

Former All Souls Rectory Every Street Manchester

Acoustic Planning Report
1132/APR1

12 September 2023

For:

McCaul Property Management Ltd



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1.0 Introduction

Lighthouse Acoustics has been appointed by McCaul Property Management Ltd to undertake an environmental sound survey at the Former All Souls Rectory, Every Street, Manchester and to undertake a detailed sound assessment for the proposed development.

The proposed development comprises the construction of 10No. residential flats.

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 residential 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 for the proposed residential flats to establish the acoustic specification for glazing/ventilation elements required across the proposed residential 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 at the Former All Souls Rectory, Every Street, Manchester. The former building has been demolished and the site is vacant.

The site is bound by Caterham Street to the north east and south east, Tutbury Street to the south west and Every Street to the north west.

Existing residential properties are situated to the south east of the site opposite Caterham Street, to the south west of the site opposite Tutbury Street and to the north west of the site opposite Every Street.

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 17:00 hours on Friday 8 September 2023 to 17:00 hours on Saturday 9 September 2023. 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 the wind conditions were calm (<1m/s) and the sky was clear. There was no rainfall and road surfaces were dry. The temperature was approximately 27°C.

At the end of the survey period there was a light north westerly breeze (<3m/s) and the sky was scattered cloud. There was no rainfall and road surfaces were dry. The temperature was approximately 26°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 fixed above the hoarding at 3.0m above ground level along the north west site boundary overlooking Every Street.

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 front facade of the proposed development. Environmental sound levels incident upon the side/rear facades of the building will be calculated based on those measured at the front of the building with allowances for distance loss from Every Street and screening from the building itself and surrounding buildings.

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	0721319	28/09/2021
Preamplifier	Casella	495	001446	28/09/2021
Microphone	Casella	251	1996	28/09/2021
Class 1 Sound Calibrator	Casella	120/1	3864878	27/10/2022
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 1132/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	70	66

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)	68	64	65	64	68	62	51	53	70
	Night-time (8 hour)	63	59	61	60	64	57	47	37	66

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	82	75	75	77	86	94	85	72	96
	89	94	94	83	87	84	77	67	90
	89	80	81	84	86	77	67	58	87
	88	80	79	83	83	76	69	60	85
	88	80	78	82	83	73	75	61	84
	87	82	83	83	83	74	73	60	84
	87	78	77	77	81	79	74	65	84
	86	82	78	79	83	75	67	57	84
	93	80	79	81	82	76	68	57	84
	82	78	77	80	82	74	76	59	84
	87	83	80	79	82	77	80	61	83
	89	80	79	80	82	73	72	62	83
	82	79	84	80	82	77	63	53	83
	87	78	81	82	82	76	66	58	83
	88	83	79	78	81	74	65	58	82

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	51	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 and passing pedestrians along Every 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.

5.7 Side/Rear Façade Environmental Sound Levels

A reduction of 10dB has been applied to the environmental sound levels measured at the front façade of the building in order to determine likely environmental sound levels incident upon the side/rear facades of the building. This is considered to be a conservative reduction when considering allowances for distance loss from Every Street and screening from the building itself and surrounding buildings.

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.

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
Ollier Smurthwaite Architects	A695-T-101E	E	22/08/23
	A695-T-110H	H	25/07/23
	A695-T-111H	H	25/07/23
	A695-T-112H	H	25/07/23
	A695-T-113G	G	17/07/23
	A695-T-114C	C	20/06/23
	A695-T-310C	C	25/07/23
	A695-T-311B	B	08/03/23
	A695-T-312B	B	08/03/23
	A695-T-313C	C	25/07/23

The proposals include the construction of a 4 storey detached building containing 10No. flats.

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 LAeq,16hour	-
Bedroom	35dB LAeq,16hour	30dB LAeq,8hour 45dB LAmax*

* 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	6m x 4m x 2.4m	8m ²	Wood/vinyl floor, curtains, sofa, table, chairs
Bedroom	4m x 3m x 2.4m	4m 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 and roof that will form the proposed residential flats will comprise the following constructions.

Element	Typical Construction
Masonry Walls	Brickwork with cavity, insulation and internal plasterboard lining
Cladding	Insulated cladding panel with insulation in void and 2No. layers internal plasterboard lining
Roof	Insulated roof with insulation in void and 2No. layers internal plasterboard lining

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
Masonry Walls	32	40	44	45	51	56	56	56
Cladding	18	24	37	48	53	55	63	63
Roof	20	35	50	50	50	50	50	50

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 (Every Street)	Living Room/ Kitchen	24	28	32	43	46	48	55	59
	Bedroom	28	32	41	44	48	50	50	50
Rear/Sides	Living Room/ Kitchen	21	25	22	33	40	43	44	48
	Bedroom	21	25	22	33	40	43	44	48

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 (Every Street)	Living Room/ Kitchen	45	10mm/16mm/16.8mm*
	Bedroom	50	12.8mm/24mm/8.8mm*
Rear/Sides	Living Room/ Kitchen	35	10mm/16mm/4mm
	Bedroom	35	10mm/16mm/4mm

*Secondary glazing is also a potential option if preferred.

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 (Every Street)	Living Room/ Kitchen	N/A Mechanical Ventilation Required							
	Bedroom	N/A Mechanical Ventilation Required							
Rear/Sides	Living Room/ 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 (Every Street)	Living Room/ Kitchen	N/A	Mechanical Ventilation Required
	Bedroom	N/A	Mechanical Ventilation Required
Rear/Sides	Living Room/ Kitchen	40	Acoustic Window Ventilator (e.g. Greenwood EAR42W)
	Bedroom	40	Acoustic Window Ventilator (e.g. Greenwood EAR42W)

Where acoustically treated mechanical ventilation is required 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.

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 (Every Street)	51	39
Rear/Sides	41*	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 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 for the proposed residential flats has been undertaken and acoustic specifications for glazing/ventilation elements have been provided in order to achieve the 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

Former All Souls Rectory, Every Street, Manchester
Time History Graph - Friday 8 September 2023 to Saturday 9 September 2023

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

