

Victoria Park Manchester

Noise Insulation Scheme Report:
Planning Condition 11(a)

Client:

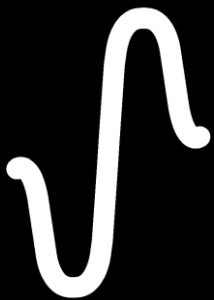
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**JAMESON
ACOUSTICS**

Consultants in acoustics,
noise and vibration

Document Control

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0	08-10-2023	AJ	-
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This report has been prepared with all reasonable skill, care and diligence for the sole benefit, use and information of the aforementioned Client in accordance with the purposes and terms agreed between ourselves and the Client. The liability of Jameson Acoustics Limited in respect of the information contained within this report will not extend to any third party.

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Executive Summary

Planning permission has been granted for a new-built residential development on Laindon Road in Victoria Park, Manchester (ref. 135848/FO/2022), subject to conditions. Condition 11 relates to a scheme for acoustically insulating the proposed residential accommodation from external noise sources.

Jameson Acoustics Limited has been commissioned to review noise survey data obtained by others for the planning application and subsequently propose a noise insulation scheme for the development.

The assessment finds that acceptable internal noise levels within habitable rooms can be achieved through the appropriate specification of façade elements and ventilation solutions. The specifications correspond to conventional triple glazing and standard hit-and-miss trickle ventilators for all dwellings.

An assessment of noise implications on the overheating strategy has been carried out in accordance with Building Regulations Part O and AVO. The assessment finds that reliance on openable windows should be an acceptable means of controlling overheating for all dwellings, day and night.

Noise levels within outdoor living spaces (gardens) have been reviewed. For all gardens, noise levels are expected to comply with BS 8233 guidelines without the need for any additional acoustic fence treatment.

Contents

1.0 Introduction 4

2.0 Objectives..... 4

3.0 Site Description 4

4.0 Planning Policy, Legislation & Assessment Guides 6

5.0 Baseline Noise Survey (by Others) 8

6.0 Incident Noise Levels 11

7.0 Achieving Internal Noise Levels 13

8.0 Overheating & Noise..... 16

9.0 Outdoor Living Spaces..... 17

10.0 Conclusions 18

Appendix A – Acoustic Terminology 19

Appendix B – Planning Policy & Assessment Guides 20

Appendix C – Noise Survey Time History Graph 26

Appendix D – Calculation Sheets 28

1.0 Introduction

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Jameson Acoustics Limited has been commissioned to review noise survey data obtained by others for the planning application and subsequently propose a noise insulation scheme for the development.

For a description of the acoustic terminology used herein, please see Appendix A.

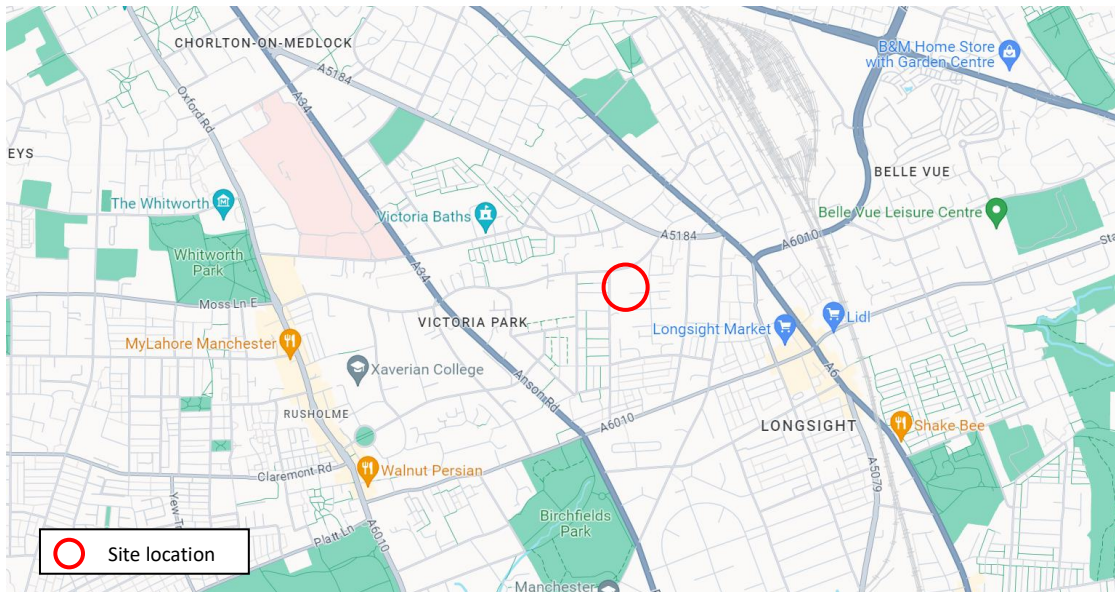
2.0 Objectives

- To review the latest national and local planning policies/requirements and relevant design standards and good practice guides that will inform the noise impact assessments.
- To review noise survey data (by others) to evaluate incident environmental noise levels onto proposed residential facades and gardens.
- Based on the survey data, to present a noise insulation scheme for the development and provide evidence of compliance with Manchester City Council requirements to assist in the discharge of Planning Condition 11(a).

3.0 Site Description

3.1 Location

The site is located on Laindon Road in Victoria Park, Manchester and falls under the jurisdiction of Manchester City Council [MCC]. See Location Plan below.



Location Plan (© maps.google.co.uk)

3.2 Description

The site is currently occupied by a Probation Centre, due to be demolished. It is bounded to the north by Daisy Bank Road and to the west by Laindon Road. The site is surrounded on all sides by existing residential properties. The dominant noise source on-site was noted (in the planning application noise report) to be vehicle movements on Daisy Bank Road and Laindon Road. See Site Plan below.



Site Plan (© maps.google.co.uk)

The proposed development comprises 8nr blocks of dwellings. Block 1 is apartments, Block 7-8 are houses. See Proposed Site Plan below.



Proposed Site Plan (c/o Ollier Smurthwaite Architects)

4.0 Planning Policy, Legislation & Assessment Guides

4.1 National Planning Policy

National planning policies are set out in the following:

- Noise Policy Statement for England [NPSE], 2010;
- National Planning Policy Framework [NPPF], 2021;
- National Planning Practice Guidance – Noise [PPGN], 2019.

These documents provide a qualitative approach to noise assessments. See Appendix B for a detailed description of each.

4.2 Local Planning Requirements

4.2.1 Planning Condition 11

Planning Condition 11 states:

11.(a) Before the development commences a scheme for acoustically insulating the proposed residential accommodation against noise from Daisy Bank Road and Laindon Road shall be submitted to and approved in writing by the City Council as local planning authority.

There may be other actual or potential sources of noise which require consideration on or near the site, including any local commercial/industrial premises.

The potential for overheating shall also be assessed and the noise insulation scheme shall take this into account. The approved noise insulation and ventilation scheme shall be completed before any of the dwelling units are occupied.

Noise survey data shall include measurements taken during a rush-hour period and night time to determine the appropriate sound insulation measures necessary.

(b) Prior to first occupation of the residential units, a verification report shall be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post completion testing to confirm that the internal noise criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the internal noise criteria.

4.2.2 Specific Guidance on Noise

MCC's Supplementary Planning Document relating to noise is their 'Planning & Noise, Technical Guidance' published in October 2022 by their Environmental Protection Team. This document provides guidance to applicants and consultants concerning the assessment and prediction of environmental noise associated with a particular development. The key elements relevant to this development are summarised below.

In relation to noise affecting newly proposed residential properties, the council has adopted the following noise limits for sites affected only by environmental noise (e.g. road traffic):

- **Bedrooms (night time – 23.00 – 07.00) 30 dB L_{Aeq} (individual noise events should not normally exceed 45 dB $L_{Amax,F}$ by more than 10 times)**
- **Living Rooms (daytime – 07.00 – 23.00) 35 dB L_{Aeq}**
- **Gardens and terraces (daytime) 55 dB L_{Aeq}**

4.3 Legislation (Building Regulations)

The development will need to be built in such a way that it conforms to the Building Regulations 2010. In relation to noise and acoustics, the key documents to consider are:

- Approved Document E: 2003 Edition (incorporating amendments to 2015) – Resistance to the Passage of Sound [ADE];
- Approved Document F: 2021 Edition – Ventilation [ADF];
- Approved Document O: 2021 Edition – Overheating [ADO].

ADE relates to the design of the building's internal building fabric and primarily considers the control sound transfer between adjacent spaces. In planning terms, this development will not share a party wall with any other building and therefore does not require any further consideration.

ADF includes a section on controlling noise from ventilation systems. It states that "*account should be taken of outside noise when considering whether openable windows are appropriate for purge ventilation*" and that noise from mechanical ventilation systems operating under normal conditions

(not boost rates) should not exceed 30 dB $L_{Aeq,T}$ for noise sensitive rooms (e.g. bedrooms) and 45 dB $L_{Aeq,T}$ in less sensitive rooms.

ADO took effect on 15 June 2022 and does not apply to work subject to a building notice, full plans application or initial notice submitted before that date, provided the building work is started before 15 June 2023. It requires noise to be considered as part of the development's overheating strategy in locations where external noise may be an issue. It states that the overheating strategy should take account of the likelihood that windows will be closed during sleeping hours if noise within bedrooms exceeds the following limits.

- 40 dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).
- 55 dB L_{AFmax} , more than 10 times a night (between 11pm and 7am).

4.4 Assessment Guides

For planning and noise, the following industry standards and assessment guides shall be considered.

- ProPG: Planning & Noise, 2017;
- BS 8233: 2014 '*Guidance on sound insulation and noise reduction for buildings*';
- World Health Organisation [WHO] Environmental Noise Guidelines, 2018;
- Acoustics, Ventilation & Overheating [AVO] Residential Design Guide, 2020.

See Appendix B for a detailed description of each.

5.0 Baseline Noise Survey (by Others)

5.1 Hann Tucker Report

A detailed noise survey was carried out by Hann Tucker Associates, as presented in their Noise Impact Assessment Report 30113/NIA1 (rev 02) dated 1 June 2023.

The associated full raw survey data was obtained via Avison Young.

5.2 Procedure

The Hann Tucker survey comprised:

- Unattended noise monitoring (Position MP1) from 11:00 hr on Monday 12 September to 15:00 hr on Friday 16 September 2022.
- Attended measurements at two positions (Positions MP2 and MP3) between 10:00-13:00 hr on Wednesday 21 September 2022.

The positions were as described and illustrated below.

Position	Type	Description
MP1	Unattended	To the southwest of the site, on Laindon Road. Attached to a lamppost box, approx. 2.5 m above ground level. Free-field conditions.
MP2	Attended	To the north of the site, on Daisy Bank Road. Attached to a tripod, approx. 1.5 m above ground level. Free-field conditions.
MP3	Attended	To the southwest of the site, on Laindon Road. Attached to a tripod, approx. 1.5 m above ground level. Free-field conditions.



Site Plan showing measurement positions (© maps.google.co.uk)

The equipment was programme to continuously log all relevant A-weighted broadband (dBA) and linear spectral noise level indices over 2-minute and 15-minute intervals.

All measurements were taken in general accordance with BS 7445-1: 2003 '*Description and Measurement of Environmental Noise*' using Class 1 sound level meters.

Weather conditions were noted to be suitable for obtaining representative measurement results, with the exception of Monday daytime (heavy rainfall). This day's data was removed from Hann Tucker's assessment.

5.3 Results

The results of the unattended survey (Position MP1) have been plotted on Time History Graph 22092-G1 enclosed in Appendix C. The graph presents the 15-minute A-weighted (dBA) L_{90} , L_{eq} and L_{max} levels throughout the duration of the survey.

The results of the attended survey, as presented in the Hann Tucker report, are given below. Measurements were taken over periods of not less than 10 minutes in each hourly period. It is assumed these readings were suitably representative of the noise climate in the hour in which the measurement was taken.

Position	Period	Hourly Free-Field Noise Level (dB)			
		L_{Aeq}	L_{A10}	L_{A90}	L_{Amax}
MP2	10:00-11:00	55	56	43	82
	11:00-12:00	56	54	41	73
	12:00-13:00	52	55	40	81
MP3	10:00-11:00	53	55	37	70
	11:00-12:00	51	52	37	71
	12:00-13:00	55	58	39	78

5.4 Analysis

Based on our own analysis of their noise survey data, a summary of the key parameters used to inform our subsequent assessments is presented below.

NB: As the dominant noise source at all positions was noted to be road traffic, the results of attended measurements have been applied to a calculation to determine the corresponding 16-hour (daytime) and 8-hour (night-time) L_{Aeq} ambient noise levels in accordance with:

- the shortened measurement procedure of the Department of Transport's Calculation of Road Traffic Noise [CRTN] 1988;
- Method 3 in the Transport Research Laboratory [TRL] Project Report PR/SE/451/02 'Converting the UK traffic noise index $L_{A10,18hr}$ to EU noise indices for noise mapping'.

The approach can be summarised as follows:

- CRTN: Measure three consecutive $L_{A10,1hr}$ as per the CRTN shortened procedure;
- CRTN: Average the three $L_{A10,1hr}$ values and subtract 1 dB to obtain the $L_{A10,18hr}$;
- TRL: Apply Method 3 equations to determine the likely $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ values.

L_{Aeq} Ambient Noise Levels

The logarithmically-averaged 16-hour daytime and 8-hour night-time L_{Aeq} ambient noise levels

Position	Free-Field Ambient Noise Level (dB)	
	Daytime L _{Aeq,16hr} (07:00-23:00)	Night-time L _{Aeq,8hr} (23:00-07:00)
MP1	55	47
MP2	53*	46*
MP3	53*	46*

* Calculated using CRTN / TRL procedures described above

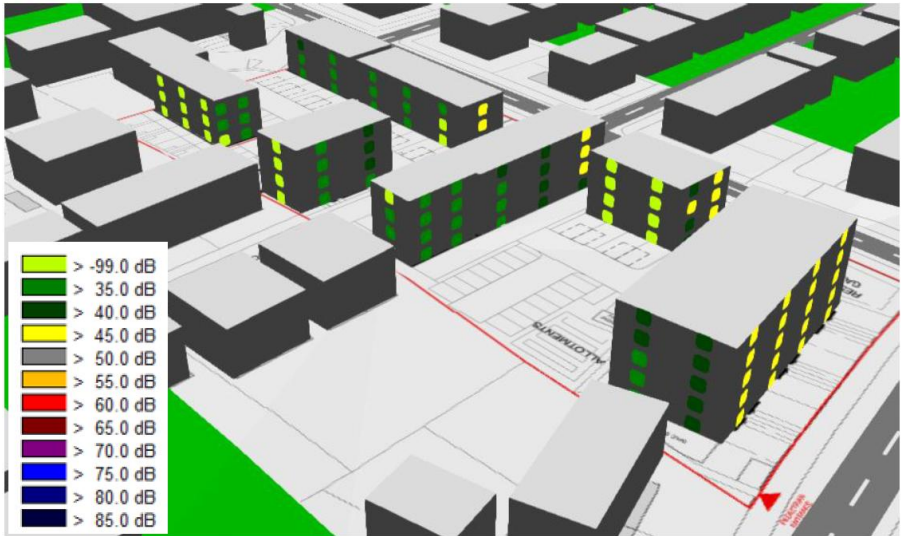
L_{Afmax} Maximum Noise Levels at Night

The 10th highest 2-minute L_{Afmax} maximum noise level ‘event’ at night

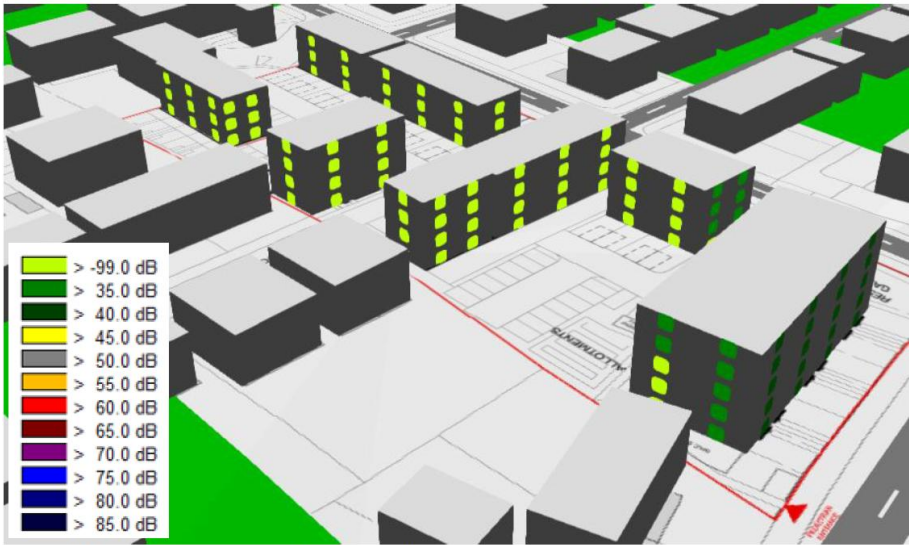
Position	Free-Field Maximum Noise Level (dB) 10 th Highest L _{Amax,2min} (23:00-07:00)
MP1	70
MP2	N/A
MP3	N/A

6.0 Incident Noise Levels

Based on the results of the noise survey, Hann Tucker have produced a noise map of the proposed development to examine incident L_{Aeq} noise levels, daytime and night-time. Screenshots from their model, as taken from their report, are presented below.



Incident Noise Levels – Daytime looking south



Incident Noise Levels – Night-time looking south



Incident Noise Levels –Daytime looking north.



Incident Noise Levels – Night-time looking north

Incident L_{Amax} noise levels are not analysed in the model. However, these can be calculated from the night-time L_{Amax} survey result at Position MP1. L_{Amax} noise levels can be attributed to road traffic (vehicle passbys on the Laindon Road). This has been verified by a review of L_{eq} and L_{max} spectral shapes, which are comparable. Given the similarities in measurement results at MP2 (on Daisy Bank Road) and MP3 (on Laindon Road), it can be assumed that the L_{Amax} noise levels measured on Laindon Road would be equivalent on Daisy Bank Road.

Based on Google Maps, the lamppost to which the MP1 microphone was attached was 3.5 metres from the roadside edge of Laindon Road. Based on the proposed site plan, the nearest residential façades (front elevations of Blocks 2, 3 and 4) will be 8.0 metres from the roadside edge of Laindon Road. As the maximum noise levels are caused by a vehicle passbys (most likely engine noise) measured at a specific moment in time, a point source distance correction can be applied to determine the equivalent L_{Amax} noise level incident onto the façade, as below.

Distance correction: $20 \times \log_{10}(r_2/r_1) = 20 \times \log_{10}(8.0/3.5) = 7 \text{ dB}$

Façade incident $L_{Amax} = L_{Amax,MP2} - \text{distance correction} = 70 - 7 = \mathbf{63 \text{ dB}}$

The worst-case, highest, incident L_{Amax} noise level on any dwelling within the development can therefore be taken as 63 dB L_{Amax} .

7.0 Achieving Internal Noise Levels

7.1 Criteria

In accordance with the planning requirements and assessment guides reviewed in Section 4.0, we would propose the following internal noise levels to be achieved (where feasible) within new dwellings during normal ventilation conditions.

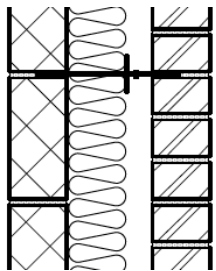
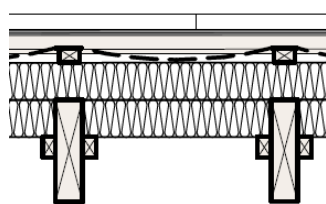
Room	Desirable Internal Noise Level	
	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Dining/Study	40 dB $L_{Aeq,16hr}$	-
Living Room	35 dB $L_{Aeq,16hr}$	-
Bedroom	-	30 dB $L_{Aeq,8hr}$ 45 dB* L_{Amax}

* Noise events (5-min) - not exceeded more than 10-15 times per night

7.2 Building Envelope Acoustic Design

7.2.1 External Walls & Roofs

The façades will comprise cavity brick/block external walls with punched-in triple glazed windows and pitched tiled cavity roofs. The constructions shall be as follows.

Element	Sketch	Description
External Wall		102.5 mm traditional brick, 150 mm (min.) cavity with 100 mm (min.) mineral wool insulation (30-60 kg/m³), 100 mm medium density block (min. 1,350 kg/m³).
Roof		4-6 mm slate roof tiles, - Breathable membrane or roof felt, - Insulated cavity containing 200 mm (min.) mineral wool insulation (30-60 kg/m³), 1 x 12.5 mm plasterboard ceiling.

The following sound reduction performance of these elements has been determined based on published data for similar constructions (from Building Bulletin 51) and using Insul sound reduction prediction software, with realistic flanking limits applied.

Element	Sound Reduction, <i>R</i> (dB) at Octave Band Centre Frequency (Hz)								Weighted Single Figure, <i>R_w</i> (dB)
	63	125	250	500	1k	2k	4k	8k	
External Wall	30	35	40	45	55	55	55	55	51
Roof	18	24	34	40	45	49	53	55	43

7.2.2 Framed External Windows/Door Systems

Preliminary sound insulation calculations have been carried out in order to specify the minimum sound insulation performance of the windows. Our calculations follow BS 8233 procedures and consider the proposed room dimensions and window/door sizes taken from the design drawings by Ollier Smurthwaite Architects.

Our calculations confirm that provisions should be made for the following performance specification to be achieved by the complete for the complete framed window/door systems to habitable rooms. Example glass configurations are provided for guidance only.

Façade Zone	Min. Required Sound Reduction Performance $R_w + C_{tr}$ (dB)	Example Configuration
ALL	26	4 / 12 / 4 / 12/ 4 mm (conventional triple glazing)

7.2.3 Background Ventilation (Part F)

Background ventilation (to Part F rates) will be provided to each dwelling by trickle ventilators, typically installed in the head of window frames, with air drawn through via constant mechanical extract ventilation fans (MEV) in bathrooms.

The trickle ventilators will need to be suitably acoustically-rated to maintain the acoustic integrity of the complete façade. Prospective suppliers will need to demonstrate their products can achieve the following minimum element sound level difference specification.

Façade Zone	Min. Required Element Sound Level Difference Performance (vent open), $D_{n,e,w} + C_{tr}$ (dB)	Example Configuration
ALL	32	Standard hit-miss trickle ventilator 2500EA e.g. Titon TA5220 (SF Xtra) + TA5005

The above assumes a single vent per room. If more than one vent is proposed, the above specification would increase by +3 dB for 2 vents, +5dB for 3 vents, +6dB for 4 vents.

Note: Noise generated by the operation of the MEV system shall be designed so as not to exceed NR 25 in the bedrooms at night (23:00-07:00) and NR 30 in bedrooms/living rooms during the day (07:00-23:00).

7.3 Evidence of Compliance

Calculation sheets to demonstrate compliance with internal noise levels are presented in Appendix C. These sheets present calculations in accordance with BS 8233 methods into worst-case bedrooms and living rooms in Block 2, 3 and 4 overlooking Laindon Road.

8.0 Overheating & Noise

8.1 Overview

Often, the overheating strategy for residential buildings places some reliance on openable windows in the summer months. For sites where incident noise levels are high, noise should be taken into account when considering whether openable windows are appropriate for providing this extra purge ventilation to control overheating.

In accordance with the Acoustics, Ventilation and Overheating Guide (AVO), the associated risk of noise levels been deemed unacceptably high with windows open would be when incident external noise levels exceed 65 dB $L_{Aeq,16hr}$ (day), 55 dB $L_{Aeq,8hr}$ (night) and 78 dB L_{Amax} (night). Where incident noise levels fall do not exceed **55 dB $L_{Aeq,16hr}$ (day), 49 dB $L_{Aeq,8hr}$ (night) and ~65 dB L_{Amax} (night)**, the development would be deemed to fall within AVO's 'Low Risk' category and, in accordance with the AVO, no detailed assessment should be required and opening windows is "likely to be suitable".

Building Regulations' Part O advises that the overheating strategy should assume windows will be closed throughout the night where incident façade noise levels exceed **49 dB $L_{Aeq,8hr}$ and 64 dB L_{Amax}** . These external noise limits are based on a 9 dB outside-to-inside level difference for window openings in low-to-medium risk locations.

8.2 Acoustics, Ventilation & Overheating (AVO) Assessment

The following table presents a comparison of incident noise levels onto the worst-case dwellings overlooking Laindon Road against the AVO threshold limits for 'low risk' below which opening windows is "likely to be suitable".

Period, Index	Worst-case Incident Noise Level, dB	AVO 'Low Risk' Threshold, dB	Compliance
Daytime, $L_{Aeq,16hr}$	54	55	✓
Night-time, $L_{Aeq,8hr}$	44	49	✓
Night-time, L_{Amax}	63	65	✓

The above demonstrates that all dwellings on the scheme can be categorised as 'low risk' in accordance with AVO, and opening windows is likely to be a suitable overheating control solution.

8.3 Building Regulations Part O Assessment

The following table presents a comparison of incident noise levels onto the worst-case dwellings overlooking Laindon Road against the Part O threshold limits below which the overheating strategy can assume windows can be open during the night.

Period, Index	Worst-case Incident Noise Level, dB	AVO 'Low Risk' Threshold, dB	Compliance
Night-time, $L_{Aeq,8hr}$	44	49	✓
Night-time, L_{Amax}	63	64	✓

The above demonstrates that noise levels within all dwellings on the scheme would fall below Part O limits, meaning the overheating strategy can assume windows can be open during the night.

9.0 Outdoor Living Spaces

For outdoor living spaces, BS 8233 states:

“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable and a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.”

On this scheme, rear gardens to houses are almost all designed to be in the centre or eastern side of the site, and all therefore benefit from considerable screening and distance loss from Laindon Road and Daisy Bank Road. The exception being the rear garden to the end dwelling in Block 5, which is in close proximity to Laindon Road. The incident daytime noise level onto the west boundary of the garden will be 55 dB L_{Aeq} . However, this garden will benefit from partial screening of the road by the house itself, and the neighbouring Block 2 houses. The reduced ‘angle of view’ of the road will reduce noise levels within the garden by at least 3 dB.

Noise levels within all gardens are therefore expected to be less than 52 dB $L_{Aeq,16hr}$, which aligns with BS 8233. Most gardens should achieve the desirable BS 8233 target of 50 dB $L_{Aeq,16hr}$.

No additional noise mitigation should be required to control noise levels within gardens.

10.0 Conclusions

Planning permission has been granted for a new-built residential development on Laindon Road in Victoria Park, Manchester (ref. 135848/FO/2022), subject to conditions. Condition 11 relates to a scheme for acoustically insulating the proposed residential accommodation from external noise sources.

Jameson Acoustics Limited has been commissioned to review noise survey data obtained by others for the planning application and subsequently propose a noise insulation scheme for the development.

The assessment finds that acceptable internal noise levels within habitable rooms can be achieved through the appropriate specification of façade elements and ventilation solutions. The specifications correspond to conventional triple glazing and standard hit-and-miss trickle ventilators for all dwellings.

An assessment of noise implications on the overheating strategy has been carried out in accordance with Building Regulations Part O and AVO. The assessment finds that reliance on openable windows should be an acceptable means of controlling overheating for all dwellings, day and night.

Noise levels within outdoor living spaces (gardens) have been reviewed. For all gardens, noise levels are expected to comply with BS 8233 guidelines without the need for any additional acoustic fence treatment.

Appendix A – Acoustic Terminology

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.
dB(A)	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 (e.g. $L_{Aeq,T}$ in dB). Noise 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 only just perceptible.
$L_{Aeq,T}$	$L_{Aeq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time measurement period, T .
$L_{10,T}$	L_{10} is the noise level exceeded for 10% of the measurement period T (i.e. the quietest 10% of the measurement) and has, for many years, been used in the assessment of road traffic noise.
$L_{90,T}$	L_{90} is the noise level exceeded for 90% of the measurement period T (i.e. the quietest 10% of the measurement) and is often used to describe the 'background' noise level.
L_{max}	L_{max} is the maximum sound pressure level recorded over the measurement period, T . L_{max} is often used in assessing scheduled environmental noise 'events' (such as train passbys), particularly at night where such events may cause sleep disturbance.
R_w	The weighted sound reduction index, R_w , is a single figure description of sound reduction as defined in BS EN ISO 717-1. It is single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The R_w is calculated from sound insulation measurements taken in an acoustic laboratory. Sound insulation ratings derived from site measurements are invariably lower than the laboratory figures and are referred to as the apparent weighted sound reduction index, R'_w .
$D_{n,e,w}$	The weighted element-normalised level difference, $D_{n,e,w}$, is a single figure description of the sound insulation performance of small building elements, such as a trickle ventilator.
C_{tr}	C_{tr} is correction term applied against the sound insulation single-number values (e.g. R_w) to provide a weighting against low frequency performance. The reference values used within the C_{tr} calculation are based on urban traffic noise.

Appendix B – Planning Policy & Assessment Guides

Planning Policy

- **Noise Policy Statement for England (NPSE)**

The Noise Policy Statement for England (NPSE) launched in March 2010 states the long-term vision of Government noise policy 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*”.

The long-term vision is supported by the following aims; 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;
- Where possible, contribute to the improvement of health and quality of life.

The intention is that the NPSE should apply to all types of noise apart from noise in the workplace (occupational noise).

The NPSE introduces a three-tier concept for the assessment of noise impacts onto a receptor:

- **NOEL – No Observed Effect Level:** 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:** The level above which adverse effects on health and quality of life can be detected.
- **SOAEL – Significant Observed Adverse Effect Level:** The level above which significant adverse effects on health and quality of life occur.

There are no numeric thresholds relating to each of the above. The NPSE acknowledges that the severity of noise impacts vary depending upon the type of noise, the type of receptor, the duration (on-time) of the noise, the characteristics of the noise, the time of day, the day of the week, etc.. As a result, the definition of what constitutes an SOAEL is somewhat flexible.

- **National Planning Policy Framework (NPPF)**

The National Planning Policy Framework (NPPF) was first published in 2012 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.”*

The express inclusion of noise in the NPPF means that it is a material planning consideration for local planning decisions.

Paragraph 123 of the NPPF document states that planning policies and decisions should aim to:

“A. Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;

B. Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;

C. Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and

D. Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”

NPPF advises that decisions relating to planning applications 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.”

To achieve this, new developments 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 should also “identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”

The NPPF recognises 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.”

- **Planning Practice Guidance on Noise (PPG)**

The National Planning Practice Guidance (PPG) is a web-based resource, launched by the Department for Communities and Local Government (DCLG) in March 2014 to support the NPPF and make it more accessible. It advises on how planning can manage potential noise impacts in new development. The guidance is regularly reviewed and updated and noise is listed as a specific category. The guidance is for ad hoc developments, as major infrastructure is covered by overarching National Policy Statements.

PPG provides the following tabulated summary of the effects of noise exposure (in terms of health and quality of life) associated with noise generating and sensitive developments.

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

Assessment Guides

- ProPG: Planning & Noise**

ProPG: Planning & Noise 'Professional Practice Guidance on Planning & Noise' was issued in May 2017 with the primary goal of assisting the delivery of sustainable residential development by promoting good health and well-being through the effective management of noise. It seeks to do that through encouraging a good acoustic design process in and around proposed new residential development having regard to national policy on planning and noise.

It is applicable to noise from existing transport sources (noting that good professional practice should have regard to any reasonably foreseeable changes in existing and/or new sources of noise). The recommended approach is also considered suitable where some industrial or commercial noise contributes to the acoustic environment provided that is “not dominant”.

ProPG advocates a systematic, proportionate, risk based, 2-stage, approach. The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging.

The two sequential stages of the overall approach are:

Stage 1 – an initial noise risk assessment of the proposed development site; and

Stage 2 – a systematic consideration of four key elements.

- Element 1 – demonstrating a “Good Acoustic Design Process”;
- Element 2 – observing internal “Noise Level Guidelines”;
- Element 3 – undertaking an “External Amenity Area Noise Assessment”; and
- Element 4 – consideration of “Other Relevant Issues”.

The ProPG considers suitable guidance on internal noise levels found in BS 8233 (see below) with the addition of an $L_{Amax,f}$ requirement for bedrooms at night, as below.

“Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.”

- **BS 8233: 2014**

British Standard 8233: 2014 ‘Sound insulation and noise reduction for buildings’ presents the following desirable internal ambient noise levels for dwellings based on steady external noise sources (e.g. road traffic).

Activity	Location	Desirable Internal Ambient Noise Level	
		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 $L_{Aeq,8hour}$

BS 8233 states that where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

For outdoor living spaces, BS 8233 states:

“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable and a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

- **World Health Organisation (WHO)**

The current WHO Environmental Noise Guidelines 2018 for the European Region supersede the 1999 Guidelines for Community Noise, although it does suggest that the 1999 values for indoor noise levels remain valid, as presented below.

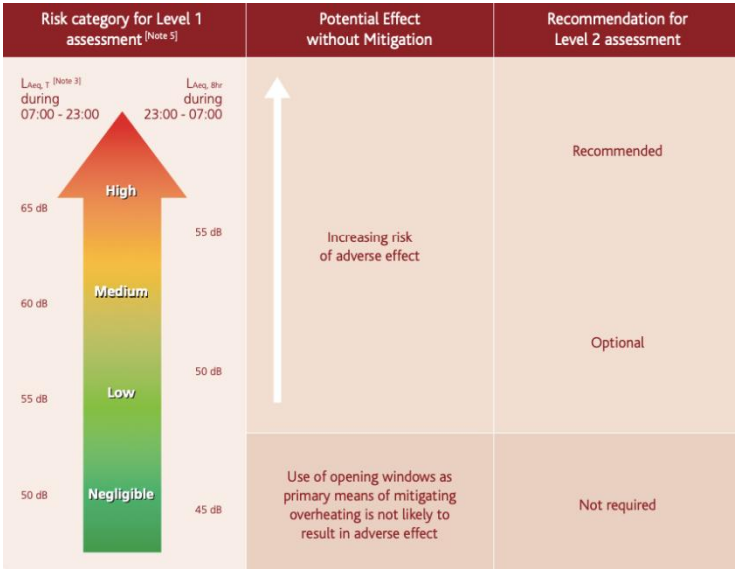
Noise Source	CNG guideline indoors all sources	ENG guideline outdoors noise from specific source only
Road traffic	35 dB $L_{Aeq, 16h}$	53 dB L_{den}
	30 dB $L_{Aeq, 8h}$	45 dB L_{night}
Railway	35 dB $L_{Aeq, 16h}$	54 dB L_{den}
	30 dB $L_{Aeq, 8h}$	44 dB L_{night}
Aircraft	35 dB $L_{Aeq, 16h}$	45 dB L_{den}
	30 dB $L_{Aeq, 8h}$	40 dB L_{night}

With regard to night-time noise “events”, WHO states *“In many situations, average noise levels like the L_{den} or L_{night} indicators may not be the best to explain a particular noise effect. Single-event noise indicators – such as the maximum sound pressure level (L_{Amax}) and its frequency distribution – are warranted in specific situations, such as in the context of night-time railway or aircraft noise events that can clearly elicit awakenings and other physiological reactions that are mostly determined by $L_{A,max}$. Nevertheless, the assessment of the relationship between different types of single-event noise indicators and long-term health outcomes at the population level remains tentative. The guidelines therefore make no recommendations for single-event noise indicators.”*

- Acoustics, Ventilation & Overheating Residential Design Guide

The Acoustics, Ventilation and Overheating Residential Design Guide (Version 1.1) was issued in January 2020 by the Association of Noise Consultants (ANC) and the Institute of Acoustics (IOA). This document provides guidance on the interdependence between acoustics, ventilation and overheating.

The AVO guide recommends a two-level approach to assess the potential impact of noise ingress through windows that have been opened to mitigate overheating and also noise from any mechanical services used to provide comfort cooling. The level 1 assessment relates to incident environmental noise levels across a proposed site, it is used to define “risk categories” for each building façade based on these levels. These categories are set out below:



At planning stage the level of information required to undertake a level 2 assessment in-line with the AVO guide is often not available and a level 1 assessment, which establishes the risk categories of each proposed façade, would be most suitable.

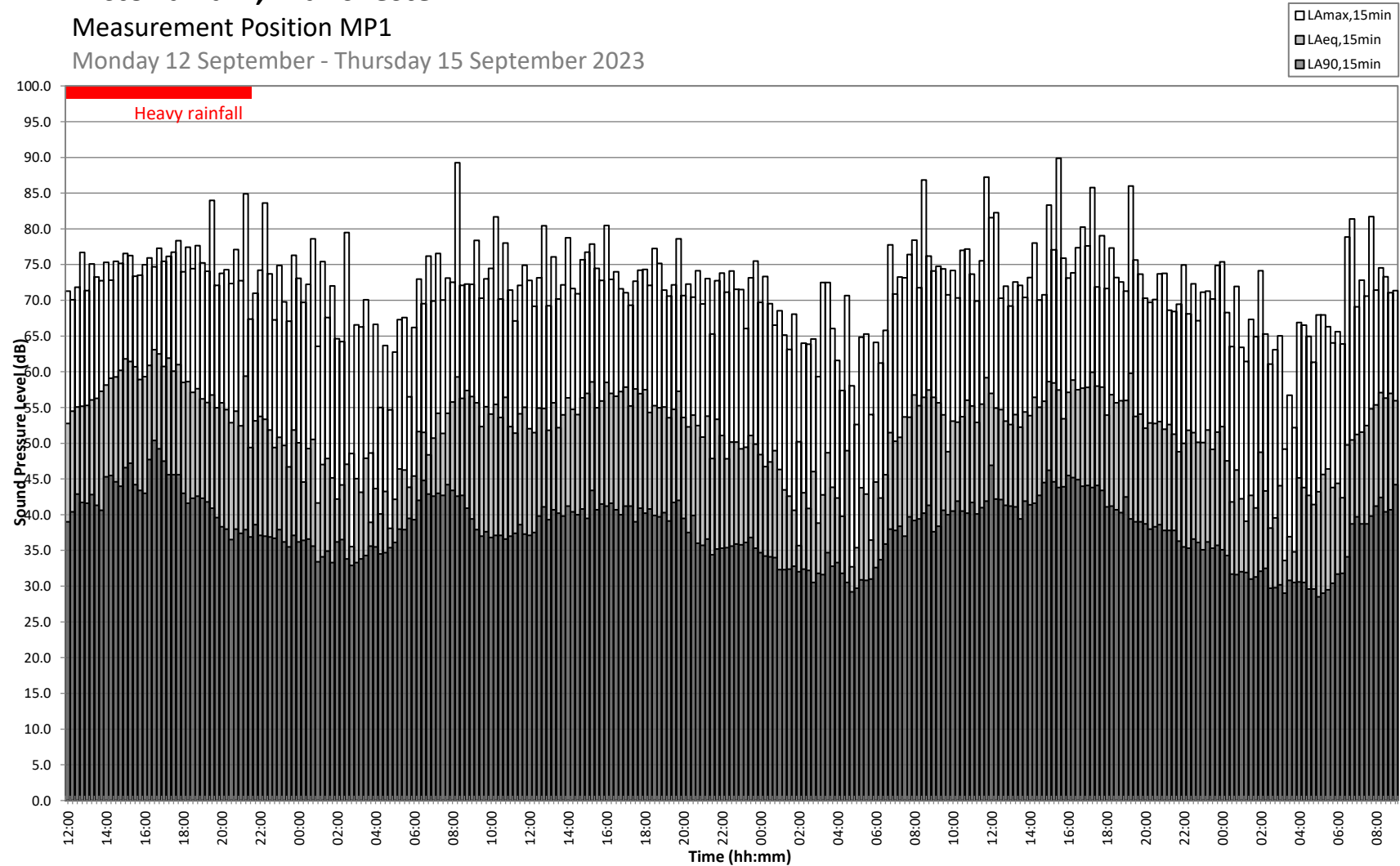
Appendix C – Noise Survey Time History Graph

Victoria Park, Manchester

Measurement Position MP1

Monday 12 September - Thursday 15 September 2023

22092-G1



Bedroom – Night-time L_{Amax}

External Building Fabric Calculation

$$Lp(int) = Lp(ext) + 10 \times \log_{10} \left(\frac{A_0}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_W}{S} 10^{\frac{-R_W}{10}} + \frac{S_g}{S} 10^{\frac{-R_g}{10}} + \frac{S_r}{S} 10^{\frac{-R_r}{10}} \right) + 10 \times \log_{10} \left(\frac{S}{A} \right) + 3$$

[illegible]