Holborn Town Hall
193-197 High Holborn
London

Environmental Noise Survey and Acoustic Design Statement Report

25331/ADS1

27 June 2018

For:

Western Heritable Limited
c/o Rolfe Judd
Old Church Court
Claylands Road
London
SW8 1NZ

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 Acoustic Design Statement Report 25331/ADS1

Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	27/06/2018	First issue.		
			Daniel Stuart Assistant Consultant	Gareth Evans Associate BSc(Hons) MIOA

Hann Tucker Associates

Environmental Noise Survey and Acoustic Design Statement Report 25331/ADS1

Contents

Attachments

1.0 Introduction

The proposed development involves the extension of the Grade II listed former Holborn Town Hall - which now comprises municipal offices, by the addition of a fifth floor on the western side of the building. This involves the addition of two new roof plant areas, external risers and internal risers.

Hann Tucker Associates have therefore been commissioned to undertake an environmental noise survey at the site, set plant noise emissions requirements based on Local Authority criteria and advise on necessary noise control measures to meet the requirements.

This report presents the survey methodology and findings. The survey data has been used to recommend plant noise emissions criteria and assess if these are achievable with the proposed development.

2.0 Objectives

To establish by means of an unmanned 24 hour survey the existing $L_{Amax,}$ L_{Aeq} and L_{A90} environmental noise levels at up to 2No. secure and accessible on-site positions, using fully computerised noise monitoring equipment.

To propose noise emission limits from the development 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 by neighbours.

To assess the noise emissions from the proposed plant, based upon data with which we are provided, and comment upon the acceptability.

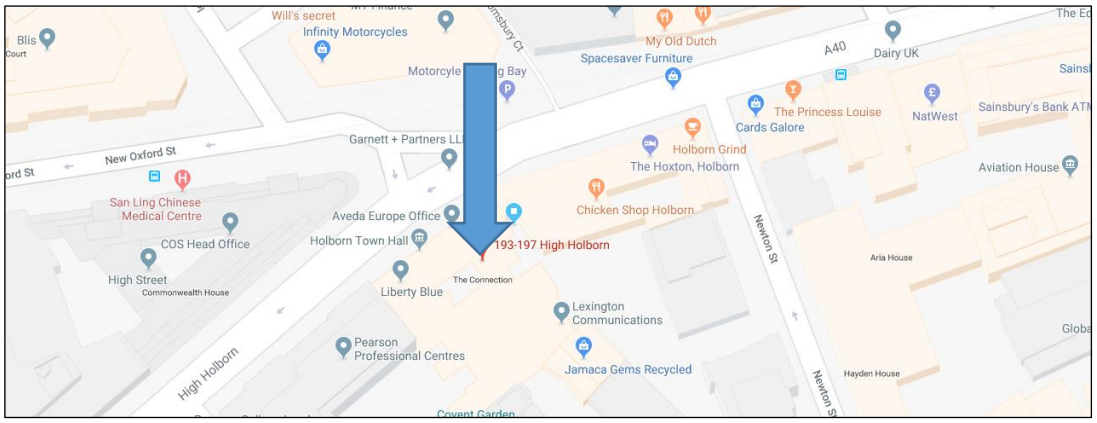
To undertake a noise assessment, based on the results of the survey, to determine the suitability of the site for development with reference to national and local planning policies.

3.0 Site Description

3.1 Location

The site is located at 193-197 High Holborn WC1V 7BD.

The location is shown in the Location Map below.



Location Map © 2018 Google Maps

The site falls within the jurisdiction of Camden.

3.2 Description

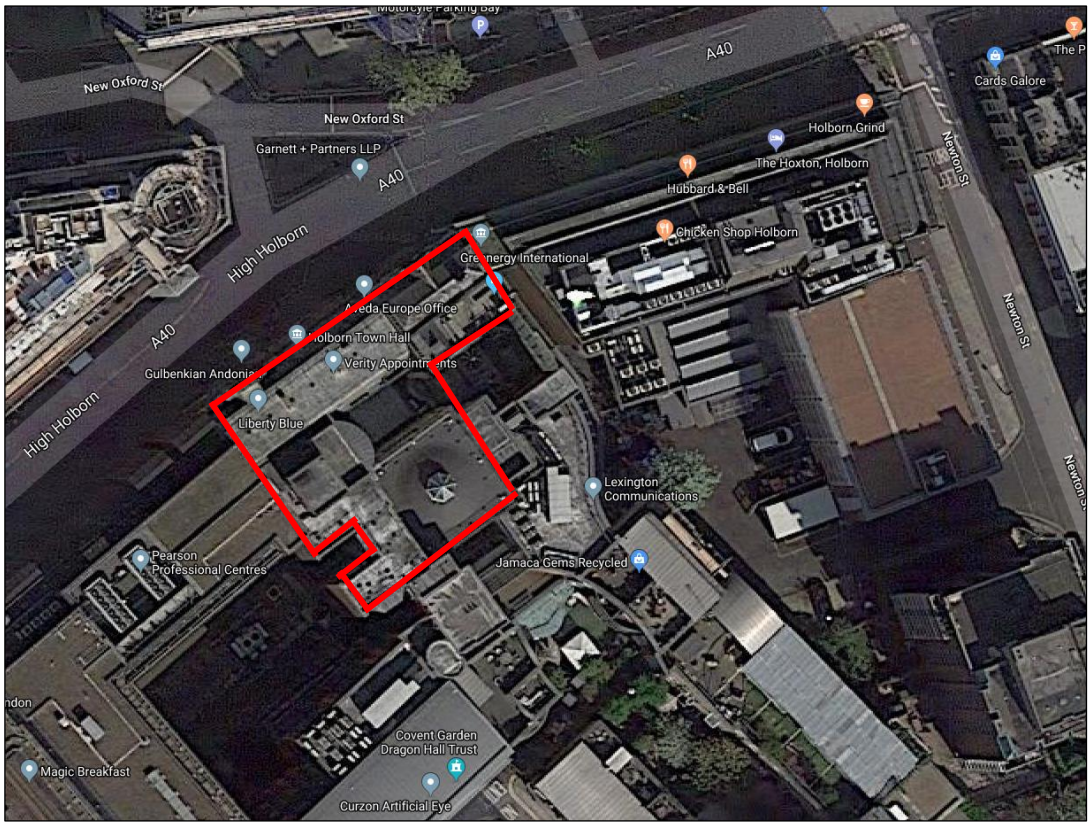
The site is a Grade II listed building and former town hall, currently of mixed use (primarily of offices).

The building is of varied heights with ground plus 3-5 storeys surrounding a central hall. The site to be extended is the level of a 4th storey rooftop, behind the façade of the building. The site is boxed in by buildings of a similar height varying from 3-6 storeys and of an office/ commercial use.

The area where one of the new plant areas is to be located is the 5th floor rooftop on site the boundary on to 198 High Holborn. The other new plant area will be adjacent to the new 5th floor extension

Dominant noise sources come from traffic from the surrounding road network and plant noise from surrounding office rooftops.

The site is shown in the Site Plan below.



Site Plan © Google Maps 2018

4.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 Methodology

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

5.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 2.45pm hours on 11 May 2018 to 2.45pm hours on 12 May 2018.

During the periods we were on site the wind conditions were calm. The sky was generally clear. We understand that generally throughout the survey period the weather conditions were partly cloudy. These conditions are considered suitable for obtaining representative measurement results.

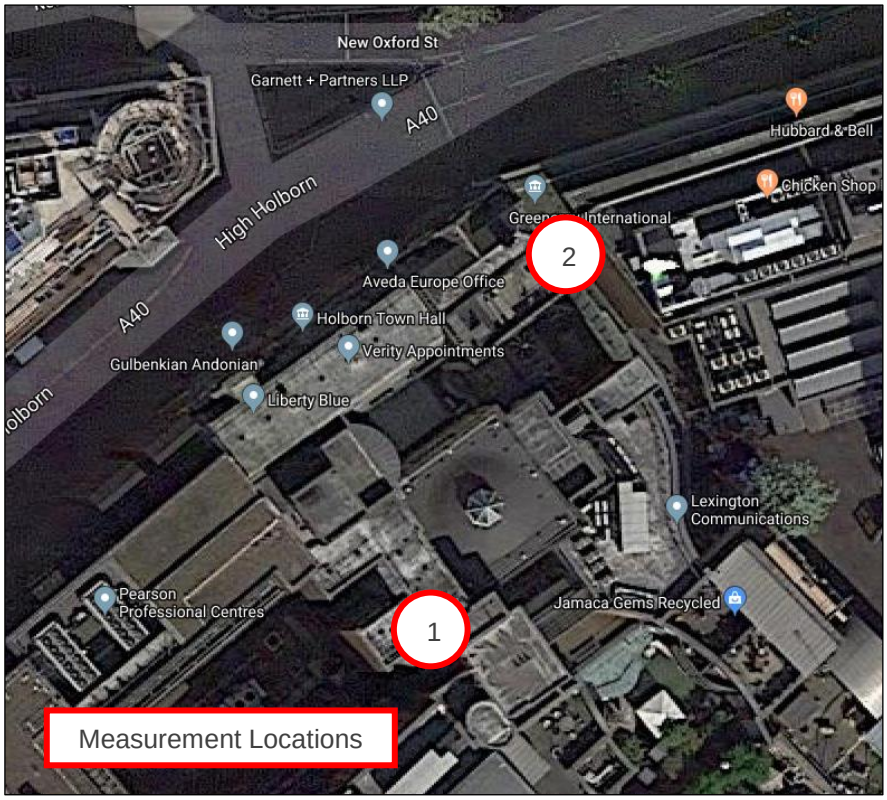
Measurements were taken continuously of the A-weighted (dBA) L_{90}, L_{eq} and L_{max} sound pressure levels over 15 minute periods.

5.1.1 Measurement Positions

The noise level measurements were undertaken at two positions as described in the table below.

Position No	Description
1	Sound level meter was located on the 4th floor (plus ground) rooftop. Microphone mounted on pole approximately 15m above ground and 35m from the nearest road (High Holborn).
2	Sound level meter was located on the 4th floor (plus ground) rooftop on the site boundary with property at 199 High Holborn. Microphone mounted on pole at a height of approximately 18m and 10m from the nearest road (High Holborn).

The positions are shown on the plan below.



Location Map © 2018 Google Maps

5.1.2 Instrumentation

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

Description	Manufacturer	Type	Serial Number	Calibration
Position 1 Type 1 ½" Condenser Microphone	PCB	377B02	122885	Calibration on 16/05/2017
Position 1 Type 1 Preamp	Larson Davis	PRM902	3692	Calibration on 16/05/2017
Position 1 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3444	Calibration on 16/05/2017
Position 2 Type 1 ½" Condenser Microphone	ACO Pacific	7052E	52450	Calibration on 21/03/2018
Position 2 Preamp	Svantek	SV12L	30424	Calibration on 21/03/2018
Position 2 Type 1 Data Logging Sound Level Meter	Svantek	957	28035	Calibration on 21/03/2018

Each 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.

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

6.0 Results

The results have been plotted on Time History Graphs 25331/TH1 and 25331/TH2 enclosed presenting the 15 minute A-weighted (dBA) L_{90}, L_{eq} and L_{max} levels at each measurement position throughout the duration of the survey.

6.1 Measured L_{eq} Noise Level

In order to compare the results of our survey with the relevant guidelines it is necessary to convert the measured $L_{Aeq(15minute)}$ 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.

Position	Measured L_{Aeq} Noise Level (dB re 2 x 10-5 Pa)	
	Daytime $L_{Aeq\ (16\ hour)}$ (07:00 – 23:00) Hours	Night-time $L_{Aeq\ (8\ hour)}$ (23:00 – 07:00) Hours
1	53	50
2	57	55

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

6.2 Measured L_{A90} Background Noise Level

Using the guidance outlined in BS4142:2014 Section 8.1.4 (below), a background level to be used with the Local Authority criteria has been selected using statistical analysis. See 25331/BG1.1 to 25331/BG2.2 enclosed.

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

The following table presents the L_{A90} background noise levels during the survey.

Position	Measured L_{A90} Background Noise Level (dB re 2 x 10-5 Pa)	
	Daytime (07:00 – 23:00) Hours	Night-time (23:00 – 07:00) Hours
1	52	48
2	54	47

7.0 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 traffic noise from the surrounding roads and surrounding rooftop plant noise.

8.0 Acoustic Design

8.1 Plant Noise

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

Note: NOAL – No Observed Effect Level, LOAEL- Lowest Observed Averse Effect Level, SOAEL – Significant Observed Adverse Effect Level.

"…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"*

Noting these criteria are given for residential dwellings and the primary noise sensitive neighbours are offices and commercial units, this rating level may be considered too stringent for the less noise sensitive neighbours. We would consider a rating level of 5dB below background a reasonable criteria for offices and commercial units.

On the basis of the above and the results of the environmental noise survey, we propose that the following plant noise emission criteria be achieved at 1 metre from the nearest commercial window.

Position	Plant Noise Emission Criteria (dB re 2x10-5 Pa)	
	Daytime (07:00 – 23:00) Hours	Night-time (23:00 – 07:00) Hours
1	47	43
2	49	42

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

If plant contains tonal or impulsive characteristics the external design criteria should be reduced by 5dBA.

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

8.2 Proposed Design Target Internal Noise Levels

We have undertaken an investigation of the "industry standards" for design parameters currently used for quality commercial office developments, using a wide range of reference documents. The following table summarises the findings of our investigation.

Design Reference Documents	Office Area Type	
	Small/Cellular	Large/Open-Plan
BCO 2014	NR35 L_{eq}	Open Plan NR40 L_{eq} Speculative NR38 L_{eq}
CIBSE Spec	NR30-35 L_{eq}	NR35 L_{eq}
BS8233: 2014	35-40 dB $L_{Aeq,T}$	45-50 dB $L_{Aeq,T}$
	(NR30-45 L_{eq} equiv approx)	(NR40-45 L_{eq} equiv approx)
BREEAM	Achieve noise levels that comply with BS8233:2014	

- Note: L_{Aeq} – 5dB = NR (approx)
- Note: The BCO speculative office criterion is a compromise between the ideals for open plan and cellular offices.

In addition, BCO advise $L_{Amax(fast)}$ noise intrusion levels should not normally be more than 55dBA in open plan/speculative offices or 50dBA in cellular offices.

The proposed building comprises speculative office accommodation so, based on the above and BCO guidance, we propose external noise intrusion levels (whether from road, rail or aircraft sources), should, after attenuation by the composite building envelope, not exceed NR38 L_{eq} and 55dB $L_{max\ (fast)}$ in office areas when measured under Cat A standards (including carpets), in accordance with the Association of Noise Consultants Guidance Noise

Measurements in Buildings – Part 2: *Noise from External Sources.*

In the case of naturally ventilated buildings, it may be appropriate or necessary to accept higher external noise intrusion levels than shown above (e.g. +5dBA relaxation in maximum ventilation mode provided occupants have the choice). Measures to minimise the impact of rainfall noise should be considered for lightweight roofs.

9.0 Plant Noise Impact Assessment

We understand the proposed plant areas comprise the units listed in the table below.

Plant Description	Location	No. of	Plant Make	Model Number
Air Conditioning Units	Plant Area A	2	Mitsubushi	PURY-P250YLM-A1
	Plant Area B	2		
	Plant Area A	2	Mitsubushi	PURY-P350YLM-A1
	Plant Area B	2		
	Plant Area A	1	Mitsubushi	PURY-P200YLM-A1
Mini VRF Heat Pump	Plant Area A	1	Mitsubushi	PUMY-SP112YKM

9.1 Plant Noise Data

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

Plant Description	Sound Pressure Level at 1m (dBA re $2x10^{-5}$ Pa)
Mitsubishi PURY-P200YLM-A1	59
Mitsubishi PURY-P250YLM-A1	60
Mitsubishi PURY-P350YLM-A1	63
Mitsubishi PUMY SP11ZYKM	51

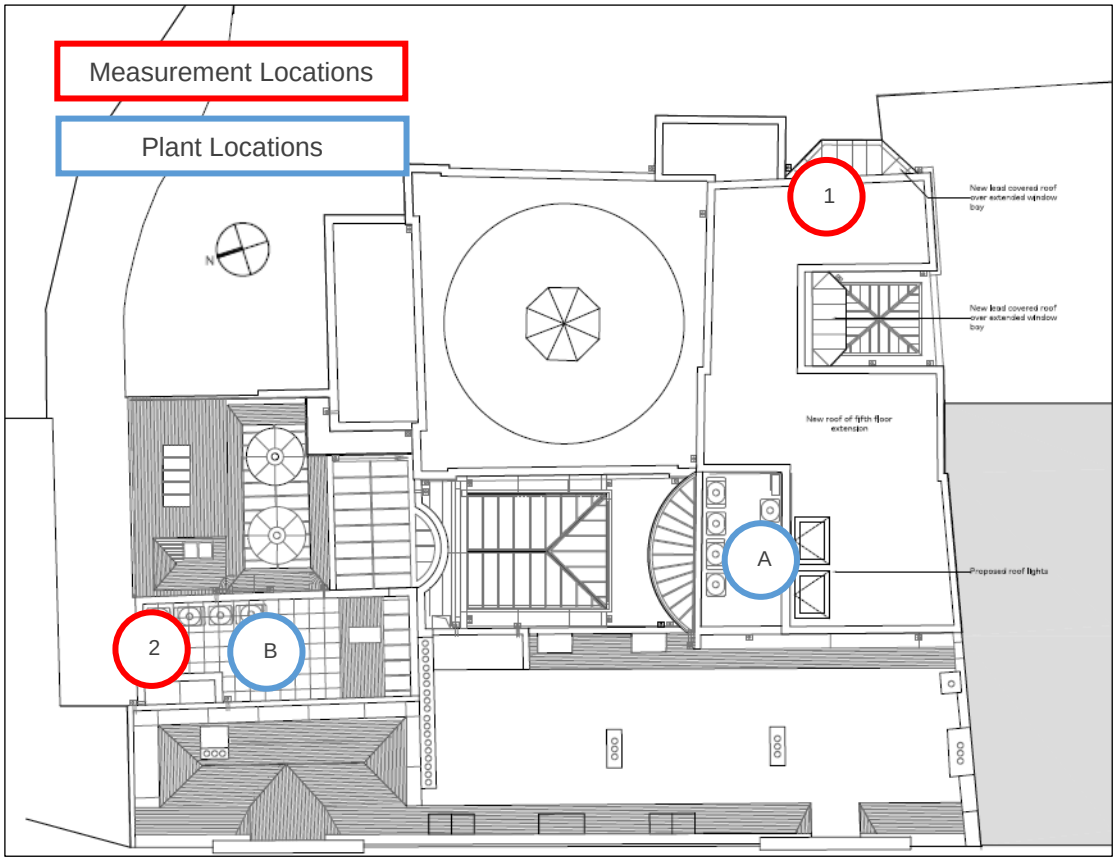
9.2 Location of Plant

Proposed Plant Area A is located on the 4th floor rooftop on the southern side of the building. This is 15m from the nearest external and off site office window. There is a 1m barrier around the rooftop comprising a brick wall separating the plant area from the neighbouring property.

Proposed Plant Area B is located on the 5th floor rooftop, on the northern side of the building. This is approximately 10m from and two storeys above the nearest external and off site office window. There is a 1m barrier comprising a brick wall separating the plant area from the

neighbouring property.

The positions are shown on the plan below.



Site Plan: © Garnett & Partners LLP 2018

9.3 Plant Noise Impact Assessment

We understand that the proposed units will be operational during daytime/night-time hours.

The following tables summarise our predictions of atmospheric noise emissions from the proposed plant areas to the nearest commercial window, assuming the existing barriers around the proposed plant areas remain in place.

9.3.1 Plant Area A:

Daytime operation (07:00 – 23:00 hours). Assuming standard mode selected.

	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Pressure Level at 1m	82	74	70	68	61	54	49	43	69
Barrier Correction	-6	-7	-8	-10	-13	-16	-19	-23	-
Point Source Distance Loss	-18	-18	-18	-18	-18	-18	-18	-18	-
Calculated Noise Level at Receptor	58	49	44	40	30	20	12	2	41

Night-time operation (07:00 – 23:00 hours). Assuming low noise mode selected.

	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Pressure Level at 1m	68	62	57	54	49	46	42	41	56
Barrier Correction	-6	-7	-8	-10	-13	-16	-19	-23	-
Point Source Distance Loss	-18	-18	-18	-18	-18	-18	-18	-18	-
Calculated Noise Level at Receptor	44	37	31	26	18	12	5	0	28

9.3.2 Plant Area B:

Daytime operation (07:00 – 23:00 hours). Assuming standard mode selected.

	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Pressure Level at 1m	81	73	70	67	61	53	48	42	68
Barrier Correction	-5	-6	-6	-7	-9	-11	-14	-16	-
Point Source Distance Loss	-17	-17	-17	-17	-17	-17	-17	-17	-
Calculated Noise Level at Receptor	59	50	47	43	35	25	17	9	44

Night-time operation (07:00 – 23:00 hours). Assuming low noise mode selected.

	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Pressure Level at 1m	65	65	55	52	47	44	40	40	68
Barrier Correction	-5	-6	-6	-7	-9	-11	-14	-16	
Point Source Distance Loss	-17	-17	-17	-17	-17	-17	-17	-17	
Calculated Noise Level at Receptor	43	42	32	28	21	16	9	7	31

Our calculations indicate that the proposed plant should be capable of achieving the requirements of the Local Authority outlined in Section 8.0.

10.0 Achievable Internal Noise Levels

At this stage of the design scheme the precise details of window to be used are not known, nor are the precise details of the ventilation.

The external envelope of the proposed scheme will incorporate suitably specified glazing so as to achieve the proposed design target internal noise levels presented above. Our preliminary calculations indicate that a glazing build-up achieving a performance of R_w25dB should be suitable to provide sufficient sound insulation such that the proposed design target internal noise levels are achieved.

Where ventilation is provided through the façade it shall be suitably acoustically attenuated to ensure the achievement of the proposed target internal noise levels is not compromised.

11.0 Conclusions

A 24 hour unmanned and fully computerised survey was undertaken, measuring the existing L_{Amax}, L_{Aeq} and L_{A90} environmental noise levels in 2No. positions.

Based on the results of the unmanned survey, a noise assessment was undertaken to determine the suitability of the proposed development for commercial use in accordance with British Standard BS8233:2014 and the Local Authority guidance/requirements.

Noise emission limits from the development have been proposed with reference to the requirements of the Local Authority and the application of BS 4142: 2014 and to minimise the possibility of noise nuisance by neighbours.

Noise emissions were assessed from the proposed plant, based upon data with which we were provided.

The assessment indicates, that under the assumptions outlined in this report, the proposed plant, should be capable of achieving the proposed environmental noise criteria at the nearest commercial window.

Appropriate target internal noise levels have been proposed. These are achievable using conventional mitigation measures.

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*.

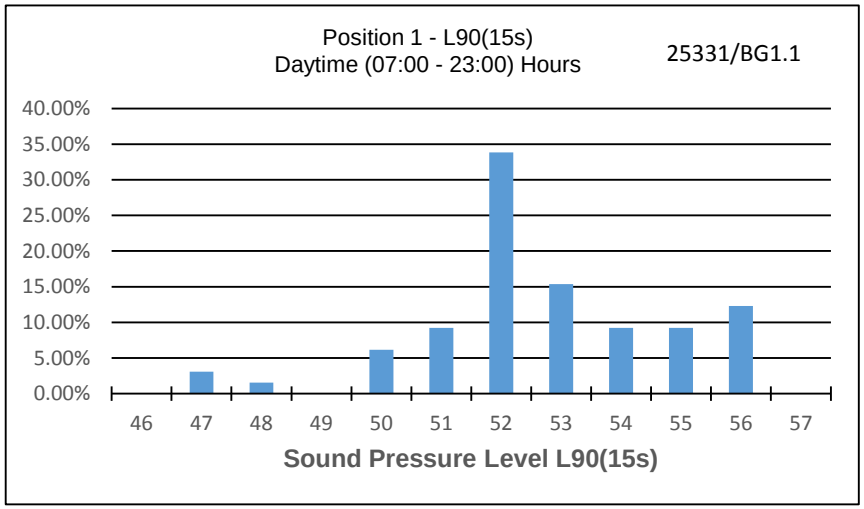
L_{max} — L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

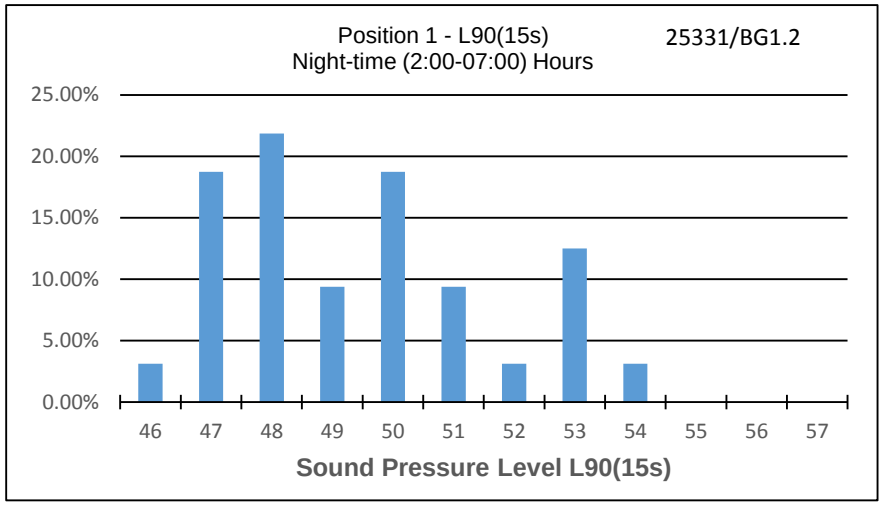
L_p — Sound Pressure Level (SPL) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

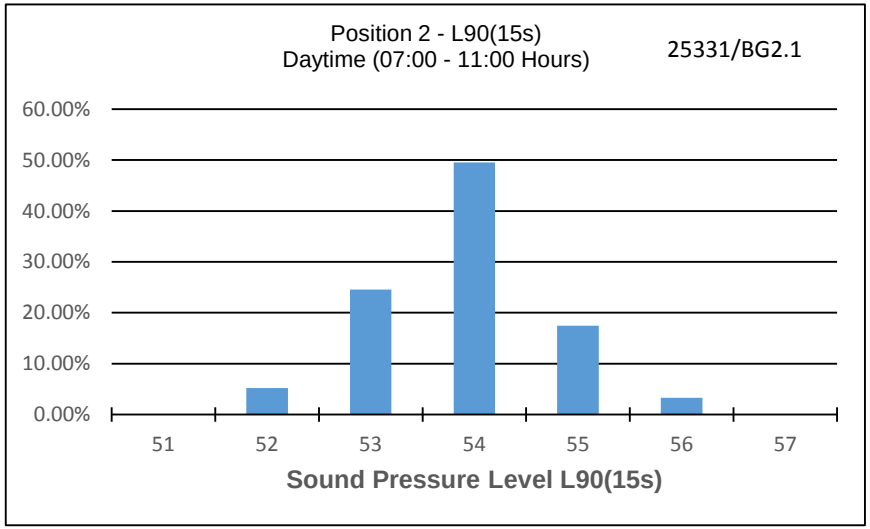
L_w — Sound Power Level (SWL) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

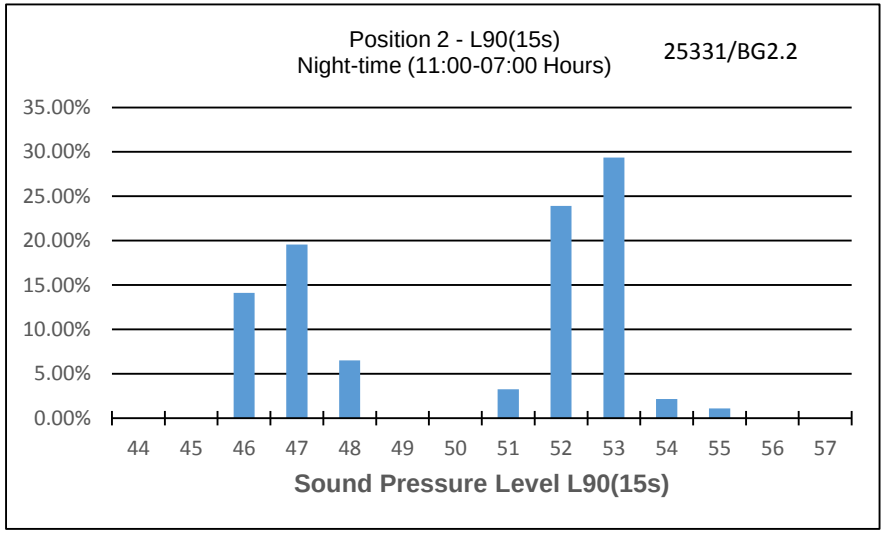
Background Noise Level Distribution

95 Dovehouse Street 25331/BG1.1-25331/BG2.2







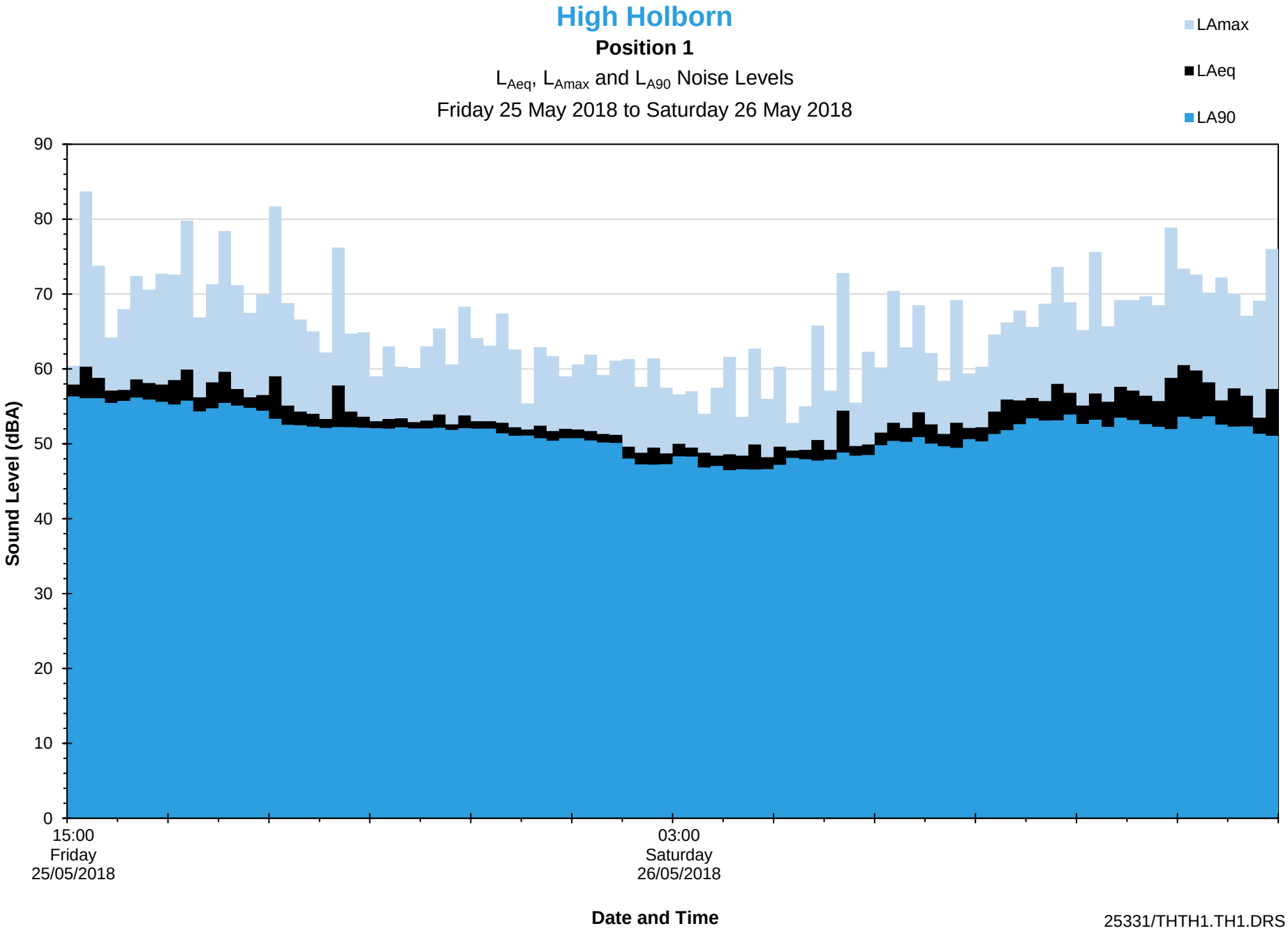


High Holborn

Position 1

L_{Aeq}, L_{Amax} and L_{A90} Noise Levels

Friday 25 May 2018 to Saturday 26 May 2018



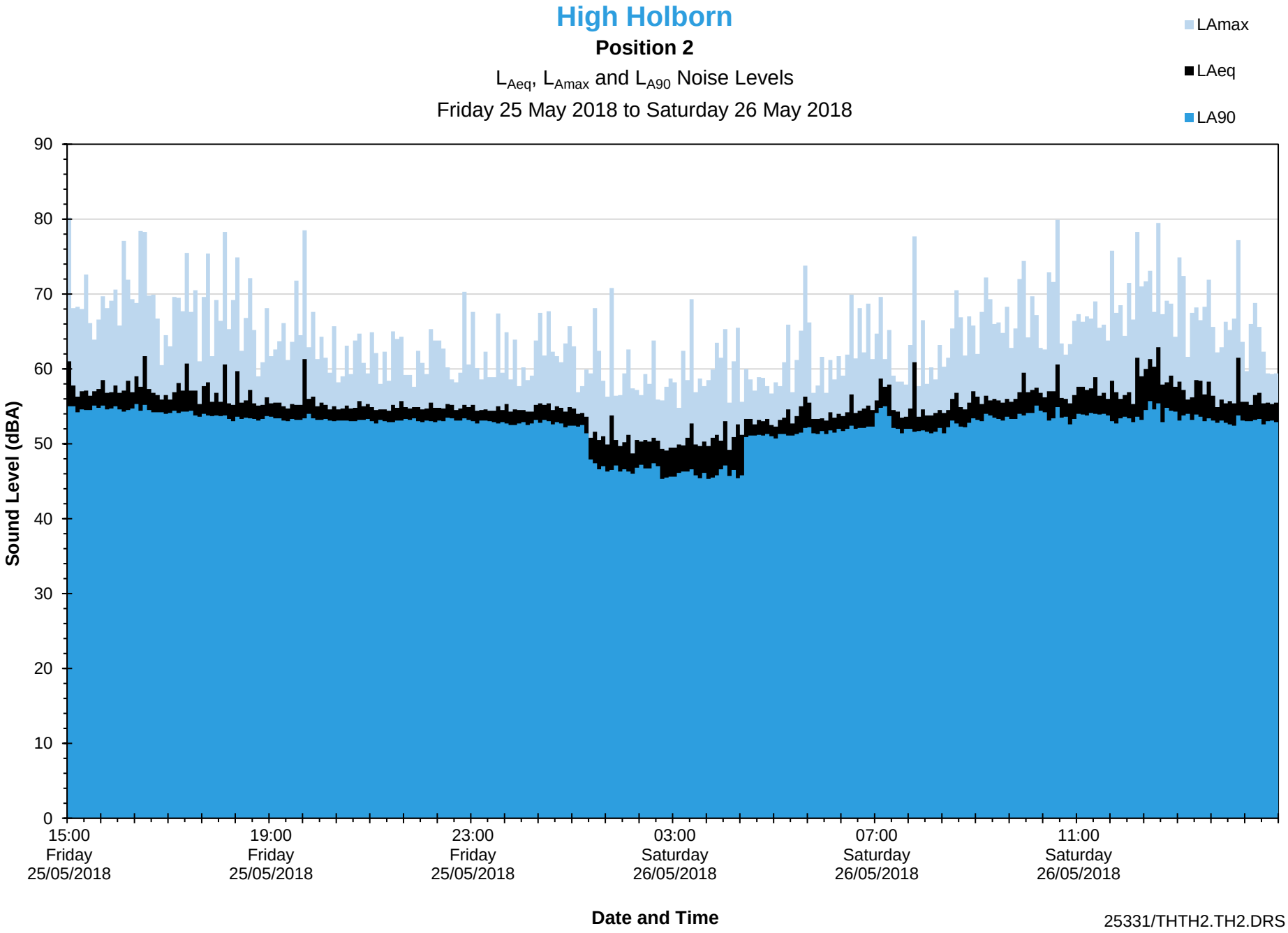
25331/THTH1.TH1.DRS

High Holborn

Position 2

L_{Aeq}, L_{Amax} and L_{A90} Noise Levels

Friday 25 May 2018 to Saturday 26 May 2018



25331/THTH2.TH2.DRS