8-10 Outram House
Great Ancoats Street
Manchester

Acoustic Planning Report
1239/APR1

24 May 2024

For:

Domicile Construction Ltd
Office 8, 2nd Floor
Unique Enterprise Centre
Belfield Road
Rochdale
OL16 2UP

LIGHTHOUSE ACOUSTICS

2nd Floor 3 Hardman Square
Spinningfields Manchester M3 3EB

☏ 0161 457 0515 ▪ 07415 151 901
✉ Enquiry@LighthouseAcoustics.co.uk
🌍 www.LighthouseAcoustics.co.uk

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Registered Office: 2nd Floor 3 Hardman Square Spinningfields Manchester M3 3EB
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1.0 Introduction

Lighthouse Acoustics has been appointed by Domicile Construction Ltd to undertake an environmental sound survey at 8-10 Outram House, Great Ancoats Street, Manchester and to undertake a detailed sound assessment for the proposed development.

The proposed development comprises the change of use of the existing office space to form 3No. residential flats at ground and 1st floors.

The survey methodology, results and assessment for the proposed development are presented in this report.

2.0 Objectives

To establish the Local Authority's acoustic requirements for the proposed development.

To visit site to undertake a detailed environmental sound survey in order to establish existing environmental sound levels at the proposed development.

To undertake a detailed environmental sound assessment of the proposed residential development to establish the acoustic specification for glazing/ventilation elements in order to achieve the acoustic requirements of the Local Authority.

To propose atmospheric plant sound emission limits at the nearest noise sensitive receptors for subsequent use in designing building services proposals in order to comply with the requirements of the Local Authority.

3.0 Site Description

The proposed residential development is at 8-10 Outram House, Great Ancoats Street, Manchester. The site comprises the ground and 1st floors of an existing 4 storey development.

The site is bound by Great Ancoats Street to the north east, Ashton Canal to the south east and adjoining buildings to the south west and north west.

The site plan below indicates the extent of the site and the surrounding environment.

Site plan indicating the extent of the site and the surrounding environment

4.0 Local Authority Requirements

4.1 Residential Developments

With regard to residential developments, Section 3.7.1.1 of the Planning & Noise Technical Guidance document (dated October 2022) produced by Manchester City Council states the following:

"The Council has adopted the following internal noise limits for residential properties:

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

4.2 Building Services

With regard to noise and vibration from fixed plant/equipment, Section 3.7.1.5 of the Planning & Noise Technical Guidance document (dated October 2022) produced by Manchester City Council states the following:

"The noise assessment should be based on BS 4142: 2014 and any application for fixed plant, equipment or machinery must demonstrate that:

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

5.0 Environmental Sound Survey

5.1 Measurements

Automated environmental sound measurements were undertaken from 11:00 hours on Monday 20 May 2024 to 11:00 hours on Tuesday 21 May 2024. During this period the L_{Amax}, L_{Aeq} and L_{A90} sound pressure levels were measured continuously over 15 minute periods along with the corresponding octave band sound pressure levels.

5.2 Weather Conditions

At the start of the survey period there was a light easterly breeze (<3m/s) and the sky was overcast. There was no rainfall and road surfaces were dry. The temperature was approximately 15°C.

At the end of the survey period there was a light easterly breeze (<3m/s) and the sky was scattered cloud. There was no rainfall and road surfaces were dry. The temperature was approximately 15°C.

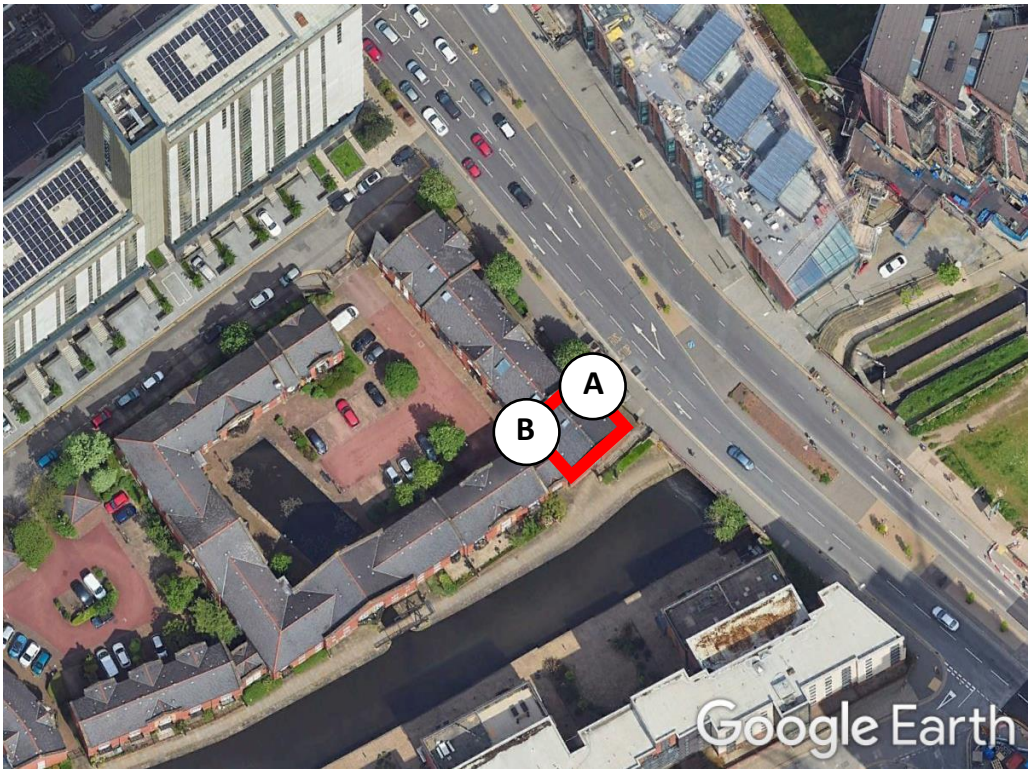
Based on publicly available weather data for the survey period we understand that weather conditions remained similar for the duration of the survey with no significant periods of rainfall or strong breezes. The weather conditions during the survey period are therefore considered to be suitable for undertaking measurements of sound levels.

5.3 Measurement Positions

Environmental sound levels were measured at 2No. positions on-site as described in the table below.

Position	Description
A	Microphone situated at 1st floor level of the north east façade of the existing building overlooking Great Ancoats Street.
B	Microphone situated at 1st floor level of the south west façade of the existing building overlooking the rear courtyard.

The measurement positions are shown on the site plan below.



Site plan showing measurement positions

The measurement positions were selected in order to assess typical environmental sound levels incident upon the front and rear facades of the proposed residential development.

5.4 Equipment

The following equipment was used to undertake the environmental sound survey.

Equipment	Manufacturer	Model	Serial No.	Calibration Date
Class 1 Sound Level Meter	Casella	633C	0721320	07/11/2023
Preamplifier	Casella	495	001414	07/11/2023
Microphone	Casella	251	1025	07/11/2023
Class 1 Sound Level Meter	Casella	633C	0721319	07/11/2023
Preamplifier	Casella	495	001446	07/11/2023
Microphone	Casella	251	1996	07/11/2023
Class 1 Sound Calibrator	Casella	120/1	3864878	01/11/2023
Environmental Noise Kit	Casella	6847	-	-
Microphone Extension Cable	Casella	C6717/5	-	-
Weather Protection System	Casella	6737	-	-

Field calibration checks were performed on the sound level meters prior to and on completion of the survey and were found to be within acceptable tolerance limits.

5.5 Results

5.5.1 Time History Graphs

The results of the environmental sound survey are presented on Time History Graphs 1239/THG1 and 1239/THG2 enclosed at the rear of the report.

5.5.2 $L_{Aeq,T}$ Ambient Sound Levels

In order to compare the results of the environmental sound survey with the internal BS 8233: 2014 levels it is necessary to convert the $L_{Aeq,15min}$ sound levels into single figure daytime $L_{Aeq,16hour}$ and night-time $L_{Aeq,8hour}$ sound levels. This has been calculated using the following formula:

$$L_{Aeq,T} = 10\,log_{10}\left(\frac{1}{N}\sum_{i}^{N} 10^{L_{Aeq,15min}{}^{i}/10}\right)$$

The calculated daytime $L_{Aeq,16hour}$ and night-time $L_{Aeq,8hour}$ sound levels at each measurement position are presented in the table below.

Position	Daytime $L_{Aeq,16hour}$ (dB)	Night-time $L_{Aeq,8hour}$ (dB)
A	69	68
B	55	52

The highest daytime $L_{Aeq,16hour}$ and night-time $L_{Aeq,8hour}$ sound levels at each measurement position are presented in the table below along with the corresponding octave band sound pressure levels.

Position	Period	L_{eq} Sound Pressure Level (dB) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
A	Daytime (16 hour)	74	67	65	63	64	64	56	48	69
	Night-time (8 hour)	69	62	61	61	63	64	53	41	68
B	Daytime (16 hour)	60	56	54	51	50	48	39	28	55
	Night-time (8 hour)	55	50	49	46	48	47	35	26	52

5.5.3 $L_{Amax,F}$ Sound Level Events

The highest 10No. individual $L_{Amax,F}$ sound level events measured during the night-time period (23:00 to 07:00 hours) over the survey period at each measurement position are detailed in the table below along with the corresponding octave band sound pressure levels.

Position	$L_{max,F}$ Sound Pressure Level (dB) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
A	99	87	79	75	99	104	85	67	105
	93	83	78	79	97	102	88	81	103
	93	82	81	79	95	97	97	81	100
	92	83	78	78	100	99	89	67	100
	91	85	80	79	93	96	88	74	97
	92	83	78	80	89	86	75	64	90
	90	86	80	83	85	83	79	69	89
	90	83	81	78	81	85	78	68	88
	95	85	84	83	81	83	78	64	86
	92	85	85	81	81	83	78	67	86

Position	$L_{max,F}$ Sound Pressure Level (dB) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
B	72	67	62	58	80	83	61	37	85
	78	70	65	60	82	81	64	47	81
	79	75	64	58	80	79	59	39	80
	75	69	64	61	74	75	62	46	76
	76	69	67	59	73	73	65	56	73
	73	65	60	61	67	68	63	55	71
	72	63	58	54	55	70	56	55	69
	71	63	59	56	66	69	58	41	69
	78	75	75	68	64	65	58	46	69
	70	62	61	57	54	68	61	50	68

5.5.4 $L_{A90,T}$ Background Sound Levels

The lowest representative daytime and night-time $L_{A90,15min}$ background sound levels measured at each position during the survey period are detailed in the table below.

Position	Lowest Representative $L_{A90,15min}$ Background Sound Levels (dB)	
	Daytime	Night-time
A	56	47
B	49	43

5.6 Discussion of Sound Climate

At the start and end of the survey period the dominant sound sources at Position A were noted to be frequent road traffic along Great Ancoats Street and the surrounding road network.

At the start and end of the survey period the dominant sound sources at Position B were noted to be road traffic from the surrounding road network.

Whilst we are unable to comment on dominant sound sources or individual sound events during the survey period, based on the surrounding environment it is likely that road traffic remained the dominant sound sources.

6.0 Detailed Sound Assessment

6.1 Assessment Method

In order to establish the acoustic specification for glazing/ventilation elements required to achieve the internal daytime $L_{Aeq,16hour}$, night-time $L_{Aeq,8hour}$ and night-time $L_{Amax,F}$ requirements an assessment has been undertaken in accordance with the more rigorous calculation method detailed in BS 8233:2014, "Guidance on sound insulation and noise reduction for buildings".

This calculation method takes into account the external sound pressure level, the sound reduction indicies of the façade elements, the area of the facade and the absorption within the room at octave band centre frequencies.

Detailed calculation sheets for living rooms, dining rooms and bedrooms are enclosed at the rear of the report.

6.2 Proposed Development

The assessment has been based on the following drawings.

Author	Drawing No.	Revision	Date
JG-D Architecture and Design	(23202)11 Ground	B	Apr 24
	(23202)11 First	A	Apr 24

The proposals include the change of use of the existing office space to form 3No. residential flats at ground and 1st floors.

6.3 Acoustic Requirements

The proposed residential apartments comprise living room/kitchen and bedroom spaces. Based on the requirements of the Local Authority detailed in Section 4.0, the following internal sound limits have been assessed to.

Room Type	07:00 to 23:00	23:00 to 07:00
Living Room/Kitchen	35dB $L_{Aeq,16hour}$	-
Bedroom	35dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$ 45dB L_{Amax}*

* should not be exceeded more than 10 times per night.

6.4 Room Assumptions

The following typical dimensions and finishes/furnishings have been assumed for the purpose of the assessment.

Room Type	Typical Room Dimensions	Typical Window Area	Typical Room Finishes / Furnishings
Living Room/ Kitchen	4m x 4m x 2.4m	$2m^2$	Wood/vinyl floor, curtains, sofa, table. chairs
Bedroom	3m x 4m x 2.4m	$2m^2$	Carpet & underlay, curtains, bed

Should the proposed dimensions/finishes/furnishings differ from those detailed above a re-assessment may be required.

6.5 Construction Proposals

It is understood that the external walls of the dwellings will comprise the following typical constructions.

Element	Typical Construction
External Walls	Brickwork with cavity, insulation and internal plasterboard lining

The following typical Sound Reduction Indicies have been assumed for the various elements.

Element	Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
External Walls	32	40	44	45	51	56	56	56

6.6 Glazing Specifications

In order to achieve the internal daytime and night-time requirements the glazing system as a whole including glass, frame, seals and openings shall provide the following minimum sound insulation performance when tested in accordance with BS EN ISO 10140-2: 2010.

Facade	Room Type	Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Front & Side	Living Room/ Kitchen	23	27	29	36	41	42	52	56
	Bedroom	24	28	32	43	46	48	55	59
Rear	Living Room/ Kitchen	20	24	20	25	34	37	35	39
	Bedroom	20	24	20	25	34	37	35	39

The table below presents typical configurations and R_w sound insulation values which may be expected to achieve the sound insulation performance specified above.

Facade	Room Type	Typical R_w Sound Insulation Value (dB)	Typical Configuration
Front & Side	Living Room/ Kitchen	40	10mm/16mm/6.4mm
	Bedroom	45	10mm/16mm/16.8mm
Rear	Living Room/ Kitchen	30	6mm/16mm/4mm
	Bedroom	30	6mm/16mm/4mm

Acoustic test data for the proposed glazing systems should be forwarded for review.

6.7 Ventilation Provision

6.7.1 Background Ventilation

In order to achieve the internal daytime and night-time requirements openable windows must remain closed. Background ventilation shall therefore be provided by ventilators in the building façade and shall provide the following minimum element normalised level differences in the open position when tested in accordance with BS EN ISO 10140-2: 2010.

Facade	Room Type	Element Normalised Level Difference, $D_{n,e}$ (dB) in Open Position at Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Front & Side	Living Room/ Kitchen	42	48	46	49	54	65	65	65
	Bedroom	42	48	46	49	54	65	65	65
Rear	Living Room/ Kitchen	31	34	39	34	41	31	33	35
	Bedroom	27	33	39	39	43	50	50	50

Should more than one ventilator be required per room the above element normalised level differences shall be increased by the following values:

Number of Ventilators Required Per Room	Additional Performance Required Per Ventilator (dB)
1	0
2	+3
3	+5
4	+6

The table below presents typical configurations and $D_{n,e,w}$ sound insulation values which may be expected to achieve the sound insulation performance specified above.

Facade	Room Type	Typical Open $D_{n,e,w}$ Sound Insulation Value (dB)	Typical Configuration
Front & Side	Living Room/ Kitchen	50	Acoustic Wall Ventilator (e.g. Greenwood MA3051) Or Acoustically Treated Mechanical Ventilation
	Bedroom	50	Acoustic Wall Ventilator (e.g. Greenwood MA3051) Or Acoustically Treated Mechanical Ventilation
Rear	Living Room/ Kitchen	35	Standard Window Ventilators
	Bedroom	40	Acoustic Window Ventilators (e.g. Greenwood EAR42W

Should acoustically treated mechanical ventilation be considered to provide continuous background ventilation, the system should achieve noise levels of L_{Aeq} ≤30dB in living rooms and bedrooms and L_{Aeq} ≤35dB in kitchens and bathrooms where providing continuous background ventilation.

A ventilation engineer should be consulted to ensure that a suitable system is proposed that satisfies the requirements of Approved Document F, "Ventilation". Acoustic test data for the proposed ventilators (or other means) should be forwarded for review acoustically.

6.7.2 Summer Cooling Ventilation

In addition to background ventilation summer cooling ventilation is required in order to minimize the need for occupants to open windows during hot summer days/nights.

In order to provide this, mechanical ventilation featuring a user controllable 'boost' function which delivers increased air flow at the occupants discretion (or other means) should be considered.

Where providing continuous background ventilation also, the system should achieve noise levels of L_{Aeq} ≤30dB in living rooms and bedrooms and L_{Aeq} ≤35dB in dining rooms, kitchens and bathrooms.

A ventilation engineer should be consulted to ensure that a suitable system is proposed that satisfies the requirements of Approved Document O, "Overheating". Detailed proposals should be forwarded for review acoustically.

6.7.3 Purge Ventilation

Purge ventilation (to aid removal of high concentrations of pollutants and water vapour released from occasional activities such as painting and decorating or accidental releases such as smoke from burnt food or spillage of water) may be provided via openable windows at the occupants discretion. As such, the internal daytime and night-time requirements may potentially be exceeded during purge ventilation conditions.

A ventilation engineer should be consulted to ensure that a suitable system is proposed that satisfies the requirements of Approved Document F, "Ventilation". Detailed proposals should be forwarded for review acoustically.

7.0 Building Services Sound Limits

Plant selections for the proposed residential flats have not been made at this stage of the development. As such, it is not possible to assess atmospheric building services sound to the nearest noise sensitive receptors.

Based on the requirements of Manchester City Council detailed in Section 4.2 and the lowest representative L_{A90} sound levels measured during the environmental sound survey detailed in Section 5.5.4, it is proposed that cumulative atmospheric plant sound emissions should be designed to achieve the following limits at the nearest noise sensitive receptors.

Nearest Noise Sensitive Receptor	L_{Aeq} Cumulative Atmospheric Plant Sound Emission Limits at Nearest Noise Sensitive Receptor (dB)	
	Daytime (07:00–23:00)	Night-time (23:00–07:00)
To the west of the site	51	42
To the east of the site	44	38

Plant sound emissions should be assessed in accordance with BS 4142:2014.

Plant sound limits for individual plant items will be dependent on the total number of plant items, the location of plant items in relation to nearest noise sensitive receptors and the proposed operational hours.

Once detailed design proposals are developed an assessment of atmospheric plant sound emissions from the proposed plant items to the nearest noise sensitive receptors should be undertaken. This will determine whether any attenuation measures are required in order to achieve the proposed limits.

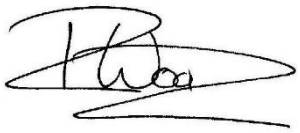
8.0 Conclusions

The Local Authority's acoustic requirements for the proposed development have been established.

A detailed environmental sound survey has been undertaken in order to establish existing environmental sound levels at the proposed development.

A detailed environmental sound assessment of the proposed residential development has been undertaken and acoustic specifications for glazing/ventilation elements have been provided in order to achieve the requirements of the Local Authority.

Atmospheric plant sound emission limits have been proposed at the nearest noise sensitive receptors for subsequent use in designing building services proposals in order to comply with the requirements of the Local Authority.



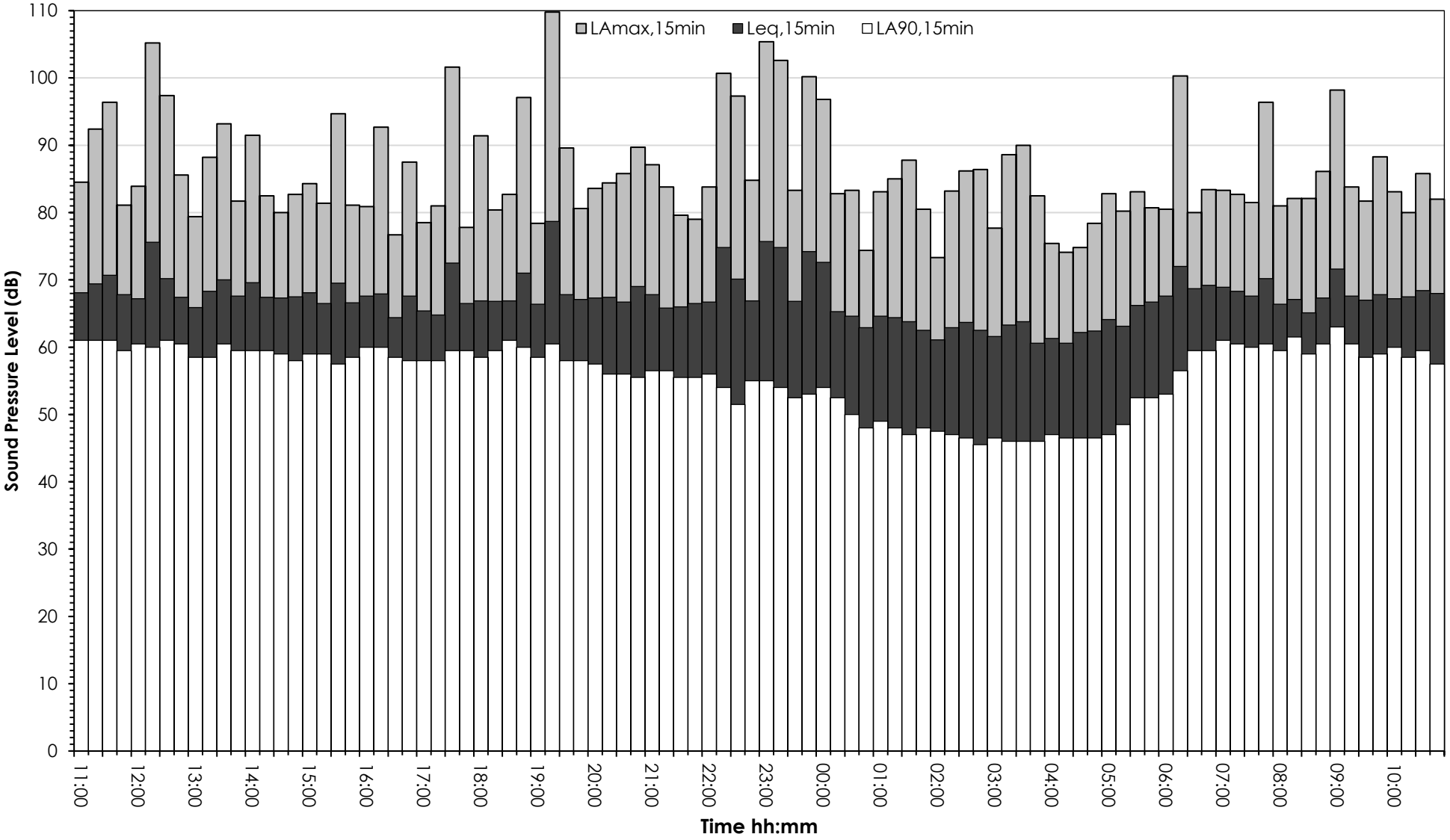
Robin Wood
LIGHTHOUSE ACOUSTICS

1239/THG1

8-10 Outram House, Great Ancoats Street, Manchester

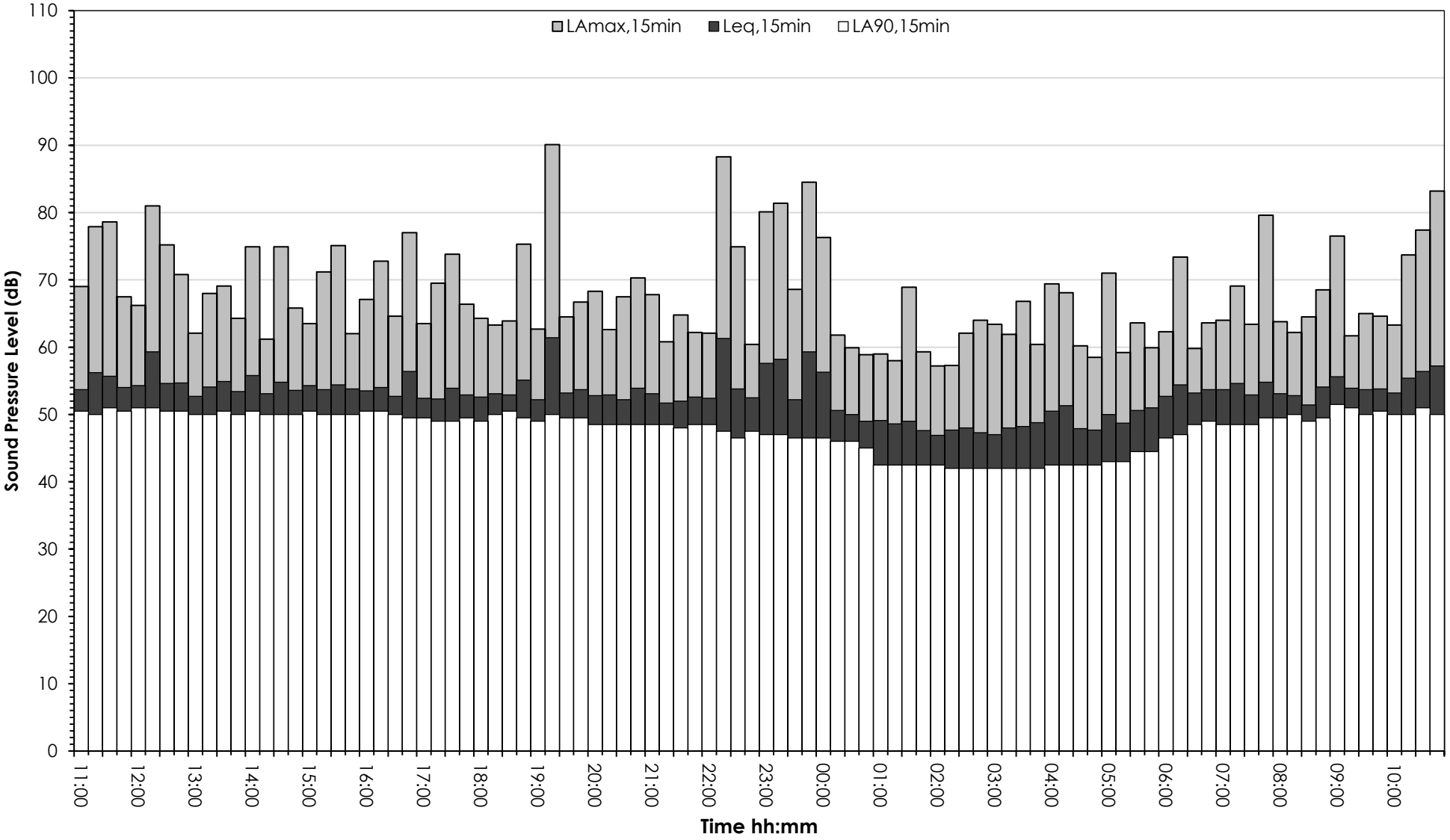
Time History Graph - Monday 20 May 2024 to Tuesday 21 May 2024

$L_{Amax,15min}$, $L_{Aeq,15min}$ & $L_{A90,15min}$ Noise Levels at Position A



1239/THG2

8-10 Outram House, Great Ancoats Street, Manchester

Time History Graph - Monday 20 May 2024 to Tuesday 21 May 2024

$L_{Amax,15min}$, $L_{Aeq,15min}$ & $L_{A90,15min}$ Noise Levels at Position B