

# 22-26 Vine Hill Farringdon

## Environmental Noise Survey and Plant Noise Assessment Report

28145/PNA1.Rev5

16 December 2021

For:  
Storey Project Management Limited  
162 Regent Street  
London  
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## Environmental Noise Survey and Plant Noise Assessment Report Report 28145/PNA1.Rev5

### Document Control

Rev	Date	Comment	Prepared by	Authorised by
5	16/12/2021	Revised to reflect updated scheme		
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4	30/11/2021	Revised based on comments.	Andrew Fermer Director BSc(Hons), MIOA	Andrew Fermer Director BSc(Hons), MIOA
3	30/03/2021	Revised to include new plant assessment reflecting new selections.	Daniel Stuart Consultant BSc(Hons), AMIOA	Andrew Fermer Director BSc(Hons), MIOA
2	09/03/2021	Revised to include new plant assessment reflecting new selections.	Daniel Stuart Consultant BSc(Hons), AMIOA	Andrew Fermer Director BSc(Hons), MIOA
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0	20/08/2021	-	Daniel Stuart Consultant BSc(Hons), AMIOA	Andrew Fermer Director BSc(Hons), MIOA



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## **1.0 Introduction**

It is proposed to replace the air conditioning plant at 22-26 Vine Hill including the installation of new external condensers which will be subject to the acoustic requirements of the London Borough of Camden.

Hann Tucker Associates have therefore been commissioned to undertake an environmental noise survey in order to determine background noise levels around the site and assess the plant proposal in line with the London Borough of Camden requirements.

## **2.0 Objectives**

To establish by means of a suitable background noise survey the existing  $L_{Amax}$ ,  $L_{Aeq}$  and  $L_{A90}$  environmental road, rail and air traffic noise levels at three representative positions, using fully computerised noise monitoring equipment. Supplementary short period manned daytime measurements will also be undertaken.

Measurement procedures shall be in general accordance with those described in BS 4142: 2014, Method for rating industrial noise affecting mixed residential areas, published by the British Standards Institution.

The survey will enable noise emission limits from the development to be identified with reference to the requirements of the Local Authority and the application of BS 4142: 2014 and to minimise the possibility of noise nuisance by neighbours.

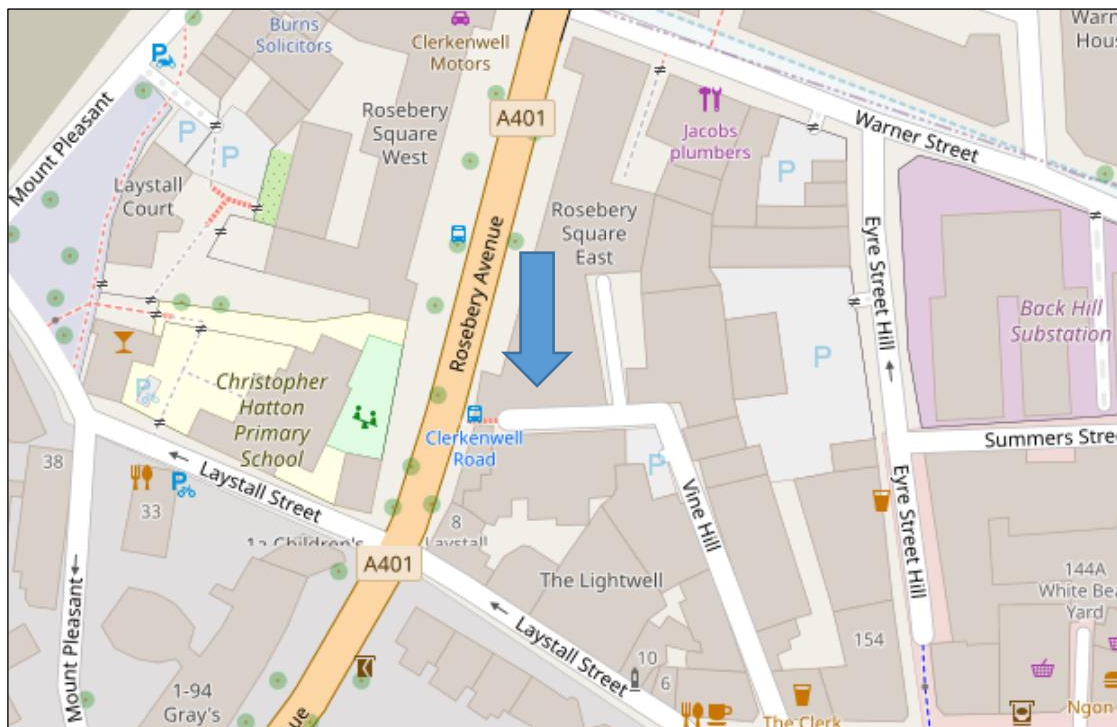
To undertake an assessment of proposed condenser plant items relative to the requirements of the project and the Local Authority.

To advise on noise control measures, if required, with reference to the requirements of the Local Authority.

## **3.0 Site Description**

### **3.1 Location**

The site is located at 22-26 Vine Hill, Farringdon. The location is shown in the Location Map below.



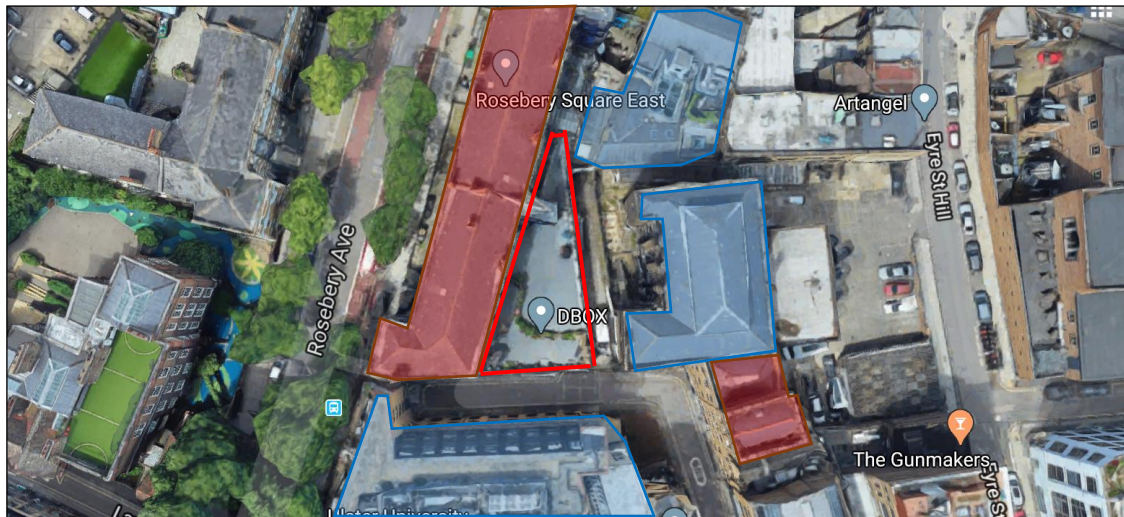
Location Map (Map data © Open Street Map 2020)

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

### 3.2 Description

The site is located at 22-26 Vine Hill, Farringdon. The site consists of an office building to the rear of Rosebery Square East, which is itself a 5No. storey mixed use building with commercial units on the ground floor and basement and residential use above. To the north and rear of the site, there are a number of commercial units in Warner Yard and residential flats towards Warner Street. To the east of the site the Ragged School is located at 18 Vine Hill, 15-29 Eyre Street which is split into office use to the rear of the site, there is residential use at 16 Vine Hill. There is an office building located to the south of the site. To the east is the aforementioned Rosebery Square, which the application site is attached to.

The site is shown in the Site Plan below with colours indicating where we understand the commercial (blue) and residential (red) uses are located in relation to the site.



Site Plan (Imagery © 2020 Bluesky, DigitalGlobe, Getmapping plc, Infoterra Ltd & Bluesky, Map Data © 2020 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 following paragraphs are from the NPPF (revised February 2019):

*“180. 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.*

*182. 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 180 also references the Noise Policy Statement for England. 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."

### 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	No Observed Adverse Effect	No specific measures required





Perception	Examples of Outcomes	Increasing effect level	Action
	area but not such that there is a perceived change in the quality of life.		
		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 London Borough of Camden's jurisdiction. Their advice regarding criteria for atmospheric noise emissions from building service plant is contained within their Local Plan, version June 2017 as follows:

### Industrial and Commercial Noise Sources

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 <sub>Amax</sub>	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L <sub>Amax</sub>	'Rating level' greater than 5dB above background and/or events exceeding 88dBL <sub>Amax</sub>

\*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.

## 5.5 BS 4142:2014

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. 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".



## 5.6 World Health Organisation Guidelines on Community Noise

BS8233:2014 is based upon the current World Health Organisation (WHO) guidance “*Guidelines on Community Noise*”. A summary of the noise guidelines relevant to the proposed scheme is presented in the table below.

Residential Environment	Critical Health Effect(s)	L <sub>Aeq</sub>	L <sub>AFmax</sub>	Time Base
Outdoor living area	Serious annoyance, daytime and evening	55	-	07:00-23:00
	Moderate annoyance, daytime and evening	50	-	07:00-23:00
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	-	07:00-23:00
Inside bedrooms	Sleep disturbance, night-time	30	45	23:00-07:00
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	60	23:00-07:00

These WHO guidelines are based, in almost all cases, on the lower threshold below which the occurrence rates of any particular effect can be assumed to be negligible.

## 5.7 Statutory Noise Nuisance

There is no quantitative definition of statutory noise nuisance. It is generally accepted however, that if the plant noise level is at least 5dB (or 10dB if tonal) below the minimum background L<sub>90(15minutes)</sub> at 1m from the nearest noise sensitive residential window, then the risk of a statutory noise nuisance is avoided. By adopting this as a design criterion the guidance contained in BS 4142:2014 should also be complied with.

## 6.0 Survey Methodology

The survey was undertaken by Daniel Stuart BSc (Hons) AMIOA.

### 6.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 11:30 hours on 13 August 2020 to 08:00 hours on 17 August 2020.

During the periods we were on site the wind conditions were calm. The sky was generally clear. We understand that generally throughout the survey period the weather conditions were similar.



These conditions are considered suitable for obtaining representative measurement results.

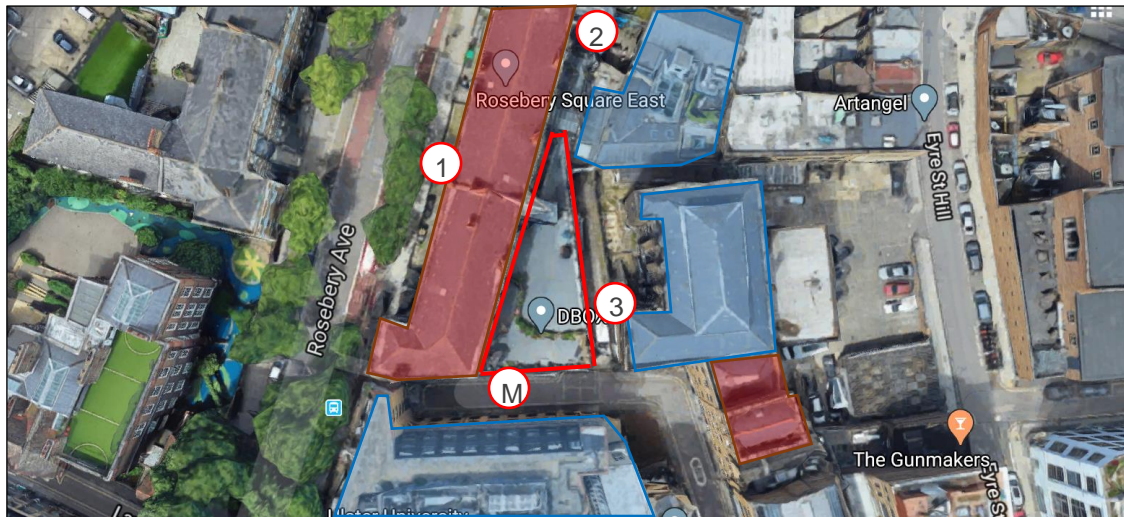
Measurements were taken continuously of the A-weighted (dBA)  $L_{90}$ ,  $L_{eq}$  and  $L_{max}$  sound pressure levels over 15 minute periods.

## 6.2 Measurement Positions

The noise level measurements were undertaken at 3No. positions as described in the table below.

Position No	Description
1	The sound level meter was located on a first floor balcony to the front of Rosebery Square East. The microphone was attached to a pole on the Roseberry Avenue Façade. This measurement position includes reflections from the façade.
2	The sound level meter was located in a third floor balcony to the rear of Roseberry Square East. The microphone was attached to a pole in the balcony approximately on top of Warner Yard. The measurement position includes reflections from the façade.
3	The sound level meter was located at ground level in the courtyard to the rear of 22-26 Vine Hill. The microphone was placed on a pole (approximately 2m from ground level) and attached to the fence between the application property and the Ragged School. The measurement position was considered to be free field.
M1	A manned measurement was undertaken on Vine Hill in conjunction with longer term unmanned measurements. The sound level meter and microphone were held in free field at an approximate distance of 2m from ground level in the centre of Vine Hill.

The measurement positions are indicated on the site plan below (see next page).



Site Plan (Imagery © 2020 Bluesky, DigitalGlobe, Getmapping plc, Infoterra Ltd & Bluesky, Map Data © 2020 Google)

### 6.3 Instrumentation

The instrumentation used during the survey is presented in the table below:

Description	Manufacturer	Type	Serial Number	Calibration
Type 1 Calibrator	Bruel & Kjaer	4231	2610161	Calibration on 19/09/2019
Type 1 ½" Condenser Microphone	PCB	377B02	107427	Calibration on 28/07/2020
Preamp	Larson Davis	PRM902	4154	Calibration on 28/07/2020
Type 1 Data Logging Sound Level Meter	Larson Davis	824	3155	Calibration on 28/07/2020
Type 1 ½" Condenser Microphone	PCB	377B02	135744	Calibration on 20/01/2020
Preamp	PCB	PRM902	4812	Calibration on 21/01/2020
Type 1 Data Logging Sound Level Meter	Larson Davis	824	3700	Calibration on 21/01/2020
Type 1 ½" Condenser Microphone	PCB	377B02	133362	Calibration on 13/09/2019
Preamp	Larson Davis	PRM902	3318	Calibration on 13/09/2019
Type 1 Data Logging Sound Level Meter	Larson Davis	824	3699	Calibration on 13/09/2019
Type 1 ½" Condenser Microphone	PCB	377B02	130405	Calibration on 04/02/2019



Description	Manufacturer	Type	Serial Number	Calibration
Preamp	Bruel & Kjaer	ZC0029	4195	Calibration on 04/02/2019
Type 1 Data Logging Sound Level Meter	Bruel & Kjaer	2260	2180670	Calibration on 04/02/2019

Each sound level meter, including the extension cable, was calibrated prior to and on completion of the surveys. No significant change was found to have occurred.

Each sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable.

Each microphone was fitted with a windshield.

## 7.0 Results

The results have been plotted on Time History Graphs 28145/TH1 to 28145/TH3 enclosed, presenting the 15 minute A-weighted (dBA)  $L_{90}$  and  $L_{eq}$  noise levels at each measurement position throughout the duration of the survey.

The  $L_{Aeq}$  (15 min) measurements recorded during the weekdays/weekends survey are presented in the table below:

Position	Weekday/Weekend	Measured $L_{Aeq,T}$ Noise Level (dB re $2 \times 10^{-5}$ Pa)	
		Daytime (07:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours
1	Weekday	66	62
	Sat-Sun	66	62
2	Weekday	54	48
	Sat-Sun	55	47
3	Weekday	56	46
	Sat-Sun	53	47





The modal  $L_{A90}$  (15 min) measurements recorded during the quietest weekdays/weekends survey are presented in the table below:

Position	Weekday/Weekend	Modal $L_{A90}(15\text{min})$ Background Noise Level (dB re $2 \times 10^{-5}$ Pa)	
		Daytime (07:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours
1	Weekday	54	42
	Sat-Sun	50	43
2	Weekday	48	42
	Sat-Sun	44	41
3	Weekday	44	43
	Sat-Sun	45	43

The lowest  $L_{A90}$  (15 min) measurements recorded during the survey are presented in the table below:

Position	Weekday/Weekend	Lowest Measured $L_{A90}(15\text{min})$ Background Noise Level (dB re $2 \times 10^{-5}$ Pa)	
		Daytime (07:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours
1	Weekday	46	40
	Sat-Sun	40	40
2	Weekday	43	40
	Sat-Sun	41	40
3	Weekday	44	43
	Sat-Sun	42	42

## 7.1 Manned Measurement

A manned measurement was undertaken at Vine Hill in conjunction with the long term unmanned measurements in order to give a greater idea of the surrounding noise climate. We noted that traffic noise from Rosebery Avenue was dominant here, despite being significantly screened from the Rosebery Court.

The results of the 15 minute manned measurement are presented in the following table with the results of the unmanned Position 1 at the same time to determine the level difference between the measurements:



Position	Time	L <sub>Aeq</sub> (dB)	L <sub>A90</sub> (dB)
[1] Manned Position	11:45 to 12:00 13/08/2020	53	47
[2] Unmanned Position 1		66	54
[2] - [1] Level Difference		13	7

## 8.0 Discussion Of Noise Climate

During the periods we were on site the dominant noise sources were noted to be predominantly road traffic from Rosebery Avenue at all positions. At positions to the rear of the site (2&3) there was some existing plant and occasional loading taking place for short periods in Vine Hill/ Warner Yard.

## 9.0 Plant Noise Emission Criteria

Building services plant external noise emission levels will need to comply with Local Authority requirements and statutory noise nuisance legislation.

### 9.1 Residential Use

A background level to be used with the Local Authority criteria has been selected based on the guidance outlined from Section 8.1.4 (below) in BS4142:2014,

*“NOTE 1 To obtain a representative background sound level a series of either sequential or disaggregated measurements ought to be carried out for the period(s) of interest, possibly on more than one occasion. A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value.”*

On the basis of the above and the results of the environmental noise survey, we propose that the following plant noise emission criteria be achieved at 1 metre from the nearest noise sensitive window to achieve Camden’s “green” noise level criteria. These can be relaxed up to 5dBA to achieve “amber” noise levels - if the development is considered applicable by the local authority.



Position	Weekday/Weekend	Plant Noise Emission Criteria at 1 metre from the nearest "dwelling" window	
		Daytime (07:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours
1	Weekday	44	32
	Sat-Sun	40	33
2	Weekday	38	32
	Sat-Sun	34	31
3	Weekday	34	33
	Sat-Sun	35	33

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.

## 9.2 Commercial Properties

As per section 5.4 the local authority guidance noise levels are given for "Dwellings" (residential use) only as reproduced below:-

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

We seek clarification from the London Borough on Camden as to how to apply their requirements for offices/commercial receptors, however the following approach should be acceptable based on achieving the guideline noise levels of BS 8233:2014 in offices with open windows.

In relation to the commercial properties within the vicinity of the proposed location of the new plant, BS 8233:2014 proposes the following internal ambient noise level design range should be satisfied.

Internal Ambient Noise Level Design Range, $L_{Aeq,T}$ (dB)
45-50



In addition, BS 8233 states that attenuation of 10 to 15 dB can be provided by an open window. Hence the following external noise level criteria must be satisfied outside the nearest office façade (based on achieving the lower limit of the above design range):

External Ambient Noise Level Limit, $L_{Aeq,T}$ (dB)
55

It should be noted that the above criteria are subject to final approval by the London Borough of Camden.

## 10.0 Plant Noise Impact Assessment

We understand the proposed plant comprises the following items:

Plant Description	Location	Qty.	Plant Make	Model Number
Condenser Units	Warner Yard Roof	6No.	Mitsubishi	PUMY-P300YBM
Condenser Units	Courtyard	2No.	Mitsubishi	PUMY-P300YBM

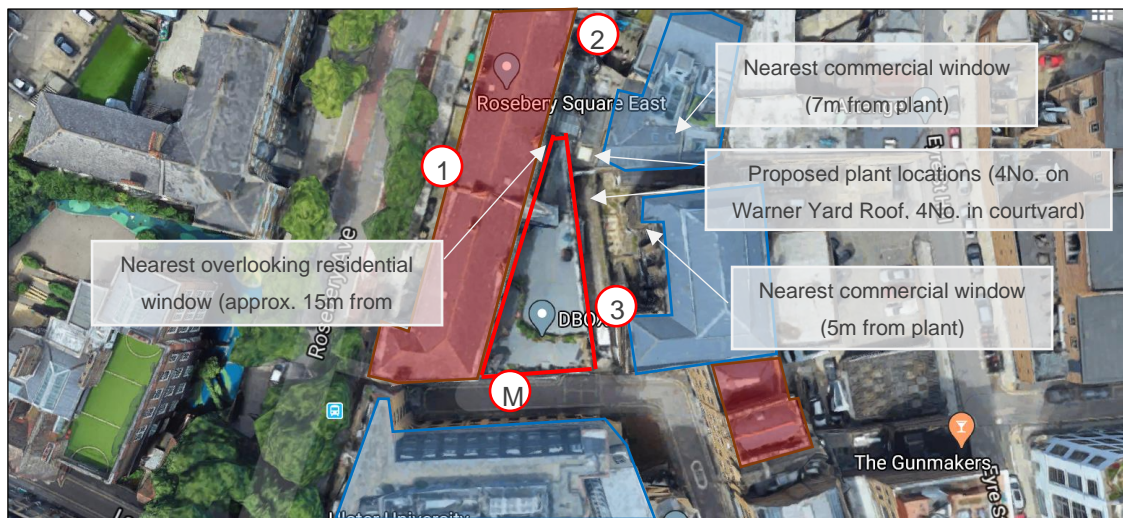
### 10.1 Plant Noise Data

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

Plant Description	Sound Pressure Level (dB re $2 \times 10^{-5}$ Pa) at 1 metre at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
PUMY-P300YBM	66	61	64	58	59	52	45	37	62

### 10.2 Location of Plant

We understand it is proposed to locate the plant in the rear courtyard as per the plan below (see next page):-



Site Plan (Imagery © 2020 Bluesky, DigitalGlobe, Getmapping plc, Infoterra Ltd & Bluesky, Map Data © 2020 Google)

We understand the nearest commercial property from the units in the courtyard is located at 18 Vine Hill, approximately 5m from the proposed plant and the nearest residential window is located at Roseberry Square East, overlooking the courtyard approximately 12m away.

For the units on the roof of Warner Yard, we understand these are approximately 7m from the nearest commercial property window which should also be screened as this is a roof light and 7m away from the windows to the rear of Rosebery court.

### 10.3 Mitigation Measures

We understand the units are to be housed in acoustic enclosures provided by Environ, limited to a sound pressure level of 34dBA at 1m.

Please see attached the acoustic enclosure specification.

### 10.4 Plant Noise Impact Assessment

#### 10.4.1 Roseberry Square East (Residential)

The following tables summarise our predictions of atmospheric noise emissions from the condenser enclosures to the nearest noise sensitive residential window.



	Sound Pressure Level (dBA)	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
6No. Roof Condensers PUMY-P300YBM at 1m With Environ Enclosure	42 at 1m	42 at 1m
Distance Loss (1m to 7m)	-17	-17
Sound Pressure Level at Receptor	25	25
2No. Courtyard Condensers PUMY-P300YBM at 1m With Environ Enclosure	37 at 1m	37 at 1m
Distance Correction (1m to 12m)	-22	-22
Sound Pressure Level at Receptor	15	15
Cumulative SPL at Receptor	25	25
Façade Reflection	+3	+3
Calculated Noise Level at Receptor	28	28

#### 10.4.2 Nearest office window

The following tables summarise our predictions of atmospheric noise emissions from the condenser enclosures to the office windows assuming the offices are only in use during daytime hours.

	Sound Pressure Level (dBA)	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
6No. Roof Condensers PUMY-P300YBM at 1m With Environ Enclosure	42 at 1m	42 at 1m
Distance Loss (1m to 7m)	-17	-17
Sound Pressure Level at Receptor	25	25
2No. Courtyard Condensers PUMY-P300YBM at 1m With Environ Enclosure	37 at 1m	37 at 1m
Distance Correction (1m to 5m)	-14	-14
Sound Pressure Level at Receptor	23	23
Cumulative SPL at Receptor	27	27
Façade Reflection	+3	+3
Calculated Noise Level at Receptor	30	30



Our calculations indicate that the proposed plant, in conjunction with the proposed mitigation measures, should be capable of achieving the requirements of the Local Authority outlined in Section 9.0.

## **11.0 Conclusion**

An environmental noise survey has been undertaken in order to establish the currently prevailing noise levels.

Plant noise emission criteria have been recommended based on the results of the noise survey and with reference to the Local Authority's requirements.

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

The assessment indicates that the proposed plant, in conjunction with the proposed attenuation should be capable of achieving the proposed environmental noise criteria at the nearest noise sensitive windows.



## 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	<p>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 <sub>A</sub> subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted</p> <p>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.</p>
L <sub>90,T</sub>	L <sub>90</sub> is the noise level exceeded for 90% of the period <i>T</i> (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.
L <sub>eq,T</sub>	L <sub>eq,T</sub> is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, <i>T</i> .
L <sub>max</sub>	L <sub>max</sub> is the maximum sound pressure level recorded over the period stated. L <sub>max</sub> is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L <sub>eq</sub> noise level.

Sound Pressure Level (L<sub>p</sub>) is the sound pressure relative to a standard reference pressure of  $2 \times 10^{-5}$  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<sub>w</sub>) 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).

# VINE HILL

## SPECIFICATION FOR

### SMALL ACOUSTIC ENCLOSURES

The condenser units shall be supplied complete with acoustic treatment which shall achieve adequate levels of attenuation to ensure that the following limiting sound pressure levels are not exceeded when measured at a distance of 1m (free field over a reflecting plane) or in any horizontal or vertical direction under any load conditions.

A-weighted Limiting Sound Pressure Level at 1m (dB re $2 \times 10^{-5}$ Pa)
34

Furthermore they shall not exhibit any significant tonal content.

Exceedances in excess of the measurement tolerance for a Type 1 sound level meter shall constitute a failure.

The enclosed outer panels shall be constructed from galvanized sheet steel having a minimum thickness of 1.6mm and fixed at 300mm (max) centres. The enclosure inner panels shall be constructed from punch-perforated (round-hole) galvanised sheet steel facing, having a minimum thickness of 0.7mm fixed at 300mm (max) centres. Flattened-expanded ("Expamet") sheet shall not be used, unless all edges of the sheet are mechanically fixed to the panel casing and galvanised steel cover strips are used to prevent rivet heads pulling through the perforated sheet (trapping the Expamet between two solid steel layers).

The inert, rot and vermin proof, non-hygroscopic and non-combustible mineral wool or glass fibre acoustic medium shall be packed to a density of not less than  $48\text{kg/m}^3$ . This shall be faced with a glass fibre cloth, or other approved infill protection membrane. Panels shall be constructed and assembled so that no egress of the acoustic medium will occur under the operating conditions.

Doors, access panels, windows and ventilation ducts or electrical cable penetrations shall be treated so as to maintain the specified acoustic insulation of the assembled enclosure.

Demountable sections shall be designed to allow easy disassembly and reassembly by unskilled personnel without affecting the acoustic performance.