14 Monmouth Street

Environmental Noise Survey and Plant Noise Assessment Report

27914/PNA1-Rev1

20 May 2020

For:

Soho House UK Ltd

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Document Control

Rev	Date	Comment	Prepared by	Authorised by
1	20/05/2020	New plant location		
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0	30/04/2020	-	Firas Farhan Principal Consultant BSc(Hons), MIOA	John Gibbs Director MIOA, MSEE, CEnv

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1.0 Introduction

It is proposed to install a condenser on the roof of 14 Monmouth Street.

Hann Tucker Associates have therefore been commissioned to undertake a detailed 24 hour daytime and night-time fully automated environmental noise survey of the site to establish the currently prevailing noise climate and propose suitable plant noise emission criteria, based on the results of the survey and the requirements of the Local Authority.

An assessment has been carried out to determine the plant noise emissions at the nearest noise sensitive window and compare proposed items of plant to this criteria.

This report presents the survey methodology and assessment findings.

2.0 Objectives

To establish, by means of detailed 24 hour daytime and night-time fully automated environmental noise monitoring, the existing A-weighted (dBA) L_{90}, L_{eq} and L_{max} environmental noise levels at a selected accessible position, thought to be representative of the nearest affected property.

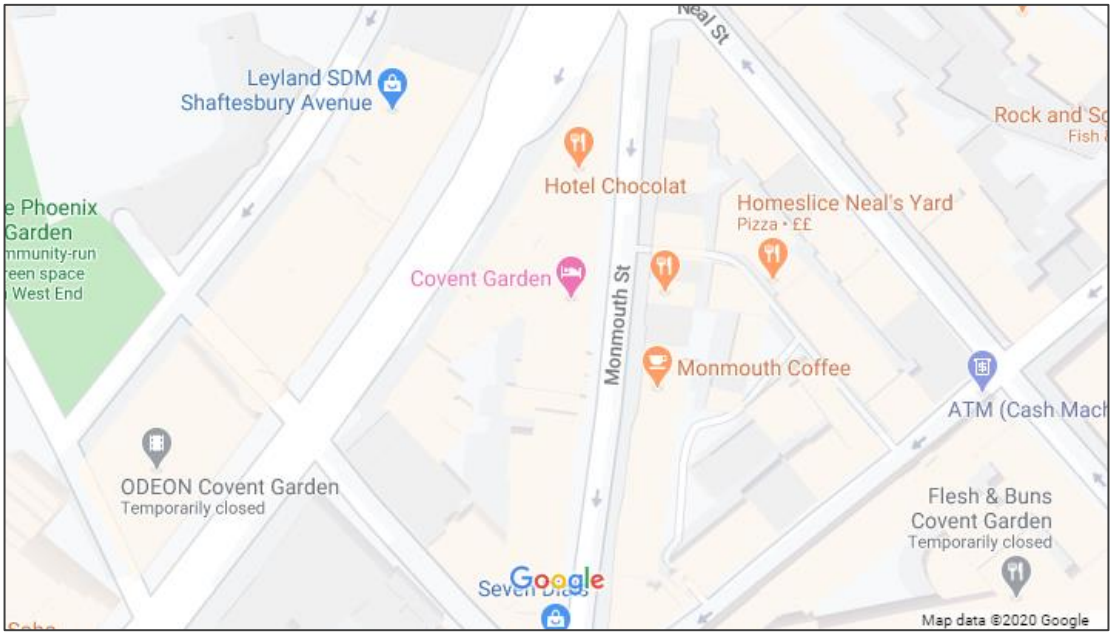
Based on the results of the noise survey, and with reference to the requirements of the Local Authority, to recommend suitable plant noise emission criteria.

To assess the proposed plant and comment on its acceptability.

3.0 Site Description

3.1 Location

The Site falls within London Borough of Camden's jurisdiction. The location is shown in the Location Map below.



3.2 Description

The site is a retail on ground plus three storey residential dwelling. The site overlooks the pedestrianised Monmouth Street to the west. The surrounding area is mixed use. The dominant noise source was noted to be from pedestrians and distance road traffic noise.

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."

The NPPF document does not refer to any other documents or British Standards regarding nose 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 comes under the jurisdiction of London Borough of Camden, which outlines its requirements as below in *Camden Local Plan 2017: Appendix 3.*

"…a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion

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 window (façade)*	*Day*	*'Rating level' 10dB below background*	*'Rating level' 9dB below and 5dB above background*	*'Rating level' greater than 5dB above background*
*Dwellings ***		*Night*	*'Rating level' 10dB below background and no events exceeding 57dBL_{Amax}*	*'Rating level' 9dB below and 5dB above background or noise events between 57dB and 88dBL_{Amax}*	*'Rating level' greater than 5dB above background and/or events exceeding 88dBL_{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 are given for dwellings, however, levels are use specific and different levels will apply dependant on the use of premises".*

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_{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.

5.7 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 $L_{Aeq,8hour}$*

5.8 BREEAM

BREEAM New Construction 2018 Pol 05 states a credit can be awarded if:

1 There are no noise-sensitive areas within the assessed building or within 800 m radius of the assessed site.

OR

2 Where there are noise-sensitive areas within the assessed building or noise-sensitive areas within 800 m radius of the assessed site, a noise impact assessment compliant with BS 4142:2014(228) is commissioned. Noise levels must be measured or determined for:

2.a Existing background noise levels:

2.a.i at the nearest or most exposed noise-sensitive development to the proposed assessed site

2.a.ii including existing plant on a building, where the assessed development is an extension to the building

2.b Noise rating level from the assessed building.

3 The noise impact assessment must be carried out by a suitably qualified acoustic consultant.

4 The noise level from the assessed building, as measured in the locality of the nearest or most exposed noise sensitive development, must be at least 5dB lower than the background noise throughout the day and night.

5 If the noise sources from the assessed building are greater than the levels described in criterion 4, measures have been installed to attenuate the noise at its source to a level where it will comply with the criterion."

Amend above if BREEAM New Construction 2018 is not the right version for this project or if the project is not being assessed for BREEAM.

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

6.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 09:00 hours on Tuesday 21 April 2020 to 09:00 hours on Wednesday 22 April 2020.

During the periods we were on site the wind conditions were moderate. The sky was generally patchy cloud. We understand that generally throughout the survey period the weather conditions were similar to this. These conditions are considered suitable for obtaining representative measurement results.

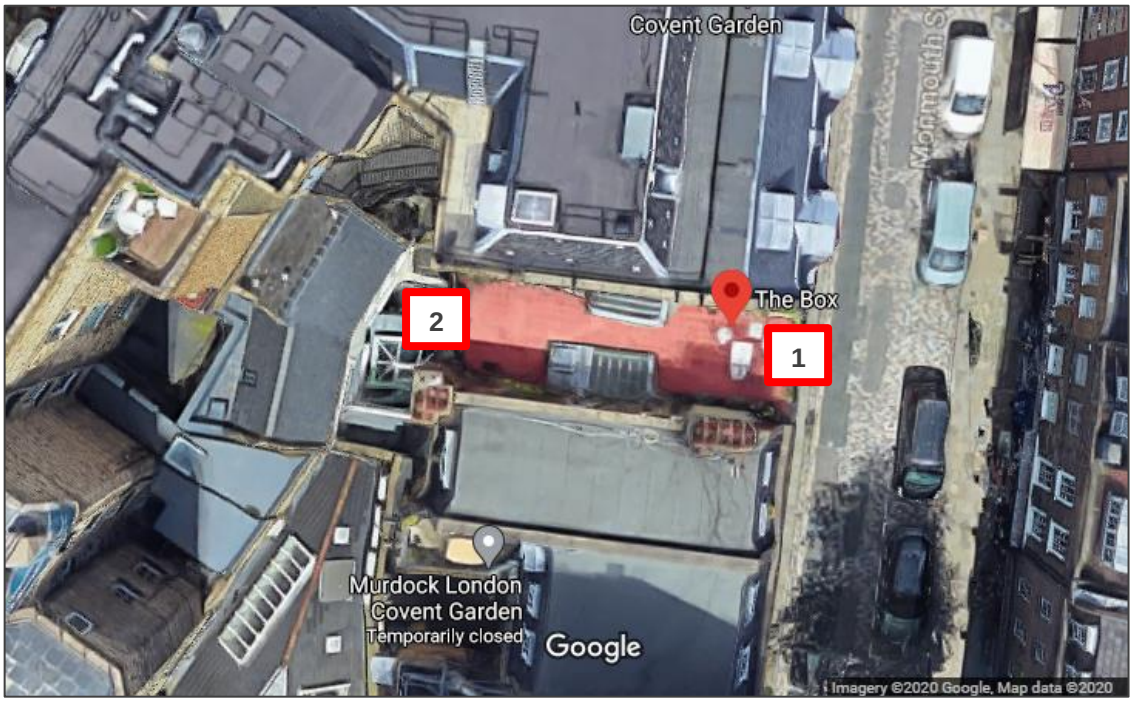
Measurements were taken continuously of the A-weighted (dBA) L_{90}, L_{eq} and L_{max} sound pressure levels over 15 minute periods.

6.2 Measurement Positions

The noise level measurements were undertaken at 2No. Positions at the development site. The measurement position is described in the table below.

Position No	Description
1	The sound level meter was located on the second floor west of the site. The microphone was attached to a pole approximately 8m above ground level and approximately 1m from the façade overlooking Monmouth Street.
2	The sound level meter was located on the roof east of the site. The microphone was attached to a pole approximately 1.5 m above floor level and approximately 1m from the façade overlooking the rear.

The positions were selected in order to assess the lowest noise levels at the development site for subsequent use in setting plant noise emission criteria and is shown on the plan below.



6.3 Instrumentation

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

Position	Description	Manufacturer	Type	Serial Number	Calibration
1	Type 1 ½" Condenser Microphone	PCB	377B02	106753	Calibration on 13/09/2019
	Preamp	Larson Davis	PRM902	880	Calibration on 13/09/2019
	Type 1 Data Logging Sound Level Meter	Larson Davis	824	3839	Calibration on 13/09/2019
2	Type 1 ½" Condenser Microphone	PCB	377B02	107842	Calibration on 13/09/2019
	Preamp	Larson Davis	PRM902	4199	Calibration on 13/09/2019
	Type 1 Data Logging Sound Level Meter	Larson Davis	824	3541	Calibration on 13/09/2019
-	Type 1 Calibrator	Bruel & Kjaer	4231	2610161	Calibration on 19/09/2019

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

The sound level meters were located in an environmental case with the microphones connected to the sound level meters via an extension cables. The microphones were fitted with a windshield.

7.0 Results

The results have been plotted on Time History Graphs 27914/TH1.01 to 27914/TH1.02 enclosed, presenting the 15 minute A-weighted (dBA) L_{90}, L_{eq} and L_{max} noise levels at the measurement position throughout the duration of the survey.

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

Lowest Measured $L_{A90(15min)}$ Background Noise Level (dB re 2 x 10^{-5} Pa)			
Position	**Daytime (07:00 – 23:00) Hours**	**Night-Time (23:00 – 07:00) Hours**	**24 Hours**
1	45 dBA	45 dBA	45 dBA
2	46 dBA	45 dBA	45 dBA

In order to compare the results of our survey with the relevant guidelines it is necessary to convert the measured $L_{Aeq(15\ ?minute)}$ noise levels into single figure daytime $L_{Aeq(16\text{-}hour)}$ (07:00-23:00 hours) and night-time $L_{Aeq(8\text{-}hour)}$ (23:00-07:00 hours) levels.

The daytime $L_{Aeq(16\text{-}hour)}$ and night-time $L_{Aeq(8\text{-}hour)}$ noise levels for each position are presented in the tables below.

L_{AeqT} Noise Level (dB re 2 x 10^{-5} Pa)		
Position	**Daytime (07:00 – 23:00) Hours**	**Night-Time (23:00 – 07:00) Hours**
1	61 dBA	51 dBA
2	52 dBA	47 dBA

N.B. The above levels are as measured at the measurement positions and include local reflections.

8.0 Discussion Of Noise Climate

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However at the beginning and end of the survey period the dominant noise sources were noted to be from pedestrians on Monmouth Street and from distance road traffic on surrounding roads.

9.0 Plant Noise Emission Criteria

9.1 Residential Criteria

The site comes under the jurisdiction of Camden Borough Council, which outlines its requirements as below in *Camden Local Plan 2017: Appendix 3*

"…a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion

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 window (façade)*	*Day*	*'Rating level' 10dB below background*	*'Rating level' 9dB below and 5dB above background*	*'Rating level' greater than 5dB above background*
*Dwellings ***		*Night*	*'Rating level' 10dB below background and no events exceeding 57dBL_{Amax}*	*'Rating level' 9dB below and 5dB above background or noise events between 57dB and 88dBL_{Amax}*	*'Rating level' greater than 5dB above background and/or events exceeding 88dBL_{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 are given for dwellings, however, levels are use specific and different levels will apply dependant on the use of premises"*

9.2 Commercial Windows

London Borough of Camden do not have a specific criteria for noise impact to commercial properties. We therefore propose that at the nearest commercial properties, the guidelines of BS 8233: 2014 "Guidance on sound insulation and noise reduction for buildings" should be followed.

In relation to the commercial properties within the vicinity of the proposed location of the new plant, Table 6 of this standard states that for "reasonable conditions for study and work requiring concentration", an appropriate internal ambient noise level design range is 35-45dB $L_{Aeq,T}$.

In addition, BS 8233:2014 states that attenuation of approximately 15dB can be provided by a partially open window. Hence the following external noise level criteria must be satisfied outside the nearest office façade (based on achieving the above design range):

External Ambient Noise Level Limit, dB $L_{Aeq,T}$
50-60

9.3 Plant Noise Emission Limits

Based on above requirements and the results of the environmental noise survey, the proposed L_{Aeq} dBA criteria are shown in the table below:

	Proposed Plant Noise Limit L_{Aeq} dBA at Nearest Noise Sensitive Façade		
Type	**Daytime (07:00-23:00 hours)**	**Night-time (23:00-07:00 hours)**	**24 Hours**
Residential Window	35 dBA	35 dBA	35 dBA
Any Commercial Window	55 dBA		

The above criteria are to be achieved with all of the proposed plant operating simultaneously.

10.0 Achievable Internal Noise Levels

We have predicted the levels that would be achievable in the dwelling with windows partially opened.

10.1 Windows Partially Open

It is generally accepted that the typical noise reduction achieved with partially opened windows is around 15dBA (ref. BS 8233:2014 Annex G.1). This value is the difference between dBA levels measured outside and inside typical dwellings, therefore 3dBA should be added to free field noise levels to determine outside levels.

A simple assessment thus indicates the following noise levels may be expected within the proposed worst case habitable rooms with partially opened windows.

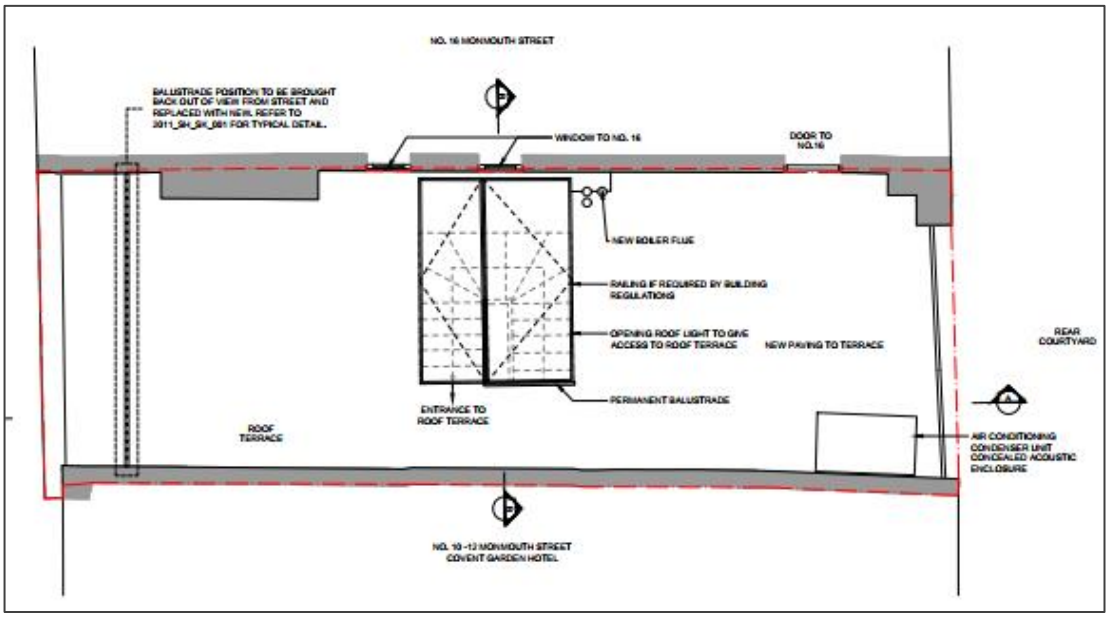
Description	Predicted Worst Case Internal Noise Levels with Windows Partially Opened			
	Position 1		Position 2	
	Daytime $L_{Aeq(16\text{-hour})}$	Night-time $L_{Aeq(8\text{-hour})}$	Daytime $L_{Aeq(16\text{-hour})}$	Night-time $L_{Aeq(8\text{-hour})}$
Façade noise level	61 dBA	51 dBA	52 dBA	47 dBA
Noise reduction for conventional thermal double glazing	-15dBA	-15dBA	-15dBA	-15dBA
Predicted internal noise levels	46 dBA	36 dBA	37 dBA	32 dBA
BS8233:2014 Criteria	35 dBA	30 dBA	35 dBA	30 dBA
Excess	+11 dBA	+6 dBA	+2 Dba	+2 dBA

The predicted internal noise levels with the windows open are above guidance given in BS8233:2014 and thus natural ventilation cannot be used without impacting on the internal noise levels.

11.0 Plant Noise Impact Assessment

11.1 Location of Plant

We understand it is proposed to install the condenser on the roof of 14 Monmouth Street. The nearest noise sensitive window is the residential window belonging to 16 Monmouth Street approximately 1m away. The following plan shows the plant location.



11.2 Plant Noise Impact Assessment

At this stage we do not have noise data for the proposed plant. In the absence of the noise data for the unit we are unable to give a detailed noise impact assessment. We would therefore recommend the following cumulative limiting levels when measured at 1 metre from the nearest noise sensitive receptor.

A-weighted Limiting Sound Pressure Level @ 1m (dB re 2 x 10^{-5} Pa)
35 dBA

Based on typical condenser unit of up to 60 dBA @1m, an acoustic enclosure in accordance with the attached specification is likely to be required.

12.0 Conclusions

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

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

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.

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).

Appendix B

Specification for Small Acoustic Enclosures

The condenser unit 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 at 1m from the nearest noise sensitive residential window under any load conditions in situ.

A-weighted Limiting Sound Pressure Level @ 1m (dB re 2 x 10^{-5} Pa)
35 dBA

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 48kg/$m^{3.}$ 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 hall 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.

The supplier shall ensure that the assembled enclosure is designed and constructed to withstand site operating conditions such as wind and snow loads, roof mounted plant, etc., as appropriate, and if outside, to be suitably weatherproofed.

The acoustic media shall not comprise materials which are generally composed of mineral fibres, either man made or naturally occurring, which have a diameter of 3 microns or less and a length of 200 microns or less or which contain any fibres not sealed or otherwise stabilised to ensure that fibre migration is prevented.

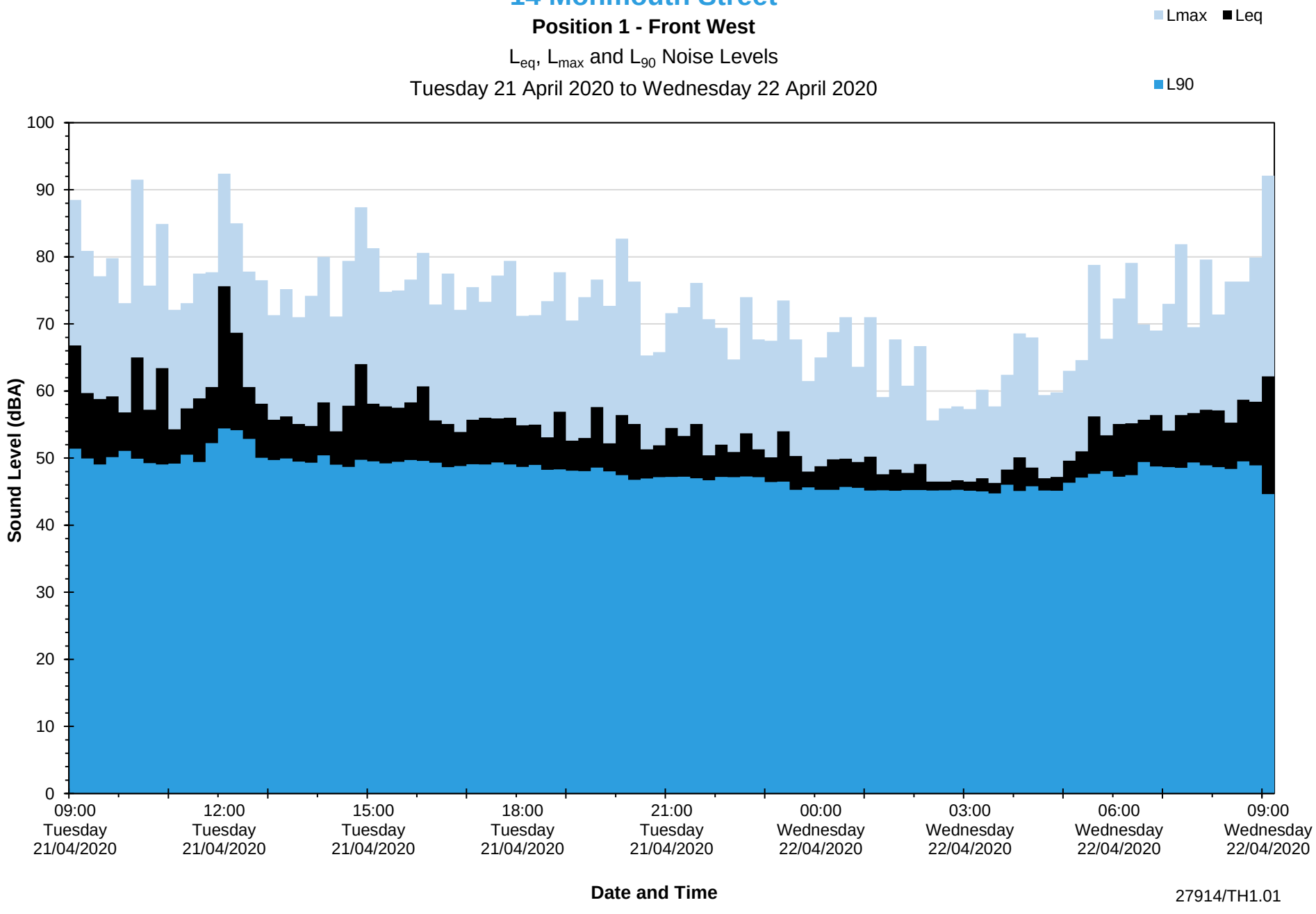
Any deviations from the above specification must be agreed by, and confirmed in writing to, Hann Tucker Associates.

14 Monmouth Street

Position 1 - Front West

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

Tuesday 21 April 2020 to Wednesday 22 April 2020



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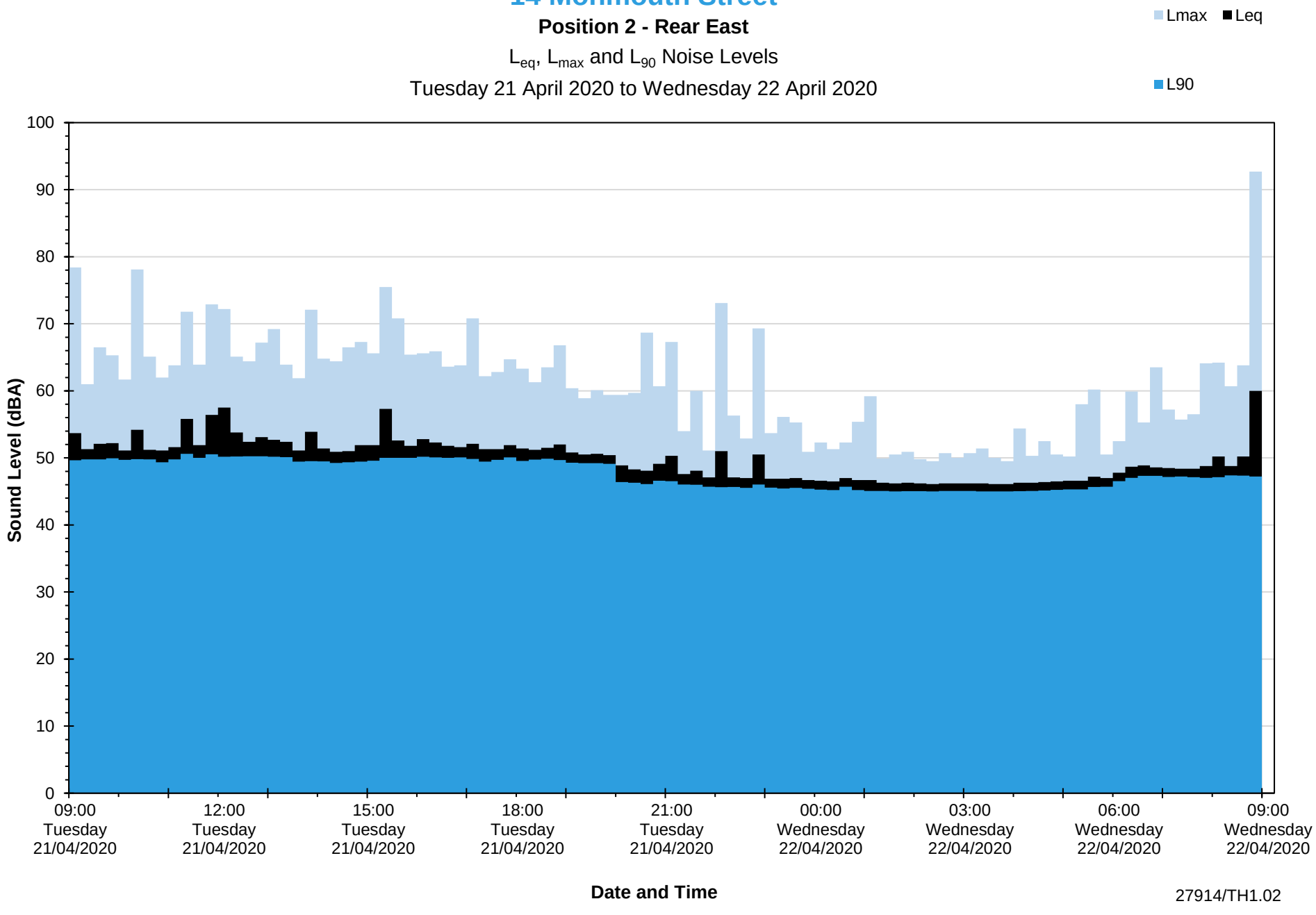
14 Monmouth Street

Position 2 - Rear East

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

Tuesday 21 April 2020 to Wednesday 22 April 2020



27914/TH1.02