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PREPARED: Tuesday, 08 December 2020

HELEN GRAHAM HOUSE

NOISE IMPACT ASSESSMENT

CONTENTS

LIST OF ATTACHMENTS

Project Ref:	AS11852	Title:	Helen Graham House, Holborn
Report Ref:	AS11852.201207.NIA	Title:	Plant Noise Impact Assessment
Client Name:	Progress My Office		
Project Manager:	Michael Symmonds		
Report Author:	Michael Symmonds		
Clarke Saunders Acoustics Winchester SO22 5BE		This report has been prepared in response to the instructions of our client. It is not intended for and should not be relied upon by any other party or for any other purpose.	

1.0 INTRODUCTION

1.1 Clarke Saunders Acoustics (CSA) has been appointed to conduct a noise impact assessment of new condensing plant at Helen Graham House, Holborn.

1.2 An environmental noise survey will be undertaken, the data from which will be used in accordance with the requirements of Camden Council to set plant noise emissions criteria for the daytime and night-time periods.

1.3 Manufacturer data for the new plant items will be used to assess the noise levels likely to be experienced by off-site residential receptors, which will be compared with the established criteria to determine compliance.

2.0 SITE DESCRIPTION

2.1 Seven new condensers will be installed within the south-western lightwell at ground floor high level. These condensers will back onto a brick wall, which extends up to approximately first floor high level, whilst they will face the application building, Helen Graham House.

2.2 The nearest off-site noise sensitive receptor is understood to be to the north of the plant location.

2.3 The site and its surroundings are shown in AS11852/SP1, with the plant location and nearest receptor identified.

3.0 LOCAL AUTHORITY REQUIREMENTS

3.1 Camden Council adopted the new Local Plan on 3 July 2017, which describes “noise thresholds” in Appendix 3. Noise levels from commercial and industrial developments including plant and machinery noise can be found in Table C of the document. A summary of this table is presented below.

EXISTING NOISE SENSITIVE RECEPTOR	ASSESSMENT LOCATION	DESIGN PERIOD	LOAEL (GREEN)	LOAEL TO SOAEL (AMBER)	SOAEL (RED)
Dwellings	Garden used for main amenity (free field) and Outside living or dining or bedroom window(façade)	Day (07:00 – 23:00)	‘Rating level’ 10 dB* below background	‘Rating level’ between 9 dB below and 5 dB above background	‘Rating level’ greater than 5 dB above background
	Outside bedroom window (façade)	Night (23:00 - 07:00)	‘Rating level’ 10 dB* below background and no events exceeding 57 dB L_{Amax}	‘Rating level’ between 9 dB below and 5 dB above background or noise events between 57 dB and 88 dB L_{Amax}	‘Rating level’ 5dB above background and/or events exceeding 88 dB L_{Amax}

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

4.0 SURVEY PROCEDURE AND EQUIPMENT

4.1 A survey of the ambient and background noise levels was undertaken on the 5th floor flat roof area as indicated on the site plan AS11852/SP1.

4.2 Measurements of consecutive 5-minute L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels were taken between 11:10 hours on Friday 30th October and 15:05 hours on Tuesday 3rd November 2020.

4.3 The following equipment was used during the survey:

- NTi sound level meter type XL2-TA;
- Rion sound level calibrator type NC74.

4.4 The calibration of the sound level meter was verified before and after use. No significant calibration drift was detected.

4.5 The weather during the survey was noted onsite at installation and retrieval of the meter. These observations were supplemented with historical weather data. Conditions were mostly dry with light to moderate winds. From inspection of the noise survey data, the moderate winds do not seem to have significantly affected the measured noise levels, owing to the relatively sheltered placement of the sound level meter.

4.6 Measurements were made following procedures in BS 7445:1991 (ISO1996-2:1987) *Description and measurement of environmental noise Part 2- Acquisition of data pertinent to land use* and BS4142:2014 + A.1:2019 *Methods for rating and assessing industrial and commercial sound,* where appropriate.

5.0 SURVEY RESULTS

5.1 Figures AS11852/TH1-5 show the L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels as time histories at the monitoring position.

5.2 The background noise climate at the property is currently determined by mechanical plant, which is installed at various positions around the lightwell. This existing plant was noted to consist of condensers and an unknown plant item, which radiates noise via a louvre at first floor level. None of these plant items are understood to be associated with Helen Graham House.

5.3 The measured typical background and average noise levels from the monitoring positions are presented in the following table.

MONITORING PERIOD	TYPICAL BACKGROUND $L_{A90, 5MINS}$	AVERAGE $L_{Aeq, T}$
07:00 - 23:00 hours	50 dB	58 dB
23:00 - 07:00 hours	45 dB	51 dB

Typical measured background and average noise levels [dB ref. 20 μPa]

6.0 DESIGN CRITERIA

6.1 On the basis of the measured noise levels, the likelihood that the plant noise will not be perceptibly tonal at the receptor, and to target a LOAEL in line with Camden's standard requirements, the design criteria for the new plant is as follows.

DAYTIME (07:00 - 23:00 HOURS)	NIGHT-TIME (23:00 - 07:00 HOURS)
L_{Aeq} ≤40 dB	L_{Aeq} ≤35 dB

Plant noise level limits [dB ref. 20 μPa]

7.0 PREDICTED NOISE IMPACT

7.1 PROPOSED PLANT

7.1.1 The current plant selections have been confirmed as follows:

- 1 no. Mitsubishi condensing unit type PUMY-SP112VKM;
- 1 no. Mitsubishi condensing unit type PUZ-ZM100VKA;
- 1 no. Mitsubishi condensing unit type PUZ-ZM35VKA;
- 1 no. Mitsubishi condensing unit type PUZ-ZM50VKA;
- 2 no. Intarcon condensing unit type BSF-QG-10 074;
- 1 no. Intarcon condensing unit type MSF-QG-20 048.

7.1.2 The Mitsubishi plant items will serve the office spaces and will be limited to an operating time of 07:00 – 18:00 hours. The Intarcon plant items will serve cold and freezer rooms, so will intermittently run 24 hours a day.

7.1.3 The sound pressure level generated by these plant items have been confirmed by the respective manufacturers as follows:

FREQUENCY (HZ)	63	125	250	500	1K	2K	4K	8K
PUMY-SP112VKM	58	55	55	52	49	45	38	32
PUZ-ZM100VKA	54	54	53	49	46	41	36	29
PUZ-ZM35VKA	58	51	45	44	40	37	32	31
PUZ-ZM50VKA	58	51	45	44	40	37	32	31
BSF-QG-10 074*	56	56	55	51	48	43	38	31
MSF-QG-20 048*	53	53	52	48	45	40	35	28

Condenser source noise level data [dB ref. 20 μPa]

*No spectrum provided by manufacturer, only overall noise level; spectrum based on the PUZ-ZM100VKA unit

7.2 PREDICTED NOISE LEVELS

7.2.1 Distance propagation losses and acoustic screening losses afforded by the brick wall described in Section 2.0 have been incorporated into the prediction of plant noise at the receptor.

7.2.2 All plant has been assumed to run during the daytime period, whilst only the Intarcon condensers have been used in the night-time calculations.

7.2.3 The following table shows the predicted plant noise level at the receptor, set against the daytime and night-time criterion.

PREDICTION	DESIGN CRITERIA
L_{Aeq} 37 dB	Daytime: L_{Aeq} ≤40 dB
L_{Aeq} 35 dB	Night-time: L_{Aeq} ≤35 dB

Predicted plant noise levels and criteria [dB ref. 20 μPa]

7.2.4 The plant noise emissions criteria are met without any additional mitigation measures, owing to the screening provided by the brick wall.

7.2.5 The calculations are summarised in Appendix B.

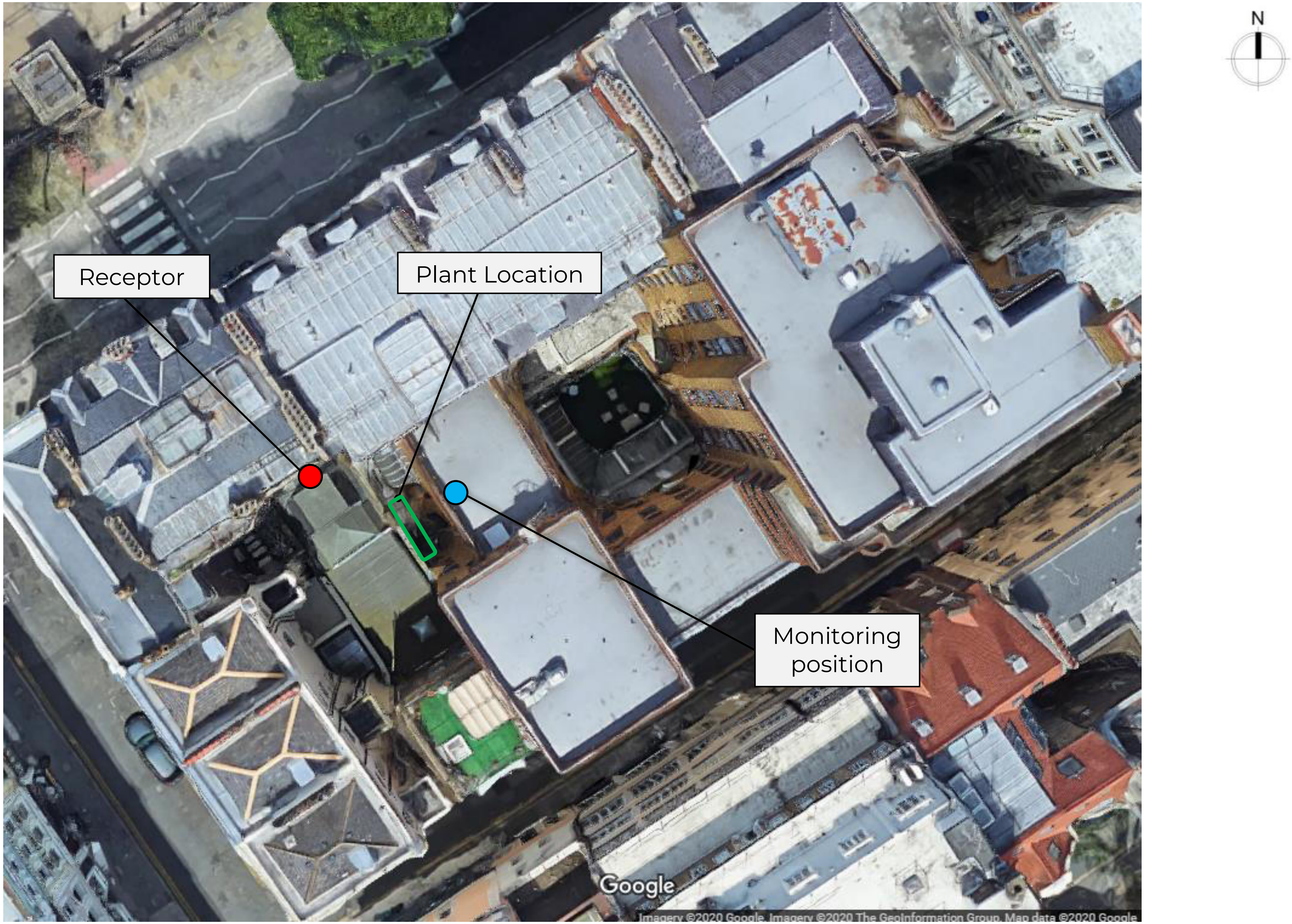
8.0 CONCLUSIONS

8.1 Clarke Saunders Acoustics has conducted an assessment of the new plant installed within the western lightwell at Helen Graham House, Holborn.

8.2 The baseline noise climate has been established from environmental noise survey data, which has been used in accordance with Camden Council's requirements to set noise emissions criteria.

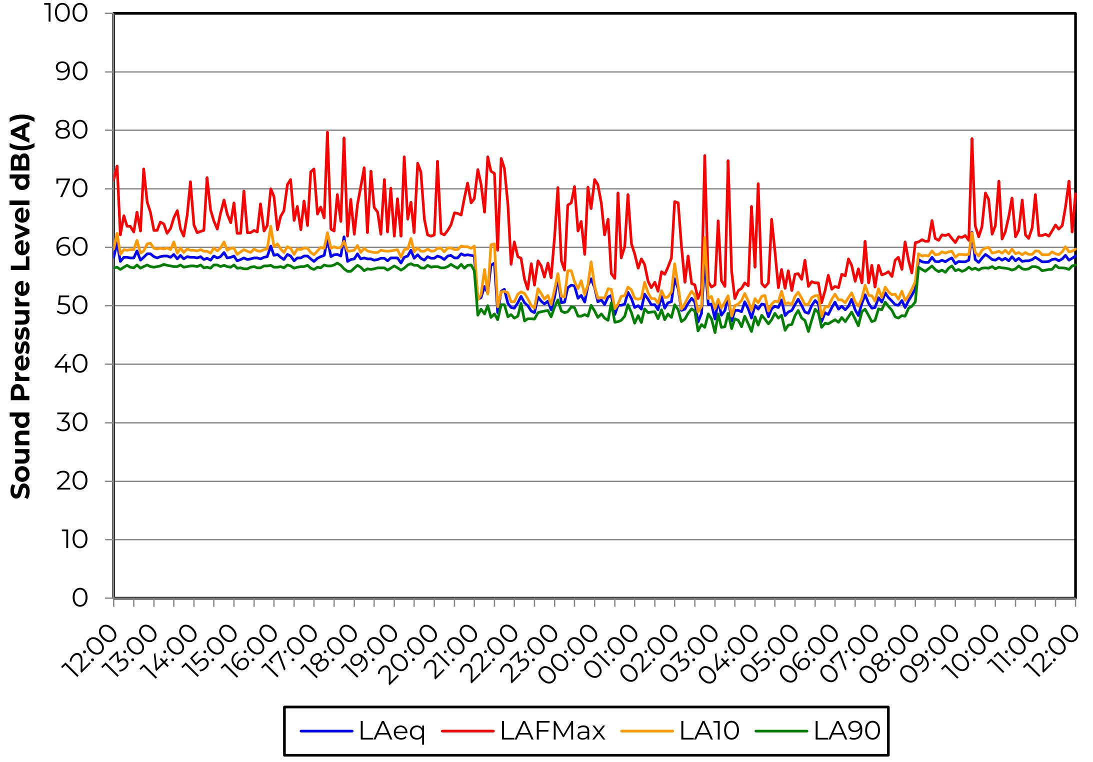
8.3 Calculations have demonstrated that the LOAEL target can be met in line with Camden's requirements without further mitigation measures.

Michael Symmonds AMIOA
CLARKE SAUNDERS ACOUSTICS


N
Receptor
Plant Location
Monitoring position
Google
Imagery ©2020 Google, Imagery ©2020 The GeoInformation Group, Map data ©2020 Google

Helen Graham House, Holborn

Environmental Noise Time History

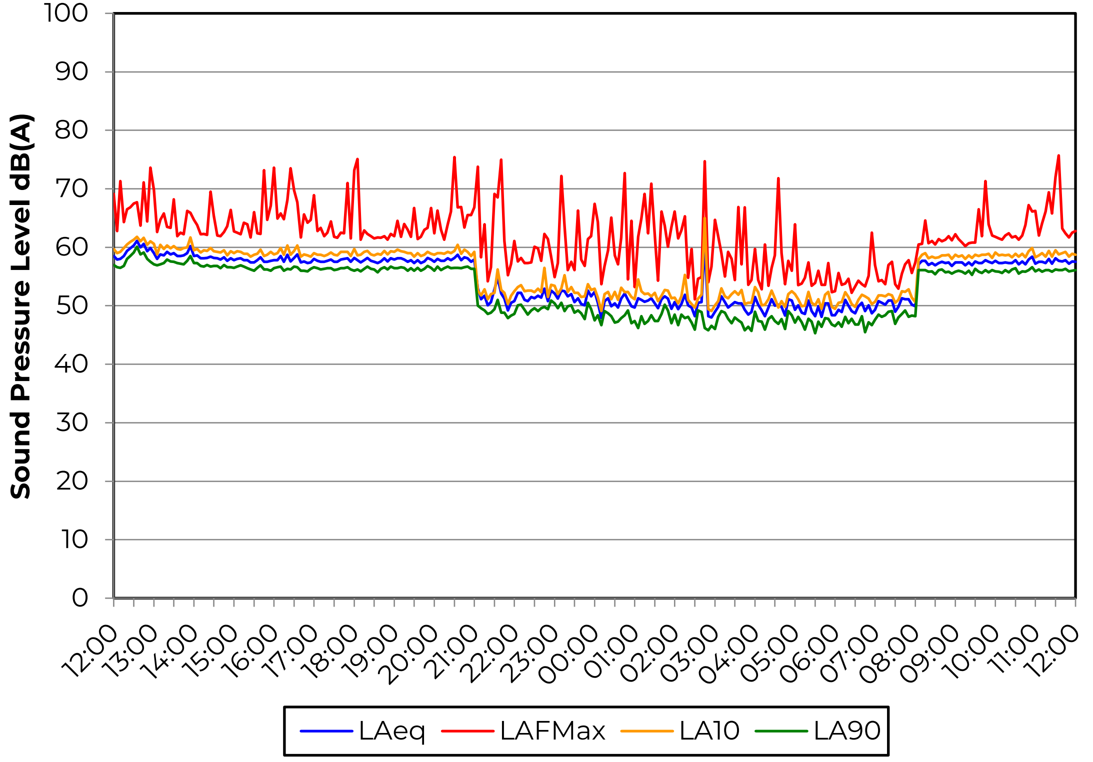


Friday 30 October to Saturday 31 October 2020

Figure AS11852/TH1

Helen Graham House, Holborn

Environmental Noise Time History

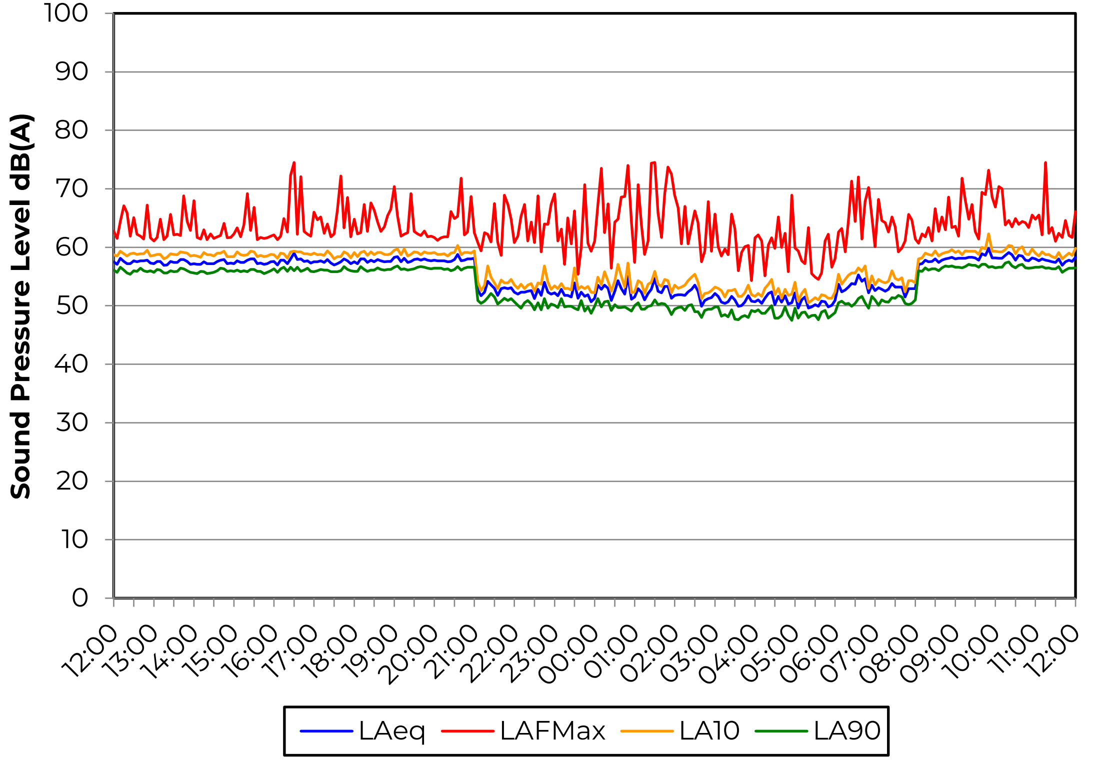


Saturday 31 October to Sunday 01 November 2020

Figure AS11852/TH2

Helen Graham House, Holborn

Environmental Noise Time History

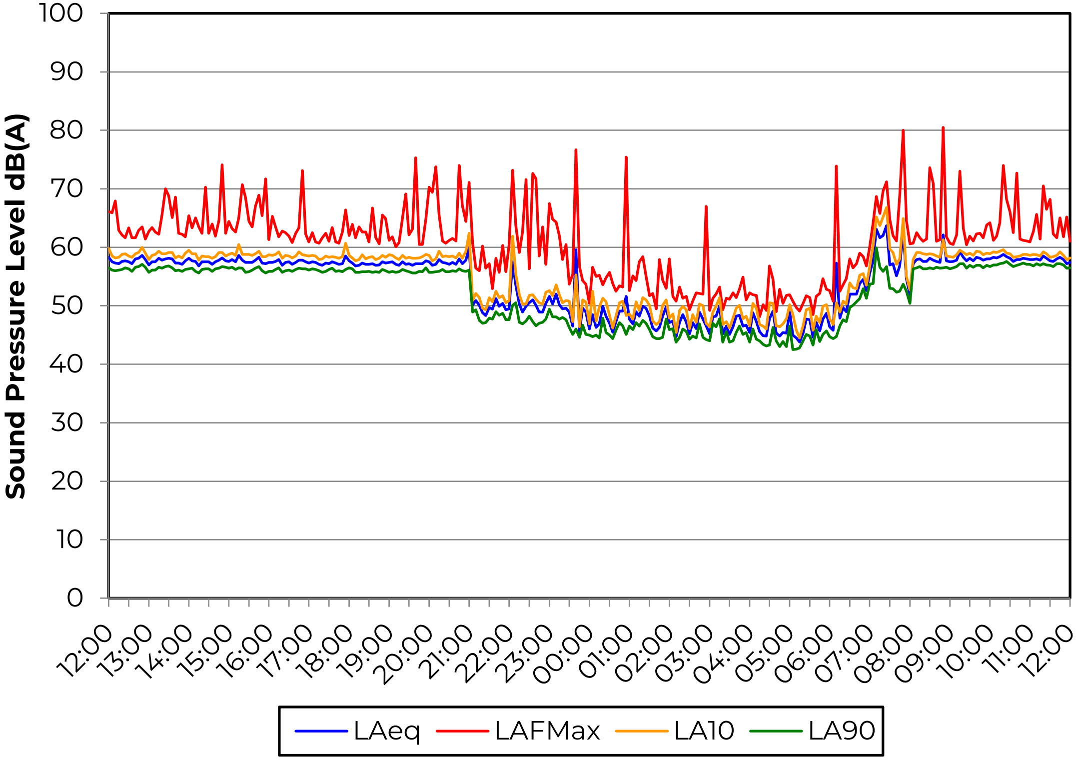


Sunday 01 November to Monday 02 November 2020

Figure AS11852/TH3

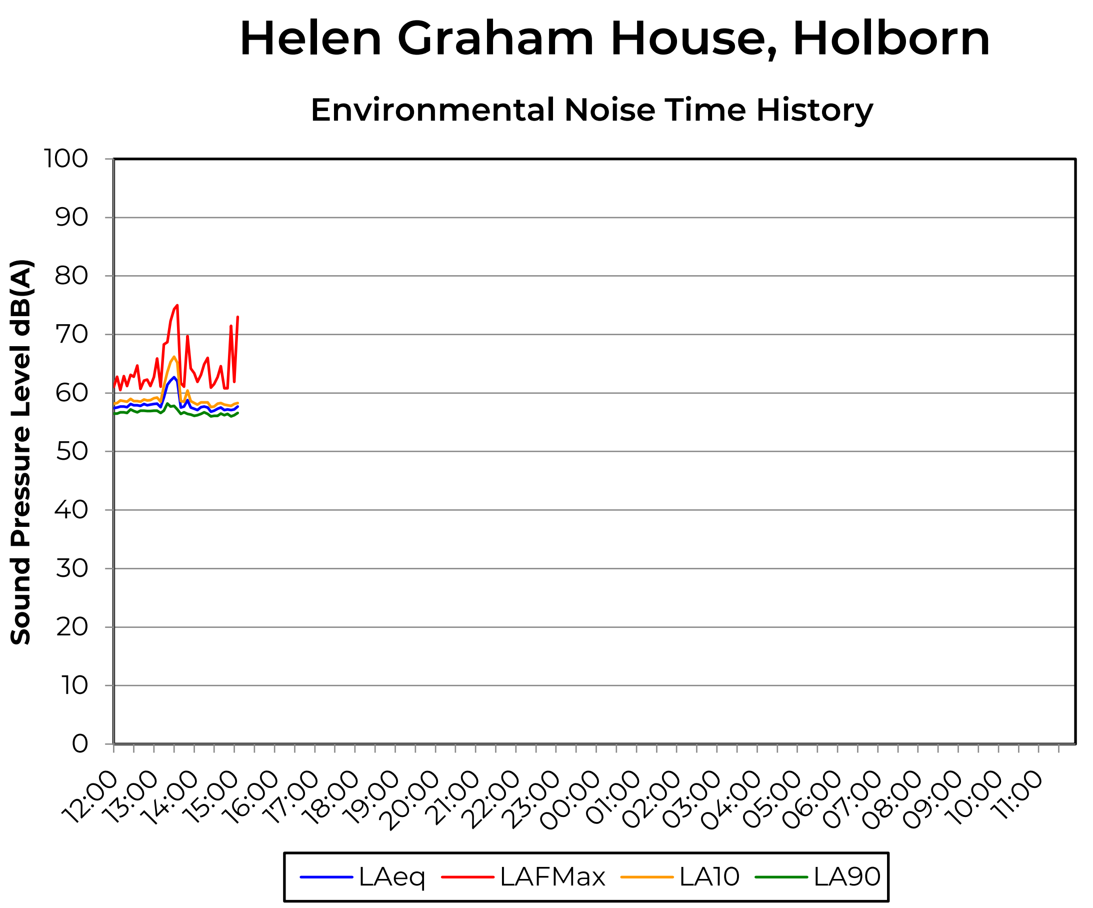
Helen Graham House, Holborn

Environmental Noise Time History



Monday 02 November to Tuesday 03 November 2020

Figure AS11852/TH4



Tuesday 03 November to Wednesday 04 November

Figure AS11852/TH5

1.1 Acoustic Terminology

The human impact of sounds is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and variation in level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

Sound Vibrations propagating through a medium (air, water, etc.) that are detectable by the auditory system.

Noise Sound that is unwanted by or disturbing to the perceiver.

Frequency The rate per second of vibration constituting a wave, measured in Hertz (Hz), where 1Hz = 1 vibration cycle per second. The human hearing can generally detect sound having frequencies in the range 20Hz to 20kHz. Frequency corresponds to the perception of 'pitch', with low frequencies producing low 'notes' and higher frequencies producing high 'notes'.

dB(A): Human hearing is more susceptible to mid-frequency sounds than those at high and low frequencies. To take account of this in measurements and predictions, the 'A' weighting scale is used so that the level of sound corresponds roughly to the level as it is typically discerned by humans. The measured or calculated 'A' weighted sound level is designated as dB(A) or L_A.

L_{eq} : A notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc).

The concept of L_{eq} (equivalent continuous sound level) has primarily been used in assessing noise from industry, although its use is becoming more widespread in defining many other types of sounds, such as from amplified music and environmental sources such as aircraft and construction.

Because L_{eq} is effectively a summation of a number of events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute sound limit.

L_{10} & L_{90} : Statistical L_n indices are used to describe the level and the degree of fluctuation of non-steady sound. The term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as a typical maximum level. Similarly, L_{90} is the typical minimum level and is often used to describe background noise.

It is common practice to use the L_{10} index to describe noise from traffic as, being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic flow.

L_{max} : The maximum sound pressure level recorded over a given period. L_{max} is sometimes used in assessing environmental noise, where occasional loud events occur which might not be adequately represented by a time-averaged L_{eq} value.

1.2 Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation has agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band. In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, e.g. 250 Hz octave band extends from 176 Hz to 353 Hz.

The most commonly used octave bands are:

Octave Band Centre Frequency Hz	63	125	250	500	1000	2000	4000	8000

1.3 Human Perception of Broadband Noise

Because of the logarithmic nature of the decibel scale, it should be borne in mind that sound levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) sound level is not twice as loud as 50dB(A). It has been found experimentally that changes in the average level of fluctuating sound, such as from traffic, need to be of the order of 3dB before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10dB is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in environmental sound level can be given.

INTERPRETATION

Change in Sound Level dB	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

1.4 Earth Bunds and Barriers - Effective Screen Height

When considering the reduction in sound level of a source provided by a barrier, it is necessary to establish the "effective screen height". For example if a tall barrier exists between a sound source and a listener, with the barrier close to the listener, the listener will perceive the sound as being louder if he climbs up a ladder (and is closer to the top of the barrier) than if he were standing at ground level. Equally if he sat on the ground the sound would seem quieter than if he were standing. This is explained by the fact that the "effective screen height" is changing with the three cases above. In general, the greater the effective screen height, the greater the perceived reduction in sound level.

Similarly, the attenuation provided by a barrier will be greater where it is aligned close to either the source or the listener than where the barrier is midway between the two.

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APPENDIX B
AS11852 Helen Graham House
PLANT NOISE CALCULATIONS

Daytime Period		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
PUMY-SP112VKM	Lp @ 1m	58	55	55	52	49	45	38	32	**54**
no of:	1	0	0	0	0	0	0	0	0	
PUZ-ZM100VKA	Lp @ 1m	54	54	53	49	46	41	36	29	**51**
no of:	1	0	0	0	0	0	0	0	0	
PUZ-ZM35VKA	Lp @ 1m	58	51	45	44	40	37	32	31	**46**
no of:	1	0	0	0	0	0	0	0	0	
PUZ-ZM50VKA	Lp @ 1m	58	51	45	44	40	37	32	31	**46**
no of:	1	0	0	0	0	0	0	0	0	
BSF-QG-10 074	Lp @ 1m	56	56	55	51	48	43	38	31	**53**
no of:	2	3	3	3	3	3	3	3	3	
MSF-QG-20 048	Lp @ 1m	53	53	52	48	45	40	35	28	**50**
no of:	1	0	0	0	0	0	0	0	0	
Total Sound Emissions		**65**	**63**	**61**	**58**	**54**	**50**	**44**	**39**	**60**
Distance propagation loss	7m	-17	-17	-17	-17	-17	-17	-17	-17	
Line of sight screening		-5	-5	-5	-5	-5	-6	-7	-8	
Total Noise Level at Receptor	$L_{eq\ 1hr}$	**43**	**41**	**39**	**35**	**32**	**27**	**20**	**14**	**37**

Night-time Period		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
BSF-QG-10 074	Lp @ 1m	56	56	55	51	48	43	38	31	**53**
no of:	2	3	3	3	3	3	3	3	3	
MSF-QG-20 048	Lp @ 1m	53	53	52	48	45	40	35	28	**50**
no of:	1	0	0	0	0	0	0	0	0	
Total Sound Emissions		**60**	**60**	**59**	**55**	**52**	**47**	**42**	**35**	**57**
Distance propagation loss	7m	-17	-17	-17	-17	-17	-17	-17	-17	
Line of sight screening		-5	-5	-5	-5	-5	-6	-7	-8	
Total Noise Level at Receptor	$L_{eq\ 1hr}$	**38**	**38**	**37**	**32**	**29**	**24**	**18**	**10**	**35**