

Land Between Old Market Street & Grant Close Manchester

Acoustic Planning Report
0785/APR2

9 January 2025

For:

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1.0 Introduction

Lighthouse Acoustics has been appointed by Zahid Khalid to undertake an environmental sound survey at land between Old Market Street and Grant Close, Manchester and to undertake a detailed sound assessment for the proposed residential development.

The survey methodology, results and assessments are presented in this report.

2.0 Objectives

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

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

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

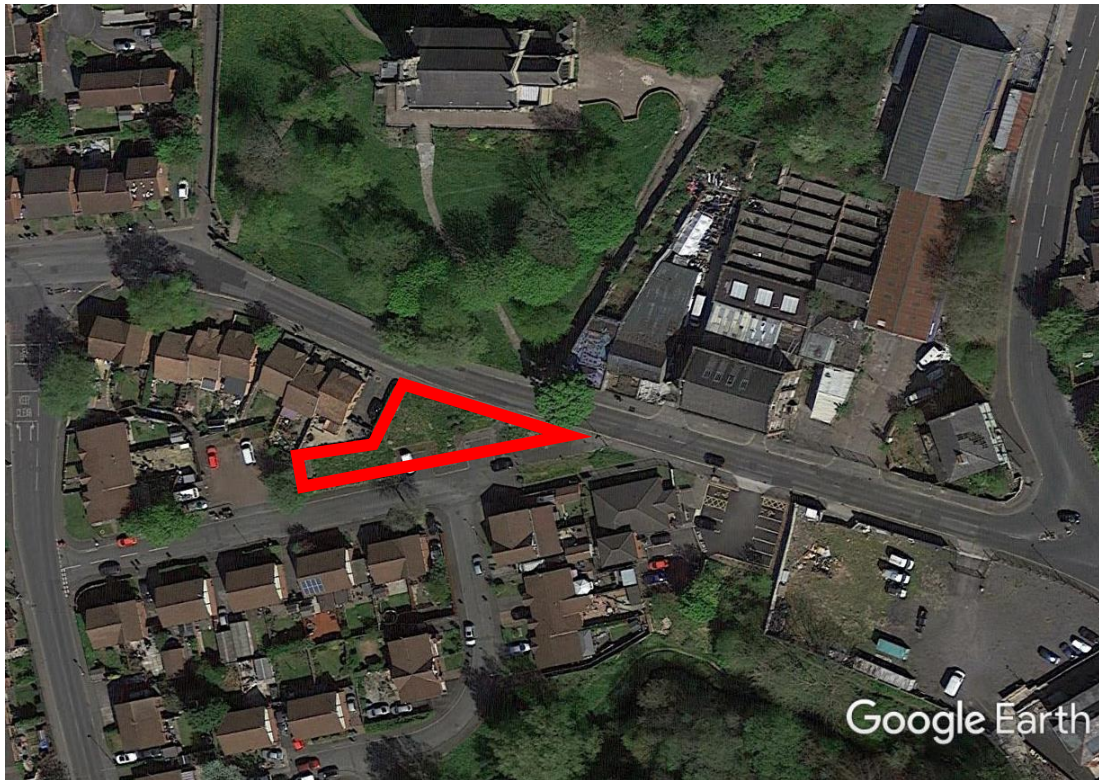
To propose representative background sound levels at the nearest noise sensitive receptors for subsequent use in assessing operational sound from the proposed building services in order to comply with the acoustic requirements of the Local Authority.

3.0 Site Description

The proposed development is situated at land between Old Market Street and Grant Close, Manchester.

The site currently comprises vacant land situated to the east of No.31 Old Market Street. The site is bound by Old Market Street to the north east, Grant close to the south and an existing residential property to the 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

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 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} "**

5.0 Environmental Sound Survey

5.1 Measurements

Automated environmental sound measurements were undertaken from 17:00 hours on Tuesday 7 January 2025 to 17:00 hours on Wednesday 8 January 2025. 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 southerly breeze (<3m/s) and the sky was overcast. There was no rainfall and road surfaces were dry. The temperature was approximately 2°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 1°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 Position

Environmental sound levels were measured at a single position on-site as described in the table below.

Position	Description
A	Microphone situated toward the north eastern site boundary at 1.5m above ground level overlooking Old Market Street in free field conditions.

The measurement position is shown on the site plan below.



Site plan showing measurement position

The measurement position was selected in order to assess typical environmental sound levels incident upon the proposed facades of the 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	5262813	25/07/2023
Preamplifier	Casella	495	003391	25/07/2023
Microphone	Casella	251	1031	25/07/2023
Class 1 Sound Calibrator	Casella	120/1	3864878	31/10/2024
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 meter 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 Graph

The results of the environmental sound survey are presented on Time History Graph 0785/THG1 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	68	60

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

Position	Period	Leq Sound Pressure Level (dB) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
A	Daytime (16 hour)	69	62	61	61	65	62	51	43	68
	Night-time (8 hour)	61	56	55	54	58	52	41	33	60

5.5.3 L_{Amax,F} Sound Level Events

The highest 15No. 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	88	80	87	81	79	72	61	52	82
	83	78	77	78	78	70	61	55	80
	90	81	83	77	78	73	62	56	79
	78	77	78	78	76	67	63	55	79
	85	84	81	77	74	66	62	55	78
	85	82	75	73	77	71	62	56	78
	88	78	76	74	78	70	63	55	78
	79	73	69	72	75	70	55	44	77
	74	64	67	70	76	70	55	46	77
	77	80	84	74	71	65	55	48	76
	90	80	77	75	75	67	65	59	76
	86	82	78	73	73	68	65	58	76
	80	80	78	75	74	69	61	55	76
	85	82	80	72	73	67	63	57	76
	86	78	76	71	75	68	62	55	75

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	55	39

The above levels will be used in subsequent assessments of any proposed building services sound in order to comply with the acoustic requirements of the Local Authority.

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 road traffic along Old Market Street. During lulls of passing road traffic, road traffic from the surrounding road network contributed towards the measured sound climate.

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 source.

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 indices of the façade elements, the area of the facade and the absorption within the room at octave band centre frequencies.

6.2 Proposed Site Layout

The assessment has been based on the following drawings.

Author	Drawing No.	Revision	Date
P4B Architecture	19003 02/01	-	-
	19003 03/01A	-	-
	19003 03/02	-	-
	19003 05/01	-	-
	19003 05/02	-	-
	19003 05/03	-	-
	19003 05/04	-	-

The proposals include the construction of 1No. detached single storey residential house with front and rear gardens.

6.3 Acoustic Requirements

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

Room Type	07:00 to 23:00	23:00 to 07:00
Living Room	35dB LAeq,16hour	-
Bedroom	35dB LAeq,16hour	30dB LAeq,8hour 45dB LAmax*
Rear Garden	50-55dB LAeq,16hour	-

* 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	4m x 3m x 2.4m	2m ²	Wood/vinyl floor, curtains, sofa
Dining/Kitchen	6m x 5m x 2.4m	5m ²	Wood/vinyl floor, table, chairs
Bedroom	4m x 3m x 2.4m	1m ²	Carpet, 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 and roof of the buildings will comprise the following typical constructions.

Element	Typical Construction
External Walls	Brickwork with cavity, insulation and internal plasterboard lining
Roof	Tiles with insulation in void and plasterboard ceiling

The following typical Sound Reduction Indices 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
Roof	20	28	34	40	45	49	49	49

6.6 Glazing Specifications

In order to achieve the internal daytime and night-time requirements the glazing/external door 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 & Sides	Living Room	23	27	29	36	41	42	52	56
	Bedroom	23	27	29	36	41	42	52	56
Rear	Dining/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 & Sides	Living Room	40	10mm/16mm/6.4mm
	Bedroom	40	10mm/16mm/6.4mm
Rear	Dining/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 & Sides	Living Room	42	48	46	49	54	65	65	65
	Bedroom	42	48	46	49	54	65	65	65
Rear	Dining/Kitchen	27	33	39	39	43	50	50	50
	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 & Sides	Living Room	50	Acoustic Wall Ventilator (e.g. Greenwood MA3051) Or Mechanical Ventilation
	Bedroom	50	
Rear	Dining/Kitchen	40	Acoustic Window Ventilators (e.g. Greenwood EAR42W)
	Bedroom	40	

Should acoustically treated mechanical ventilation be considered To provide continuous background ventilation, the system should achieve noise levels of $L_{Aeq} \leq 30\text{dB}$ in living rooms and bedrooms and $L_{Aeq} \leq 35\text{dB}$ 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 $L_{Aeq} \leq 30\text{dB}$ in living rooms and bedrooms and $L_{Aeq} \leq 35\text{dB}$ 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.

6.8 Screening Provision

A daytime $L_{Aeq,16\text{hour}}$ sound level of 68dB was measured at Position A which exceeds the daytime requirement of $L_{Aeq,16\text{hour}} 55\text{dB}$ in rear gardens.

The proposed house will provide a significant amount screening between road traffic along Old Market Street and the rear garden. As such, daytime $L_{Aeq,16\text{hour}}$ sound levels of $\leq 55\text{dB}$ are expected within the rear garden. The fences to the rear garden do not therefore need to comply with any acoustic specification.

7.0 Mechanical Ventilation

Proposals for the mechanical ventilation systems are not known at this stage of the development. As such, it is not possible to assess atmospheric sound emissions from the proposed mechanical ventilation systems to the nearest noise sensitive receptors.

Once details for the proposed mechanical ventilation systems are known, an assessment of atmospheric sound emissions from the proposed mechanical ventilation systems to the nearest noise sensitive receptors should be undertaken. This will determine whether any attenuation measures are required in order to achieve the acoustic requirements of the Local Authority.

The assessment should be undertaken in accordance with BS 4142:2014 and be assessed against the lowest representative daytime and night-time $L_{A90,15min}$ background sound levels measured at each position during the survey period as detailed in the table below.

Nearest Noise Sensitive Receptor	Lowest Representative $L_{A90,15min}$ Background Sound Levels (dB)	
	Daytime	Night-time
Front	55	39
Rear	45*	29*

* Based on a 10dB reduction to the environmental sound levels measured at the front façade of the building.

8.0 Conclusions

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

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

A detailed sound assessment of the proposed development has been undertaken and glazing/ventilation specifications have been provided in order to achieve the internal daytime and night-time requirements of the Local Authority.

Representative background sound levels have been proposed at the nearest noise sensitive receptors for subsequent use in assessing atmospheric sound emissions from mechanical ventilation systems in order to comply with the acoustic requirements of the Local Authority.



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LIGHTHOUSE ACOUSTICS

0785/THG1

Old Market Street, Manchester
Time History Graph - Tuesday 7 January 2025 to Wednesday 8 January 2025
 $L_{Amax,15min}$, $L_{Aeq,15min}$ & $L_{A90,15min}$ Noise Levels at Position A

