



FLAT 17, 55-59  
SAFFRON HILL,  
LONDON, EC1N 8QX

## Plant Noise Assessment

Reference: 13293.RP01.PNA.0

Prepared: 30 January 2024

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Flat 17

55-59 Saffron Hill

London

EC1N 8QX

# Plant Noise Assessment



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Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	30 January 2024	Sameer Verma	Martin Raisborough

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The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and will need to be developed into full working drawings by the lead designer to incorporate all other design disciplines.



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## 1. INTRODUCTION

A number of items of condenser plant have been installed Flat 17, 55-59 Saffron Hill, London, EC1N 8QX. A planning application is to be made to the London Borough of Camden (LBoC) for the installed units. As part of this application, consideration is required to be given to atmospheric noise emissions from the installed equipment at the nearest noise-sensitive receptors.

RBA Acoustics has been commissioned to undertake measurements of the prevailing noise conditions at the site & provide an assessment of the atmospheric noise emission limits in accordance with LBoC's requirements.

A summary of acoustic terminology is included in Appendix A.

## 2. SITE DESCRIPTION

The site and nearest noise-sensitive receptors are shown in the site plan in Figure C1 and Figure C2 (Appendix C).

### 2.1 Site Location

Flat 17 is located on the sixth floor of 55-59 Saffron Hill, London, a residential apartment block. It is surrounded by a mix of commercial and residential premises, with offices towards the west and the Ziggurat Building, another residential apartment block, towards the north.

Saffron Hill and Saffron Street are roads within the immediate vicinity of the site and generally see high footfall and steady vehicle movements throughout the day. The general noise climate is made up of road traffic, pedestrian and typical anonymous urban noise.

The plant, 2No. condenser units, have been installed on the balcony of Flat 17. Both units are placed at the north of the property, facing towards the Ziggurat Building.

### 2.2 Location of the Nearest Noise-Sensitive Receptors

The nearest noise sensitive receptors are understood to be as follows:

- Receptor 1 - The nearby residential apartment located at the Ziggurat Building opposite the site, on a similar 6<sup>th</sup> floor level,
- Receptor 2 - The apartments immediately above and immediately below Flat 17.

## 3. CRITERIA

The requirements of LBoC's Environmental Health Department regarding new building services plant are understood to be as follows.

*"A relevant standard or guidance document should be referenced when determining values for NOEL, LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion)."*

Noise Policy Statement for England (NPSE) defines NOEL, LOAEL and SOAEL as follows:

- **NOEL** – No Observed Effect Level. The level below which no health effect or detrimental impact on the quality of life is observed.
- **LOAEL** – Lowest Observed Adverse Effect Level. The level at which adverse effects on health and quality of life can be detected
- **SOAEL** – Significant Observed Adverse Effect Level. The level above which significant adverse effects on health and quality of life occur.

## 4. ENVIRONMENTAL NOISE SURVEY

### 4.1 Survey Methodology

Monitoring of the prevailing background noise was undertaken over the following period:

09:15 Monday 15 January to 09:00 Tuesday 16 January 2024.

As the survey was unattended it is not possible to comment with certainty regarding meteorological conditions throughout the entire survey period. However, based on observations during the site visits and weather reports for the area, conditions were generally considered suitable for obtaining representative noise measurements, being predominantly dry with little wind.

### 4.2 Measurement Location

To determine the existing noise climate around the site measurements were undertaken at the following location:

#### *Measurement Position 1 – Flat 17 Balcony*

A microphone was set on an extension pole and attached to the balcony railing of flat 17. The microphone was positioned approximately 2m above the balcony floor, and at least 1m from any reflective surfaces. The noise climate at this position is the same as that experienced in the surrounding area but has been chosen specifically to be representative of the noise climate at the nearby noise sensitive properties.

Note that the installed condenser units were not in operation during the measurement survey.

The measurement position is also illustrated on the site plan attached in Figure C1 and photos in Figure C2 (Appendix C).

### 4.3 Instrumentation

For information regarding the equipment used for the measurements please refer to Appendix B.

The sound level meter was calibrated both prior to and on completion of the survey with no significant calibration drift observed.

The calibration reference level was 114.0dB. The meter readings of the reference level before and after the measurements were 114.0dB and 114.0dB respectively which were within the calibration tolerance.

## 4.4 Results

The noise levels measured are shown as time-histories on the attached Graphs 1-3 (Appendix C).

The lowest  $L_{A90, 15 \text{ minute}}$  and the period averaged  $L_{Aeq}$  noise levels measured are summarised in Table 1.

Table 1 – Measured Sound Levels

Measurement Period	Position 1 – Flat 17 Balcony	
	Lowest $L_{A90, 15 \text{ minute}}$ (dB)	$L_{Aeq}$ (dB)
Daytime (07:00 – 23:00)	47	57
Night-time (23:00 – 07:00)	44	52

## 5. BS 4142 ASSESSMENT

This assessment has been based on the information provided to RBA Acoustics by the client and is described in the following sections.

### 5.1 Proposed Plant Limitations

The requirements of LBoC's Environmental Health Department regarding new building services plant are described in Section 3.

In line with these requirements, and considering the measured background sound levels with the plant inoperative, we propose that noise emissions from items of mechanical services do not exceed the following levels when assessed at the nearest noise sensitive location:

- Daytime (07:00 to 23:00)                      37 dBA
- Night-time (23:00 to 07:00)                34 dBA

In line with BS 4142:2014, should the proposed plant be identified as having intermittent or tonal characteristics, a further penalty should be subtracted from any of the above proposed noise emission limits.

It should be noted that the above requirements are to be applied at the nearest residential adjacencies and alternative criteria should be incorporated if there are also commercial properties affected by the proposed plant installations.

### 5.2 Plant Items

The following plant have been installed:

Table 2 – Plant Types

Ref.	Manufacturer/Model/Duty	Plant Type
CU1	Fujitsu AOYG18KBTA2	Condenser Unit
CU2	Fujitsu AOYG24KMTA	Condenser Unit

### 5.3 Plant Locations

Both items of plant have been placed on the north facing portion of the balcony of Flat 17, 55-59 Saffron Hill. The equipment positions are indicated on the site plan in Figure C1 and Figure C1 in Appendix C.

### 5.4 Plant Noise Levels

Information regarding the noise levels of the proposed plant has been provided by the manufacturer of the units. The associated plant noise levels are detailed as follows:

Table 3 – Plant Noise Levels

Unit	Parameter	Sound Level (dB) at Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
CU1 (53dBA)	$L_p$ at 1m	60	60	55	50	46	41	37	40
CU2 (54dBA)	$L_p$ at 1m	70	48	60	50	47	39	38	26

Review of the octave band data provides no indication of any tonal characteristics associated with the proposed plant.

The units are fitted with inverter drivers so there is a smooth and gradual ramp up and down of fan speeds. The noise spectrum shape is also broadband in nature. As such, it is not considered that there are any attention-grabbing noise characteristics associated with the operation of these units such that a rating correction would need to be applied in accordance with BS 4142 methodology.

### 5.5 Calculation of Noise Levels at Nearest Noise-Sensitive Receptors

BS 4142:2014+A1:2019 states:

*Calculations are often more reliable than a single short-term measurement when long-term averages are to be determined and in other cases where it is impossible to carry out measurements because of high residual sound levels. In case of the latter, it is sometimes convenient to carry out the measurements closer to the source and then use a calculation method to estimate the specific sound level at the assessment location(s).*

Thus, calculations using the manufacturer's noise data provided will be used to determine the specific and rating sound levels and assessed against the measured background sound levels.

Our calculation method for predicting noise levels from the proposed plant at the nearest noise-sensitive receptors, based on the information above, is summarised below.

- Source Term SPL / SWL
- Distance Attenuation
- Directivity
- Screening

It is assumed that the units will operate at all hours. Only the night-time criteria has been considered in our assessment as the plant noise emission limit is lower during this period. Meeting the night-time criteria will mean the daytime criteria will also be met.

The results of the calculations indicate the following rating sound levels at the nearest affected residential properties:

Table 4 – Predicted Rating Sound Levels

Operating Period	Noise Level (dB) at Receptor 1 – Ziggurat Building Apartment Window		Noise Level (dB) at Receptor 2 – Apartment Window Above/Below Flat 17 Balcony	
	Prediction	Criterion	Prediction	Criterion
Night-time (23:00 – 07:00)	32	34	34	34

Noise from the installed plant is not in exceedance of the proposed limits and Local Authority criteria and should, therefore, be considered appropriate.

As such, no mitigation measures would be required to be included in the design and installation.

## 5.6 Impact on Nearest Noise-Sensitive Receptors

The impact on the nearest noise sensitive receptors has also been calculated by comparing the calculated rating sound level (unmitigated) with the background sound level in accordance with BS 4142:2014+A1:2019 and is summarised in Table 5:

Table 5 – Predicted Impact level at Nearest Noise-Sensitive Receptors

Receptor	Time Period	Excess of rating level over plant noise emission limit (dB)	NPSE Impact Level
Receptor 1 – Ziggurat Building Apartment Window	Daytime (07:00 – 23:00)	– 5	NOEL
	Night-time (23:00 – 07:00)	– 2	NOEL
Receptor 2 – Apartment Window Above Flat 17 Balcony	Daytime (07:00 – 23:00)	– 3	NOEL
	Night-time (23:00 – 07:00)	– 0	NOEL

## 6. CONCLUSION

RBA Acoustics has been commissioned to undertake a noise impact assessment in relation to a number of installed condenser units on the balcony of Flat 17, 55-59 Saffron Hill, London, EC1N 8QX.

Monitoring of the prevailing background noise level at the site, with the condensers inoperative, was undertaken between Monday 15 and Tuesday 16 January 2024. The background sound levels have been used as a basis for the setting of noise emission limits for the plant based on the requirements of the London Borough of Camden.

Based on the two installed condenser plant items, a noise impact assessment upon the nearby noise sensitive receptors have been undertaken in accordance with BS 4142 methodology. The results of our assessments indicate that noise from the installed plant items is not expected to cause an observable adverse effect on the occupants of the nearby noise sensitive properties, and is in accordance with the adopted plant noise emission limits.



# Appendix A – Acoustic Terminology

A-weighting (e.g. dB(A))	A correction applied across the frequency bands to take into account the response of the human ear, and therefore considered to be more representative of the sound levels people hear.
DeciBel (dB)	Unit used for many different acoustic parameters. It is the logarithmic ratio of the level being assessed to a standard reference level.
$L_{eq}$	The level of a notional steady sound which, over a stated period of time, $T$ , would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
$L_{Aeq,T}$	The A-weighted level of a notional steady sound which, over a stated period of time, $T$ , would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
$L_{An}$ (e.g. $L_{A10}$ , $L_{A90}$ )	The sound level exceeded for n% of the time. E.g. $L_{A10}$ is the A-weighted level exceeded for 10% of the time and as such can be used to represent a typical maximum level. Similarly, $L_{A90}$ is the level exceeded for 90% of the measurement period, and is often used to describe the underlying background noise.
$NR$	Noise Rating – A single figure term to describe a measured noise level which considers the frequency content of the noise, generally used for internal noise level measurements (particularly mechanical services plant).

# Appendix B – Instrumentation

The following equipment was used for the measurements.

Table B1– Equipment Calibration Details				
Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Valid Until
Norsonic Type 1 Sound Level Meter	Nor140	1403226	U42991	18 January 2025
Norsonic Pre Amplifier	1209A	12066		
Norsonic ½” Microphone	1225	168180	42990	18 January 2025
Norsonic Sound Calibrator	1251	31988	U42989	18 January 2025

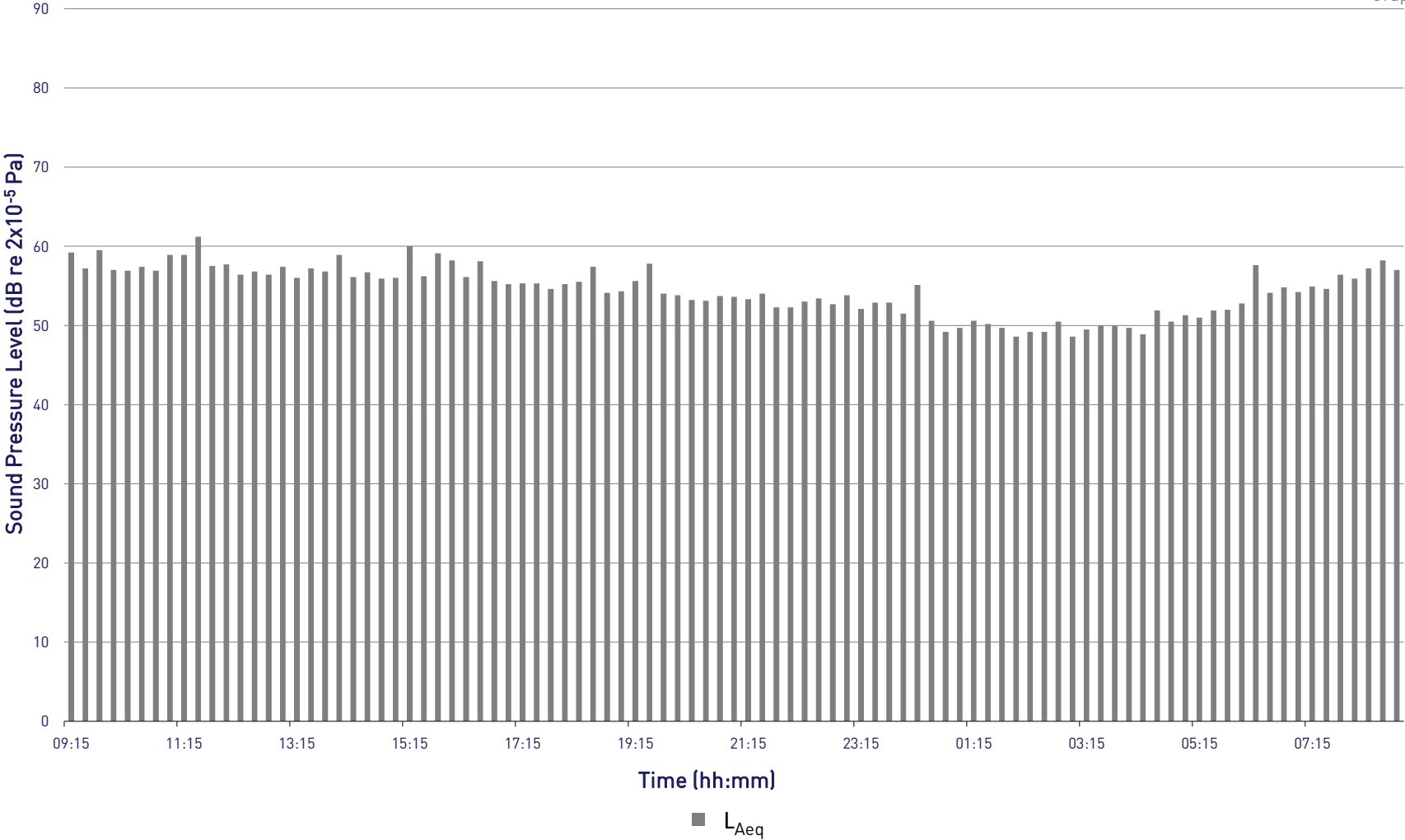
## Appendix C – Graphs and Site Plans

55-59 Saffron Hill  
L<sub>Aeq</sub> Time History  
Monday 15th January 2024 to Tuesday 16th January 2023



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Graph 1



55-59 Saffron Hill

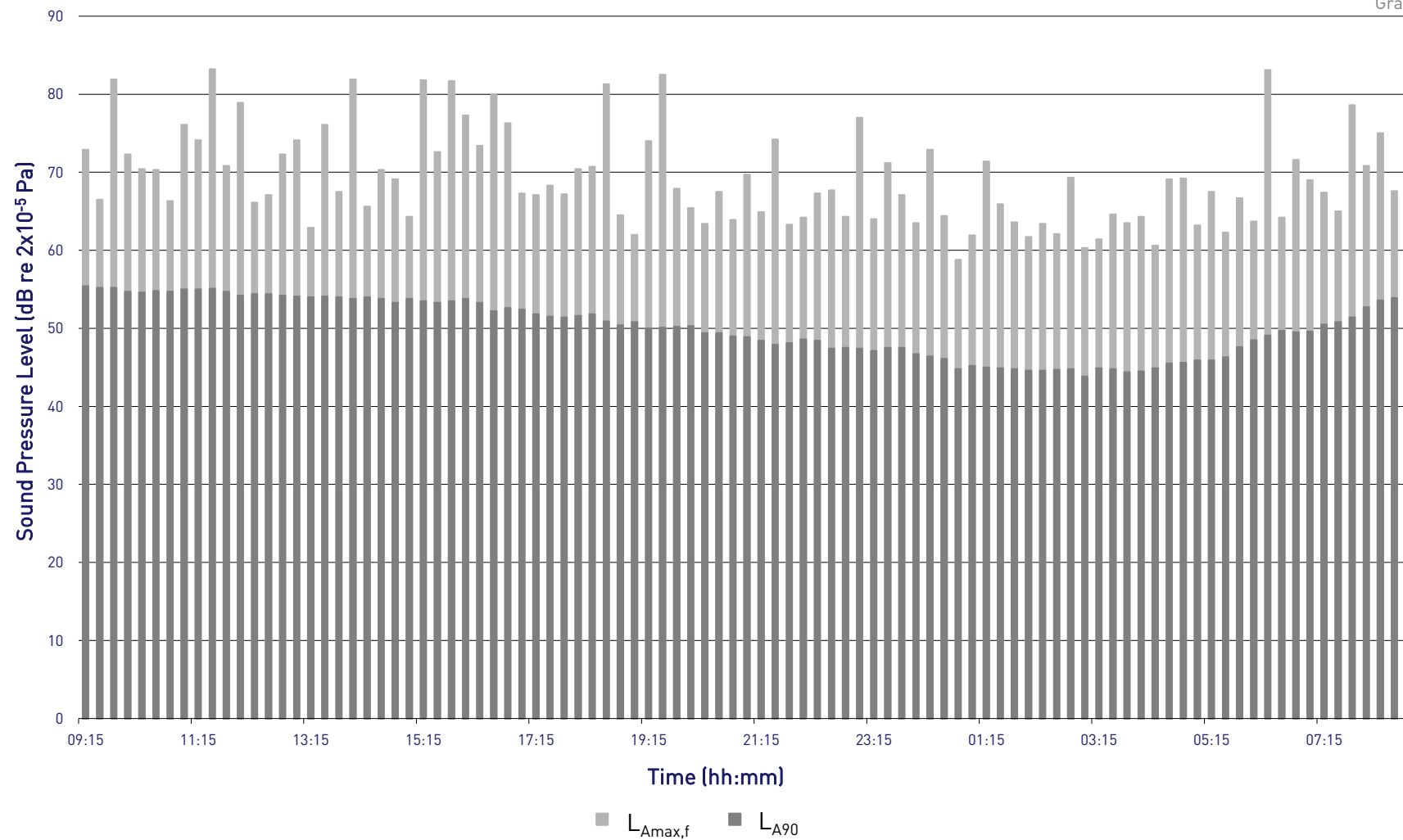
$L_{Amax,f}$  and  $L_{A90}$  Time History

Monday 15th January 2024 to Tuesday 16th January 2023



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Graph 2



55-59 Saffron Hill

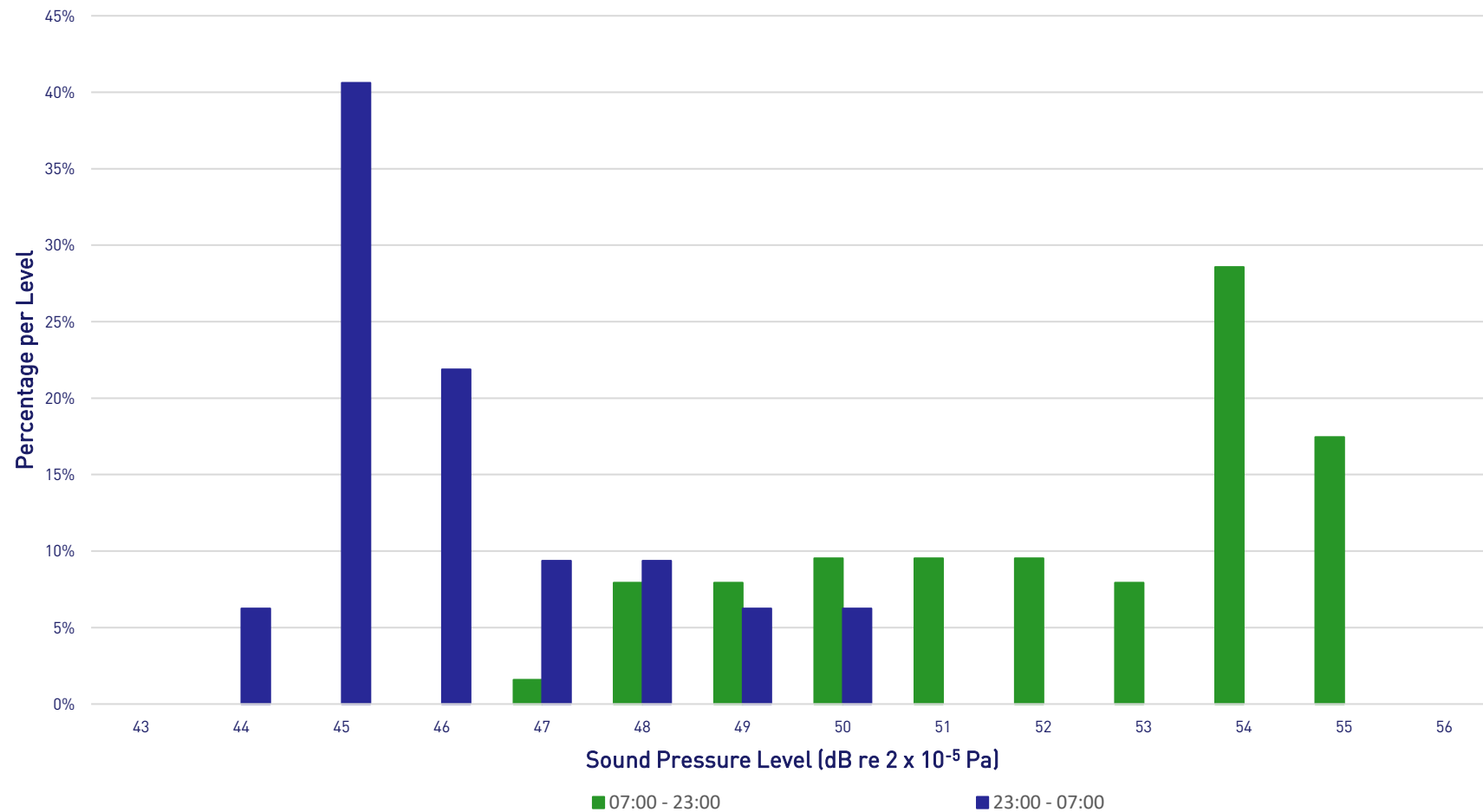
L<sub>A90,15 minutes</sub> Histogram

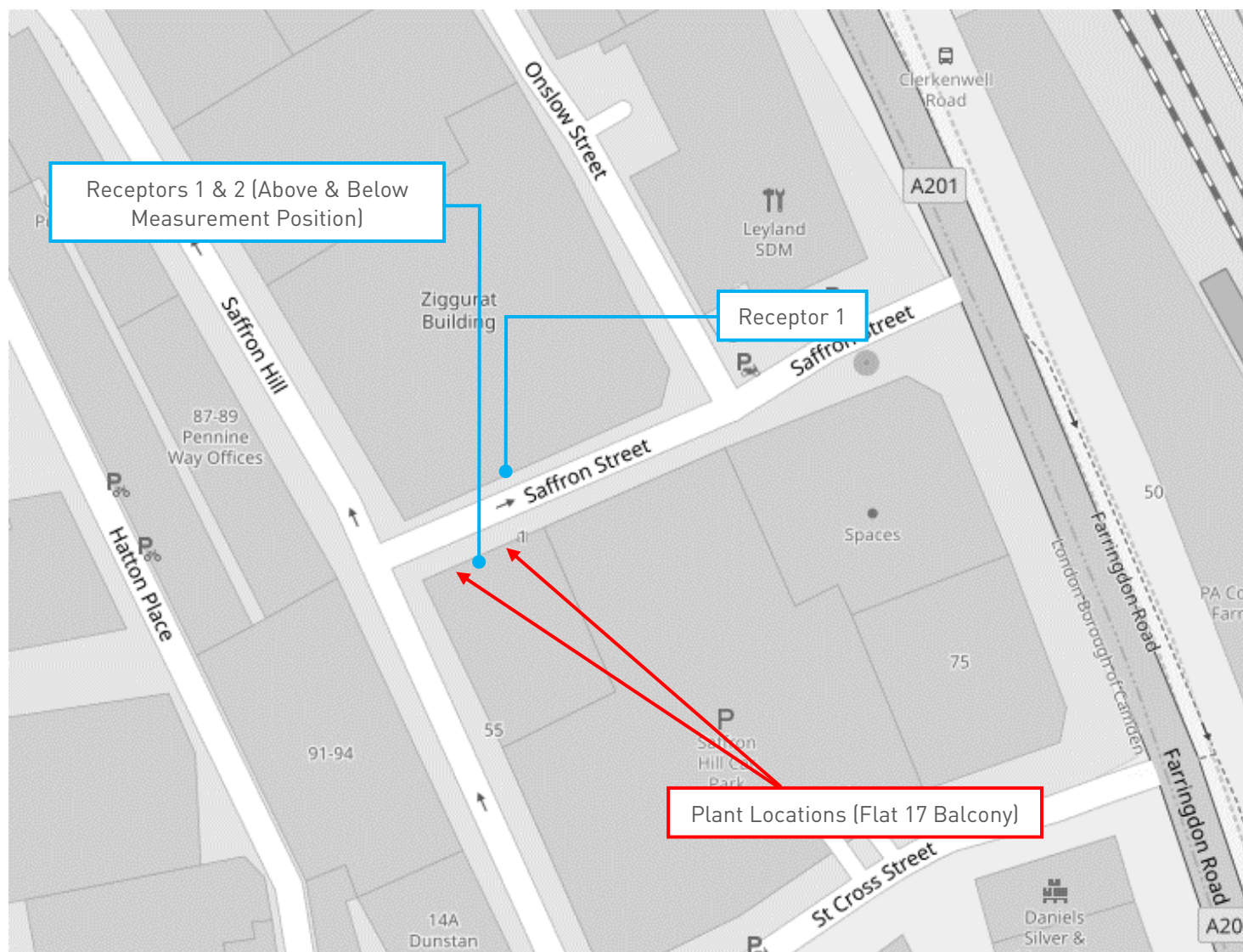
Monday 15th January 2024 to Tuesday 16th January 2023



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Graph 3





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Flat 17, 55-59 Saffron Hill, London, EC1N 8QX

Approximate Locations of Site, Plant & Nearest Noise-Sensitive Receptors

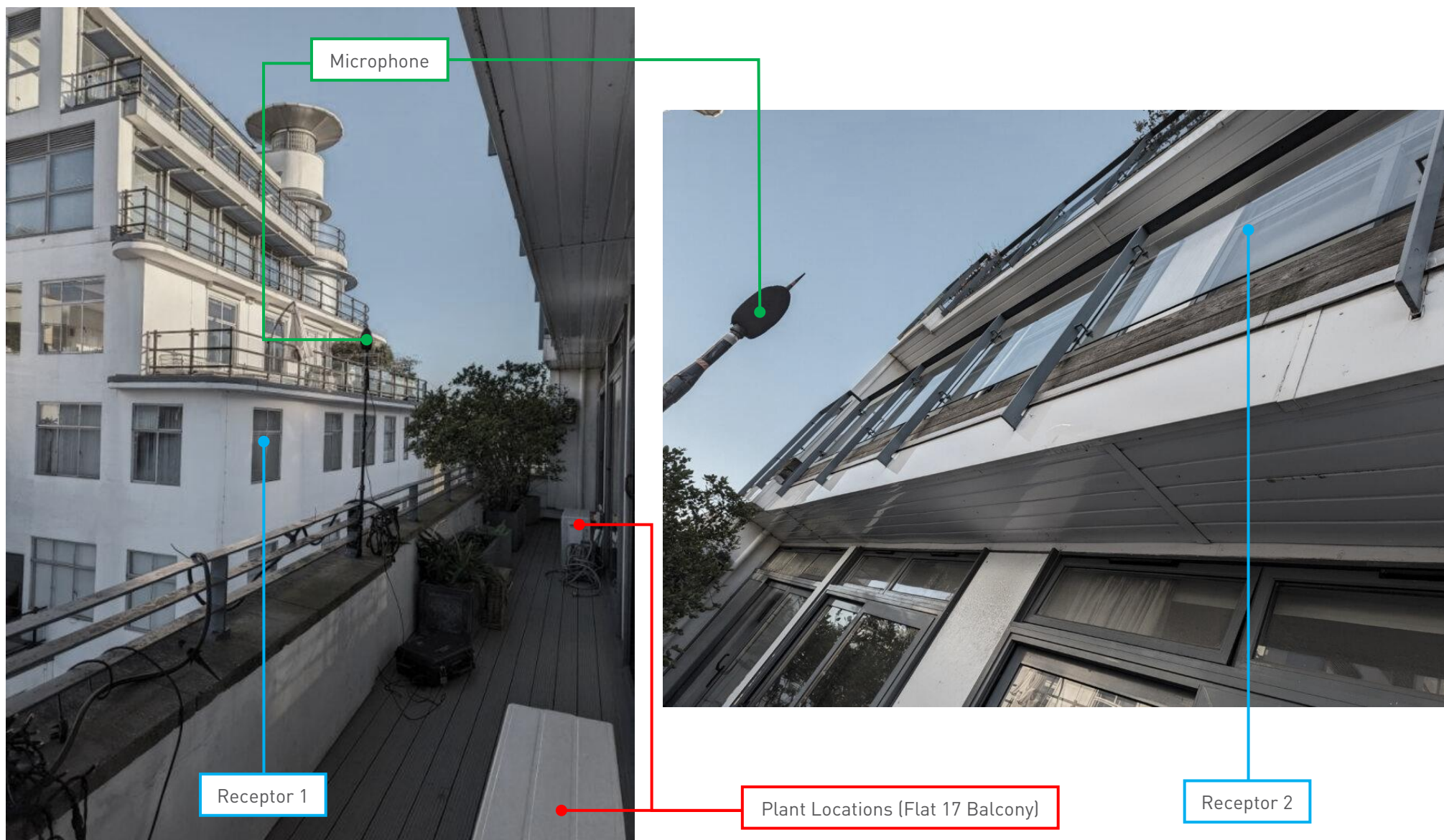
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Figure C1

30 January 2024

Not to Scale





Flat 17, 55-59 Saffron Hill, London, EC1N 8QX  
 Photos of Plant & Nearest Noise-Sensitive Receptors  
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Figure C2  
 30 January 2024  
 Not to Scale





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