German Historical Institute
17 Bloomsbury Square
London

Environmental Noise Survey
and Plant Noise Assessment Report

31518/PNA1

3 December 2024

For:
German Historical Institute
17 Bloomsbury Square
London
WC1A 2LP

Hann Tucker Associates
Consultants in Acoustics Noise & Vibration

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Hann Tucker Associates

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Document Control

Rev	Date	Comment	Prepared by	Reviewed by	Approved by
0	03/12/2024	-			
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Hann Tucker Associates

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Contents

Attachments

1.0 Introduction

Hann Tucker Associates Limited (Hann Tucker) has been commissioned by German Historical Institute to undertake a noise assessment for a site in Camden, London.

The site, which is located 17 Bloomsbury Square, is proposing to install new external building services plant.

Hann Tucker Associates has therefore been commissioned to undertake a detailed environmental noise survey at the site to establish baseline noise conditions as presented herein.

Suitable plant noise emission criteria based on the requirements of the of the Local Authority have been established, and a plant noise impact assessment undertaken.

2.0 Objectives

To undertake an environmental noise survey to establish the existing L_{Amax}, L_{Aeq} and L_{A90} environmental noise levels at selected accessible positions.

To identify noise emission limits from the development with reference to the requirements of the Local Authority and to minimise the possibility of noise nuisance to neighbours.

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

To advise on noise control measures if required.

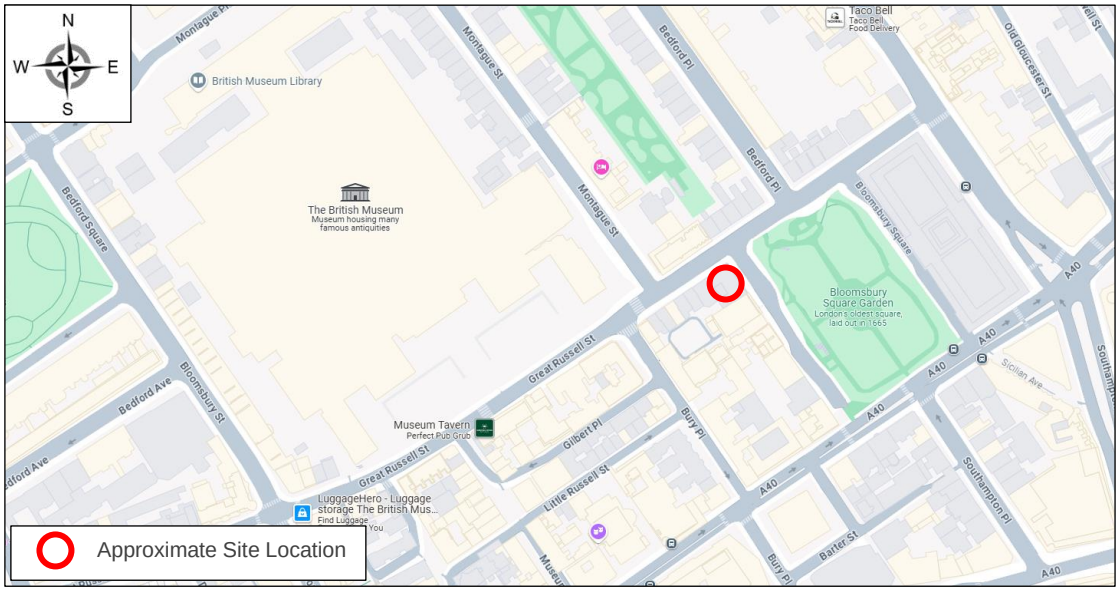
3.0 Acoustic Terminology

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

4.0 Site Description

4.1 Location

The site is located at 17 Bloomsbury Square, London, WC1A 2LP. The location is shown in the Location Map below.



Location Map (Map data © 2024 Google)

The site falls within the jurisdiction of London Borough of Camden.

4.2 Description

The property is located in a mixed-use area (residential, commercial and office premises). The site is bounded to the north by Great Russell Street and mixed-use premises (office and residential), to the east by Bloomsbury Square and Bloomsbury Square Garden, to the south and west by mixed-use premises (commercial and office).

The mixed-use buildings have a height that ranges from ground floor plus 3 to 4 storeys, with at least one basement level.

The nearby road network includes Great Russell Street to the north of the site and Bloomsbury Square to the east of the site.

The site is shown in the Site Plan overleaf.

Site Plan (Imagery © 2024 Map Data © 2024 Google)

5.0 Planning Policies, Standards & Guidance

5.1 Policies & Guides

In order to provide a suitable assessment a number of national planning policies have been considered.

All guidance used to form a noise impact assessment is taken from various standards, guidance, and Local Authority requirements as summarised below:

- Local Planning Policy
- British Standard 4142:2014 + A1:2019
- Statutory Noise Nuisance

Detailed information for relevant planning policies and guidance can be found within Appendix B.

5.2 Specific Local Authority Criteria

The site lies within the jurisdiction of London Borough of Camden. Their advice regarding criteria for atmospheric noise emissions from building service plant is as follows:

“A relevant standard or guidance document should be referenced when determining values for

LOAEL and SOAEL for non-anonymous 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).

Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

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 or bedroom window (façade)*	*Day*	*'Rating level' 10dB* below background*	*'Rating level' between 9dB below and 5dB above background*	*'Rating level' greater than 5dB above background*
*Dwellings***	*Outside bedroom window (façade)*	*Night*	*'Rating level' 10dB* below background and no events exceeding 57dB L_{Amax}*	*'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L_{Amax}*	*'Rating level' greater than 5dB above background and/or events exceeding 88dB 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.*

***levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.*

The periods in Table C correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The Council will take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

There are certain smaller pieces of equipment on commercial premises, such as extract

ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS:4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require a NR curve specification of NR35 or below, dependant on the room (based upon measured or predicted Leq,5mins noise levels in octave bands) 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area."

6.0 Baseline Noise Survey

6.1 Procedure

Fully automated environmental noise monitoring was undertaken by Rebeca Sanchez MSc(Hons), LArch, AMIOA and assisted by James Corbey from approximately 10:45 hours on Tuesday 19 November 2024 to 11:00 hours on Friday 22 November 2024, to establish existing baseline noise levels. Measurements were taken continuously of the A-weighted (dBA) L_{90}, L_{eq}, and L_{max} sound pressure levels over discrete 15-minute periods.

6.2 Measurement Position

The microphone was attached to a pole approximately 1.2 metres above ground level and at least 0.5 m from the east façade of the property. The microphone is considered to include local reflections.

The position is shown on the plan below.

Plan Showing Unattended Measurement Positions (Imagery © 2024, Map Data © 2024 Google)

6.3 Weather Conditions

For the unattended survey between Tuesday 19 November 2024 and Friday 22 November 2024, local weather reports indicated no notable periods of prolonged rainfall, with temperatures ranging from 1°C (night) to 12°C (day) and wind speeds less than 6 m/s. For short periods, the wind speed exceeded 6 m/s. During our time on site, skies were overcast, wind conditions were light and from a southeastern direction and road surfaces were largely dry.

6.4 Instrumentation

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

Description	Manufacturer	Type	Serial Number	Calibration
Type 1 ½" Condenser Microphone	PCB	377B02	163037	Calibration on 20/08/2024
Preamp	Larson Davis	PRM902	3945	Calibration on 20/08/2024
Type 1 Data Logging Sound Level Meter	Larson Davis	824	2897	Calibration on 20/08/2024
Type 1 Calibrator	Bruel & Kjaer	4230	1558535	Calibration on 26/07/2024

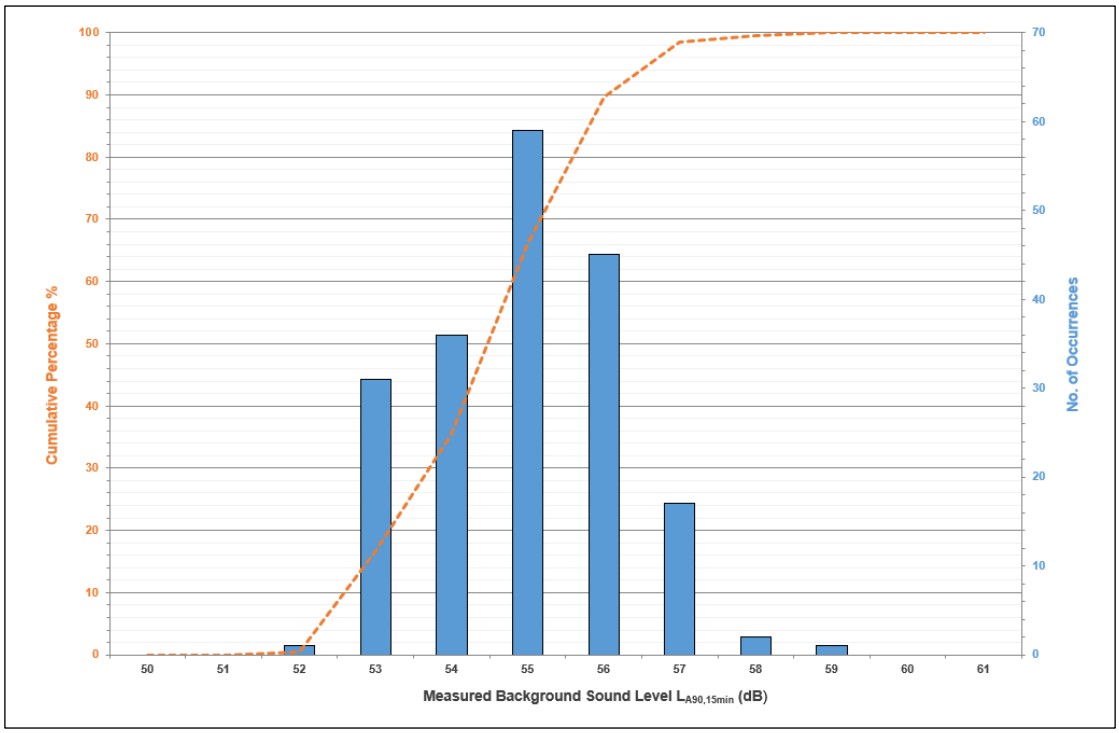
The sound level meter, including the extension cable, was calibrated prior to and on completion of the surveys. No significant change was found to have occurred (no more than 0.2 dB).

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

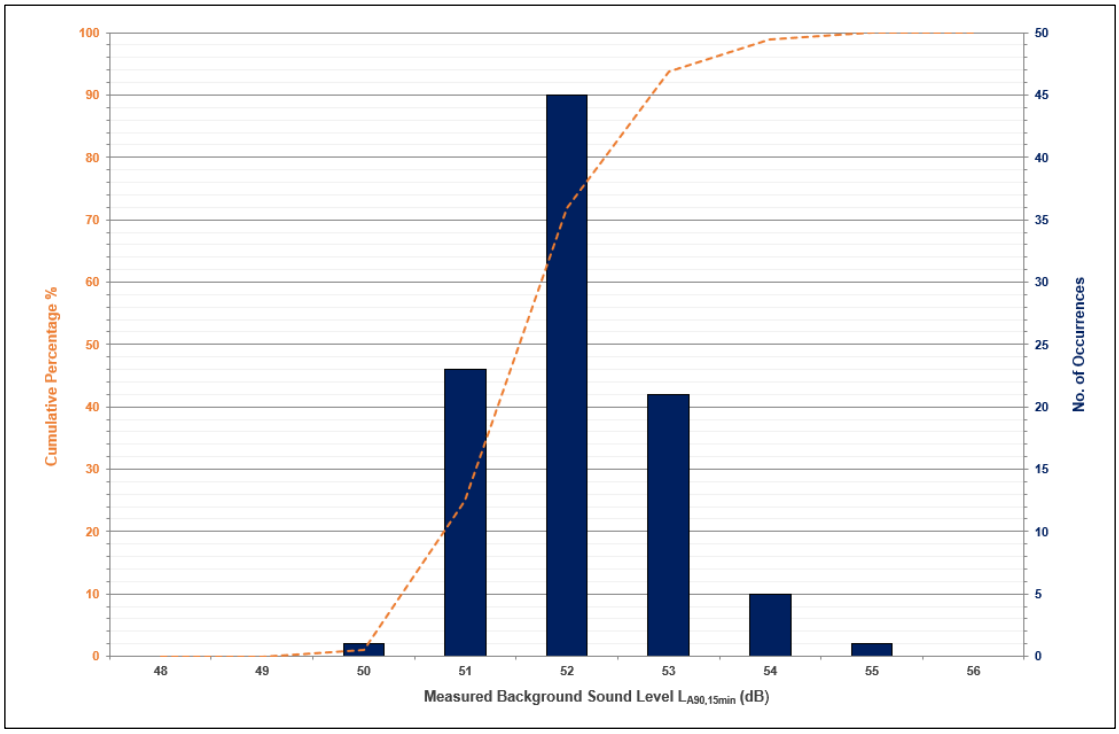
6.5 Results

The results have been plotted on Time History Graph 31518/TH1 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.

BS 4142 states that *"the background sound level must be reliable and suitably represent the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods."* Taking this into account, the following histograms have been created which display the occurrence of each sound level (L_{A90}) for the day and night-time periods.



Statistical analysis of daytime background noise levels (7:00-23:00 hrs)



Statistical analysis of night-time background noise levels (23:00-7:00 hrs)

Based on the above plots the L_{A90} values presented below are considered to be the 'representative' background sound levels determined through statistical analysis of the 15-minute readings.

Representative Measured $L_{A90(15min)}$ Background Sound Level (dB re 2 x 10^{-5} Pa)	
Daytime (07:00 – 23:00) Hours	**Night-Time (23:00 – 07:00) Hours**
53	51

6.6 Discussion Of Noise Climate

Due to the nature of the survey, i.e. unattended, 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 noise climate was noted to be dominated by road traffic noise.

7.0 Plant Noise Emission Criteria

Building services plant external noise emission levels will need to comply with local authority requirements and statutory noise nuisance legislation.

Based on the results of the noise survey and the requirements of the Local Authority (as outlined in Section 5.2), we propose that the following plant noise emission criteria be achieved incident at the nearest noise sensitive residential windows, with all plant operating simultaneously.

Rating Plant Noise Emission Criteria ($L_{Ar,Tr}$, dB)	
Daytime (07:00 – 23:00 hours)	**Night-time (23:00 – 07:00 hours)**
43	41

The above criteria are to be achieved with all of the proposed plant operating simultaneously. It should be noted that the above are subject to the final approval of the Local Authority.

8.0 Plant Noise Impact Assessment

8.1 Proposed Plant

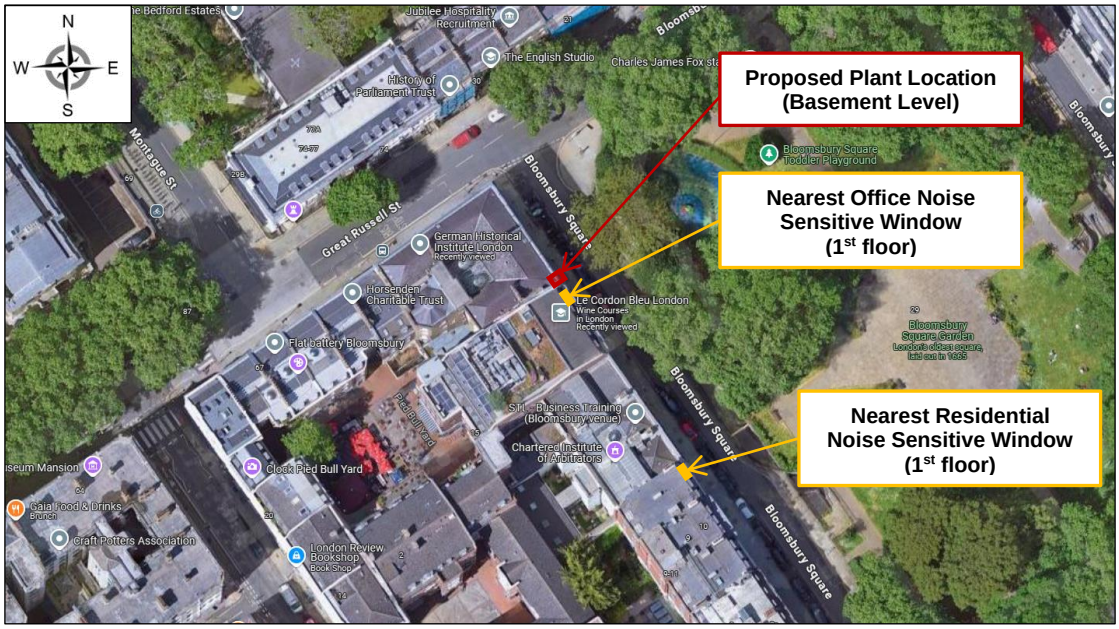
We understand the proposed plant comprises 1No. condenser unit, model PUMY-SP112YKMR2, maker Mitsubishi.

8.1.1 Plant Location

We understand that the proposed condenser unit will be located externally at basement level, near the east boundary of the property.

We have identified the worst affected noise sensitive properties near the site (residential and office/cookery school), which are located south of the site, at first floor level. The distance between the location of the condenser unit and the nearest noise sensitive residential window (9-11 Bloomsbury Square) is approximately 40 metres. The distance between the location of the condenser unit and the nearest noise sensitive office/cookery school (Le Cordon Bleu) window is approximately 4 metres.

The location of the condenser unit is shown on the image below along with the location of the nearest noise sensitive residential and office/cookery school windows.



Plant location (Imagery © 2024, Map Data © 2024 Google)

8.1.2 Plant Operation

We understand that the condenser unit would be operational during daytime hours.

8.1.3 Plant Noise Data

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

Plant Description	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at 1 metre at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
PUMY-SP112YKMR2	58	55	55	52	49	46	38	32	54

8.2 Plant Noise Impact Assessment

8.2.1 Assessment to nearest residential window

The following table summarises our predictions of atmospheric noise emissions from the proposed plant to the nearest noise sensitive residential window.

Description	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Manufacturer's Sound Pressure Level at 1m	58	55	55	52	49	46	38	32	54
Conformal Area Distance Loss (1.0 m to 40.0 m) Eight-spherical radiation	-21	-21	-21	-21	-21	-21	-21	-21	
Barrier Loss from our own building	-6	-8	-9	-12	-14	-17	-20	-20	
Directivity Loss	0	0	0	-4	-7	-7	-7	-7	
Calculated Noise Level at Residential Window	**31**	**26**	**25**	**15**	**7**	**1**	**<0**	**<0**	**19**
Acoustic Feature Correction (Intermittency)									+3
Rating Level									22
Rating Plant Noise Emission Criteria (Daytime)									43
Excess over Rating Plant Noise Emission Criteria									**-21**

The assessment indicates that the proposed plant noise emissions should be 21 dB below the rating plant noise emission criteria (daytime), thus the proposed plant should be capable of achieving the requirements of the Local Authority outlined in Section 7.0.

8.2.2 Assessment to nearest office window

The following table summarises our predictions of atmospheric noise emissions from the proposed plant to the nearest noise sensitive office/cookery school window.

Description	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Manufacturer's Sound Pressure Level at 1m	58	55	55	52	49	46	38	32	54
Conformal Area Distance Loss (1.0m to 4.0 m) Eight-spherical radiation	-3	-3	-3	-3	-3	-3	-3	-3	
Barrier Loss from our own building	-5	-5	-5	-4	-4	-2	0	0	
Directivity Loss	0	0	0	-4	-7	-7	-7	-7	
Calculated Noise Level at Office Window	**50**	**47**	**47**	**41**	**35**	**34**	**28**	**22**	**43**

Based on the above predictions of atmospheric noise emissions the table below provides an initial BS4142:2014 assessment.

Results		Relevant Clause	Commentary
Specific Sound Level	L_{Aeq} = 43dB	7.3.8 7.3.9 7.3.10	Cumulative noise level at the nearest receptor for all items of plant with proposed mitigation measures.
Acoustic Feature Correction	+3 dB	9.2	Intermittency correction
Rating level	(43+3) dB = 46dB	9.2	
Background sound level	L_{A90} = 53dB	8.1.1 8.1.3 8.3	Representative background sound level measured near the office noise sensitive receptor during daytime.
Excess of rating over background sound level	**(46-53) dB = -7 dB**	**11**	**Assessment indicates likelihood of a low impact to residents**
Assessment indicates likelihood of a low impact to office		11	The rating level is 7dB below to the background level and thus should indicate a low impact on the nearby office premises.
Uncertainty of the assessment	Low	10	The background sound level is based on a 72 hours noise survey.

With reference to BS:4142:2014+A1:2019, the assessment indicates that the proposed plant noise emissions should be 7dB below the representative background noise level and thus should indicate a low impact on the nearby office premises.

9.0 Conclusions

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

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

An assessment has been carried out to determine the plant noise emissions at the nearest noise sensitive windows.

The assessment indicates that the proposed plant should be capable of achieving the proposed environmental noise criteria at the nearest noise sensitive residential window.

The assessment also indicates that the proposed plant noise emissions should be 7dB below the representative background noise level and thus should indicate a low impact on the nearby office premises.

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

Planning Policies, Standards & Guidance

B.1 BS 4142:2014 + A1:2019

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.

B.2 Statutory Noise Nuisance

S79(1)(g) of the Environmental Protection Act 1990 defines a statutory nuisance as *"noise emitted from a premises so as to be prejudicial to health or a nuisance".* A duty is placed on the Local Authority to serve an abatement notice under S80 if it becomes satisfied that a statutory nuisance exists.

There is however no quantitative definition/objective method in determining statutory noise nuisance, and as such we are not able to definitively advise or determine on such matters. Noise nuisance is subjective and requires multiple factors to be considered, including but not limited to:

- Straining to hear something is *generally* considered not a nuisance, however,
- Noise level (of source and relative to background), timing, duration, type of noise, frequency, location, continuous or repetitive, all factor into judging nuisance.

To mitigate against, though not remove entirely, the risk of a statutory noise nuisance, a noise assessment should be undertaken by a Suitably Qualified Acoustician. Adoption of appropriate and relevant industry standards/guides can provide a structured framework for such assessments, improving the credibility of mitigation efforts. It is also important to also recognise that ongoing management (both active and passive) may also be necessary depending on the context of the situation.

Appendix C

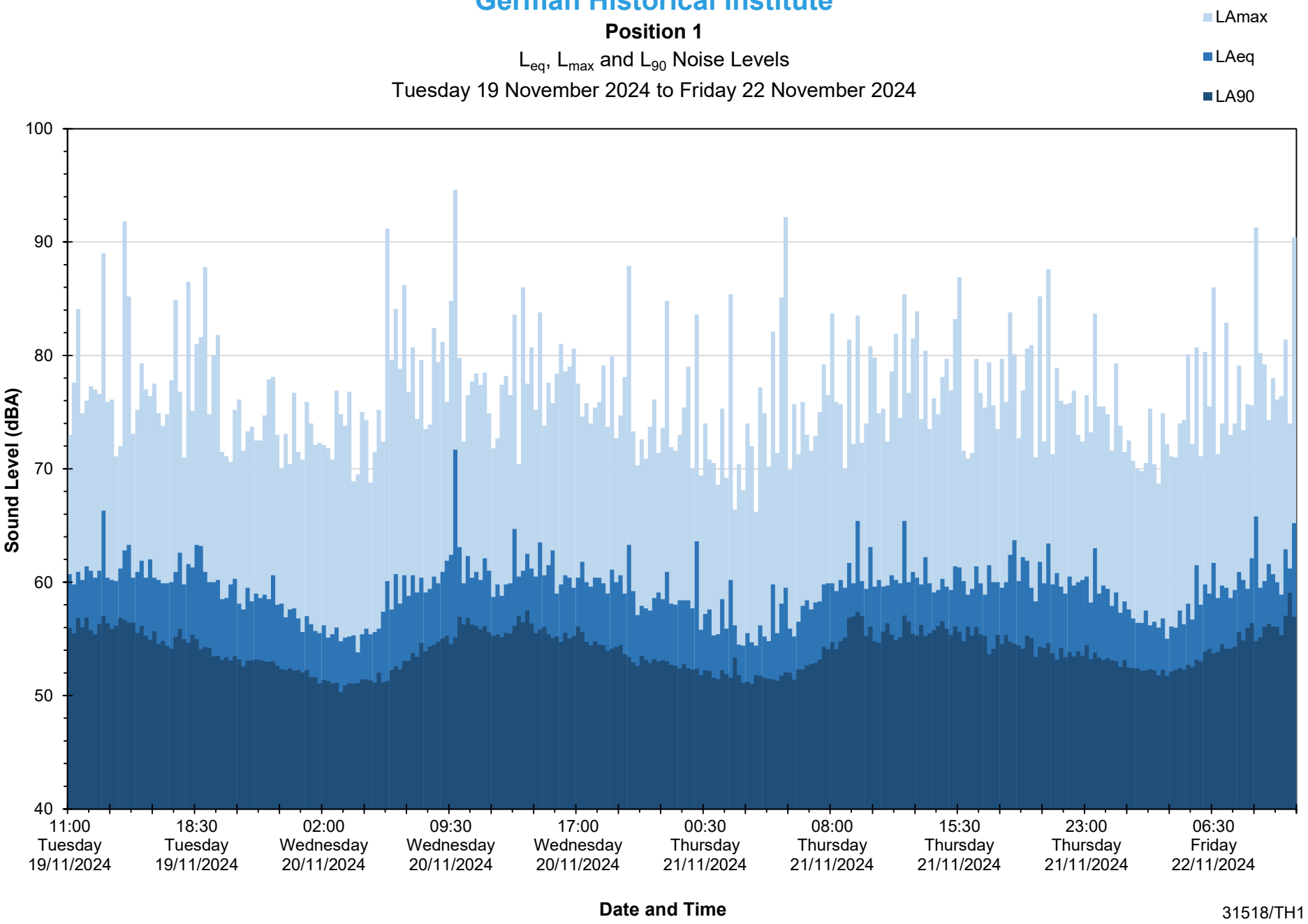
Time History Graph

German Historical Institute

Position 1

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

Tuesday 19 November 2024 to Friday 22 November 2024



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