



**ScotchPartners**  
Building Services Engineering | Sustainability | Acoustics

**The Lamb and Flag, 33 Rose Street, London**  
Fuller, Smith, and Turner PLC

**Noise Impact Assessment**

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## Project Particulars

Client Name: Fuller, Smith, and Turner PLC

Project Name: The Lamb and Flag, 33 Rose Street, London

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## Revision History

Revision	Date	Prepared By	Checked By
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## 1 Introduction

- 1.1.1 Two new internal air conditioning (AC) units and an associated external condenser unit have been proposed to serve The Lamb & Flag public house located at 33 Rose St, London WC2E 9EB. This report assesses the noise impact of the external condenser unit, which is to be located on the pub's flat roof at second storey level, on the surrounding environment.
- 1.1.2 An external noise survey has been conducted at the site to establish the prevailing ambient and background noise levels affecting the site and neighbouring noise sensitive properties.
- 1.1.3 Measurement data has been used to assess external noise emission from the new plant on the nearest noise-sensitive receivers.
- 1.1.4 Chapter 2 of this report presents the acoustic requirements. Chapter 3 describes the external noise survey and Chapter 4 describes the noise assessment including a BS 4142 assessment.
- 1.1.5 The full measurement data are available on request. Definitions of some of the terminology used throughout the report have been included in Appendix A.

## 2 Acoustic requirements

### 2.1 Response by Westminster City Council

2.1.1 In response to the application of the installation of AC and condenser units (ref: 23/08918/FULL), City of Westminster Council has requested a detailed noise impact assessment that complies with Westminster City Council's City Plan 2019-2040 (adopted April 2021). The city plan contains a policy concerning local environmental impacts, Policy 33, with Part C of the policy specifically dedicated to noise and vibration. 'Reason 1' of the City of Westminster's response outlines a set of required information a noise impact assessment should include and is reproduced below:

*"\* The location of the nearest noise sensitive receptors and tranquil open spaces that may be affected by noise from the proposed plant or activity. Sensitive use includes residential use, educational establishments, hospitals, hotels, hostels, concert halls, theatres, law courts, and broadcasting and recording studios, but is not exhaustively limited to these use types. Indicate the distance of the window(s) and/or tranquil open space from the source in metres.*

*\* The proposed operational hours of the plant/activity, plant type, number and locations.*

*\* The measured Ambient noise level (LAeq) for the 16 hours daytime and 8 hours night time (If plant to operate at night) to assess which planning condition applies (see Standard Planning Conditions on our website: [www.westminster.gov.uk/planning-building-and-environmental-regulations/find-appeal-or-comment-planning-application/decisions-your-planning-application/standard-conditions-and-informatives](http://www.westminster.gov.uk/planning-building-and-environmental-regulations/find-appeal-or-comment-planning-application/decisions-your-planning-application/standard-conditions-and-informatives)).*

*\* The representative lowest background noise level assessment (LA90 15 minutes) over the proposed hours of operation including the time, date and weather conditions, instrumentation and calibration, noise sampling locations and a copy of the noise survey data, (graphical & numerical).*

*\* Manufacturers Specifications of plant and/or proposed noise levels of internal activity in Octave or 1/3 octave band format.*

*\* Calculations for the predicted noise level 1 metre from the window of the nearest sensitive property including distance, directionality and screening effects.*

*\* You will need to demonstrate that the predicted noise level outside the most affected window will comply with the limits stated in our standard conditions. As a guideline these limits are normally 10dB below the lowest background LA90 (15mins). However, you will need to refer to Policy 33 in the City Plan 2019-2040 and the guidance in the draft Environmental Supplementary Planning Guidance, which may require correction penalties for tonality or intermittency.*

*\* Include any proposed attenuation measures and details of noise reductions achieved. Additionally, it is recommended that reference be made to BS 8233:2014, which contains guidance for commercial design criteria."*

## 2.2 Environmental Supplementary Planning Document

2.2.1 Westminster City Council's *Environmental Supplementary Planning Document* (ESPD) (adopted February 2022) provides objective guidance when assessing the noise from external activities against existing ambient noise. This can be seen in [Table 2-1](#).

Existing External Ambient Noise Level	Tonal or Intermittent Noise/Noise Source	Noise level that should not be exceeded at the nearest Noise sensitive Receptor <sup>1</sup>
Exceeds WHO Guideline levels $L_{Aeq}$ 55 dB over periods of day-time (7am-11pm) and $L_{Aeq}$ 45 dB at night-time (11pm-7am)	Does not contain tones or intermittent noise sufficient to attract attention	10 dB below the minimum external background noise level
	Contains tones or intermittent noise sufficient to attract attention	15 dB below the minimum external background noise level
	Noise emitted from emergency plant or an emergency life supporting generator	10 dB above the lowest background noise level within a 24 hour period
Does not exceed WHO Guideline levels $L_{Aeq}$ 55 dB over periods of day-time (7am-11pm) and $L_{Aeq}$ 45 dB at night-time (11pm-7am)	Does not contain tones or intermittent noise sufficient to attract attention	5 dB below the minimum external background noise level
	Contains tones or intermittent noise sufficient to attract attention	10 dB below the minimum external background noise level
	Noise emitted from emergency plant or an emergency life supporting generator	10 dB above the lowest background noise level within a 24 hour period
Below 30 dB $L_{A90,15min}$ at the nearest noise sensitive receptors Both day-time (7am-11pm) and night-time (11pm-7am)	Noise contains and/or does not contain tones or intermittent noise	Site specific standards that avoid noise disturbance to nearest noise sensitive receptors may be considered

<sup>1</sup> Measured at the nearest noise sensitive receptor 1m from the most affected façade, relative to the existing external background noise level in this location and including assessment at the quietest time during which the plant operates or when there is internal activity at the development site. The background noise level should be expressed in terms of the lowest  $L_{A90,15min}$  during day-time or night-time (depending on the hours of use being applied for)

Table 2-1: Objective guidance to follow when assessing noise from external activities

2.2.2 It is considered that achieving the criteria presented in [Table 2-1](#) and the response provided by Westminster City Council would satisfy Policy 33 of Westminster City Council's *City Plan 2019-2040*, and therefore would be acceptable to the local authority.

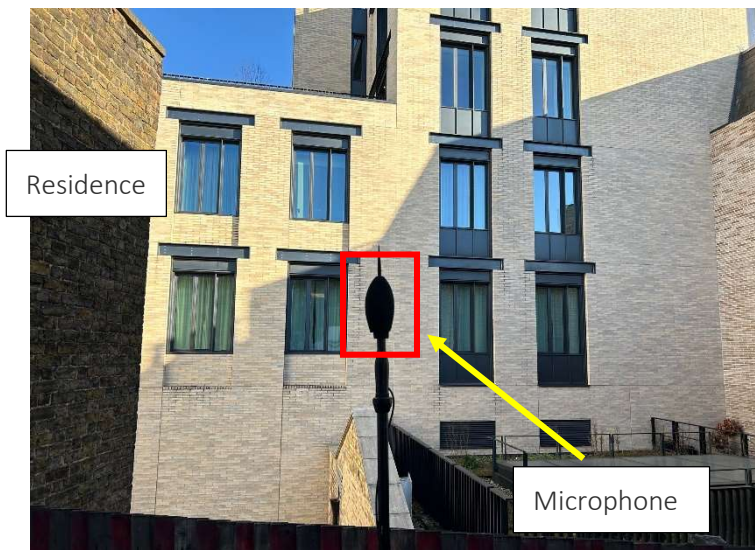
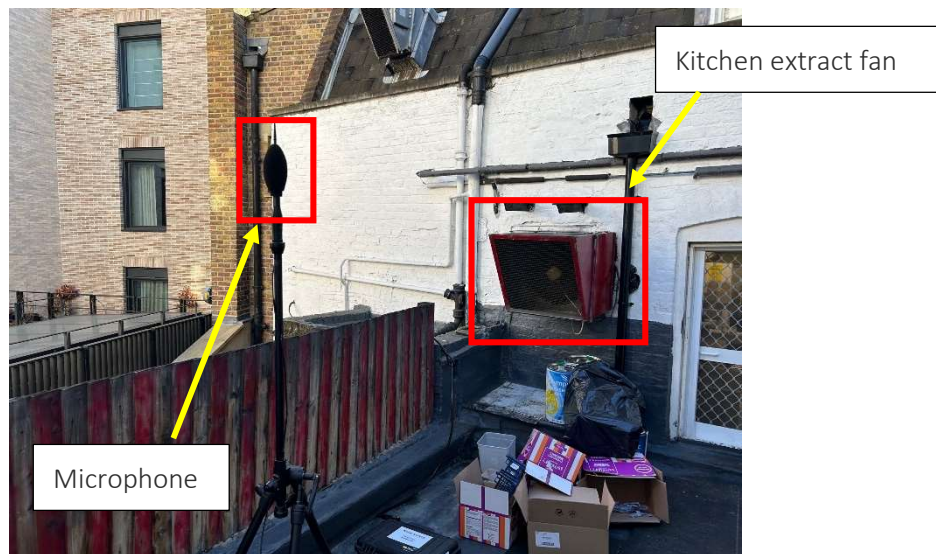
## 3 External noise survey

### 3.1 Site description

- 3.1.1 The site is located on Rose Street, a narrow alleyway situated in between Floral Street and Garrick Street in Covent Garden. If entering through Garrick Street, the front of the pub is directly in view. The surrounding area consists mainly of retail and commercial buildings, as well as some residences.
- 3.1.2 The main source of noise affecting the site and neighbouring properties is road traffic on Garrick Street. A/C and condenser units serving a commercial development directly to the west of the site are also significant contributors to noise. It should also be noted that there was construction work on Garrick Street, but it is assumed that this only occurred between the hours of 08:00 and 18:00.
- 3.1.3 The immediate neighbours are a retail development to the north and a row of restaurants to the south. To the south is an apartment building also on Rose Street, and to the east is Floral Court, a garden and mixed-use building with residential sections. Immediately east of the site is a residential section of Floral Court, with windows of the residence facing the roof terrace of the site building.

### 3.2 Measurement methodology

- 3.2.1 Continuous, unattended noise level measurements were conducted at a single position on the roof terrace of the site building. The microphone was placed in what is considered representative of free-field conditions; extended around 1.5m above the local ground.
- 3.2.2 The measurement position along with the locations of the sound source and receptors are shown on the site map in Figure 3-1.
- 3.2.3 The measurement position was selected as it was considered accessible and secure and a good representation of noise levels impacting the residences of Floral Court. Situated at a close distance to the microphone is a kitchen extract fan. Based on conversation with the facility's manager, the extract fan is to be on in the hours of 10:00-22:00 on Friday and Saturday and 10:00-20:00 on Sunday. When the extract fan is operating it is considered to have an unrepresentative influence on the measurements when considering the noise climate impacting the Floral Court residences. Therefore, the data measured at times when the extract fan is in operation have been discounted from the assessment and the lowest background sound level is taken from hours outside of the extract fan's hours of operation.
- 3.2.4 The following images show the measurement position in relation to the extract fan and most impacted residence, Floral Court, as well as an image showing the AC units of the neighbouring property:





3.2.5 Statistical and spectral data were recorded in 15-minute samples between 12:15 on Friday 19<sup>th</sup> and 14:45 on Monday 22<sup>nd</sup> January 2024. The Fast (125ms) time constant was used.

3.2.6 The following equipment were used for the survey:

Type	Model	Serial No.
Class 1 Sound level meter	Norsonic 131	1312766
Environmental microphone	Norsonic 1227	170606
Portable sound calibrator	Norsonic 1251	31313

Table 3-1 Noise level measurement equipment

3.2.7 The calibration of the sound level meter and associated microphone was checked prior to and on completion of the measurement period in accordance with recommended practice. No significant drift in calibration occurred during the measurement period. The accuracy of the calibrator can be traced to National Physical Laboratory Standards.

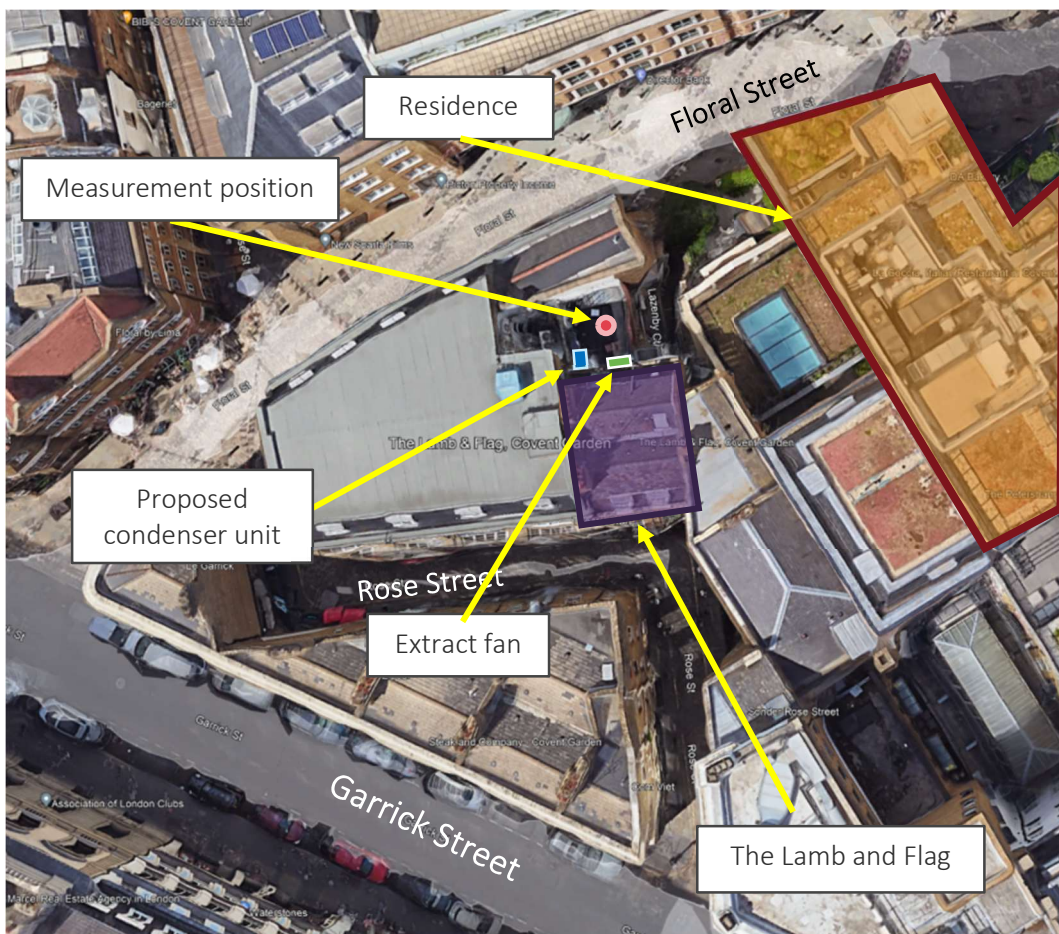


Figure 3-1 Site map highlighting the measurement position

### 3.3 Weather

3.3.1 Sourced from a nearby weather station in Northolt, UK, weather data shows that high wind speeds were recorded in the area from 12:00 Sunday 21<sup>st</sup> January to 12:00 Monday 22<sup>nd</sup> January due to a storm. It should be noted that wind speeds at this level can affect measurements of the background sound level. Because of the influence of the strong winds, data measured at this time have been discounted as the measured sound levels at this time are not considered representative of the typical ambient sound climate.

### 3.4 Measurement results

3.4.1 Full measurement data are available upon request.

3.4.2 The lowest measured background sound levels typically expected to occur during the daytime and night-time at the nearest noise sensitive properties are set down in Table 3-2. These levels have been derived from the measured data.

Time	Lowest background sound level
Day (07:00-23:00)	48 dB $L_{A90,15min}$
Night (23:00-07:00)	46 dB $L_{A90,15min}$

Table 3-2 Lowest background sound levels recorded during the survey

3.4.3 A graph showing the sound level history is presented in Figure 3-2.

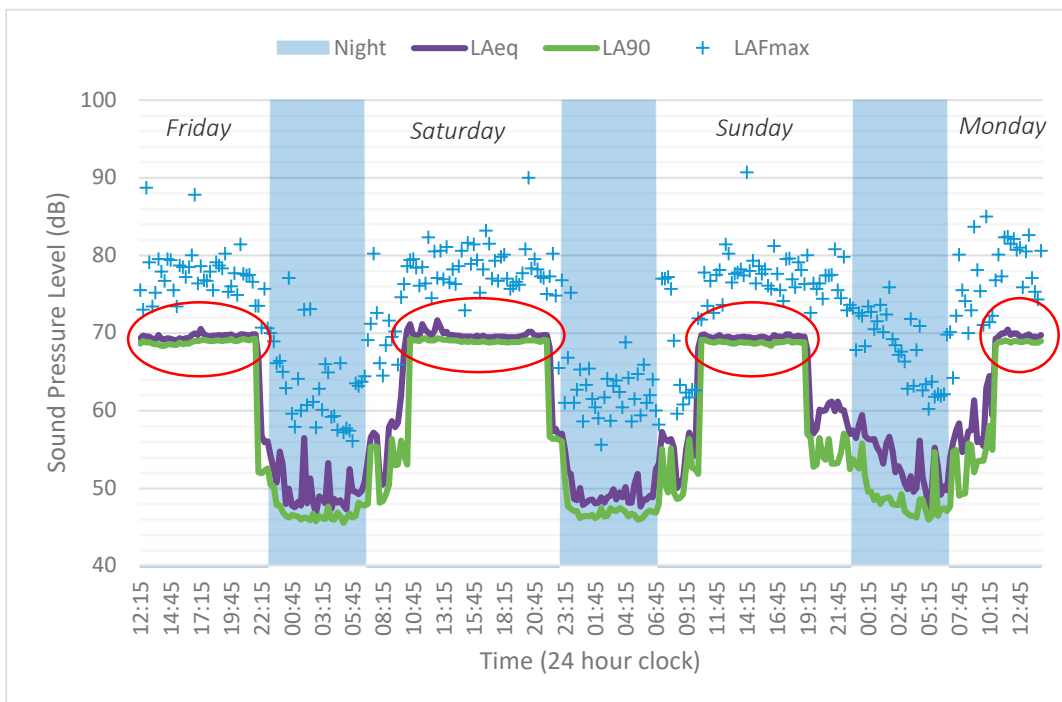


Figure 3-2: Measured sound level history between Friday 19/01/24 and Monday 22/01/24, Circled red are the sound pressure levels at the times the nearby kitchen extract fan is believed to be in operation.

## 4 Noise emission assessment

### 4.1 Plant proposals

4.1.1 The condenser unit is proposed to be placed on a roof terrace on the second floor of the building, adjacent to the pub's kitchen. Figure 4-1 shows the site plan and roof elevations with the proposed location of the plant circled in red.

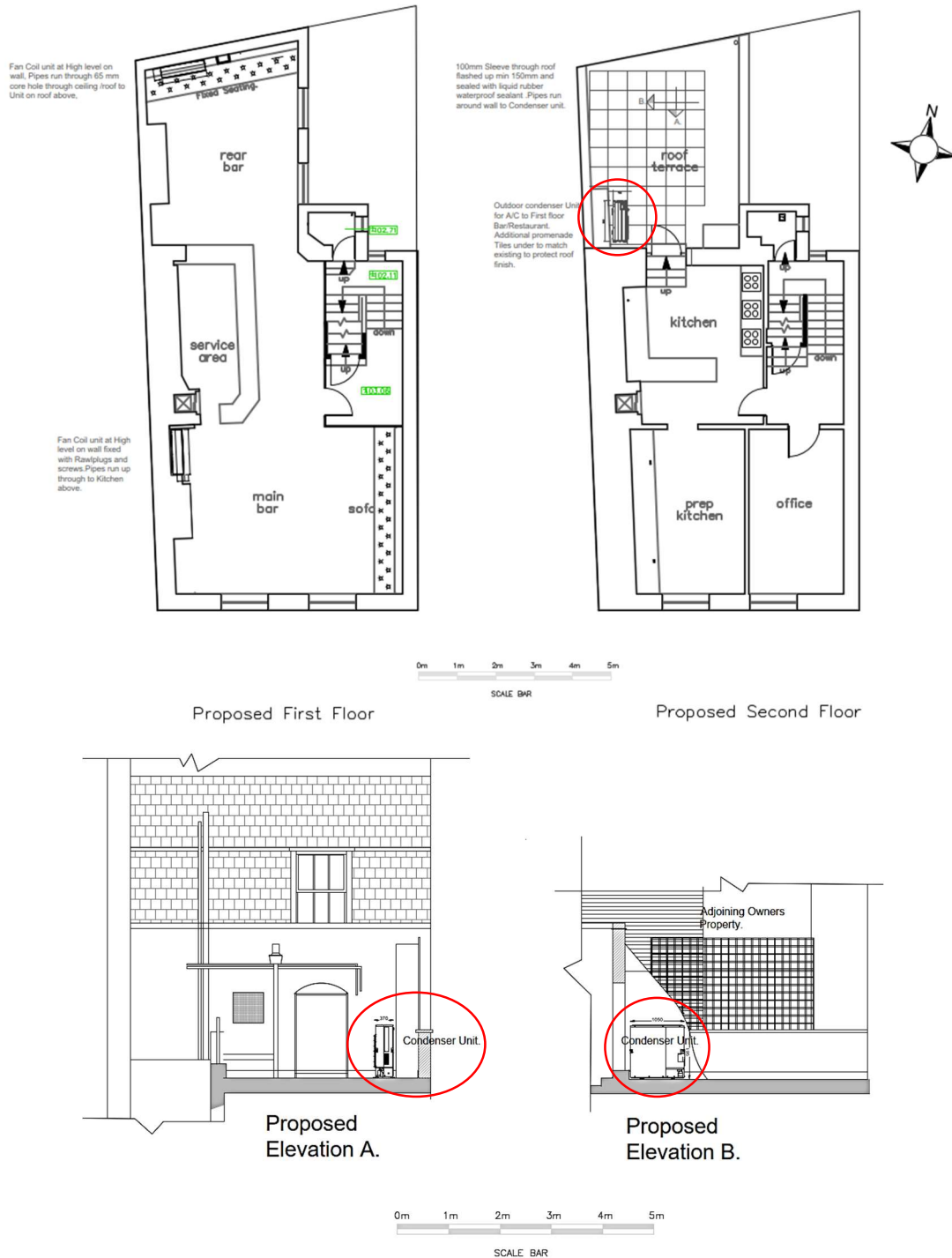


Figure 4-1 Site plan and roof elevations showing proposed location of external plant circled red

4.1.2 Table 4-1 states the model of the condenser unit, along with the sound power level as quoted by the manufacturers.

Item	Qty	Sound power level
MITSUBISHI PUZM-140YKA2	1	67 dB $L_{pA}$

*All values are sound power levels assuming a point-source*

*Table 4-1 Plant sound levels*

4.1.3 As the manufacturer only provided the cumulative A-weighted sound power level, the spectral sound data have been derived based on octave band frequency data provided for similar units. This is provided below in table 4-2.

Frequency	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Sound power level (dB)	79	72	66	65	61	58	53	52

*Table 4-2 Derived spectral data for MITSUBISHI PUZM-140YKA2*

4.1.4 It is understood that the proposed condenser unit will be operational during the hours of 12:00 to 23:00 Monday through Friday, 11:00 to 23:00 Saturday, and 12:00 to 22:30 Sunday.

## 4.2 Nearest noise-sensitive receivers

4.2.1 The roof terrace the plant is proposed to be located faces the windows of a residence, 25 Floral St, which is considered to be the most impacted noise-sensitive receiver. The noise assessment location has been selected to be a point 1m in front of the nearest window of this residence when considering the location of the new plant.

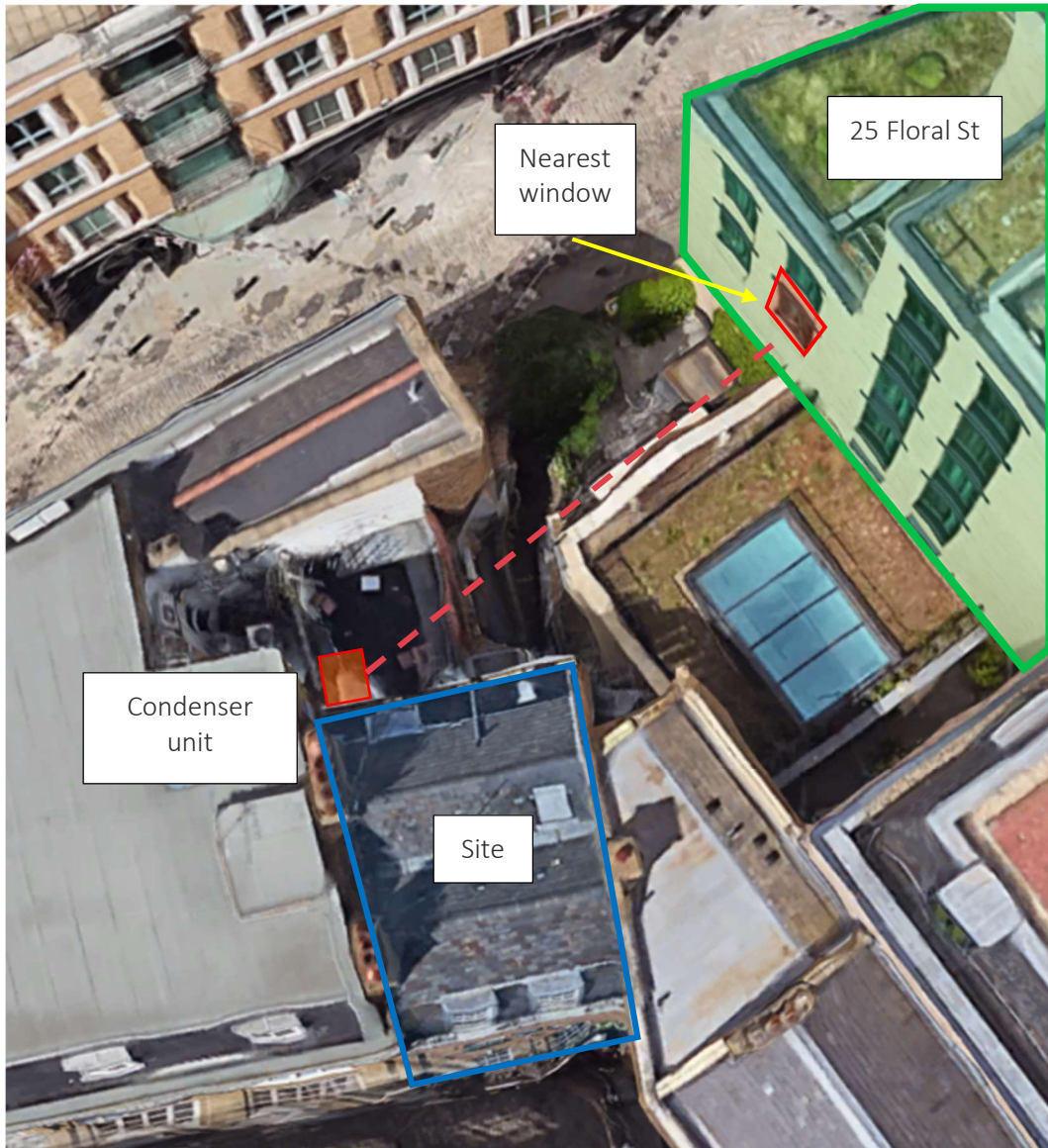


Figure 4-2 Location of proposed plant (highlighted orange) and nearest noise sensitive receiver (residence highlighted in green). Red dashed line shows horizontal distance between plant and assessment location.

4.2.2 The approximate horizontal distance between the rooftop plant and the assessment location is 14m. This equates to about 23 dB of distance attenuation. There is a clear line of sight between the proposed location of the plant and the nearest window of the neighbouring residence. Hence, no corrections to the predicted sound level have been made due to screening.

### 4.3 Background sound level

4.3.1 It is understood that the proposed condenser unit will be operational during the hours of 12:00 to 23:00 Monday through Friday, 11:00 to 23:00 Saturday, and 12:00 to 22:30 Sunday. Due to the aforementioned existing kitchen extract fan operating during similar hours during the noise survey, the background sound level has been selected as the lowest measured background sound level during the night (23:00 to 07:00). This is considered a conservative approach to the assessment. Our selected background sound level is therefore 46 dB  $L_{A90,15min}$ , which is assumed to be representative of the lowest background sound level at the assessment location.

### 4.4 Specific sound level

4.4.1 The specific sound level  $L_{Aeq}$ , i.e., the noise emission level from the proposed plant predicted at the assessment location, has been determined to be 36 dB  $L_{Aeq}$ .

### 4.5 Rating level

4.5.1 To establish the BS 4142:2014 rating level and comply with the required standards set out in the Environmental Supplementary Planning Document (ESPD) for Westminster City Council (which in turn follows Policy 33 of the City Plan), appropriate corrections should be applied to account for certain acoustic characteristics that may indicate that the noise from the plant is more discernible. Therefore, the following corrections have been addressed:

- **Tonality:** Noise from the proposed equipment will typically be airflow noise at maximum duty, which is broadband in character, and therefore not expected to contain tonal qualities. This correction has therefore not been applied.
- **Impulsivity:** When properly maintained, noise from the proposed units is not expected to exhibit impulsive characteristics, therefore this correction has not been applied.
- **Intermittency:** the plant is expected to continuously run during its hours of operation and in that period is expected to have a continuous, non-intermittent, noise emission. Therefore, no corrections have been made to account for intermittency.
- No other corrections for acoustic characteristics have been applied.

4.5.2 As no corrections have been required to be made, the rating level is hence equal to the specific sound level, and we can therefore establish the rating level  $L_{Aeq}$  at the assessment location to be 36 dB.

#### 4.6 British Standard 4142 Assessment

4.6.1 A BS 4142 assessment has been carried out and it has been found that the rating level does not exceed the lowest measured background sound level at the most impacted residence. The rating level of the plant was predicted to be 10 dB below the lowest background sound level, and hence the plant is not considered to have an adverse impact on the surrounding environment and the requirements of Policy 33 are expected to be met from a noise perspective.

4.6.2 BS 4142 requires the consideration of the context and uncertainty of the noise assessment. In regard to the context, the noise source is considered to have similar acoustical characteristics to the dominant noise sources in the surrounding area, that being AC units serving nearby commercial developments and road traffic. Hence the addition of this new plant is not expected to alter the existing soundscape of the surrounding area.

4.6.3 In regard to the uncertainty of the noise assessment, it is important to note that, due to the complexity of sound propagation, there is some uncertainty in using a simplified model. There is also some uncertainty that the measurements conducted are representative of the area throughout an entire year. To account for this, the lowest measured background sound level has been selected for the background sound level. We hence use a conservative approach to account for the inherent uncertainty in the assessment.

## 5 Conclusion

- 5.1.1 An assessment of noise emission from a proposed external condenser unit has been carried out based on the findings of an external noise survey conducted at the site. Consideration has been given to the requirements of Westminster City Council on the topic of noise as stated in Policy 33 of their City Plan.
- 5.1.2 The findings of this assessment demonstrate that the predicted noise emission level from the proposed plant does not exceed a level 10dB below the background sound level, thus meeting the requirements laid out by Westminster City Council.
- 5.1.3 It is concluded that the proposed plant is considered to have a 'low impact' on the surrounding environment according to BS 4142, and complies with the guidance set out in the ESPD and Policy 33. This would therefore indicate that planning permission for the condenser unit should not be refused on the basis of noise.



## Appendix A – Terminology

This appendix provides an explanation of some of the terms used in this report.

<p><b>A-weighting</b> <math>L_A</math> or <math>L_{pA}</math>, <math>L_{WA}</math></p>	<p>Within its operating limits a precision measurement microphone measures all frequencies the same so the output it produces does not reflect what we would actually hear. The A-weighting is an electronic filter that matches the response of a sound level meter to that of the human ear. When A-weighted the Sound Pressure Level <math>L_p</math> becomes <math>L_{pA}</math> (or <math>L_A</math>) and the Sound Power Level <math>L_W</math> becomes <math>L_{WA}</math>.</p>
<p><math>L_p</math></p>	<p>The instantaneous sound pressure level (<math>L_p</math>)</p>
<p><math>L_{pA}</math> (or <math>L_A</math>)</p>	<p>The A-weighted instantaneous sound pressure level (<math>L_{pA}</math> or <math>L_A</math>). This is the root mean square size of the pressure fluctuations in the air. This level can fluctuate wildly even for seemingly steady sounds. To make sound level meters easier to read the values on the display are smoothed or damped out. This is effectively done by taking a rolling average of the previous 0.125s (FAST time constant) or the previous 1s (SLOW time constant).</p>
<p><math>L_{AF}</math>, <math>L_{AS}</math></p>	<p>The letters F or S are added to the subscripts in the notation to indicate when the FAST or SLOW time constant has been used. These are often omitted but it is good practice to include them.</p>
<p><math>L_{max}</math></p>	<p>The maximum instantaneous sound pressure level (<math>L_{max}</math>),</p>
<p><math>L_{Amax}</math></p>	<p>The A-weighted maximum instantaneous sound pressure level (<math>L_{Amax}</math>)</p>
<p><math>L_{AFmax}</math></p>	<p>The A-weighted maximum instantaneous sound pressure level with a FAST time constant (<math>L_{AFmax}</math>).</p>
<p><math>L_{N,T}</math></p>	<p>The percentage exceedance sound pressure level (<math>L_{N,T}</math>),</p>
<p><math>L_{AN,T}</math>, <math>L_{AFN,T}</math> <math>N</math> = %age value, 0-100 <math>T</math> = measurement time eg. <math>L_{A90}</math>, <math>L_{A10}</math>, <math>L_{AF90}</math>, 5 min</p>	<p>The A-weighted percentage exceedance sound pressure level (<math>L_{AN,T}</math>), the A-weighted percentage exceedance sound pressure level with a FAST time constant (<math>L_{AFN,T}</math>). This is the sound pressure level exceeded for <math>N\%</math> of time period <math>T</math>. e.g. If an A-weighted level of <math>x</math> dB is exceeded for a total of 6 minutes within one hour, the level will have been above <math>x</math> dB for 10% of the measurement period. This is written as <math>L_{A10,1hr} = x</math> dB. <math>L_{A0}</math> (the level exceeded for 0% of the time) is equivalent to the <math>L_{Amax}</math> and <math>L_{A100}</math> (the level exceeded for 100% of the time) is equivalent to the <math>L_{Amin}</math>. It is good practice to include the letter which identifies the time constant used as this can make a significant difference to the value.</p>
<p><math>L_{eq,T}</math></p>	<p>The equivalent continuous sound pressure level over period <math>T</math> (<math>L_{eq,T}</math>),</p>
<p><math>L_{Aeq,T}</math> <math>T</math> = measurement time eg. <math>L_{Aeq,5min}</math></p>	<p>The A-weighted equivalent continuous sound pressure level over period <math>T</math> (<math>L_{Aeq,T}</math>). This is effectively the average sound pressure level over a given period. As the decibel is a logarithmic quantity the <math>L_{eq}</math> is not a simple arithmetic mean value. The <math>L_{eq}</math> is calculated from the raw sound pressure data. It is not appropriate to include a reference to the FAST and SLOW time constants in the notation.</p>

