Jury's Inn
Holborn
London

Environmental Noise Survey
and Entertainment Noise Assessment Report

28133/ENA1
Rev1

8 September 2020

For:
Queensgate GEM LLM SPV 3 Ltd
Jurys Inn Holborn Hotel
NLH 20
50-60 Southampton Row
London
WCI 4AR

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Hann Tucker Associates

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Report 28133/ENA1

Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	08/09/2020	Wording changes		
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Attachments

1.0 Introduction

The 9th floor roof of Jury's Inn, Holborn is proposed to be used as a rooftop bar.

Hann Tucker Associates have therefore been instructed to undertake a detailed environmental noise survey and assessment to determine the potential noise break-out from the rooftop bar to neighbouring residential properties.

2.0 Objectives

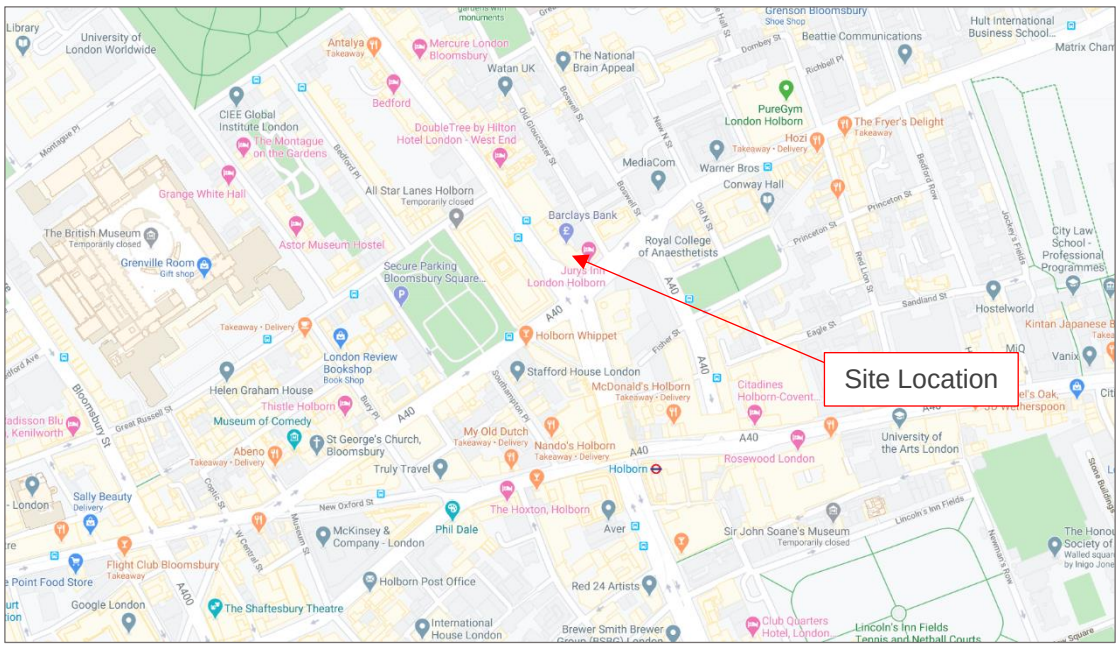
To establish by means of a detailed seventy-two hour survey the existing L_{Amax}, L_{Aeq}, L_{A10} and L_{A90} environmental noise levels at suitable and accessible on-site positions, using fully computerised unmanned monitoring equipment.

To undertake a noise impact assessment of potential noise break-out from the roof bar to residential properties. Provide advice for mitigating potential adverse noise impact as required.

3.0 Site Description

3.1 Location

The site is located at Jury's Inn, Holborn and falls within the jurisdiction of London Borough of Camden. The location is shown in the Location Map below.



Location Map (maps.google.co.uk)

3.2 Description

Jury's Inn, Holborn is a ground plus 9 storey building located in Holborn. The building is bordered to the south west by Southampton Row and to the south east by Theobalds Road A40. The immediate area is made up of commercial, office, and residential space.

The site is shown in the Site Plan below.

Site Plan (Google Earth, 2020)

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 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."

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 lies within the jurisdiction of Camden City Council. Their advice regarding entertainment noise breakout is outline in Policy A4 Noise and vibration as follows:

"The Council will seek to ensure that noise and vibration is controlled and managed.

Development should have regard to Camden's Noise and Vibration Thresholds (Appendix 3). We will not grant planning permission for:

a. *development likely to generate unacceptable noise and vibration impacts; or*
b. *development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses…*

…6.89 Where uses sensitive to noise and vibration are proposed close to an existing source of noise or when development is likely to generate noise is proposed, the Council will require an acoustic report to accompany the application. In assessing applications, we will have regard to noise and vibration thresholds, set out in Appendix 3, and other relevant national and regional policy and guidance and British Standards. Further guidance on the application of these standards will be provided in supplementary planning document Camden Planning Guidance on amenity."

Appendix 3

Entertainment Noise

Assessments for noise from entertainment and leisure premises must include consideration to amplified and unamplified music, human voices, footfall and vehicle movements and other general activity. Appropriate metrics must be used to measure and assess the noise impact including LAeq and LAmax metrics and appropriate frequency spectrum. Planning permission will not be granted in instances where it is not possible to achieve suitable and sufficient internal noise levels with reference to the most up to date and appropriate guidance within proposed noise sensitive receptors despite appropriate mitigation proposals due to the totality of noise from existing entertainment venues.

Table D: Noise levels applicable to proposed entertainment premises (customer noise)

Noise sensitive receptor	Assess-ment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings	Garden used for amenity (free field)	Day	The higher of 55dB $L_{Aeq,5min}$ Or 10dB below existing $L_{Aeq,5min}$ Without entertainment noise	56dB to 60dB $L_{Aeq,5min}$ Or 9dB to 3dB below existing $L_{Aeq,5min}$ Without entertainment noise	The higher of 61dB $L_{Aeq,5min}$ Or 2dB below existing $L_{Aeq,5min}$ Without entertainment noise
Dwellings	Garden used for amenity (free field)	Evening	The higher of 50dB $L_{Aeq,5min}$ Or 10dB below existing $L_{Aeq,5min}$ Without entertainment noise	51dB to 55dB $L_{Aeq,5min}$ Or 9dB to 3dB below existing $L_{Aeq,5min}$ Without entertainment noise	The higher of 56dB $L_{Aeq,5min}$ Or 2dB below existing $L_{Aeq,5min}$ Without entertainment noise
Dwellings	Garden used for amenity (free field)	Night	The higher of 45dB $L_{Aeq,5min}$ Or 10dB below existing $L_{Aeq,5min}$ Without entertainment noise	46dB to 50dB $L_{Aeq,5min}$ Or 9dB to 3dB below existing $L_{Aeq,5min}$ Without entertainment noise	The higher of 51dB $L_{Aeq,5min}$ Or 2dB below existing $L_{Aeq,5min}$ Without entertainment noise

For entertainment and plant noise rating curves should be measured as a 15 minute linear Leq at the octave band centre frequencies.

Room	Noise rating curve	Design period
Bedrooms	NR25	23:00-07:00hrs
All habitable rooms	NR35	07:00-23:00hrs

”

5.5 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.

5.6 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 $L_{Aeq,8hour}$*

6.0 Survey Methodology

The survey was undertaken by G. De Rienzo BSc(Hons) MIOA.

6.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 10:45 hours on Friday 07 August 2020 to 10:45 hours on Monday 10 August 2020.

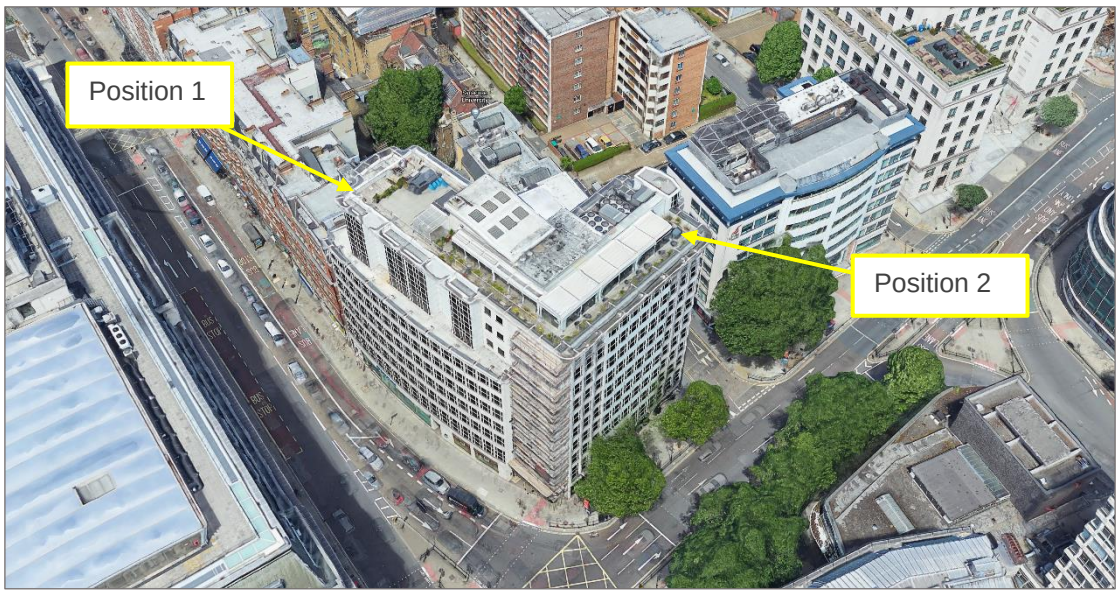
During the periods we were on site the wind conditions were calm. The sky was generally clear. We understand that generally throughout the survey period the weather conditions were similar to this. These conditions are considered suitable for obtaining representative measurement results.

Measurements were taken continuously of the A-weighted (dBA) L_{90}, L_{eq} and L_{max} sound pressure levels over 5 minute periods.

6.2 Measurement Positions

The noise level measurements were undertaken at 2No. positions as described in the table below.

Position No	Description
1	The microphone was located on the 9th floor roof overlooking Southampton Row. The microphone was secured to the existing building edge protection and was approximately 2 metres above roof level.
2	The microphone was located on the 9th floor roof overlooking Theobalds Road A40. The microphone was secured to the existing building edge protection and was approximately 2 metres above roof level.



Plan Showing Measurement Positions (Google Earth, 2020)

6.3 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	ACO Pacific	7052E	71839	Calibration on 09/08/2019
Position 1 Preamp	Svantek	SV18	75733	Calibration on 09/08/2019
Position 1 Type 1 Data Logging Sound Level Meter	Svantek	971	74368	Calibration on 09/08/2019
Position 2 Type 1 ½" Condenser Microphone	ACO Pacific	7052E	68293	Calibration on 13/09/2019
Position 2 Preamp	Svantek	SV18	72276	Calibration on 13/09/2019
Position 2 Type 1 Data Logging Sound Level Meter	Svantek	971	72538	Calibration on 13/09/2019

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 (no more than 0.1 dB).

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.

7.0 Results

The results have been plotted on Time History Graphs 28133/TH1.1 and 28133/T1.2 enclosed, presenting the 15 minute A-weighted (dBA) L_{90} and L_{eq} noise levels at each measurement position throughout the duration of the survey.

The Lowest $L_{Aeq\ (5\ min)}$ measurements recorded during the survey are presented in the table below:

Position	Lowest Measured $L_{Aeq(5min)}$ Background Noise Level (dB re 2 x 10^{-5} Pa)		
	Daytime (07:00 – 19:00) Hours	Evening (19:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours
1	54 dBA	56 dBA	52 dBA
2	57 dBA	58 dBA	55 dBA

8.0 Discussion Of Noise Climate

During the periods we were on site the dominant noise source was noted to be road traffic.

9.0 Entertainment Noise Criteria

Customer noise levels in event spaces will need to comply with Camden's requirements for LOAEL as outlined in Section 5.4.

On the basis of the above and the results of the environmental noise survey, we propose that the following customer entertainment noise criteria be achieved at 1 metre from the nearest garden used for amenity.

Customer Noise Emission Limit from Entertainment Spaces (dBA)		
Daytime (07:00 – 19:00) Hours	Evening (19:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours
55	50	45

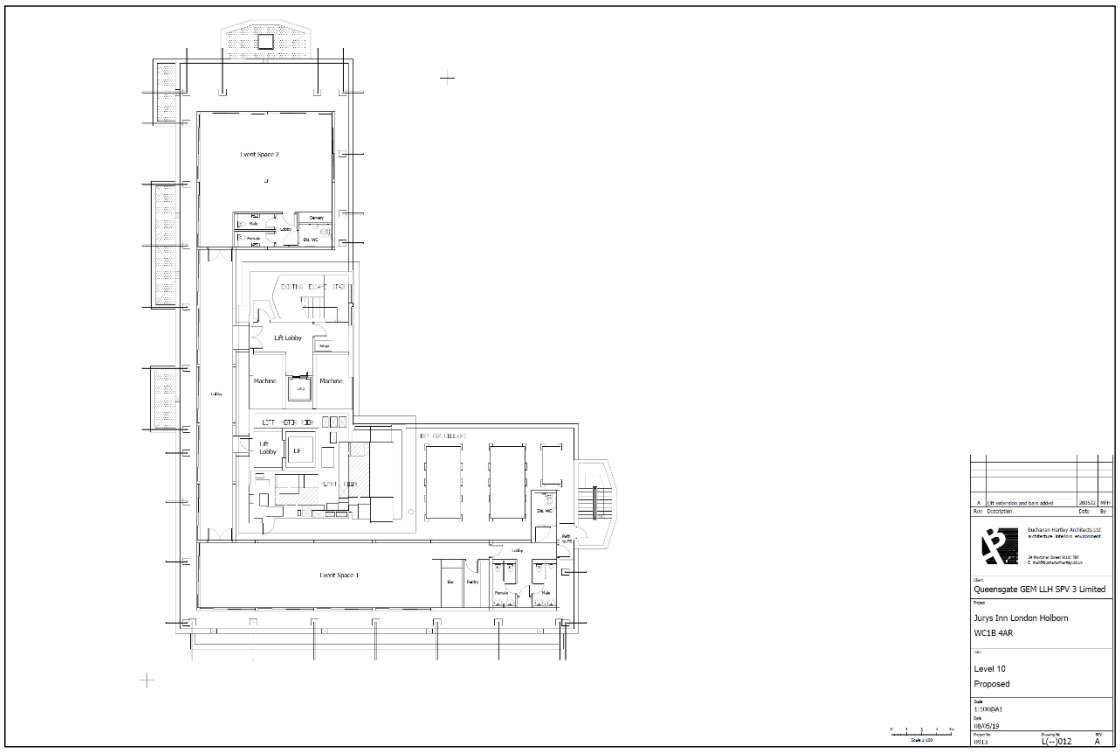
The following internal noise levels due to entertainment noise should be achieved within neighbouring residential dwellings.

Room	Noise rating curve	Design period
Bedrooms	NR25	23:00 – 07:00
All habitable rooms	NR35	07:00 – 23:00

It should be noted that the above are subject to the final approval of the Local Authority.

10.0 Entertainment Noise Impact Assessment

It is proposed to have 2No. event spaces on the roof of Jury's Inn, Holborn. Both roof event spaces can be used as either open or closed spaces and can be seen below.



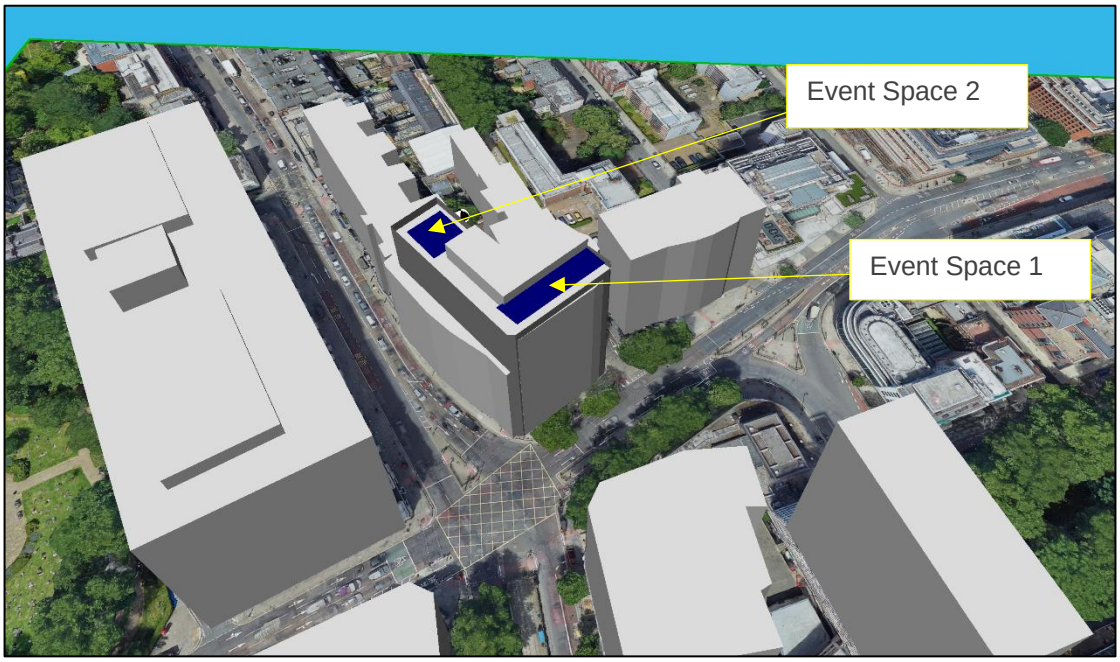
Drawing provided by Buchanan Hartley Architects Ltd

10.1 3D Noise Map

We have created a 3D noise map using computer software CadnaA.

The noise map has been used to determine the maximum noise levels allowed in each event space during the day, evening, and night to achieve the Local Authority requirements.

The noise map can be seen below.



CadnaA Noise Model created by Hann Tucker Associates

10.2 Assessment to Nearest Residential Garden (Customer Noise)

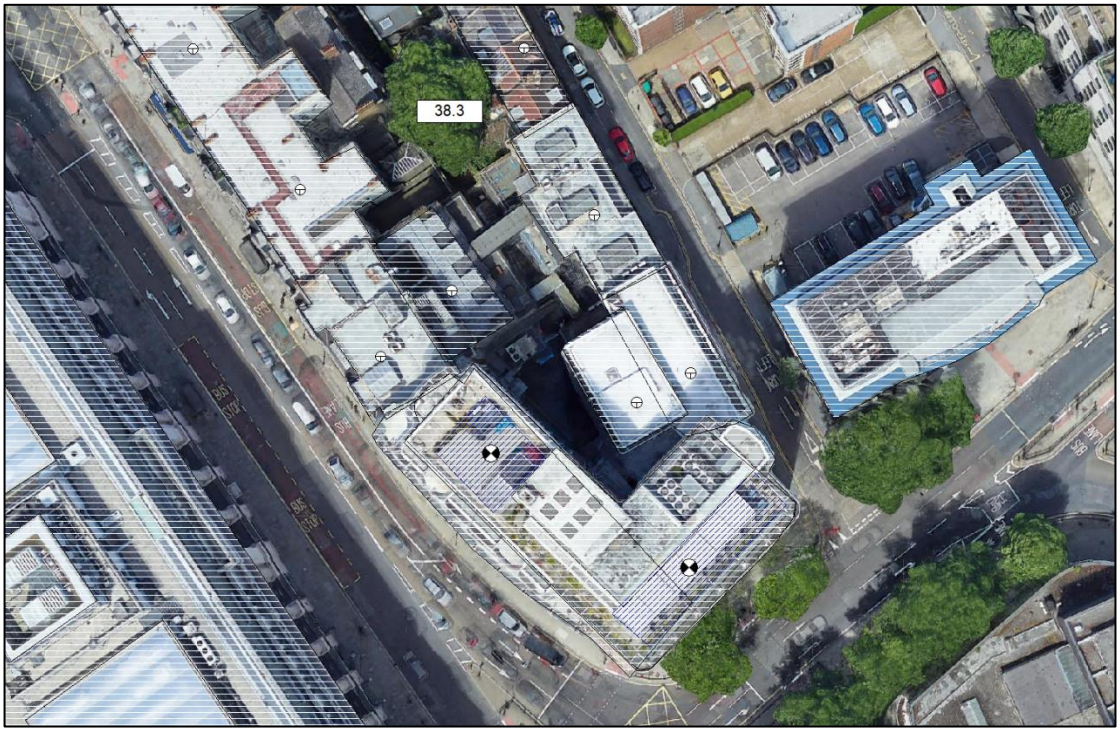
Camden require customer noise levels from event spaces to fall below the levels outlined in Table D, Appendix 3 of their Local Plan. These levels, as calculated from our environmental noise survey, can be found in Section 9.0.

The nearest residential gardens to the proposed event spaces can be seen below.

(Google Earth, 2020)

The noise level of speech can range from approximately 50dBA – 65dBA. In a rooftop bar setting where voices may be raised this is likely to be at the higher end i.e. approx. 65dBA. In a worst-case scenario where approximately 25 customers are all talking loudly at the same time the cumulative noise level in each event area could reach approximately 79dBA.

Our model below uses this worst-case scenario and assesses the noise level from each rooftop event area to the nearest residential garden.



CadnaA noise map showing calculated noise level within nearest residential garden due to customer noise (worst-case)

The noise model indicates that in a worst-case scenario where customers are talking loudly, the customer noise level within the nearest residential garden is likely to be approximately 38dBA.

The assessment indicates that customer noise level are likely to fall well below the Local Authority requirements for LOAEL as outlined in Section 9.0 and should therefore be low impact to nearby residential external amenity areas.

10.3 Assessment to Neighbouring Internal Residential Areas

We have undertaken as assessment to the nearest residential windows to determine the maximum limiting noise levels allowed from each event space.

The nearest residential windows can be seen below.

(Google Earth, 2020)

Noise from the proposed event spaces should not exceed NR25 within neighbouring residential bedrooms during the night, and should not exceed NR35 in any residential habitable space during the day.

It is generally accepted that the typical noise reduction achieved with partially opened windows is around 15dBA (ref. BS 8233:2014 Annex G.1).

Therefore to achieve the Local Authority criteria, noise levels should not exceed NR40 1 metre outside bedrooms at night, and should not exceed NR50 1 metre outside all habitable windows during the day as shown in the table below.

Room	Entertainment Noise Maximum Sound Pressure Level 1 metre outside window at Octave Band Centre Frequency (Hz)								NR
	63	125	250	500	1k	2k	4k	8k	
Bedrooms (23:00 – 07:00)	67	57	49	44	40	37	35	33	40
All habitable rooms (07:00 – 23:00)	75	66	59	54	50	47	45	44	50

Using our 3D noise model, we have calculated the maximum limiting noise levels permitted from each proposed event space to achieve the above.

Our model indicates that the following limiting noise levels for amplified music should be maintained to achieve the Local Authority requirements within nearby residential dwellings.

In open event spaces

The following table outlines the proposed limiting noise levels in open event spaces.

Event Space	Limiting Sound Pressure Level in Open Event Space at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
1 (07:00 – 23:00)	89	80	77	76	73	72	70	69	80
1 (23:00 – 07:00)	80	71	68	67	64	63	61	60	71
2 (07:00 – 23:00)	88	79	76	75	72	71	69	68	79
2 (23:00 – 07:00)	78	69	66	65	62	61	59	58	69

Table 1 – limiting music noise levels in open event spaces

In fully enclosed event spaces

If the event spaces are fully enclosed with typical double glazing as the weakest element, and without any openings, then our calculations indicate that the following limiting noise levels should meet the Local Authority requirements.

Event Space	Limiting Sound Pressure Level in Fully Enclosed Event Space at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
1 (07:00 – 23:00)	102	93	94	99	96	98	100	96	105
1 (23:00 – 07:00)	93	84	85	90	87	89	91	87	96
2 (07:00 – 23:00)	100	91	92	97	94	96	98	94	103
2 (23:00 – 07:00)	91	82	83	88	85	87	89	85	94

Table 2 - limiting music noise levels in fully enclosed event spaces

We have advised in Section 10.2 that large groups talking loudly could reach approximately 79dBA in the event spaces. This should be acceptable during the day but may exceed the proposed limiting noise levels at night (23:00 – 07:00).

It is therefore reasonable to suggest that after 23:00, customer noise in outdoor areas is mitigated to ensure it does not adversely impact nearby existing residential dwellings.

Reasonable noise levels after 23:00 could be therefore achieved by including rules such as the following:

- Event spaces should be fully enclosed after 23:00;
- Customers should be encouraged to be inside these fully enclosed event spaces after 23:00;
- Outdoor areas should be reserved only for individuals or small groups (approx. 2-4 customers) for short periods only i.e. fresh air, smoking etc.
- Quiet behaviour for outdoor customers after 23:00 should be encouraged.
- Assuming the event spaces are fully enclosed after 23:00, then music must be limited to the levels shown in Table 2. This could be achieved via an electronic limiter;
- If doors/windows are left open i.e. for ventilation, then music should be limited to the levels outlined in Table 1.

11.0 Conclusions

An unmanned 72 hour noise survey has been undertaken to establish the existing noise levels at Jurys Inn, Holborn.

An assessment has been undertaken in line with Local Authority requirements to determine the noise impact of the proposed rooftop event spaces at nearby noise sensitive gardens and internal areas.

The assessment of customer noise indicates that even in the worst-case scenarios noise from customers is unlikely to exceed the Local Authority requirements within neighbouring residential gardens.

Limiting noise levels for amplified music have been provided to achieve suitable internal noise levels within nearby dwellings in line with the Local Authority requirements.

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).

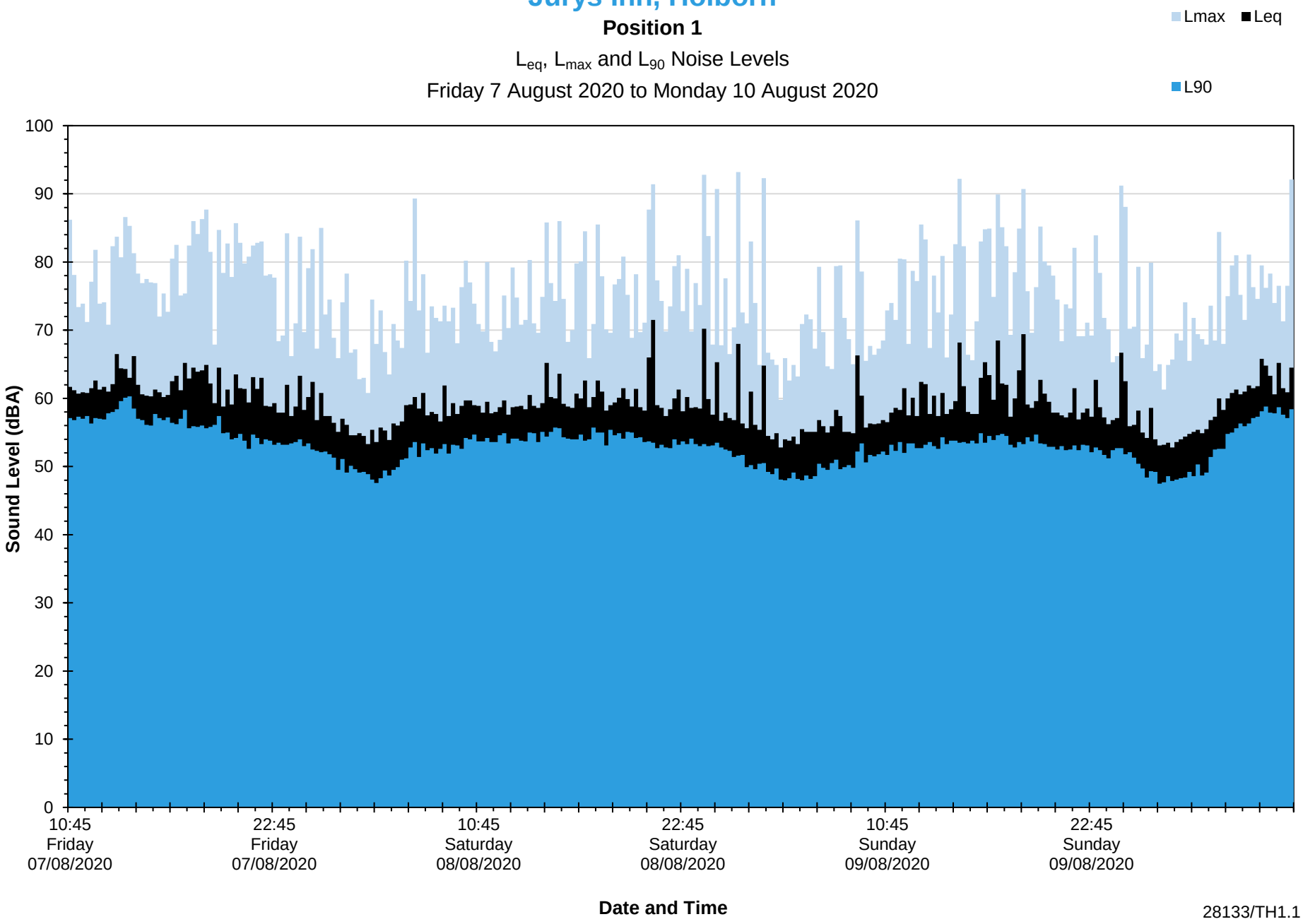
Sound Power Level (SWL or L_w) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

Jurys Inn, Holborn

Position 1

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

Friday 7 August 2020 to Monday 10 August 2020



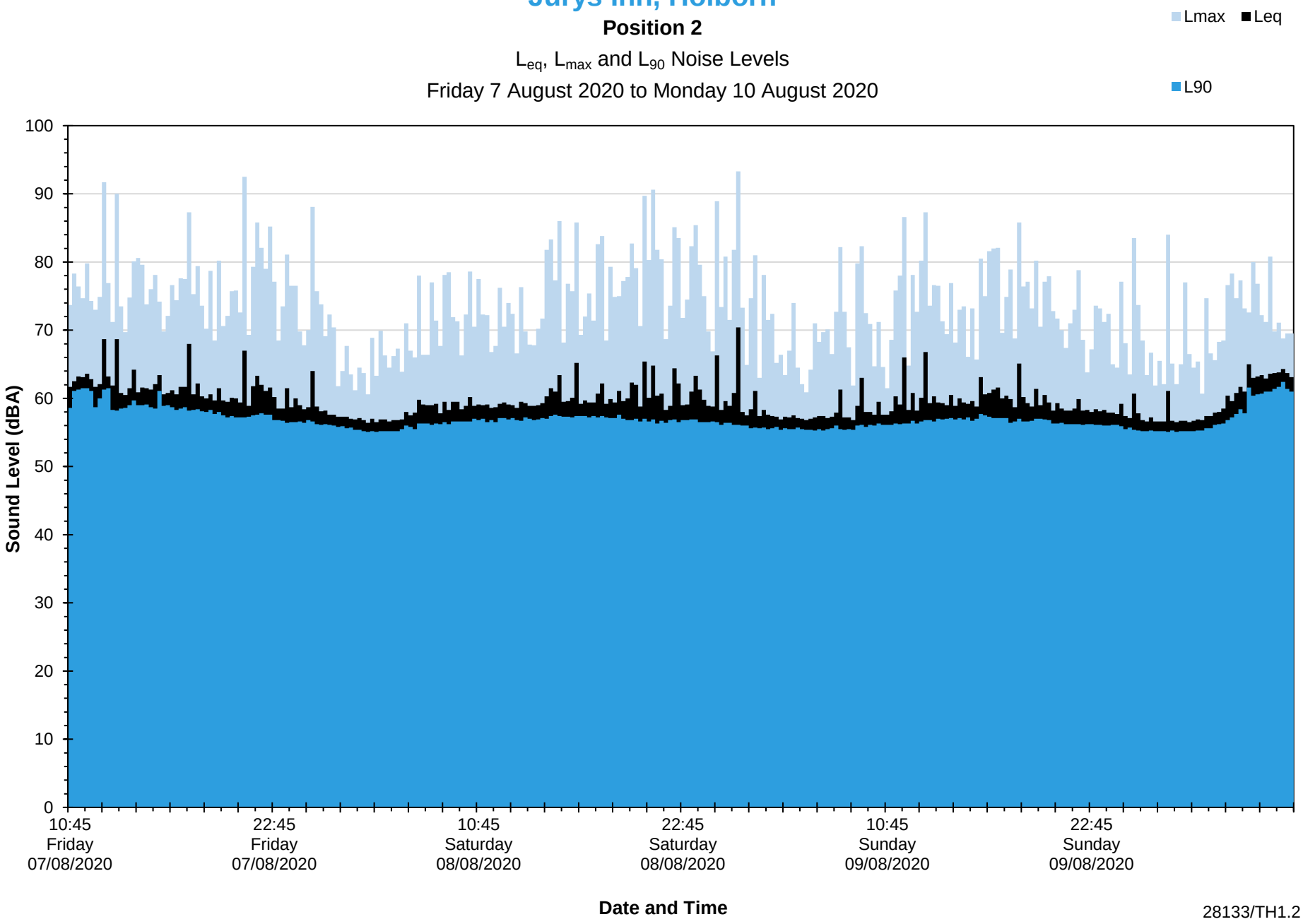
28133/TH1.1

Jurys Inn, Holborn

Position 2

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

Friday 7 August 2020 to Monday 10 August 2020



28133/TH1.2