 through to 08.30 6th May 2025. The instrument was set up to monitor noise levels continuously and store data in fifteen-minute intervals.

3.3 Weather: The prevailing weather condition throughout the majority of the entire survey period was satisfactory for noise monitoring, being dry, reasonably cold and with little to moderate breeze. Windspeed, although not recorded, was considered to be less than 5 m/s throughout the survey period.

3.4 Site Noise Characteristics: Although the survey was un-manned it is expected that the ambient noise level was characterised by distant road traffic noise, in particular along Chalcot Road, Chalcot Square, Fitzroy Road and Gloucester Road. No other significant sources of noise were identified during the site visits, and the data is considered a true representation of the area's background noise level.

4.0 Survey Results

4.1 The results of the environmental survey are presented in graphical format in the attached appendix 2, showing the recorded values of L_{Aeq} and L_{A90}. See Appendix 1 for a glossary of terms.

4.2 To determine a representative (typical) background noise level at the noise monitoring position, the $L_{A90,15min}$ recorded values are rounded to the nearest decibel and plotted against percentage occurrence for daytime, evening, and night-time periods, shown in figure 1 below. This statistical analysis methodology is in line with BS 4142 *Methods for rating and assessing industrial and commercial sound*.

4.3 With reference to the measured data and background noise level statistical analysis in figure-1, the environmental noise levels are summarised in table-2 below.

Monitoring period	Minimum background level	Typical background level	Equivalent level
Daytime (07:00–19:00)	32.7 dB $L_{A90,15min}$	38 dB $L_{A90,15min}$	46.5 dB $L_{Aeq,12hr}$
Evening (19:00-23:00)	35.2 dB $L_{A90,15min}$	38 dB $L_{A90,15min}$	47.9 dB $L_{Aeq,4hr}$
Night time (23:00–07:00)	29.1 dB $L_{A90,15min}$	33 dB $L_{A90,15min}$	44.2 dB $L_{Aeq,8hr}$

Table-2: Summary of noise monitoring data.

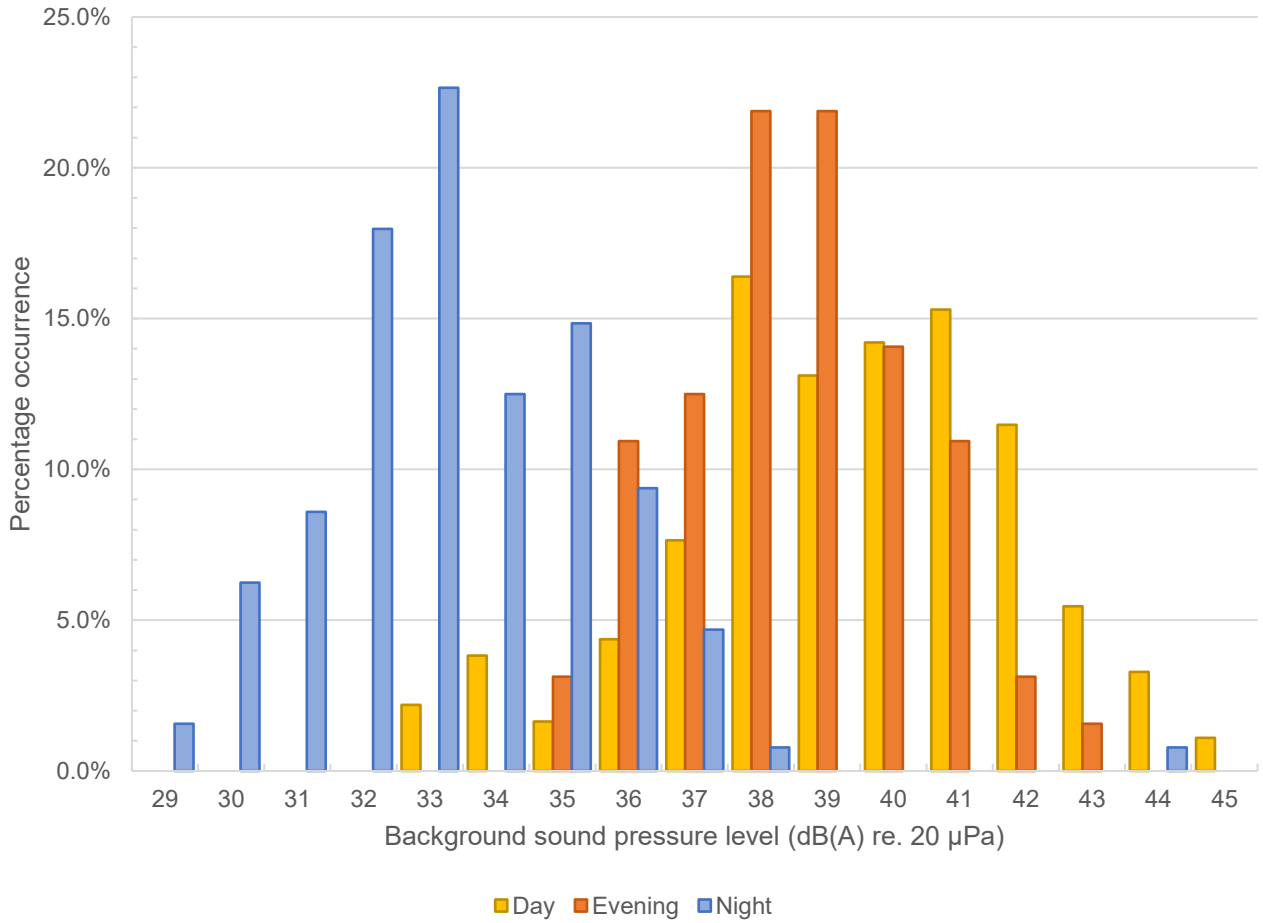


Figure-2: Statistical analysis of $L_{A90,15min}$ values to determine a representative 'typical' background sound level in accordance with BS4142 methodology.

5.0 Design noise criteria

5.1 Criteria for mechanical services noise emissions are normally based upon the prevailing level of background noise in the period of concern and may be set against this to a level as normally defined by the local planning authority.

5.2 In terms of an appropriate external design noise criteria, Camden London Borough Council's planning advice within Appendix 3 of the local plan states that - *it is expected that BS4142:2014 'Methods for rating and assessing commercial and industrial noise' will be used. For such cases a 'rating level' of 10dB below the background noise level (15dB if tonal elements are present) should be considered as the design criteria.*

5.3 To conform to the above criteria, and in accordance with the minimum background noise levels measured during the survey (summarised in table-2), noise from the plant installations should not exceed the following values. Values have been rounded to the nearest whole number for practical purposes. Note that these levels must be achieved cumulatively with all plant operating, and as measured at 1 metre from the window of the nearest affected property.

Plant operation period	Design Noise Criteria
Daytime plant operation (07:00-19:00)	28 dB $L_{Aeq,Tr}$
Evening plant operation (19:00-23:00)	28 dB $L_{Aeq,Tr}$
Night time plant operation (23:00-07:00)	23 dB $L_{Aeq,Tr}$

Table-3: Camden London Borough Council planning legislation plant noise level criteria.

6.0 Assessment positions

6.1 Windows of nearest noise sensitive properties

The site is surrounded by residential properties (primarily three and four storey Victorian terraced town houses) with the rear elevations facing onto the development site. The nearest noise sensitive residential buildings have been identified as follows in relation to the location of the proposed plant installations: No's 29/30 Chalcot Road & No's 16 Chalcot Square

6.1.1 Chalcot Square

The nearest property in Chalcot Square in relation to the plant area, is No.16 directly next door. We have assessed the noise transmission to the upper floor windows of the property as being the critical noise path. The nearest windows are 20 metres from the nearest point of the plant.

6.1.2 Chalcot Road

The nearest noise affected property in Chalcot Road in relation to the plant area, is No.29/30 due to the potential contribution from the new plant installation noise. We have assessed the noise transmission to the upper floor windows of the property as being the critical noise path. The nearest windows are 11 metres from the nearest point of the new plant.

6.2 Gardens and terrace areas of the nearest noise sensitive properties

6.2.1 Chalcot Square

The external terrace at the rear of No.16 Chalcot Square is considered to be the nearest outdoor space likely to be affected by noise from the plant installations. We have assessed the noise at a midway point on the terrace from the from the nearest point of the plant.

Again, we believe this to be a pessimistic approach as in reality the central point of each ventilation opening would normally be used to assess the relative distances from noise source to receptor locations.

6.2.2 Chalcot Road

The external terrace at the rear of No. 29/30 Chalcot Road is considered to be the nearest outdoor space likely to be affected by noise from the new plant installations. This location will benefit from the shielding effect from the boundary wall separating the two premises.

We have assessed the noise at a midway point on the terrace from the nearest point of the plant location. We believe in reality the central point of each ventilation opening would normally be used to assess the relative distances from noise source to receptor locations.

7.0 Plant Noise Assessment

7.1 Plant details and location: It is proposed that 2 no. Air Source Heat Pumps (ASHP), serving the premises of 15 Chalcot Square, are to be located in the rear garden. The equipment in question is detailed below, together with the manufacturers certified noise data.

There is no evidence of tonal features from the manufacturer's published data. In addition, the units utilise a 'soft-start' motor which will reduce perception of intermittency. It should be noted the plant will have the capacity to operate 24 hours a day, in line with the comfort heating/cooling requirements of the property. This ASHP is not recommend being put on quiet mode as it reduces the compressor frequency this reduces the units capacity output.

Model	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dBA
ASHP – EBLA-D3V37	54	52	52	50	46	43	39	31	**52**

Table 4: Manufacturer's noise data. Sound pressure level (SPL) values measured at 1 metre from the equipment in free-field conditions, re. 20 µPa.

7.2 The nearest noise affected premises to the plant installation location are described in detail in section 6: 16 Chalcot Square (residential noise sensitive receptor 1) and 29/30 Chalcot Road (residential noise sensitive receptor 2).

7.3 Noise impact assessment calculations: Our calculations, predicting the resultant sound pressure level at 1 metre from the nearest noise sensitive windows of the locations identified above, are detailed as follows for the most stringent plant operation periods.

NSR 1 windows - Noise impact assessment	Daytime calculation	Nighttime calculation
ASHP's EBLA-D3V37	52 dB L_{pA}	52 dB L_{pA}
Combined plant noise level at 1 meter (free field)	55 dB L_{pA}	55 dB L_{pA}
Hard surface reflections	+6 dB	
Distance loss (20 metres)	-26 dB	
Rating level at receptor	**35 dB $L_{Aeq,Tr}$**	**35 dB $L_{Aeq,Tr}$**
Design noise criteria	28 dB $L_{Aeq,Tr}$	23 dB $L_{Aeq,Tr}$
Level exceeding noise criteria	**7 dBA**	**12 dBA**

Table 5: Noise impact assessment calculation for residential noise sensitive receptor 1.

NSR 2 windows - Noise impact assessment	Daytime calculation	Nighttime calculation
ASHP's EBLA-D3V37	52 dB L_{pA}	52 dB L_{pA}
Combined plant noise level at 1 meter (free field)	55 dB L_{pA}	55 dB L_{pA}
Hard surface reflections	+3 dB	
Distance loss (11 metres)	-21 dB	
Barrier loss	-10 dB	
Rating level at receptor	**27 dB $L_{Aeq,Tr}$**	**27 dB $L_{Aeq,Tr}$**
Design noise criteria	28 dB $L_{Aeq,Tr}$	23 dB $L_{Aeq,Tr}$
Level exceeding noise criteria	**1 dBA**	**4 dBA**

Table 6: Noise impact assessment calculation for residential noise sensitive receptor 2.

NSR 1 garden - Noise impact assessment	Daytime calculation	Nighttime calculation
Combined plant noise level at 1 meter (free field)	55 dB L_{pA}	55 dB L_{pA}
Hard surface reflections	+6 dB	
Distance loss (12 metres)	-22 dB	
Barrier loss (partial line of sight)	-5 dB	
Rating level at receptor	**34 dB $L_{Aeq,Tr}$**	**34 dB $L_{Aeq,Tr}$**
Design noise criteria	28 dB $L_{Aeq,Tr}$	23 dB $L_{Aeq,Tr}$
Level exceeding noise criteria	**6dBA**	**11 dBA**

Table 7: Noise impact assessment calculation for residential noise sensitive receptor 1.

NSR 2 garden - Noise impact assessment	Daytime calculation	Nighttime calculation
Combined plant noise level at 1 meter (free field)	55 dB L_{pA}	55 dB L_{pA}
Hard surface reflections	+3 dB	
Distance loss (6 metres)	-16 dB	
Barrier loss	-10 dB	
Rating level at receptor	**32 dB $L_{Aeq,Tr}$**	**32 dB $L_{Aeq,Tr}$**
Design noise criteria	28 dB $L_{Aeq,Tr}$	23 dB $L_{Aeq,Tr}$
Level exceeding noise criteria	**4 dBA**	**9 dBA**

Table 8: Noise impact assessment calculation for residential noise sensitive receptor 2.

7.5 The results of the assessments indicate that the plant noise rating level at a position 1 metre from the nearest noise sensitive window, and 1.2 metres above ground level in the neighbouring gardens, may exceed the design noise criteria by a maximum of 12dBA during nighttime plant operation.

8.0 Noise mitigation measures

8.1 The following measures are aimed at reducing noise emissions from plant by a minimum of 7 dBA in order to satisfy the requirements of the local planning authority.

8.2 The ASHP's will need to be installed within an acoustic enclosure(s) formed of solid, high-mass, absorptive acoustic panel-work. The internal faces of the panels should be perforated with a fibre wool infill of density greater than 45 kg/m^3. The enclosure inlet and exhaust airflow paths should be formed of acoustic louvres, resulting in an enclosure insertion loss equal to or greater than the specification contained in table-9.

8.3 The following component performances, installed in the arrangement described above, would achieve an overall insertion loss of 12 dBA and, as such, achieve the design noise criteria at the nearest NSR.

Item	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Acoustic enclosure – Insertion loss	4	7	10	12	15	16	13	12

Table-9: Acoustic enclosure performance specification.

9.0 Conclusion

9.1 An unattended background noise level monitoring survey has been carried out at 15 Chalcot Square, London NW1 8YA.

9.2 Based upon the survey results, knowledge of the local authority's planning policies and relevant environmental design standards, criteria applicable to noise from the mechanical services plant have been established.

9.3 A noise impact assessment, in line with BS 4142, has been carried out on the proposed mechanical plant installations; it is determined that the design noise criteria will be exceeded by a maximum of 12 dBA.

9.4 Recommendations have been given for suitable noise mitigation measures which if implemented in full will achieve the design noise criteria, and as such meet the planning noise requirements of the local planning authority.

Appendix 1 – Glossary of terms

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (Lp) the reference quantity is $2x10^{-5}$ N/m^2. The sound pressure level existing when microphone measured pressure is $2x10^{-5}$ N/m^2 is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (Lp).
Frequency	Is related to sound pitch; frequency equals the ratio between velocity of sound and wavelength.
A-weighting	Arithmetic corrections applied to values of Lp according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of Lp actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of Lp actually measured.
$L_{n,T}$	Lp which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during time, T.
$L_{Amax,T}$	The instantaneous maximum A weighted sound pressure level which occurred during time, T.
Background Noise Level	The value of $L_{A90,T}$, ref. BS4142:2014.
Traffic Noise Level	The value of $L_{A10,T}$.
Specific Noise Level	The value of $L_{Aeq,T}$ at the assessment position produced by the specific noise source, ref. BS4142:2014.
Rating Level	The specific noise level, corrected to account for any characteristic features of the noise, by adding a 5 dBA penalty for any tonal, impulsive or irregular qualities, ref. BS4142:2014.
Specific Noise Source	The noise source under consideration when assessing the likelihood of complaint.
Assessment Position	Unless otherwise noted, is a point at 1 m from the façade of the nearest affected sensitive property.

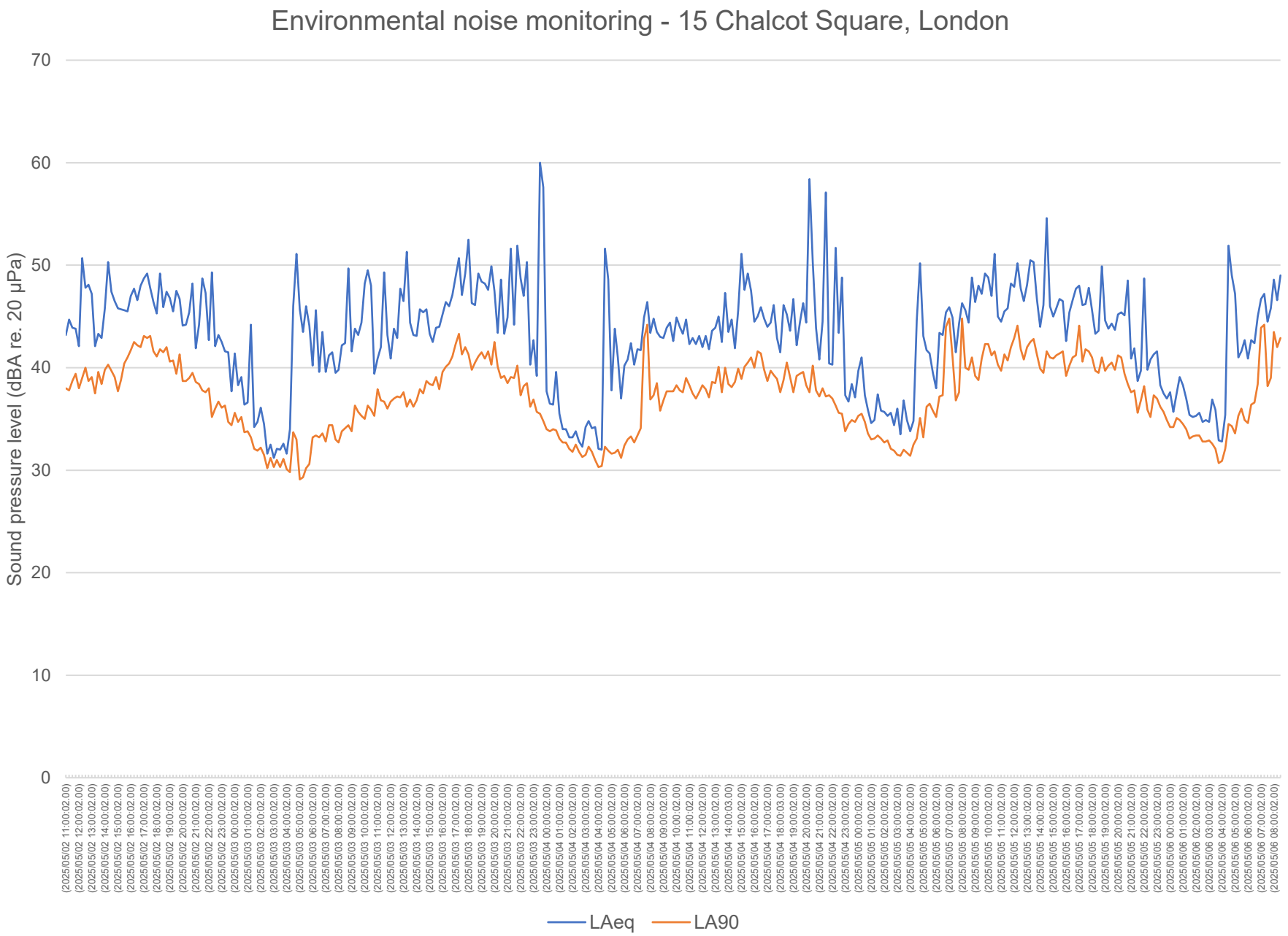
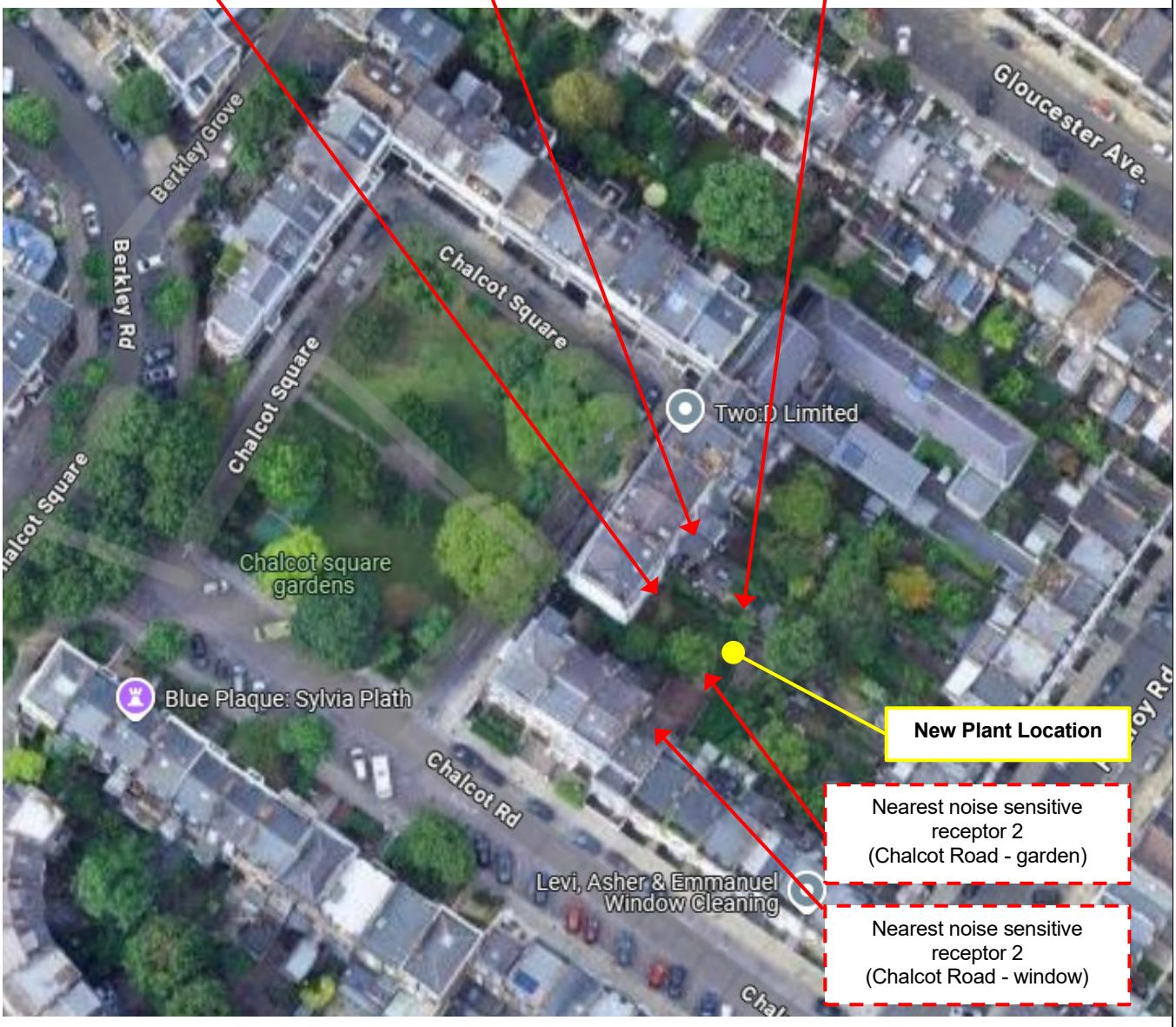

Environmental noise monitoring - 15 Chalcot Square, London
Sound pressure level (dBA re. 20 µPa)
70
60
50
40
30
20
10
0
LAeq
LA90

Figure A1



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NOICO NOISE CONTROL

Project: 15 Chalcot Square, London, NW1 8YA London	Title: Site layout
Dwg No: 2504053-4	Date: 08/05/25

Landmark House, Station Road, Hook, Hampshire, RG27 9HA
Tel: 01256 766207