clement acoustics
www.clementacoustics.co.uk

London office
1B(c) Yukon Road
London
SW12 9PZ
Tel: 0203 475 2280

Manchester office
105 Manchester Road
Bury
BL9 0TD
Tel: 0161 850 2280

1 - 5 PORTPOOL LANE,
HOLBORN, LONDON

NOISE IMPACT ASSESSMENT

Report **17935-NIA-01**

Prepared on 22 March 2023

Issued For:

Med Logistics Health Services Limited

1st Floor, Clock Park Shripney Road

Bognor Regis

PO22 9NH

Executive Summary

This Noise Impact Assessment has been undertaken in order to assess a proposed plant installation for commercial use at 1 - 5 Portpool Lane, Holborn.

The proposed plant installation comprises 6 No. Toshiba Air Conditioning Condenser Units.

A background noise survey has been undertaken as detailed in the report, in order to determine an appropriate noise emission criterion, in accordance with the requirements of London Borough of Camden Council and British Standard 8233: 2014.

Calculations were undertaken for the nearest identified receiver, identified as 1-17 Shene Building, a residential building, and 80-86 Grays Inn Road, an office building. It should be noted that if there are closer receivers that Clement Acoustics is not aware of, a reassessment will be necessary, and this should therefore be confirmed by the Client.

It has been demonstrated that compliance with the established criterion is feasible, dependant on the following material considerations:

- The plant could be in use at any time over a 24-hour period
- The noise emissions data for the proposed units as obtained from available manufacturer information
- Plant and receiver locations are as established in this report and marked on the attached site plan

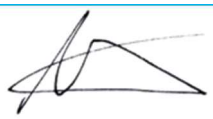
If there is any deviation from the above, Clement Acoustics must be informed, in order to establish whether a reassessment is necessary.

Clement Acoustics has used all reasonable skill and professional judgement when preparing this report. The report relies on the information as provided to us at the time of writing and the assumptions as made in our assessment.

This report is designed to be suitable to support a plant noise planning application, as per our original scope of work.

Contents

List of Attachments

Issue	Date of Issue	Author	Reviewed	Authorised
0	06/12/2022			
		Jamie Newton Consultant BEng (Hons) AMIOA	**Matthew Markwick** Principal Consultant BSc (Hons) MSc MIOA	**Duncan Martin** Director BSc (Hons) MIOA
A	20/03/2023			
		Jamie Newton Consultant BEng (Hons) AMIOA	**John Smethurst** Director BSc (Hons) MIOA	

Issue	Comment
0	First issue
A	Addressing client comments and inclusion of Hatton Garden Conservation Area Appraisal and Management Strategy assessment

1.0 INTRODUCTION

Clement Acoustics has been commissioned by Med Logistics Health Services Limited to measure existing background noise levels at 1 - 5 Portpool Lane, Holborn. Measured noise levels have been used to determine noise emissions criteria for a proposed plant installation in agreement with the planning requirements of the London Borough of Camden.

This report presents the results of the environmental survey followed by noise impact calculations and outlines any necessary mitigation measures.

An acoustic terminology glossary is provided in Appendix A.

2.0 SITE DESCRIPTION

The site is an existing office block bound by Portpool Lane to the south, commercial premises to the east and west, and a courtyard space and residential flats to the north. The surrounding area is predominantly mixed use in nature.

Current proposals are to install 6 No. air conditioning condenser units on the western building façade, for commercial use.

1-17 Shene Building, a residential building, and 80-86 Grays Inn Road, an office building have been identified as the nearest affected receivers. This nearest noise sensitive receivers were identified through observations on-site. If there are any receivers closer to that identified within this report then a further assessment will need to be carried out. Therefore, the closest noise sensitive receiver should be confirmed by the client before the plant is installed or any noise mitigation measures are implemented.

Locations are shown in attached site plan 17935-SP1.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Unattended Noise Survey Procedure

Measurements were undertaken at one position as shown on indicative site drawing 17935-SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the nearest affected receiver.

The surroundings and position used for the monitoring location are described in Table 3.1.

Position No.	Description
1	The microphone was mounted on a fence at 1st floor level at the back of the building. The microphone was positioned 2 m from reflective surfaces. [1]

Table 3.1: Description of unattended monitoring locations

Note [1]: The position was considered to be free field according to guidance found in BS 4142: 2014, and a correction for reflections has therefore not been applied.

Continuous automated monitoring was undertaken for the duration of the survey between 14:30 on 11 November 2022 and 13:30 on 14 November 2022.

The measurement procedure generally complied with BS 7445: 1991: '*Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use*'.

The locations of the measurement positions are shown on attached site plan 17935-SP1.

3.2 Weather Conditions

At the time of set-up and collection of the monitoring equipment, the weather conditions were dry with light winds. It is understood that the weather conditions during the unattended survey remained dry with wind speeds below 5 m/s.

It is considered that the weather conditions did not significantly adversely affect the measurements and are therefore considered suitable for the measurement of environmental noise.

It is considered that the weather conditions were suitable for the measurement of environmental noise.

3.3 Equipment

The equipment calibration was verified, by means of a field verification check, before and after use and no abnormalities were observed.

The equipment used was as follows.

- 1 No. Svantek Type 957 Class 1 Sound Level Meter
- Rion Type NC-74 Class 1 Calibrator

4.0 RESULTS

4.1 Unattended Noise Survey Results

The $L_{Aeq:\,5min}$, $L_{Amax:\,5min}$, $L_{A10:\,5min}$ and $L_{A90:\,5min}$ acoustic parameters were measured at the location shown in site drawing 17935-SP1.

Measured noise levels are shown as a time history in Figure 17935-TH1, with average ambient and typical background noise levels summarised in Table 4.1.

It should be noted that the guidance of the latest revision of British Standard 4142: 2014 +A1 2019 *'Methods for rating and assessing industrial and commercial sound'*, as detailed in Section 8.1 of the standard is as follows:

'The objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.'

Therefore, the typical background noise level will be used for the purpose of this assessment.

Time Period	Average ambient noise level $L_{eq:\,T}$	Typical background noise level $L_{90:\,5min}$
Daytime (07:00 - 23:00)	51 dB(A)	43 dB(A)
Night-time (23:00 - 07:00)	47 dB(A)	41 dB(A)

Table 4.1: Average ambient and typical background noise levels

5.0 NOISE CRITERIA

5.1 Relevant Local Policy

The assessment and recommendations in this report have been undertaken in accordance with Policy D14 of the London Plan 2021, which contains the following relevant sections:

"*D14. In order to reduce, manage and mitigate noise to improve health and quality of life, residential and other non-aviation development proposals should manage noise by:*

> *5) mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on existing noise-generating uses*".

5.2 Local Authority Criteria

The Camden Local Plan (2017) document states the following regarding industrial 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."*

In order to resent a robust assessment it has been assumed that the proposed plant units will be operational at any time.

Based on the results of the environmental noise survey and requirements of the London Borough of Camden Council, Table 5.1 presents the proposed plant noise emission criteria to be achieved at residential receivers.

Period	Plant Noise Emission Limit $L_{eq:T}$
Daytime (07:00 - 23:00)	33 dB(A)
Night-time (23:00 - 07:00)	31 dB(A)

Table 5.1: Plant noise emission limits

5.3 Commercial Receivers

The closest receivers to the proposed plant are existing commercial offices on the first floor of 80-86 Grays Inn Road. Locations are shown as Receiver 2 in attached site plan 17935-SP1.

In order to assess whether noise emissions will be controlled to an acceptable level, guidance has been sought in British Standard 8233: 2014 '*Guidance on sound insulation and noise reduction for buildings*' [BS 8233].

In Table 6 of BS 8233, guidance is given on typical noise levels for non-domestic buildings where concentration may be required. The relevant guidance given in this table is summarised in Table 5.2.

Objective	Location	Design range $L_{Aeq,T}$ dB
Study and work requiring concentration	Staff/meeting room	35-45 dB(A)
	Executive office	35-40 dB(A)

Table 5.2: BS8233 recommended internal background noise levels

Based on the use of the adjacent space, we would recommend noise emissions should not exceed the design ranges shown in Table 5.2.

6.0 PLANT NOISE IMPACT ASSESSMENT

6.1 Proposed Installation

The proposed plant installation comprises the following:

- 1 No. Toshiba RAV-GM301ATP-E condenser unit
- 2 No. Toshiba RAV-GM401ATP-E condenser unit
- 1 No. Toshiba RAV-GM561ATP-E condenser unit
- 1 No. Toshiba RAV-GM801ATP-E condenser unit

Noise emissions for the proposed plant units, as provided by the manufacturer, are shown in Table 6.1. Loudest modes of operation have been used in order to present a robust worst-case assessment.

Plant Unit	Sound Pressure Levels (at 1 meter, dB) in each Frequency Band								
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Toshiba RAV-GM301ATP-E	60	47	49	44	43	35	34	24	47
Toshiba RAV-GM401ATP-E	61	52	48	48	46	41	37	30	50
Toshiba RAV-GM561ATP-E	52	49	49	45	44	38	34	26	48
Toshiba RAV-GM801ATP-E	55	54	54	50	46	40	34	26	52

Table 6.1: Manufacturer provided noise emissions levels

British Standard 4142: 2014 +A1 2019 *'Methods for rating and assessing industrial and commercial sound'* provides guideline penalties that can be applied to noise emissions to account for tonality, impulsivity and intermittency. Where a sound source is neither tonal nor impulsive, but is still distinctive against the residual acoustic environment, a penalty may still be applied.

The available penalties for different characteristics are summarised in Table 6.2.

Characteristic	Comments	Maximum Penalty
Tonality	Can be converted to 2 dB for a tone which is just perceptible, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible	+6 dB
Impulsivity	Can be converted to 3 dB for impulsivity which is just perceptible, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible	+9 dB
Intermittency	When the sound has identifiable on/off conditions	+3 dB
Distinctiveness	Intended for sources that are neither tonal nor impulsive, but distinctive against background noise sources	+3 dB

Table 6.2: Available penalties according to BS 4142: 2014

With reference to Table 6.2, a +3 dB acoustic feature correction for distinctiveness has been applied to the residential assessment, as per BS 4142: 2014 guidance.

The proposed plant location is on the western façade of 1 - 5 Portpool Lane, Holborn which is shown on indicative site plan 17935-SP1 and indicative elevation 17935-SP2.

6.2 Residential Noise Impact Assessment

The closest receiver has been identified as the window on the western facade of a residential property opposite which is a minimum of 23 m from the proposed plant location. The residential receiver is shown on attached site plan 17935-SP1 as Receiver 1.

Screening of the nearest noise sensitive receptor is provided by the building envelope.

Taking into account all necessary acoustic corrections, the resulting noise level at the identified residential windows would be as shown in Table 6.3. Detailed calculations are shown in Appendix B.

Receiver	Night Time Hours Criterion	Noise Level at Receiver (due to proposed plant)
Nearest Residential Property	31 dB(A)	22 dB(A)

Table 6.3: Noise levels and project criterion at noise sensitive receivers

As presented in Table 6.3 and Appendix B, the proposed plant installation would be expected to meet the requirements of the proposed criteria.

6.3 British Standard Requirements

Further calculations have been undertaken to assess whether the noise emissions from the proposed plant unit would be expected to meet recognised British Standard recommendations, in order to further ensure the amenity of nearby noise sensitive receivers.

British Standard 8233: 2014 '*Guidance on sound insulation and noise reduction for buildings*' gives recommendations for acceptable internal noise levels in residential properties. Assuming worst case conditions, of the closest window being for a bedroom, BS 8233: 2014 recommends 30 dB(A) as being acceptable internal sleeping conditions during night-time.

With loudest external levels of 22 dB(A), acceptable internal conditions would be met without taking the attenuation of the window itself into consideration. According to BS 8233: 2014, a typical building facade with a partially open window offers 15 dB attenuation.

It can therefore be predicted that, in addition to meeting the requirements of the set criteria, the emissions from the proposed plant would be expected to meet the most stringent recommendations of the relevant British Standard, with neighbouring windows partially open. Predicted levels are shown in Table 6.4.

Receiver	Recommended Target – *For resting/sleeping conditions in a bedroom, in BS 8233: 2014*	Noise Level at Receiver (due to plant installation)
Inside Residential Window	30 dB(A)	7 dB(A)

Table 6.4: Noise levels and BS 8233: 2014 criteria inside nearest residential space

6.4 Commercial Noise Assessment

The closest commercial receivers have been identified as a first-floor window on the eastern facade of 80-86 Grays Inn Road. The commercial receiver is shown on attached site plan 17935-SP1 as Receiver 2.

Taking into account all necessary acoustic corrections, including the reduction of assumed partially open windows to offices, the resulting noise level inside the identified windows would be as shown in Table 6.5. Detailed calculations are shown in Appendix B.

Receiver	Design Range	Rating noise Level at Receiver (due to proposed plant)
Commercial Receiver	35-40 dB(A)	35 dB(A)

Table 6.5: Noise levels and project criterion at noise sensitive receivers

As presented in Table 6.6 and Appendix B, the proposed plant installation with suggested attenuation would be expected to meet the requirements of the proposed criteria.

6.5 Hatton Garden Conservation Area Appraisal and Management Strategy

Regarding plant noise, the Hatton Garden Conservation Area Appraisal and Management Strategy states:

> *"The Council expects services to be concealed from view as far as possible and sited so as to minimise noise at street level and in adjacent properties."*

It is understood that the proposed plant location has been chosen with the above taken account, with the proposed units being set back from Portpool Lane a minimum of 1.5 m. Sections 6.2 - 6.4 of this report assesses noise from the proposed plant at adjacent properties and show compliance with all relevant criteria.

7.0 CONCLUSION

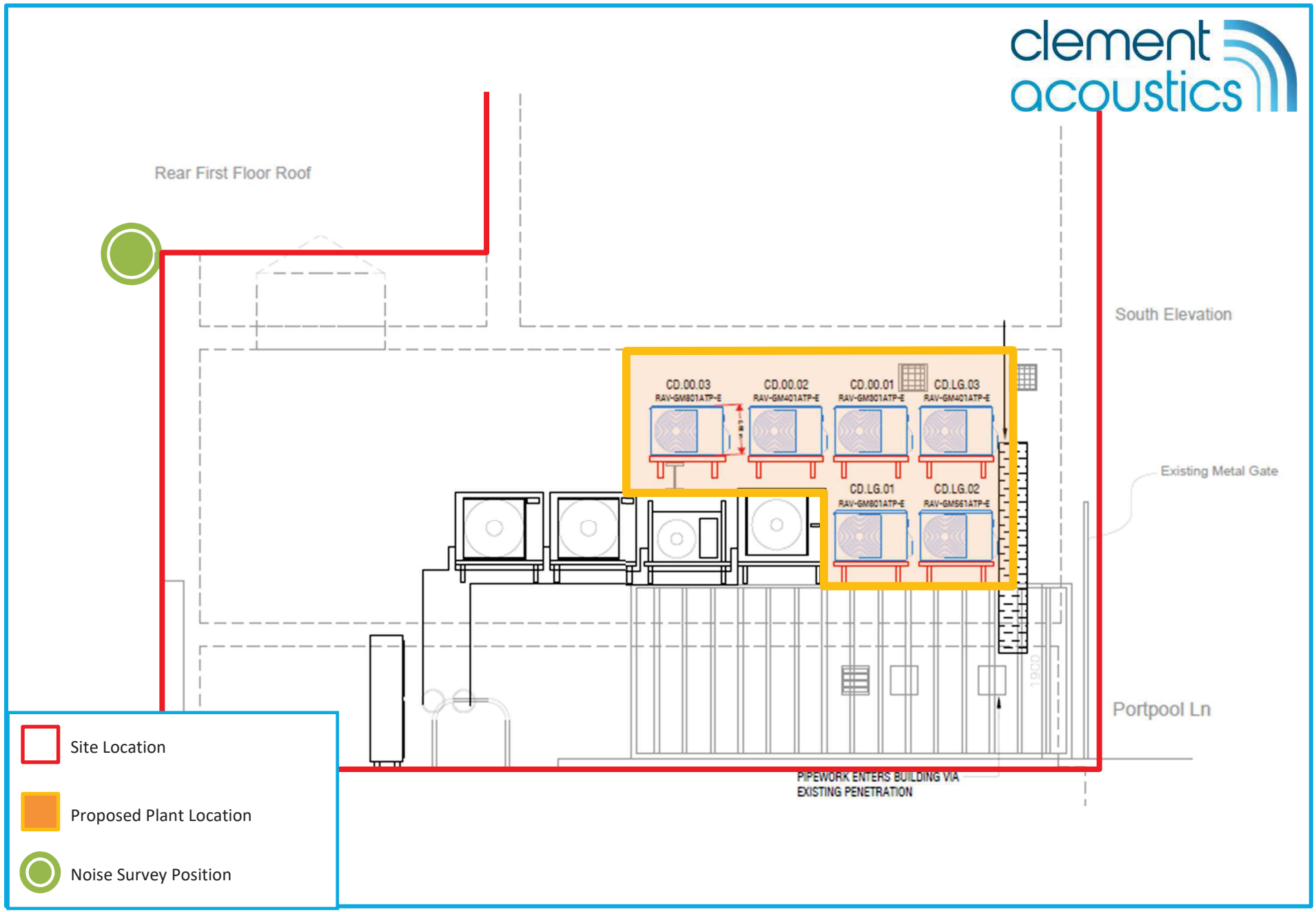
An environmental noise survey has been undertaken at 1 - 5 Portpool Lane, Holborn. The results of the survey have enabled criteria to be set for noise emissions from the proposed plant in accordance with the requirements of the London Borough of Camden Council.

A noise impact assessment has then been undertaken using manufacturer noise data to predict the noise levels, due to the proposed plant, at the nearby noise sensitive receivers.

Calculations show that noise emissions from the proposed units should meet the requirements of the London Borough of Camden Council and British Standard 8233: 2014, with no requirement for any mitigation.

17935-SP1 Indicative site plan indicating noise monitoring position, proposed plant location and nearest noise sensitive receiver

Date: 6 December 2022

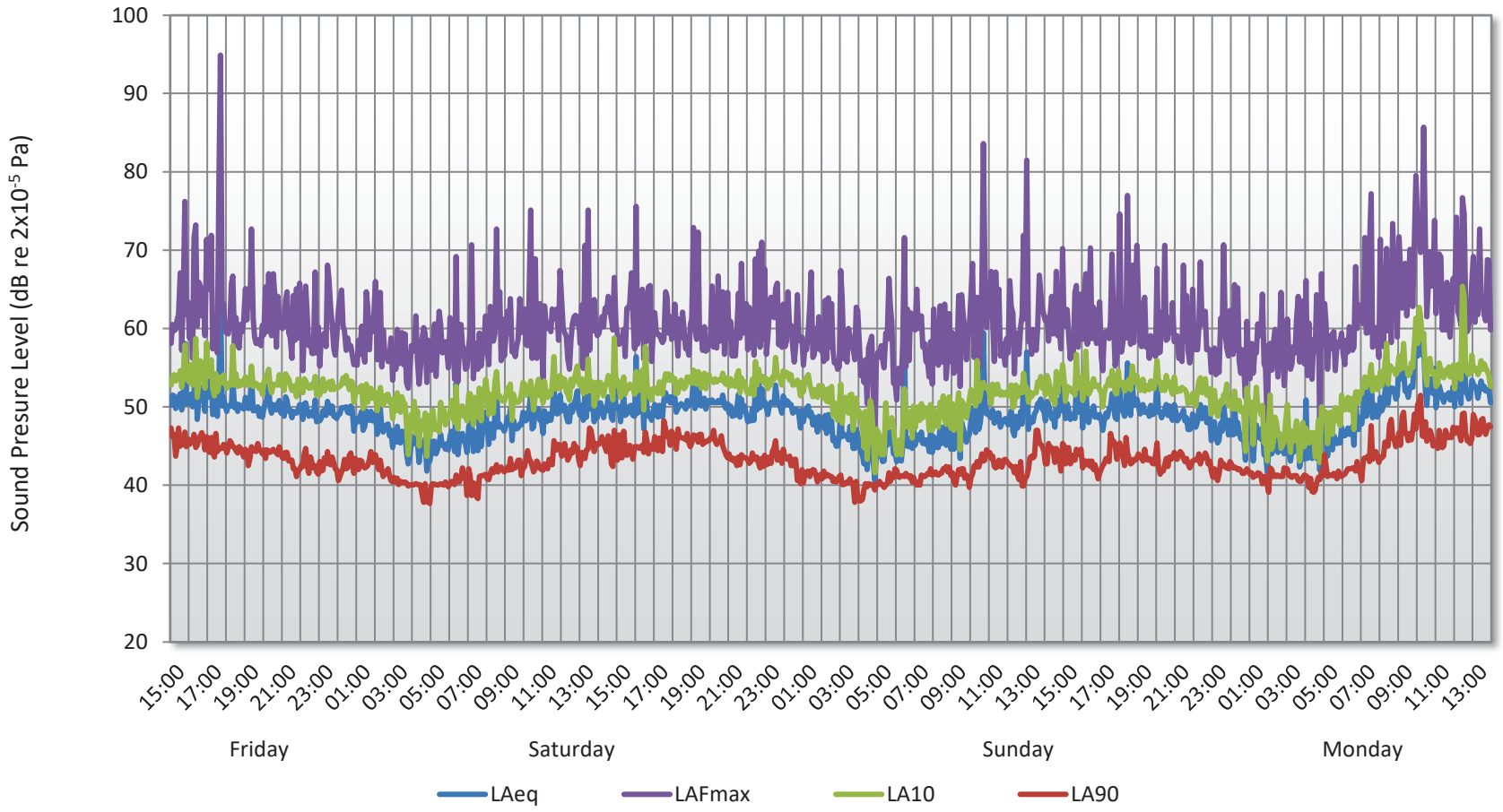


17935-SP2 Indicative site plan indicating noise monitoring position and plant location **Date:** 6 December 2022

1 - 5 Portpool Lane, Holborn

Position 1

Environmental Noise Time History
11 November 2022 to 14 November 2022



17935-TH1

APPENDIX A

GLOSSARY OF ACOUSTIC TERMINOLOGY

dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq}. The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for not more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise

L_{90}

This is the level exceeded for not more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 10 such octave bands whose centre frequencies are defined in accordance with international standards.

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than one alone and 10 sources produce a 10 dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3 dB for each doubling of distance.

Subjective impression of noise

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.

APPENDIX B

17935

1 - 5 Portpool Lane, Holborn

EXTERNAL PLANT NOISE EMISSIONS CALCULATION

Residential Receiver

Receiver: Nearest Residential Receiver
Source: Proposed plant installation

	Frequency, Hz								
	63	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*	*dB(A)*
Manufacturer provided sound pressure level at 1 metre									
Toshiba RAV-GM301ATP-E	60	47	49	44	43	35	34	24	47
Toshiba RAV-GM401ATP-E	61	52	48	48	46	41	37	30	50
Toshiba RAV-GM401ATP-E	61	52	48	48	46	41	37	30	50
Toshiba RAV-GM561ATP-E	52	49	49	45	44	38	34	26	48
Toshiba RAV-GM801ATP-E	55	54	54	50	46	40	34	26	52
Toshiba RAV-GM801ATP-E	55	54	54	50	46	40	34	26	52
Combined Sound Pressure Level at 1 m	66	60	59	56	53	47	43	35	58
Correction for reflections, dB	3	3	3	3	3	3	3	3	
Distance correction to receiver, dB (23 m) [1]	-27	-27	-27	-27	-27	-27	-27	-27	
Correction for Barrier Attenuation, dB	-8	-10	-13	-16	-19	-22	-22	-22	
Correction for BS4142 Distinctiveness rating, dB	3	3	3	3	3	3	3	3	
Sound pressure level at receiver	**38**	**29**	**25**	**19**	**13**	**5**	**0**	**-8**	**22**

[1] Distance loss calculated assuming Point Source attenuation (*typically used where distance is more than 3x the largest source dimension*)

Design Criterion	**31**

BS 8233 ASSESSMENT CALCULATION

Receiver: Inside Nearest Residential Window
Source: Proposed plant installation

	Frequency, Hz								
	63	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*	*dB(A)*
Sound pressure level outside window	38	29	25	19	13	5	0	-8	22
Minimum attenuation from partially open window, dB	-15	-15	-15	-15	-15	-15	-15	-15	
Sound pressure level inside nearest noise sensitive premises	**23**	**14**	**10**	**4**	**-2**	**-10**	**-15**	**-23**	**7**

Design Criterion	**30**

Commercial Receiver

Receiver: Nearest Commercial Receiver
Source: Proposed plant installation

	Frequency, Hz								
	63	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*	*dB(A)*
Manufacturer provided sound pressure level at 1 metre									
Toshiba RAV-GM301ATP-E	*60*	*47*	*49*	*44*	*43*	*35*	*34*	*24*	*47*
Toshiba RAV-GM401ATP-E	*61*	*52*	*48*	*48*	*46*	*41*	*37*	*30*	*50*
Toshiba RAV-GM401ATP-E	*61*	*52*	*48*	*48*	*46*	*41*	*37*	*30*	*50*
Toshiba RAV-GM561ATP-E	*52*	*49*	*49*	*45*	*44*	*38*	*34*	*26*	*48*
Toshiba RAV-GM801ATP-E	*55*	*54*	*54*	*50*	*46*	*40*	*34*	*26*	*52*
Toshiba RAV-GM801ATP-E	*55*	*54*	*54*	*50*	*46*	*40*	*34*	*26*	*52*
Combined Sound Pressure Level at 1 m	66	60	59	56	53	47	43	35	58
Correction for reflections, dB	3	3	3	3	3	3	3	3	
Distance correction to receiver, dB (4 m) [2]	-11	-11	-11	-11	-11	-11	-11	-11	
Correction for Partially Open Window, dB	-15	-15	-15	-15	-15	-15	-15	-15	
Sound pressure level at receiver	**43**	**37**	**36**	**33**	**30**	**24**	**20**	**12**	**35**

[2] Distance loss calculated assuming Conformal Area attenuation (source dimensions: length = 4.6 m, depth = 2.1 m, height = 0.3 m)

Design Criterion	**35-40**