

31-32 & 33-34 Alfred Place London

Plant Noise Assessment Report

29661/PNA3

15 December 2023

For:
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Plant Noise Assessment Report 29661/PNA3

Document Control

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Plant Noise Assessment Report 29661/PNA3

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1.0 Introduction

It is proposed to refurbish the properties on 31-32 & 33-34 Alfred Place. Works related to the refurbishment include renovations of the existing properties and the installation of new plant.

Hann Tucker Associates have therefore been commissioned to undertake an assessment to determine plant noise emissions at the nearest noise sensitive window and compare the predicted noise levels to the proposed criteria stated in our Environmental Noise Survey 29661/ENS1.

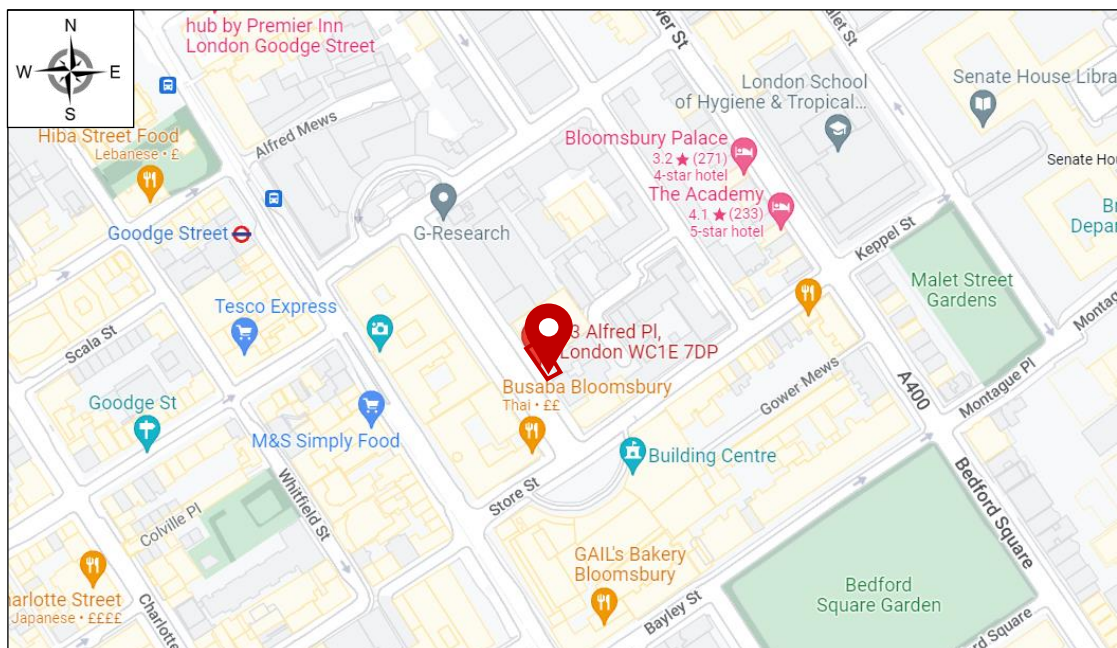
2.0 Objectives

To assess noise emissions from the proposed plant with reference to the proposed noise criteria presented in our Environmental Noise Survey 29661/ENS1 and comment on its acceptability.

3.0 Site Description

3.1 Location

The site is located at 31-32 & 33-34 Alfred Place, London, WC1E 7DP. The location is shown in the Location Map below.



Location Map (Map data © 2023 Google)

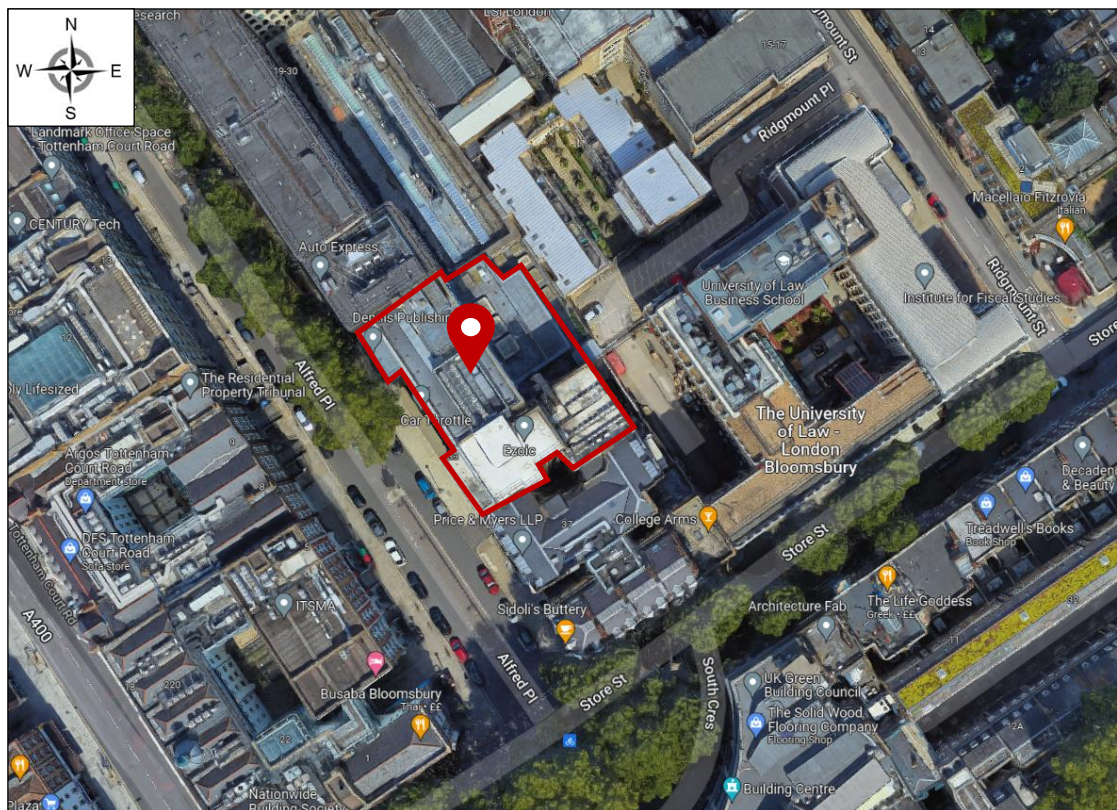
The site falls within the jurisdiction of London Borough of Camden.



3.2 Description

The site is bounded to the north-west with office premises, to the southwest with Alfred Place (currently a plaza) and mixed-use buildings (commercial/office/residential), to the southeast with office premises and the University of Law-London Bloomsbury, and to the north-east with residential premises and Ridgmount Place. The offices at the north-west have a height of ground plus 7 storeys. The mixed-use buildings at the southwest and the offices at the southeast have a height that ranges from ground plus 3 to ground plus 4 storeys. The university has a height of ground plus 5 storeys. The residential dwellings have a height that ranges from ground plus 2 to ground plus 3 storeys.

The site is shown in the Site Plan below.



Site Plan (Imagery © 2023 Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map Data © 2023 Google)

4.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.



5.0 Acoustic Standards and Guidelines

5.1 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) was published in March 2010 (i.e. before the NPPF). The NPSE is the overarching statement of noise policy for England and applies to all forms of noise other than occupational noise, setting out the long term vision of Government noise policy which is to:

“Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.”

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.”*

The Explanatory Note to the NPSE has three concepts for the assessment of noise in this country:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.

LOAEL – Lowest Observable Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

None of these three levels are defined numerically and for the SOAEL the NPSE makes it clear that the noise level is likely to vary depending upon the noise source, the receptor and the time of day/day of the week, etc. The need for more research to investigate what may represent an SOAEL for noise is acknowledged in the NPSE and the NPSE asserts that not stating specific SOAEL levels provides policy flexibility in the period until there is further evidence and guidance.



The NPSE concludes by explaining in a little more detail how the LOAEL and SOAEL relate to the three NPSE noise policy aims listed above. It starts with the aim of avoiding significant adverse effects on health and quality of life, then addresses the situation where the noise impact falls between the LOAEL and the SOAEL when *“all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development.”* The final aim envisages pro-active management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development which include the need to minimise travel distance between housing and employment uses in an area.

5.2 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) was first published in March 2012. This document replaced the existing Planning Policy Guidance Note 24 (PPG24) “Planning and Noise”. A new edition of NPPF was published in July 2021 and comes into effect immediately.

The following paragraphs are from the NPPF (published July 2021):

185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable



mitigation before the development has been completed.”

Paragraph 185 also references the Noise Policy Statement for England (NPSE). This document does not refer to specific noise levels but instead sets out three aims:

- “Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.”

The NPPF document does not refer to any other documents or British Standards regarding noise other than the NPSE.

Paragraph 2 of the NPPF states that *“planning law required that applications for planning permission must be determined in accordance with the development plan unless material considerations indicate otherwise.”*

Paragraph 12 of the NPPF states that *“The presumption in favour of sustainable development does not change the statutory status of the development plan as the starting point for decision making. Where a planning application conflicts with an up-to-date development plan (including any neighbourhood plans that form part of the development plan), permission should not usually be granted. Local planning authorities may take decisions that depart from an up-to-date development plan, but only if material considerations in a particular case indicate that the plan should not be followed.”*

5.3 Planning Practice Guidance on Noise

Planning Practice Guidance (PPG) under the NPPF has been published by the Government as a web based resource at <http://planningguidance.planningportal.gov.uk/blog/guidance/>. This includes specific guidance on Noise although, like the NPPF and NPSE the PPG does not provide any quantitative advice. It seeks to illustrate a range of effect levels in terms of examples of outcomes as set out in the following table:



Perception	Examples of Outcomes	Increasing effect level	Action
Not noticeable	No effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable hard, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

5.4 Local Authority Requirements

The site lies within the jurisdiction of London Borough of Camden. Their advice regarding criteria for atmospheric noise emissions from building service plant is as follows:

“A relevant standard or guidance document should be referenced when determining values for 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).



Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dBL _{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L _{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88dB L _{Amax}

*10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.

**levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.

The periods in Table C correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The Council will take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS:4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require a NR curve specification of NR35 or below, dependant on the room (based upon measured or predicted Leq,5mins noise levels in octave bands) 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area."



London Borough of Camden's advice regarding criteria for atmospheric noise emissions from generators is as follows:

"6.100 Emergency equipment such as generators which are only to be used for short periods of time will be required to meet the noise criteria of no more than 10dB above the background level (L90 15 minutes). During standby periods, emergency equipment will be required to meet the usual criteria for plant and machinery. Conditions to this effect may be imposed in instances where emergency equipment forms part of the application."

5.5 BS 4142:2014 + A1:2019

When setting plant noise emission criteria reference is commonly made to BS 4142:2014 *"Methods for rating and assessing industrial and commercial sound"*.

The procedure contained in BS 4142:2014 provides an assessment of the likely effects of sound on people when comparing the specific noise levels from the source with representative background noise levels. Where the noise contains "a tone, impulse or other characteristic" then various corrections can be added to the specific (source) noise level to obtain the "rating level".

BS 4142 states that: *"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific noise can be obtained by the difference of the rating noise level and the background noise level and considering the following:*

- *"Typically, the greater this difference, the greater the magnitude of the impact."*
- *"A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."*
- *"A difference of around +5dB 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."*



The determination of the “rating level” and the “background level” are both open to interpretation, depending on the context.

In summary it is not possible to set plant noise emission criteria purely on the basis of BS 4142:2014+A1:2019. It is reasonable to infer from the above, however, that a difference of around -5dB corresponds to “No Observed Effect Level” as defined in the Noise Policy Statement for England. It is also reasonable to infer from the above that if the plant noise rating level does not exceed the existing background noise level outside any noise sensitive residential window then the plant noise is of “low impact”.

6.0 Plant Noise Emission Criteria

Building services plant external noise emission levels will need to comply with local planning/environmental authority requirements and statutory noise nuisance legislation.

The requirements imposed by London Borough of Camden are stated on Section 5.4 of this report.

On the basis of the above and the results of the Environmental Noise Survey 29661/ENS 1, we propose that the following plant noise emission criteria be achieved at 1 metre from the nearest noise sensitive residential windows.

Façade	Plant Noise Emission Criteria (dB re 2×10^{-5} Pa)		
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)	24 hours
North-east	42 dBA	39 dBA	39 dBA

The above criteria are to be achieved with all of the proposed plant operating simultaneously. It should be noted that the above are subject to the final approval of the Local Authority.



7.0 Plant Noise Impact Assessment

7.1 Existing Plant

We understand the proposed plant comprises the following:

Plant item	Plant Description	Location	Qty	Plant Make	Model Number
1	Condenser 02/A	5 th floor Roof	1	Mitsubishi Electric	PUMY-P200YKM3 (613793-UK)
2	Condenser 02/B	5 th floor Roof	1	Mitsubishi Electric	PUMY-SP112VKM2.TH (613812-UK)
3	Condenser 02/C	5 th floor Roof	1	Mitsubishi Electric	PUMY-SP112VKM2.TH (613812-UK)
4	Condenser 03/A	5 th floor Roof	1	Mitsubishi Electric	PUMY-SP125VKMR2.TH (503784)
5	Condenser 03/B	5 th floor Roof	1	Mitsubishi Electric	PUMY-SP112VKM2.TH (613812-UK)
6	Condenser 03/C	5 th floor Roof	1	Mitsubishi Electric	PUMY-SP112VKM2.TH (613812-UK)
7	Condenser 04/A	5 th floor Roof	1	Mitsubishi Electric	PUMY-P200YKM3 (613793-UK)
8	Condenser 04/B	5 th floor Roof	1	Mitsubishi Electric	PUMY-SP112VKM2.TH (613812-UK)
9	Condenser 04/C	5 th floor Roof	1	Mitsubishi Electric	PUMY-SP112VKM2.TH (613812-UK)
10	Condenser 05/A	5 th floor Roof	1	Mitsubishi Electric	SUZ-M25VAR2.TH (493492)
11	Condenser 05/B	5 th floor Roof	1	Mitsubishi Electric	PUMY-SP112VKM2.TH (613812-UK)

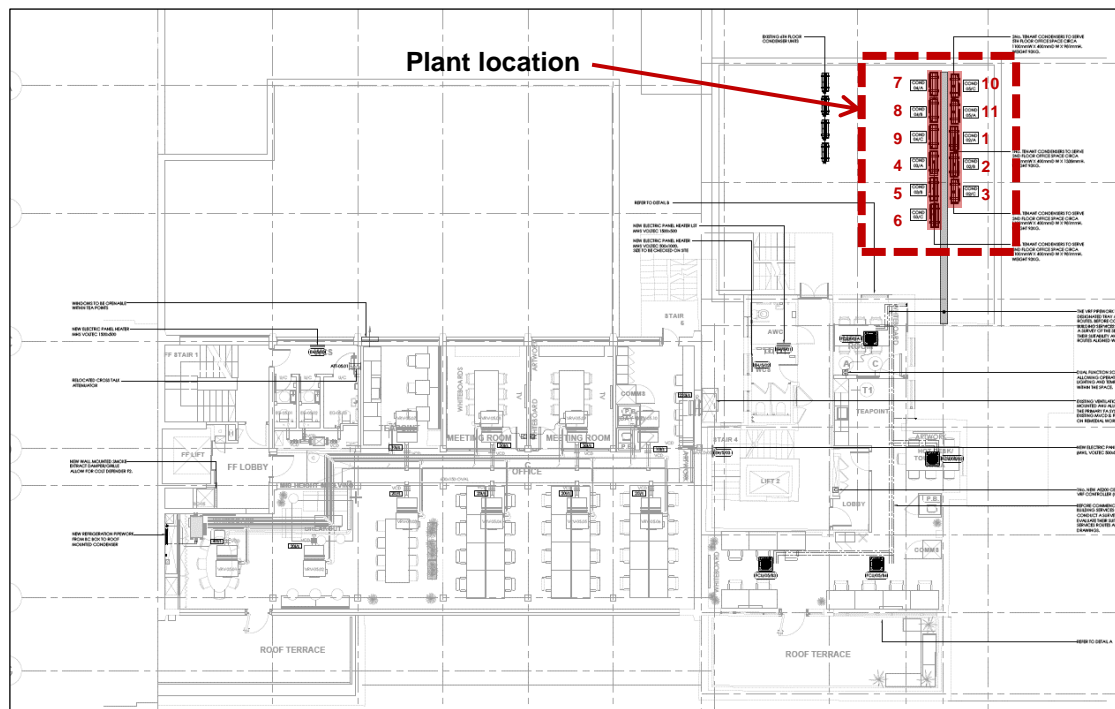
7.2 Drawings

Our acoustic analyses are based on the following drawing provided by GDM.

Reference	Title	Date
1112-GDM-XX-05-DR-M-5617	Combined Services Layout	03.11.23



The proposed plant layout plan is shown below.



Proposed 5th Floor Roof Plan (Plan provided by GDM)

7.3 Plant Noise Data

We understand the manufacturer's noise data for the equipment to be as follows:

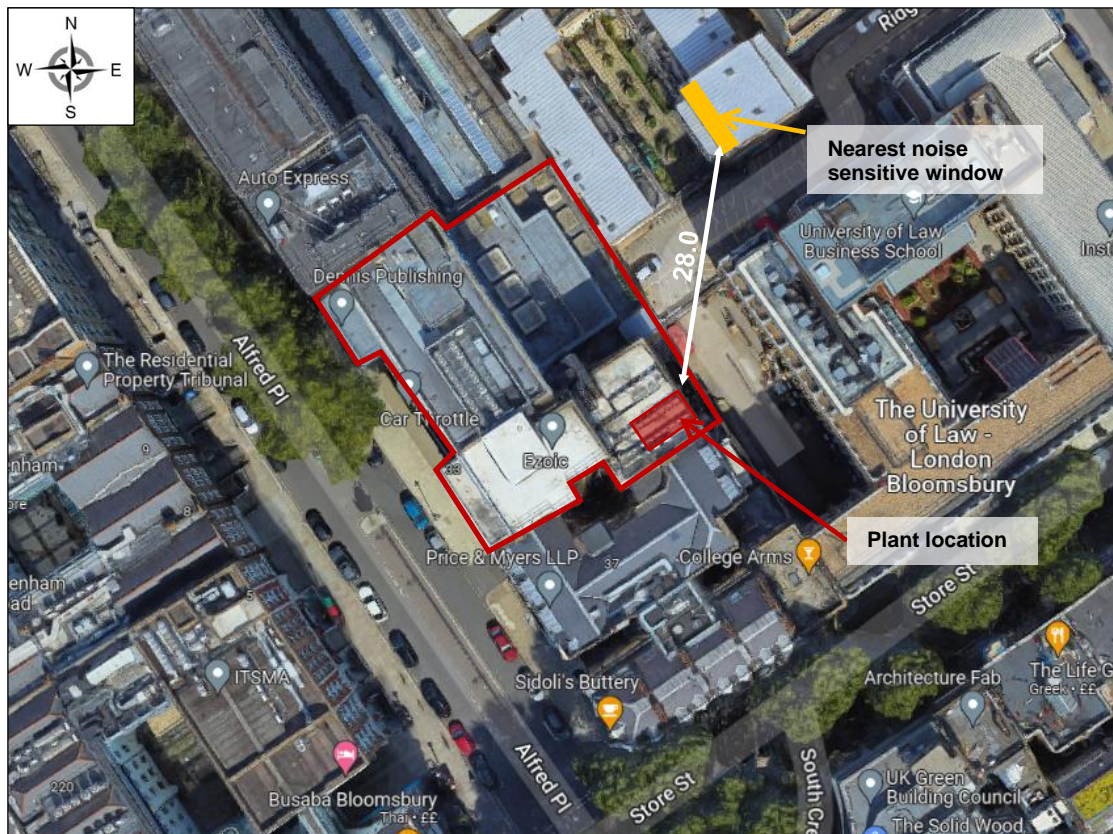
Plant item	Model Number	Sound Pressure Level (dB re 2×10^{-5} Pa) at 1 metre at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
1 & 7	PUMY-P200YKM3 (613793-UK)	64	61	61	58	57	52	49	41	61
2, 3, 5, 6, 8, 9 & 11	PUMY-SP112VKM2.TH (613812-UK)	58	55	55	52	49	45	38	32	54
4	PUMY-SP125VKMR2.TH (503784)	60	59	56	53	52	47	41	33	56
10	SUZ-M25VAR2.TH (493492)	51	52	50	44	41	39	32	26	46



7.4 Location of Plant

We understand the proposed plant will be located on the 5th floor roof of 33-34 Alfred Place, which will be at a height of ground plus 5 storeys approximately. The distance from the nearest plant to the nearest noise sensitive residential window is approximately 28 metres, and is located at first floor level.

The location of the plant and the nearest noise sensitive window are shown on the plan below.



Proposed Plant Location - Site Plan (Imagery © 2023 Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map Data © 2023 Google)

7.5 Plant Noise Impact Assessment

We understand that the plant will be operational during daytime/night-time hours.

The following table summarise our predictions of atmospheric noise emissions from the plant to the nearest noise sensitive residential window.



Plant Item	Description	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
1 Condenser 02/A	Manufacturer's Sound Pressure Level at 1m	64	61	61	58	57	52	49	41	61
	Barrier Loss Correction (roof edge)	-5	-5	-5	-5	-6	-7	-8	-10	
	Conformal Area Distance Loss (1.0 m to 30 m)	-25	-25	-25	-25	-25	-25	-25	-25	
	Façade correction	+3	+3	+3	+3	+3	+3	+3	+3	
	Calculated Noise Level at Window	37	34	34	31	29	23	19	9	33
2 Condenser 02/B	Manufacturer's Sound Pressure Level at 1m	58	55	55	52	49	45	38	32	54
	Barrier Loss Correction (roof edge)	-5	-6	-6	-7	-9	-11	-14	-16	
	Conformal Area Distance Loss (1.0 m to 31 m)	-25	-25	-25	-25	-25	-25	-25	-25	
	Façade correction	+3	+3	+3	+3	+3	+3	+3	+3	
	Calculated Noise Level at Window	31	27	27	23	18	12	2	<0	24
3 Condenser 02/C	Manufacturer's Sound Pressure Level at 1m	58	55	55	52	49	45	38	32	54
	Barrier Loss Correction (roof edge)	-6	-6	-7	-9	-11	-14	-16	-19	
	Conformal Area Distance Loss (1.0 m to 32 m)	-25	-25	-25	-25	-25	-25	-25	-25	
	Façade correction	+3	+3	+3	+3	+3	+3	+3	+3	
	Calculated Noise Level at Window	30	27	26	21	16	9	0	<0	23
4 Condenser 03/A	Manufacturer's Sound Pressure Level at 1m	60	59	56	53	52	47	41	33	56
	Barrier Loss Correction (roof edge)	-5	-6	-6	-7	-9	-11	-14	-16	
	Conformal Area Distance Loss (1.0 m to 31 m)	-25	-25	-25	-25	-25	-25	-25	-25	
	Façade correction	+3	+3	+3	+3	+3	+3	+3	+3	
	Calculated Noise Level at Window	33	31	28	24	21	14	5	<0	26



Plant Item	Description	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
5 Condenser 03/B	Manufacturer's Sound Pressure Level at 1m	58	55	55	52	49	45	38	32	54
	Barrier Loss Correction (roof edge)	-6	-6	-7	-9	-11	-14	-16	-19	
	Conformal Area Distance Loss (1.0 m to 32 m)	-25	-25	-25	-25	-25	-25	-25	-25	
	Façade correction	+3	+3	+3	+3	+3	+3	+3	+3	
	Calculated Noise Level at Window	30	27	26	21	16	9	0	<0	23
6 Condenser 03/C	Manufacturer's Sound Pressure Level at 1m	58	55	55	52	49	45	38	32	54
	Barrier Loss Correction (roof edge)	-6	-7	-8	-10	-12	-15	-18	-20	
	Conformal Area Distance Loss (1.0 m to 33 m)	-26	-26	-26	-26	-26	-26	-26	-26	
	Façade correction	+3	+3	+3	+3	+3	+3	+3	+3	
	Calculated Noise Level at Window	29	25	24	19	14	7	<0	<0	21
7 Condenser 04/A	Manufacturer's Sound Pressure Level at 1m	64	61	61	58	57	52	49	41	61
	Barrier Loss Correction (roof edge)	-5	-5	-5	-6	-6	-7	-9	-11	
	Conformal Area Distance Loss (1.0 m to 28 m)	-24	-24	-24	-24	-24	-24	-24	-24	
	Façade correction	+3	+3	+3	+3	+3	+3	+3	+3	
	Calculated Noise Level at Window	38	35	35	31	30	24	19	9	34
8 Condenser 04/B	Manufacturer's Sound Pressure Level at 1m	58	55	55	52	49	45	38	32	54
	Barrier Loss Correction (roof edge)	-5	-5	-5	-5	-6	-7	-8	-10	
	Conformal Area Distance Loss (1.0 m to 29 m)	-25	-25	-25	-25	-25	-25	-25	-25	
	Façade correction	+3	+3	+3	+3	+3	+3	+3	+3	
	Calculated Noise Level at Window	31	28	28	25	21	16	8	0	26
9 Condenser 04/C	Manufacturer's Sound Pressure Level at 1m	58	55	55	52	49	45	38	32	54
	Barrier Loss Correction (roof edge)	-5	-5	-5	-5	-6	-7	-8	-10	



Plant Item	Description	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
	Conformal Area Distance Loss (1.0 m to 30 m)	-25	-25	-25	-25	-25	-25	-25	-25	
	Façade correction	+3	+3	+3	+3	+3	+3	+3	+3	
	Calculated Noise Level at Window	31	28	28	25	21	16	8	0	26
10 Condenser 05/A	Manufacturer's Sound Pressure Level at 1m	51	52	50	44	41	39	32	26	46
	Barrier Loss Correction (roof edge)	-5	-5	-5	-5	-6	-7	-8	-10	
	Conformal Area Distance Loss (1.0 m to 29 m)	-25	-25	-25	-25	-25	-25	-25	-25	
	Façade correction	+3	+3	+3	+3	+3	+3	+3	+3	
	Calculated Noise Level at Window	24	25	23	17	13	10	2	<0	20
11 Condenser 05/B	Manufacturer's Sound Pressure Level at 1m	58	55	55	52	49	45	38	32	54
	Barrier Loss Correction (roof edge)	-5	-5	-5	-6	-6	-7	-9	-11	
	Conformal Area Distance Loss (1.0 m to 28 m)	-24	-24	-24	-24	-24	-24	-24	-24	
	Façade correction	+3	+3	+3	+3	+3	+3	+3	+3	
	Calculated Noise Level at Window	32	29	29	25	22	17	8	0	27
Cumulative Sound Pressure Level at the nearest noise sensitive receptor										38

Our calculations indicate that the proposed plant should be capable of achieving the requirements of the Local Authority outlined in Section 6.0.

8.0 Conclusions

An assessment has been carried out to determine the plant noise emissions at the nearest noise sensitive window.

The assessment indicates that the proposed plant should be capable of achieving the proposed environmental noise criteria at the nearest noise sensitive residential window.

Appendix A

The acoustic terms used in this report are defined as follows:

dB Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The _A subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

L_{90,T} L₉₀ 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_{eq,T} L_{eq,T} is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

L_{max} L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

Sound Pressure Level (L_p) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

Sound Power Level (SWL or 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).