43 Whitfield Street
London

Environmental Noise Survey and Plant Noise Assessment Report

28861/PNA1

4 June 2021

For:
Hart Dixon
14 Devonshire Square
London
EC2M 4YT

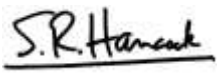
Hann Tucker Associates
Consultants in Acoustics Noise & Vibration

Head Office: Duke House, 1-2 Duke Street, Woking, Surrey, GU21 5BA (t) +44 (0) 1483 770 595
Manchester Office: First Floor, 346 Deansgate, Manchester, M3 4LY (t) +44 (0) 161 832 7041
(w) hanntucker.co.uk (e) enquiries@hanntucker.co.uk

Hann Tucker Associates

Environmental Noise Survey and Plant Noise Assessment Report 28861/PNA1

Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	04/06/2021	Draft issue		
			Kyungmin Kim Assistant Consultant	Simon Hancock Director BEng (Hons), CEng, MIMechE, MCIBSE, FIOA

Hann Tucker Associates

Environmental Noise Survey Report
28861/PNA1

Contents

Attachments

1.0 Introduction

It is proposed to replace and install new roof plant on the lower roof area at 43 Whitfield Street.

Hann Tucker Associates have been commissioned to undertake a noise survey to establish the existing environmental noise level around the roof and determine the appropriate plant noise criteria with reference to the Local Authority criteria's requirements.

2.0 Objectives

To inspect the site to familiarise ourselves with its layout and surroundings in order to identify suitable accessible locations for environmental noise measurements.

To establish by means of an unmanned 24 hour survey the existing L_{Amax}, L_{Aeq}, and L_{A90} environmental road, rail and air traffic noise levels at a secure and accessible on-site positions, using fully computerised noise monitoring equipment.

Measurement procedure shall be in general accordance with British Standard BS 7445 "Description and Measurement of environmental noise".

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.

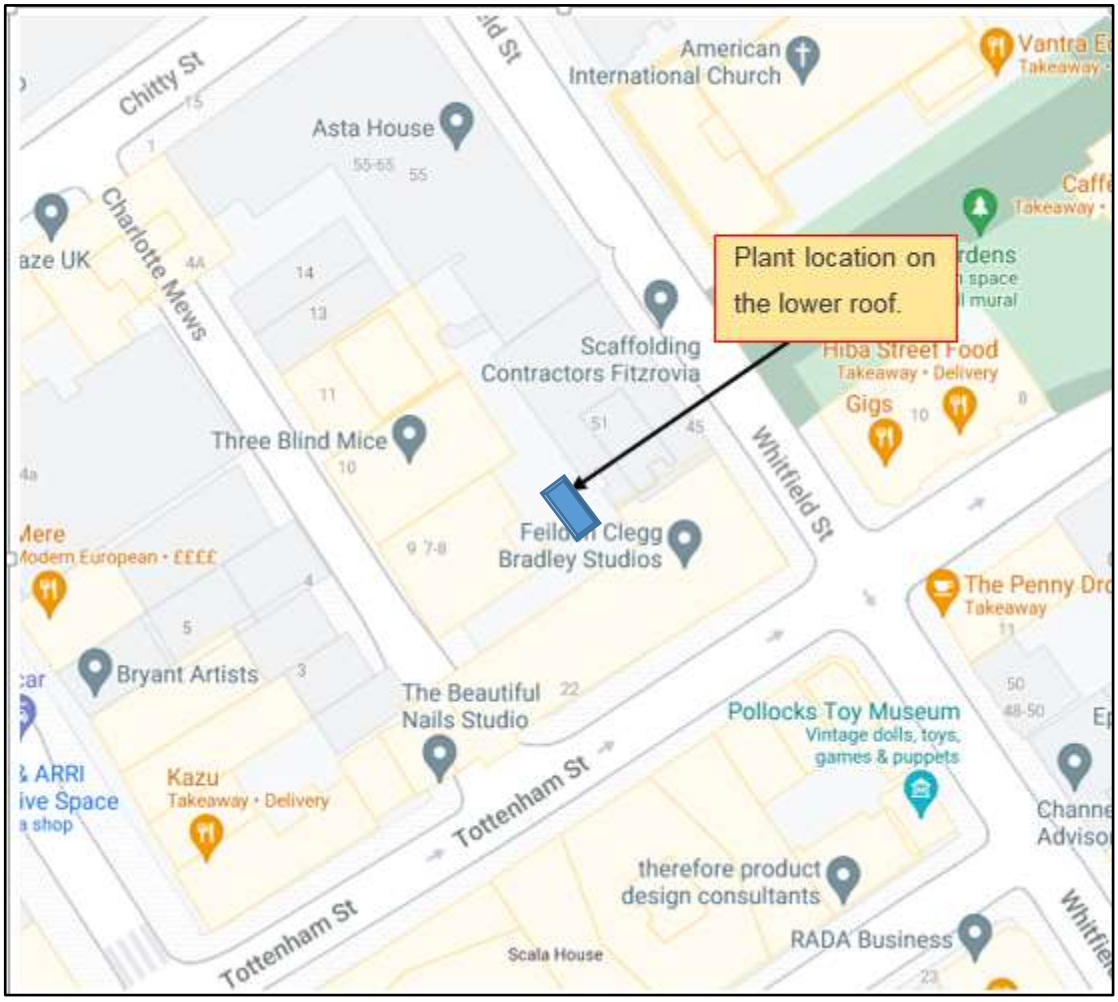
The survey will enable noise emission limits from the development to be identified with reference to the requirements of the Local Authority and/or the application of BS 4142: 2014 and to minimise the possibility of noise nuisance to neighbours.

To present our methodology and findings in a detailed Environmental Noise Survey and Plant Noise Impact Assessment Report to accompany the planning application

3.0 Site Description

3.1 Location

43 Whitfield Street is a commercial office building set over 6 storeys, from the ground and up to level 5. The location is shown in the Location Map below.



Location Map (Map Data © 2021 Google)

The site falls within the jurisdiction of London Borough of Camden

3.2 Description

The plant is located on the first floor roof of 43 Whitfield Street, and is lower than surrounding buildings.

Currently, there are 4 vertical VRF (variable refrigerant flow) condensers within wooden fenced enclosure, and 6 smaller DX (direct expansion) condensers distributed around the roof area serving the adjacent 7 – 10 Charlotte Mews.

The site is shown in the Site Plan below.

Site Plan (Map Data © 2021 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 2018 and comes into effect immediately.

This new edition however, contains no new directions with respect to noise, and hence, all previous references remain extant. The paragraph references quoted below relate to the July 2018 edition.

Paragraph 170 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by (amongst others) *"preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, water or noise pollution or land stability."*

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 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	Unacceptable Adverse Effect	Prevent

	appetite, significant, medically definable hard, e.g. auditory and non-auditory.		

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 stated in London Borough of Camden's Local Plan.

As quoted below from Policy 4 titled *"Noise and Vibration"* included in Chapter 6 *"Protecting amenity"* in the Local Plan, the London Borough of Camden recognises commercial office as a noise sensitive development:

"6.90 Noise sensitive developments includes housing, schools and hospitals as well as offices, workshops and open spaces. "

Considering the Local Authority's guidance and from most recent noise assessment surveys completed for plant proposals within the London Borough of Camden, the following statement should be referred:

"Noise levels at a point 1 metre external to sensitive facades shall be at least 10dB(A) less than the existing background measurement (LA90), expressed in dB(A) when all plant/equipment (or any part of it) is in operation unless the plant/equipment hereby permitted will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps), then the noise levels from that piece of plant/equipment at any sensitive façade shall be at least 15dB(A) below the LA90, expressed in dB(A).

Reason: To safeguard the amenities of the adjoining premises and the area generally in accordance with the requirements of policies A1 and A4 of the Camden Local Plan 2017."

However we have requested their advice concerning the noise level criterion for offices but have not received a reply at the time of writing.

5.5 BS 7445:2003

BS 7445:2003 states the details from pertinent standards regarding the general measurement instrumentation, procedure and condition, are important to be referenced and carefully recorded.

When setting an outdoor measurements near buildings, if not otherwise specified, the preferred measurement positions are 1 m to 2 m from the façade and 1.2 m to 1.5 m above each floor level of interest.

BS 7445 also states that: *"The measurements described in this British Standard are designed to give a reliable physical description of the environmental noise. For assessment of human reactions to noise it is sometimes necessary to make adjustments to the measured values in order to arrive at a more meaningful basis for the assessment When such adjustments are made to a value of equivalent continuous A-weighted sound pressure level it is termed rating level,* $L_{Ar,T}$*."*

5.6 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".

5.7 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_{Aeq}	L_{AFmax}	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.

5.8 British Standard BS8233: 2014

British Standard 8233: 2014 "Guidance on sound insulation and noise reduction for buildings" provides guidance for the control of noise in and around buildings.

BS8233:2014 Section 7.7.2 titled "Internal ambient noise levels for dwellings" states:

"In general for steady external noise sources, it is desirable that internal ambient noise levels do not exceed the following guideline values:

Activity	*Location*	*Desirable Internal Ambient Criteria*	
		07:00 - 23:00	*23:00 - 07:00*
Resting	*Living Rooms*	*35 dB $L_{Aeq,16hour}$*	-
Dining	*Dining Room/Area*	*40 dB $L_{Aeq,16hour}$*	-
Sleeping (Daytime Resting)	*Bedroom*	*35 dB $L_{Aeq,16hour}$*	*30 dB $L_{Aeq,8hour}$*

5.9 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 $L_{90(15minutes)}$ 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 Kyungmin Kim, Assistant Consultant.

6.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 13:00 hours on Wednesday 19th May 2021 to 13:00 hours on Thursday 20th May 2021.

During the periods we were on site the wind conditions were moderate. The sky was overcast. 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 Position

The microphone was attached to the hand rail on the roof area approximately 1.5 metres above roof ground level, which is at first floor level of the building.

The microphone position is shown on the plan below.

Plan Showing Measurement Positions (Map Data © 2021 Google)

6.3 Instrumentation

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

Description	Manufacturer	Type	Serial Number	Calibration
Type 1 Data Logging Sound Level Meter	Svantek	971	72538	21/01/2021
Preamp	Svantek	SV18	72276	21/01/2021
Microphone	ACO Pacific	7052E	68293	21/01/2021
Type 2260 Calibrator	Brüel & Kjær	4231	2115545	09/06/2020

The sound level meter, including the extension cable, was calibrated prior to and on completion of the surveys. No significant changes were found to have occurred (no more than 0.1 dB).

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

The microphone was fitted with a windshield.

7.0 Results

The results have been plotted on Time History Graph 28861/TH1 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 Lowest L_{eq} and $L_{A90\ (15\ min)}$ measurements recorded during the survey are presented in the tables below:

Lowest Measured $L_{Aeq(15min)}$ Noise Level (dB re 2 x 10^{-5} Pa)	
Daytime (07:00 – 23:00) Hours	**Night-Time (23:00 – 07:00) Hours**
49 dBA	45 dBA

Lowest Measured $L_{A90(15min)}$ Background Noise Level (dB re 2 x 10^{-5} Pa)	
Daytime (07:00 – 23:00) Hours	**Night-Time (23:00 – 07:00) Hours**
44 dBA	42 dBA

8.0 Discussion Of Noise Climate

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately determine the individual noise sources or specific noise events that occurred throughout the duration of survey. Nevertheless, during the periods we were on site the subjectively dominant noise source was traffic noise from the surrounding road network

9.0 Plant Noise Emission Criteria

9.1 Residential Receptors

The nearest residential receptors are located at 22 Tottenham Street, and Asta House, 65 Whitfield Street.

Residential receptors located at 22 Tottenham Street are acoustically screened from the existing/proposed plant.

Residential receptors located at Asta House is located at approximately 48.5 metres to the north of the plant.

Based on the requirements of the London Borough of Camden (see Section 6.4), and the results of our environmental noise survey, we recommend that the following plant noise emission criteria be achieved at 1 metre from the nearest noise sensitive residential window.

Proposed Noise Criteria (dBA) at Noise Sensitive Residential Window	
Daytime (07:00 – 23:00 hours)	**Night-time (07:00 – 23:00 hours)**
34	32

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 Non-Residential Receptors

The nearest office receptors are the windows of 45 Whitfield Street located approximately 9.2 metres away, which overlook the existing/proposed plant.

For office receptors we propose to ensure plant noise levels are no higher than that from the existing plant with all existing plant running normally.

This would equate to the following plant noise emission criteria be achieved at 1 metre from the nearest noise sensitive office window.

Proposed Noise Criteria (dBA) at Noise Sensitive Office Window
TBA

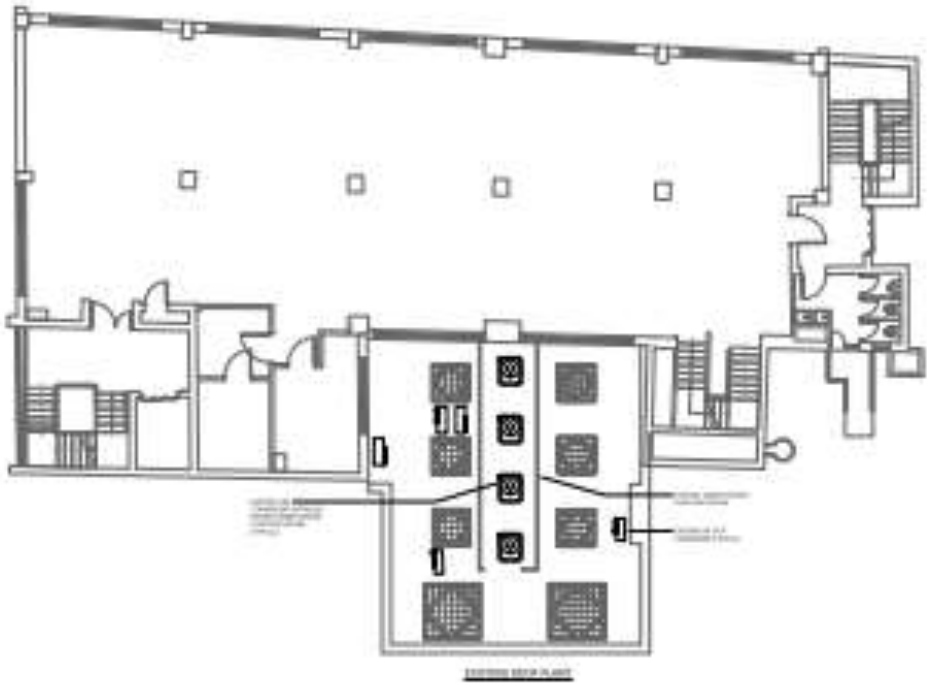
This is subject to acceptance by Camden.

10.0 Plant Noise Impact

It is proposed to replace existing roof plant, comprising four vertical VRF condensers within a fenced enclosure and six small DX split condensers distributed around this area.

This existing plant is proposed to be replaced with an individual external condenser serving each floor (Grd-5th, 6No in total).

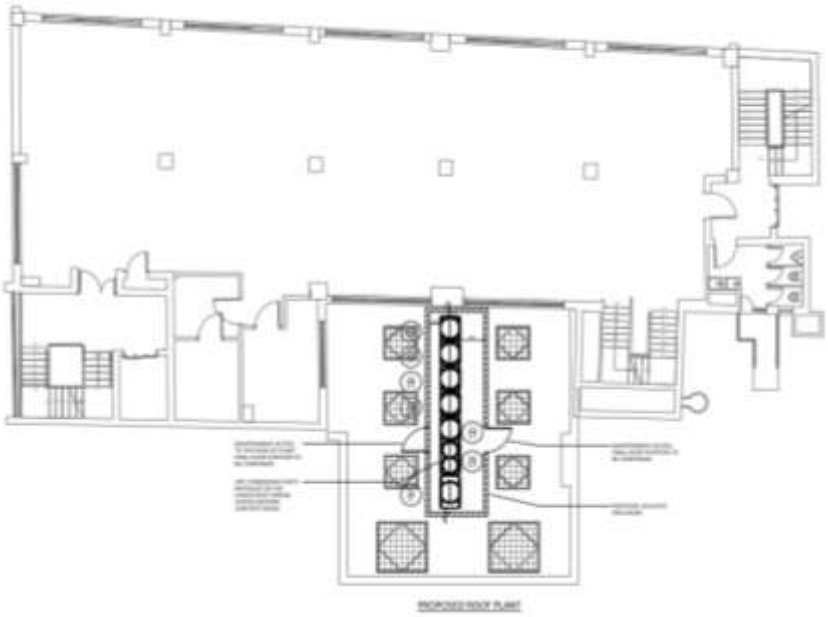
Please see plan of Existing External Plant Layout below.



In addition, tenants may also want to install small DX splits to serve the server rooms. These would be part of a future tenant fit out.

The plant noise emission criteria proposed in Section 9 will be achieved through a combination suitably quiet plant selections, acoustic enclosures, and other attenuation measures. In this way environmental plant noise emissions will be controlled to acceptable levels.

Please see plan of Proposed External Plant Layout below.



11.0 Conclusions

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. This is subject to agreement with Camden.

The plant noise emission criteria proposed will be achieved through a combination suitably quiet plant selections, acoustic enclosures, and other attenuation measures.

On this basis environmental plant noise emissions will be controlled to acceptable levels

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.

$L_{90,T}$ — L_{90} 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.

L_p — Sound Pressure Level (SPL) 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).

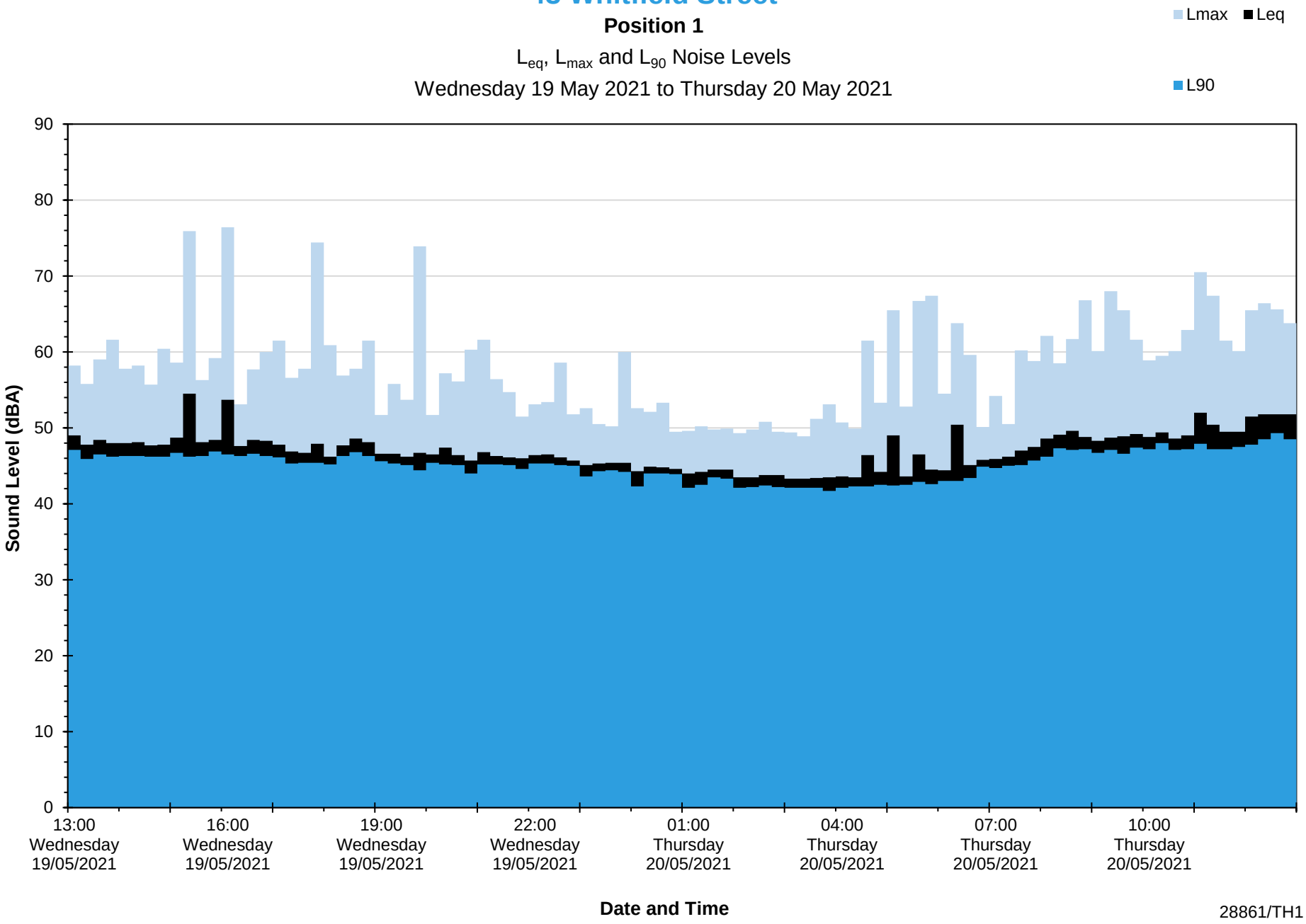
L_w — Sound Power Level (SWL) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

43 Whitfield Street

Position 1

L_{eq}, L_{max} and L_{90} Noise Levels

Wednesday 19 May 2021 to Thursday 20 May 2021



28861/TH1