

4 Hardman Square Manchester

Noise Impact Assessment Report

29822/NIA1

13 June 2022

For:
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Document Control

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1.0 Introduction

Hann Tucker Associates Limited (Hann Tucker) has been commissioned by Quartz Project Services to undertake a noise assessment for a site in Spinningfields, Manchester.

The site, which is located at 4 Hardman Square, is being considered for redevelopment including refurbishments to the ground floor reception area including the formation of a mezzanine level and the existing office accommodation, and a rooftop extension with an external roof terrace for use by the building occupants.

Baseline noise conditions have been established by means of a detailed noise survey, presented herein. The findings have subsequently been used to assess the suitability of the site for the creation of an external roof terrace. Measures required to mitigate noise impacts for the proposed development (when operational) have been discussed in context with relevant national & local planning policies, design standards and good practice guides.

2.0 Objectives

- To review the latest national and local planning policies, industry standards and good practice design guides relating to noise surveys and assessments of proposed residential developments.
- To establish, by means of an unmanned 48-hour survey, the existing L_{Amax} , L_{Aeq} , L_{A90} and L_{A1} environmental road, rail and air traffic noise levels at 2No. secure and accessible on-site positions, using fully computerised noise monitoring equipment.
- Based on the results of the survey, noise emission limits from the development are to be identified with reference to the requirements of the Local Authority to minimise the possibility of noise nuisance to neighbours.
- To present our methodology and findings in a detailed Environmental Noise Survey and Noise Impact Assessment Report to accompany the planning application.

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 4 Hardman Square and falls within the jurisdiction of Manchester City Council. See Location Map below.



Location Map (Map data @2022)

4.2 Description

The site is at 4 Hardman Square within Spinningfields, Manchester. The site is bound by Gartside Street to the west and neighbouring buildings to all other sides. To the north lies Manchester Crown Court and in all other directions lie multi-storey office buildings with ground floor retail units. Additionally, within Hardman square lies two indoor/outdoor restaurants.

The nearest noise sensitive residential receptor is understood to be the Leftbank apartment buildings located 130m to the north-west of the site.

See site plan overleaf.

5.1.1 National Planning Policies

In order to provide a suitable assessment a number of national planning policies have been considered, including:

Planning Policy, Standards & Guidance



- The National Planning Policy Framework (NPPF), 2021
- The Noise Policy Statement for England (NPSE), 2010
- Planning Practice Guidance – Noise (PPGN), 2019

The above documents highlight the importance of considering the potential noise effects on any new residential development and provide a qualitative approach to assessment. However, each of the above does not provide any quantitative guidance. As such, all quantitative guidance used to form a noise impact assessment is taken from various other standards and guidance as detailed in the following sections.

A detailed summary of each of the above National Planning Policies is provided in Appendix B for reference.

5.2 Standards & Guides

5.2.1 BS 4142:2014

BS 4142: 2014 describes methods for rating and assessing the effects of outdoor sound levels, of an industrial and/or a commercial nature, *“on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident”*.

The impact of a specific sound is indicated by subtracting the existing background noise level from the rating level (i.e. noise level from the proposed items of plant/machinery/etc plus any acoustic feature corrections). The standard states that:

- “a difference of around +10dB or more is likely to be an indication of a significant adverse impact”;
- “a difference of around +5dB is of marginal significance is likely to be an indication of an 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”.

The noise from the new development is expressed in terms of a rating level and given as a $L_{Aeq, T}$ noise level. The existing background noise level is expressed in terms of a $L_{A90, T}$ noise level. T is the assessment time interval, which is 1-hour for operations during daytime hours (07:00 to 23:00) and 15-minutes for operations during night-time hours (23:00 to 07:00).

BS 4142:2014 states that if a noise source contains an ‘acoustic feature’, such as tonality, intermittency or impulsiveness, an appropriate penalty should be applied.



5.3 Local Planning Guidance

Manchester City Council requirements are outlined in Section 3.0 of Manchester City Council's Planning & Noise Technical Guidance document (December 2015).

5.3.1 Fixed Plant Noise Emissions

Section 3.6.1.5.1 outlines that the noise assessment for fixed plant should be based on BS 4142:2014 and the assessment must demonstrate that

“Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme so as to achieve a rating level of 5 dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.”

5.3.2 Amplified Sound Egress Criteria - residential premises

Section 3.7.1.2 stipulates the following criteria regarding entertainment noise egress, which apply to nearby residential properties only:

“Entertainment noise ($L_{Aeq,5min}$) should be controlled to 5dB below the typical background noise level (L_{A90}) in each octave band at the nearest noise sensitive location.”

These are cumulative limits and consider the contributions from all areas.

5.3.3 Amplified Sound Egress Criteria – Office premises

MCC stipulate amplified noise egress criteria for residential receptors should not exceed 5 dB below the background noise level, however, there is no specific requirements to control noise egress to office developments. As such, to minimise the risk of disturbance to adjacent office developments it is advised that the cumulative noise level as a result of noise egress due to amplified music does not exceed 5 dB below the internal noise level within the office assuming a sealed façade.

6.0 Baseline Noise Survey

6.1 Procedure

Unattended noise monitoring was undertaken on site over a 4-day period to establish full daytime and night-time noise levels over a typical weekday and weekend period. The monitoring was carried out between 15:00 hours on Thursday 26 May 2022 and 15:00 hours



on Monday 30 May 2022 with equipment set up to record broadband and spectral (octave band) sound pressure levels over discrete 5 and 15-minute periods.

The survey was performed by Rory Nicholls BEng(Hons) AMIOA. All measurements were collated in general accordance with BS 7445-1:2003 *Description and Measurement of Environmental Noise*.

6.2 Measurement Positions

The measurement positions were as described and illustrated below.

Position	Type	Description
1	Unattended	To the southwest corner of the site. Microphone in free-field conditions approx. 28 m above local ground level.
2	Unattended	To the southeast corner of the site. Microphone in free-field conditions approx. 28 m above local ground level.



Site Plan (Map data @2022)



6.3 Weather Conditions

For the unattended survey between Thursday 26 May 2022 and Monday 30 May 2022, local weather reports indicated no notable periods of prolonged and/or heavy rainfall, with temperatures ranging from 8 °C (night) to 17 °C (day) and wind speeds less than 5 m/s.

During our time on site, skies were largely clear with patchy cloud cover, wind conditions were light and from a westerly direction and road surfaces were dry.

Weather conditions were deemed suitable for obtaining representative noise readings.

6.4 Instrumentation

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

Position	Description	Manufacturer	Type	Serial Number	Last Calibration
1	Sound Level Meter	Larson Davis	824	3533	15/07/2021
2	Sound Level Meter	Larson Davis	LxT	4568	15/07/2021
1 & 2	Type 1 Calibrator	Larson Davis	CAL200	3083	06/05/2021

Each unattended sound level meter was housed in a weatherproof case with the microphone connected via an extension cable. Manned measurements were taken with a handheld sound level meter mounted onto a tripod. All microphones were fitted with a windshield.

Each sound level meter was calibrated prior to and on completion of the survey. No significant deviations occurred (not more than 0.1 dB).

6.5 Results

6.5.1 Unattended Survey

The results of the unattended survey have been plotted on Time History Graphs 29822/TH1 to 29822/TH2 enclosed. These graphs present the 15-minute A-weighted (dBA) L_{90} , L_{eq} and L_{max} levels at both positions throughout the duration of the survey.

A summary of the results, as used to inform subsequent assessments against current



guidelines, is presented in the table below. The L_{A90} values presented are the lowest levels determined through an arithmetic average of each 15-minute interval across the 4-day measurement period, in line with Appendix A of Manchester City Council's Planning & Noise Technical Guidance.

All results are free-field levels.

Position	Daytime (07:00 – 23:00 hrs)			Night-time (23:00 – 07:00 hrs)	
	$L_{Aeq,16hr}$	$L_{A90,15min}$	$L_{A1,15min}$	$L_{Aeq,8hr}$	$L_{A90,15min}$
1	57	51	71	55	49
2	59	52	75	56	49

A summary of the octave band L_{90} levels at Position 1 are shown below.

Period	Background Sound Levels (dB) per Octave Band Centre Frequency (Hz)						
	63	125	250	500	1000	2000	4000
Daytime (07:00 – 23:00 hrs)	57	55	53	51	50	45	35
Night-time (23:00 – 07:00 hrs)	58	55	52	48	47	42	33

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 vehicular movements on Gartside Street, Hardman Street and Bryon Street.

7.0 Development-Generating Noise Impacts

7.1 Nearest Noise Sensitive Receptors

The nearest office receptor are the multi-storey developments directly adjacent to site boundary. The nearest residential receptor is the apartment block to the northwest of the site boundary, approximately 125 meters from the roof terrace.



7.2 Fixed Plant & Equipment

Based on the results of the noise site and the requirements of the Local Authority, we propose that the following plant noise emission criteria be achieved incident at the nearest noise sensitive residential windows, in free-field conditions, with all plant operating simultaneously.

Plant Noise Emission Criteria ($L_{Aeq,T}$, dB)	
Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
46	44

Noise shall be assessed in accordance with BS 4142:2014 with corrections applied for any plant emitting noise of a tonal or irregular quality. The above limits shall be subject to the final approval of the Local Authority.

7.3 Entertainment Noise Impacts

7.3.1 Proposed Limits

It is understood that the terrace is to be used for ad-hoc events. As such, the levels of noise egress from the terrace to nearby off-site receptors need to be considered in line the MCC requirements.

MCC stipulate amplified noise egress criteria for residential receptors should not exceed 5 dB below the background noise level, however, there is no specific requirements to control noise



egress to office developments. As such, to minimise the risk of disturbance to adjacent office developments it is advised that the cumulative noise level as a result of noise egress due to amplified music does not exceed 5 dB below the internal noise level within the office.

All office developments in the area have sealed facades. As such, assuming an internal noise level of NR 35 and the sound insulation performance of a typical thermal double-glazed window we have established amplified noise egress limits are the most affected office receptor.

Based on the above the below limits are provided for a residential receptor and an office receptor. Night-time levels for the office receptor have not been provided as it is assumed that offices will be closed during the night.

Receptor	Time	Octave Band Entertainment Noise Egress Limit, L_{eq} (dB)						
		63	125	250	500	1000	2000	4000
Residential	Day (07:00 – 23:00)	52	50	48	46	45	40	30
	Night (23:00 – 07:00)	53	50	47	43	42	37	28
Office	Day (07:00 – 23:00)	67	56	47	51	57	50	52

7.3.2 Assessment

Amplified noise will be required to be controlled as to not exceed the proposed limits at the nearest receptor.

Based on achieving the proposed limits, the following table presents our proposed amplified noise limits at the perimeter of the roof terrace, accounting for distance attenuation to the office receptor.

Period	Octave Band Entertainment Noise Limit with Terrace, L_{eq} (dB)						
	63	125	250	500	1000	2000	4000
Daytime Limit (07:00 – 23:00)	90	81	72	76	82	75	77
Night-time Limit (23:00 – 07:00)	90	89	86	82	81	76	67

7.4 External Terrace Area – Speech



Calculations have been carried out to determine the noise egress level from the proposed external terraces to the nearby office premises.

The calculations take into account attenuation due to distance and speech levels are based upon typical male speech (as they provide a worst-case scenario compared to female speech). The calculations assume the upper design limit of 50 people all talking at once.

	Sound Pressure Level (dBA)
Speech Emission Level	66*
Quantity Correction at 50 people	17
Distance Attenuation	-21
Cumulative Noise Level	59
Measured Ambient Noise Level, L_{Aeq}	56
Difference to Ambient	-3

*Male speaker with a raised voice at 1m from the source

This is considered to be a worst-case scenario as it assumes full capacity to the terrace area. Given this, noise levels would be expected to be lower for much of the time (particularly within office hours). As such it is not expected that the external terraces would have a significant effect on the noise levels in the offices.

8.0 Conclusions

A detailed environmental noise survey has been undertaken in order to establish the currently prevailing environmental noise climate around the site.

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

An assessment has been carried out and external amplified sound limits have been set for the external terraces.

An assessment had been carried on the potential impact of speech levels when the external terrace is in use.

Appendix A – Acoustic Terminology

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 <i>T</i> (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, <i>T</i> .
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).

Appendix B –National Planning Policies

National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) was first published in 2012, replacing the existing Planning Policy Guidance Note 24 (PPG24) “Planning and Noise”, and sets out the government’s planning policies for England and how these are expected to be applied.

The latest revision of the NPPF (July 2021) states that planning system should contribute to, and enhance, the natural and local environment by (amongst others) *“preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, water or noise pollution or land stability.”*

NPPF advises that planning policies and decisions should ensure:

“...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] *“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”* and *“identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”*

“...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.”

The NPPF makes reference to the Noise Policy Statement for England.

Noise Policy Statement for England (NPSE)

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.”

That vision is supported by the following NPSE noise policy aims which are reflected in three of the four aims of planning policies and decisions in the NPPF as below:

“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.

Planning Practice Guidance on Noise (PPG)

Planning Practice Guidance (PPG) under the NPPF has been published by the Government as a web based resource. 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:

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, 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
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

4 Hardman Square, Spinningfields

Position 1

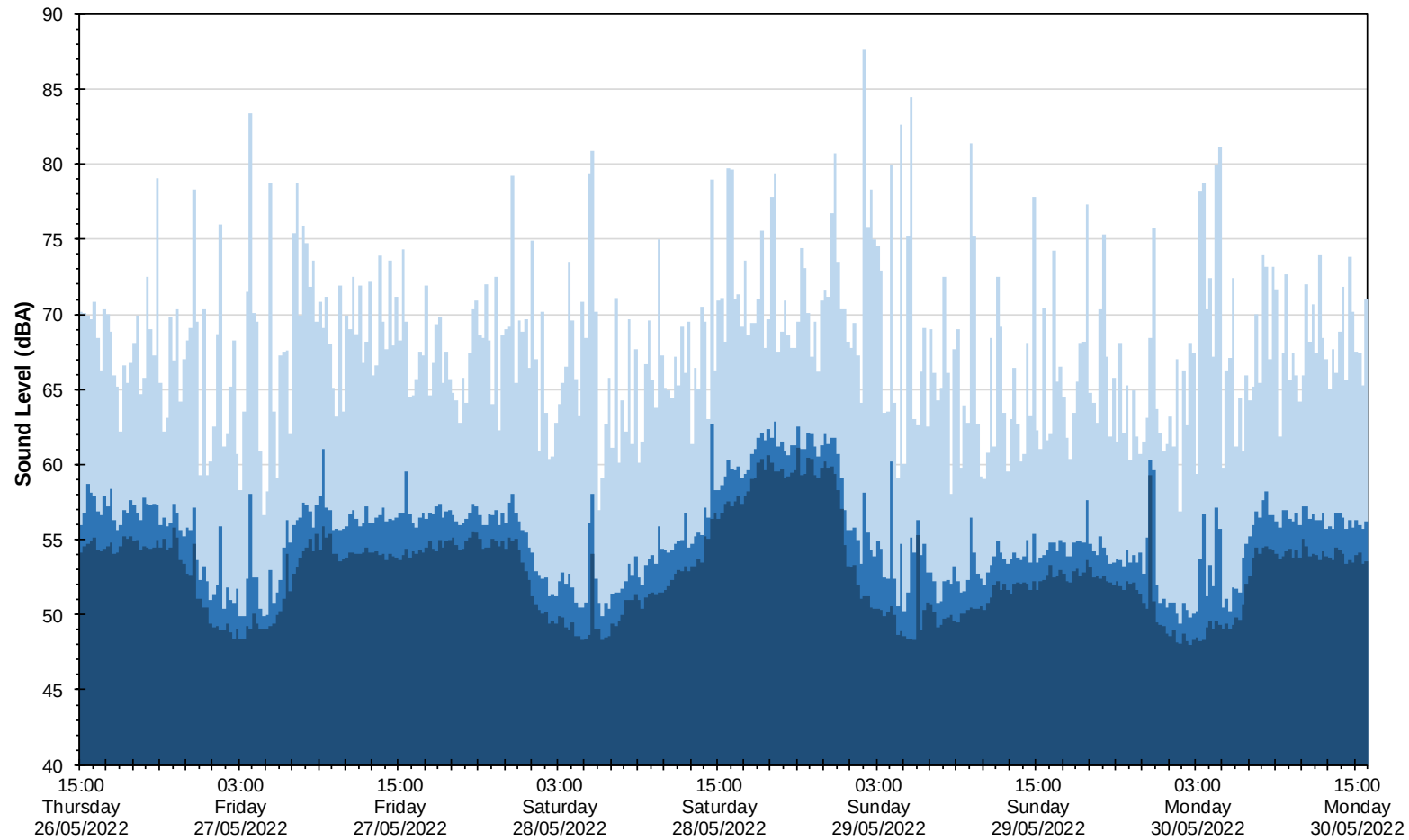
L_{eq} , L_{max} and L_{90} Noise Levels

Thursday 26 May 2022 to Monday 30 May 2022

■ L_{Amax}

■ L_{Aeq}

■ L_{A90}



Date and Time

29822/TH1

4 Hardman Square, Spinningfields

Position 2

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

Thursday 26 May 2022 to Monday 30 May 2022

■ L_{max}

■ L_{Aeq}

■ L_{A90}

