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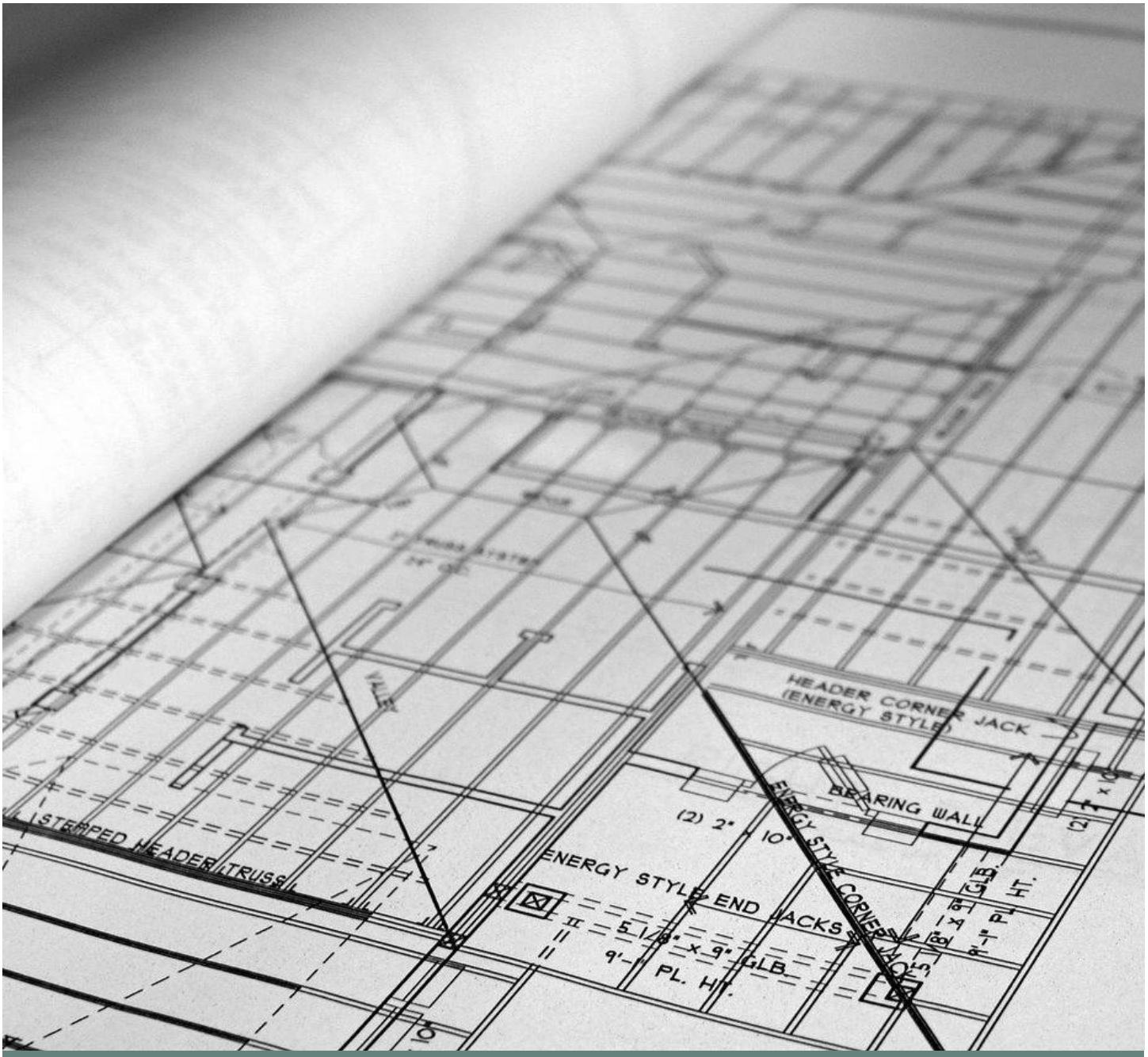

55 Newton Street, Manchester

Noise Impact Assessment

Client: AAIP Partnership

Project Number: 0542021

Date: 11th June 2021

REPORT ISSUE & STATUS LOG

	Revision Number		
	1	2	3
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1 INTRODUCTION

1.1 OVERVIEW

1.1.1 JPM Acoustics Ltd has been appointed by AAIP Partnership to undertake a noise impact assessment to support a planning application for the proposed change of use of 55 Newton Street, Manchester from commercial premises to a residential dwelling.

1.1.2 This report presents an assessment of the suitability of the site for residential use and draws on the results of a baseline noise survey undertaken in May 2021. The assessment has been undertaken with due consideration to relevant British Standards and current guidance relating to noise.

1.1.3 This report is necessarily technical in nature. Therefore, to assist the reader, a glossary of acoustic terminology is provided in **Appendix A**.

1.2 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

1.2.1 The development site is the existing three-storey building at 55 Newton Street in Manchester. The building is currently vacant but formerly accommodated offices and commercial space across the ground, first and second floor with storage at basement level.

1.2.2 The site is bounded by Newton Street to the southeast, Bradley's Court to the northeast and by existing commercial/residential buildings on all other sides. The noise climate at 55 Newton Street is dominated by the passage of road traffic along Newton Street.

1.2.3 The existing building is to be refurbished to create a single dwelling. The site location and front elevation are shown in **Figure 1-1**. Proposed layout plans are included in **Appendix B**.

Figure 1-1: Site Location and Front Elevation

2 LEGISLATION AND GUIDANCE

2.1 MANCHESTER CITY COUNCIL (MCC) PLANNING & NOISE TECHNICAL GUIDANCE, DECEMBER 2015

2.1.1 MCC's Planning and Noise Technical Guidance document includes the following internal noise level criteria for residential developments:

- 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 15 times)
- Living Rooms (daytime - 07.00 - 23.00) 35 dB L_{Aeq}
- Gardens and terraces (daytime) 55 dB L_{Aeq}

2.1.2 The above criteria are concordant with those from BS 8233 and the World Health Organisation (WHO) *Guidelines for Community Noise* 1999.

2.2 BS 8233:2014: GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS (BS 8233)

2.2.1 BS 8233 provides guidance for the control of noise in and around buildings and recommends internal and external noise level criteria for residential dwellings. The British Standard states that it is desirable that internal ambient noise levels do not exceed the guideline values in **Table 2-1**.

Table 2-1: Internal Desirable Guideline Values from BS 8233

Activity	Location	Period	
		07:00 to 23:00 Hours, i.e. Daytime	23:00 to 07:00 Hours, i.e. Night-time
Resting	Living Room	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 $L_{Aeq,8hour}$

2.2.2 BS 8233 does not provide specific criteria for one-off noise events (L_{AFmax}), however, it is common practice to adopt 45 dB L_{AFmax} as a criterion for typical events at night, based on the guidance from the World Health Organisation (WHO) *Guideline for Community Noise* 1999 and *Environmental Noise Guidelines for the European Region* 2018. Therefore, this criterion has been adopted for this assessment.

3 BASELINE NOISE SURVEY

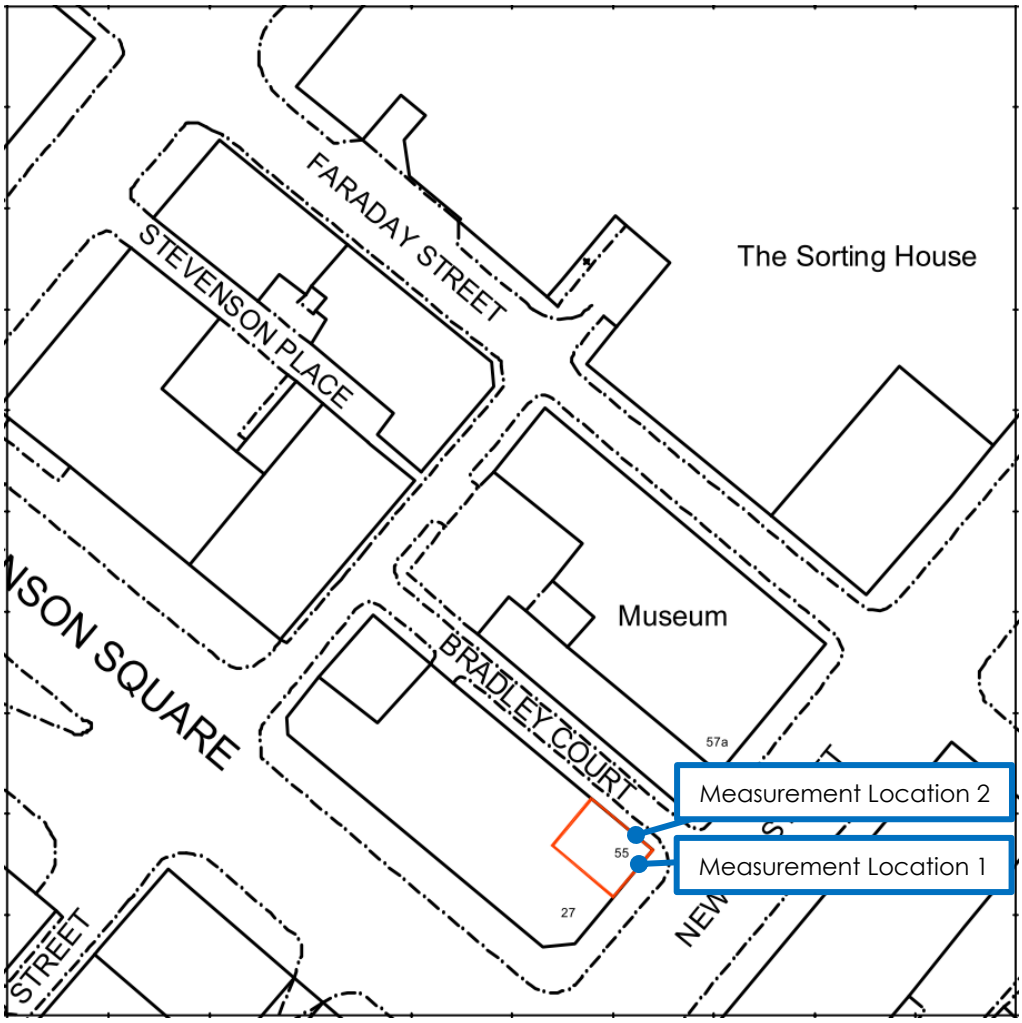
3.1 OVERVIEW

3.1.1 To inform the assessment, a baseline noise survey was undertaken on the site commencing at 12:00 on the 18th May and finishing at 11:30 on the 19th May 2021.

3.2 MEASUREMENT LOCATIONS

3.2.1 The measurement locations adopted during the baseline noise survey are shown on **Figure 3-1** below.

Figure 3-1: Measurement Locations



3.2.2 Measurement Location 1 (ML1) was on the south-eastern elevation overlooking Newton Street, the microphone was on a pole protruding approximately 1 m out of a first floor window in façade conditions. Monitoring at ML1 was undertaken between 12:00 on 18th May and 11:30 on 19th May 2021. The location was representative of the noise environment at the elevation overlooking Newton Street.

3.2.3 Measurement Location 2 (ML2) was on the north-eastern elevation overlooking Bradley's Court, the microphone was on a pole protruding approximately 1 m out of a first floor window in façade conditions. Monitoring at ML1 was undertaken between 12:00 on 18th May and 11:30 on 19th May 2021. The location was representative of the noise environment at the elevation overlooking Bradley's Court.

3.3 EQUIPMENT

3.3.1 The baseline noise survey was undertaken using the Class 1 specification noise measurement equipment detailed in **Table 3-1**. Measurement equipment was calibrated using a portable calibrator immediately before and after the measurements with no significant drift in calibration observed. The sound level meter, pre-amplifier and microphone were calibrated to traceable standards within 24 months prior to the measurements. The portable calibrator was calibrated within 12 months prior to the measurements.

Table 3-1: Equipment Details

Measurement Location	Item	Make & Model	Serial No.	Calibration Due
1	Sound Level Meter	Svantek 971	80344	March 2022
	Pre-Amplifier	Svantek SV18	71577	
	Microphone	ACO Pacific 7052E	69566	
2	Sound Level Meter	Svantek 971	60745	August 2021
	Pre-Amplifier	Svantek SV18	64535	
	Microphone	ACO Pacific 7052E	66815	
1 and 2	Calibrator	01 dB CAL21	34675335	November 2021

3.4 WEATHER CONDITIONS

3.4.1 Weather conditions during the survey were conducive to environmental noise monitoring, it being dry with negligible winds.

3.5 RESULTS

3.5.1 **Tables 3-2** to **3-5** include a summary of measured noise levels. Full survey results are included in **Appendix C**. Free-field levels have derived from façade levels by applying a -3 dB correction.

Table 3-2: Measured Sound Pressure Levels at Measurement Location 1, Free-field

Start Date and Time	Period	dB $L_{Aeq,T}$	dB L_{AFmax}
18/05/2021 12:00	Daytime[1] (07:00 to 23:00)	63	-
18/05/2021 23:00	Night-time (23:00 to 00:00)	56	80[2]

[1] Includes periods between 12:00 and 23:00 on 18th May and 07:00 and 11:30 on 19th May 2021.
[2] 90th Percentile of $L_{AFmax,15min}$ noise levels measured during the night-time.

Table 3-3: Octave Band Sound Pressure Levels at Measurement Location 1, Free-field

Period	Octave Band Sound Pressure Levels (L_{eq}, dB)								dB(A)
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
Daytime	67	63	57	57	59	57	52	45	63
Night-time	63	57	51	50	52	49	46	42	56

Table 3-4: Measured Sound Pressure Levels at Measurement Location 2, Free-field

Start Date and Time	Period	dB $L_{Aeq,T}$	dB L_{AFmax}
18/05/2021 12:00	Daytime[1] (07:00 to 23:00)	60	-
18/05/2021 23:00	Night-time (23:00 to 00:00)	53	78[2]

[1] Includes periods between 12:00 and 23:00 on 18th May and 07:00 and 11:30 on 19th May 2021.
[2] 90th Percentile of $L_{AFmax,15min}$ noise levels measured during the night-time.

Table 3-5: Octave Band Sound Pressure Levels at Measurement Location 2, Free-field

Period	Octave Band Sound Pressure Levels (L_{eq}, dB)								dB(A)
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
Daytime	64	62	55	54	56	53	51	44	60
Night-time	60	55	49	48	49	46	44	42	53

4 ASSESSMENT

4.1 INTERNAL NOISE LEVELS

4.1.1 BS 8233 suggests that an open window (for ventilation) provides approximately 15 dB of attenuation between free-field external noise levels and internal noise levels.

4.1.2 As the measured noise levels from **Tables 3-2** to **3-5** are more than 15 dB above the desirable guideline values from **Table 2-1**, internal noise level criteria will not be achieved with partially open windows. As such, this section considers internal noise levels with windows closed and ventilators open.

4.1.3 A series of noise break-in calculations have been undertaken based on the current scheme drawings, included in **Appendix B,** and the measured levels from **Tables 3-2** to **3-5**. The calculations were undertaken in accordance with the 'more rigorous calculation' method from Section G.2 of BS 8233. The calculations were used to determine the minimum glazing and ventilation performances for each space.

4.1.4 Generally, where a barrier fully blocks line of sight between a source and receiver, a circa. 10 dB reduction would be expected. As the windows to the top floor bedroom are fully screened from Newton Street, a 10 dB reduction to the noise levels in **Tables 3-2** to **3-5** has been assumed in the break-in calculations for this space.

4.1.5 **Table 4-1** details the minimum glazing and ventilation sound insulation performances required for each proposed noise sensitive space and the predicted internal noise levels should the minimum sound insulation performances be achieved.

Table 4-1: Predicted Internal Noise Levels with Windows Closed and Vents Open, dB

Assessment Location, Room	Element	Required Sound Insulation Performances and Example Constructions	Predicted Daytime Level $L_{Aeq,16h}$	Predicted Night-time Level $L_{Aeq,8h}$	Predicted Night-time level L_{AFmax}
Lower Ground Floor Bedroom 2	Glazing	31 dB R_w+C_{tr} 4 mm glass/ 12 mm air gap/ 10 mm glass	30	24	45
	Ventilator	40 dB $D_{n,e,w}+C_{tr}$ Acoustic trickle ventilator or through-wall ventilator			
Lower Ground Floor Bedroom 3	Glazing	27 dB R_w+C_{tr} 4 mm glass/ 12 mm air gap/ 4 mm glass	27	20	45
	Ventilator	40 dB $D_{n,e,w}+C_{tr}$ Acoustic trickle ventilator or through-wall ventilator			
Ground Floor Kitchen/Dining Room	Glazing	27 dB R_w+C_{tr} 4 mm glass/ 12 mm air gap/ 4 mm glass	40	-	-
	Ventilator	32 dB $D_{n,e,w}+C_{tr}$ Trickle ventilator or through-wall ventilator			
First Floor Lounge	Glazing	27 dB R_w+C_{tr} 4 mm glass/ 12 mm air gap/ 4 mm glass	35	-	-
	Ventilator	36 dB $D_{n,e,w}+C_{tr}$ Acoustic trickle ventilator or through-wall ventilator			
Second Floor Bedroom	Glazing	27 dB R_w+C_{tr} 4 mm glass/ 12 mm air gap/ 4 mm glass	27	19	44
	Ventilator	32 dB $D_{n,e,w}+C_{tr}$ Trickle ventilator or through-wall ventilator			

4.1.6 It can be seen from **Table 4-1** that the internal desirable guideline values from BS 8233, as detailed in **Table 2-1**, and MCC's internal noise level criteria would be achieved in the proposed noise sensitive spaces, provided the glazing and ventilation units achieve the stated performances. The 45 dB L_{AFmax} criterion from the WHO guidelines would also be predicted to be achieved in bedrooms at night.

4.1.7 It is understood that some of the existing single pane sash windows at first floor level are required to be retained for heritage reasons. Typically, old sash windows would be expected to achieve circa. 24 dB R_w+C_{tr}, and therefore the existing windows alone will not be able to meet the requirements from **Table 4-1**. However, installing secondary glazing comprising, for example, a single layer of 6 mm glass would increase this performance to circa 32 dB R_w+C_{tr}, which achieves all the performance requirements for glazing from **Table 4-1**. Alternatively, the existing frames could be replaced with similar looking, well-sealed modern frames which can accommodate double glazed panes suitable to achieve the required level of sound insulation.

4.1.8 Given that the desirable guideline values can be achieved, noise need not be a determining factor in granting planning consent for the proposed development.

5 CONCLUSION

5.1.1 JPM Acoustics Ltd has been appointed by AAIP Partnership to undertake a noise impact assessment to support a planning application for a proposed residential dwelling in Manchester.

5.1.2 This report presents an assessment of the suitability of the site for residential dwelling and draws on the results of a baseline noise survey undertaken in May 2021. The assessment has been undertaken with due consideration to relevant British Standards and current guidance relating to noise.

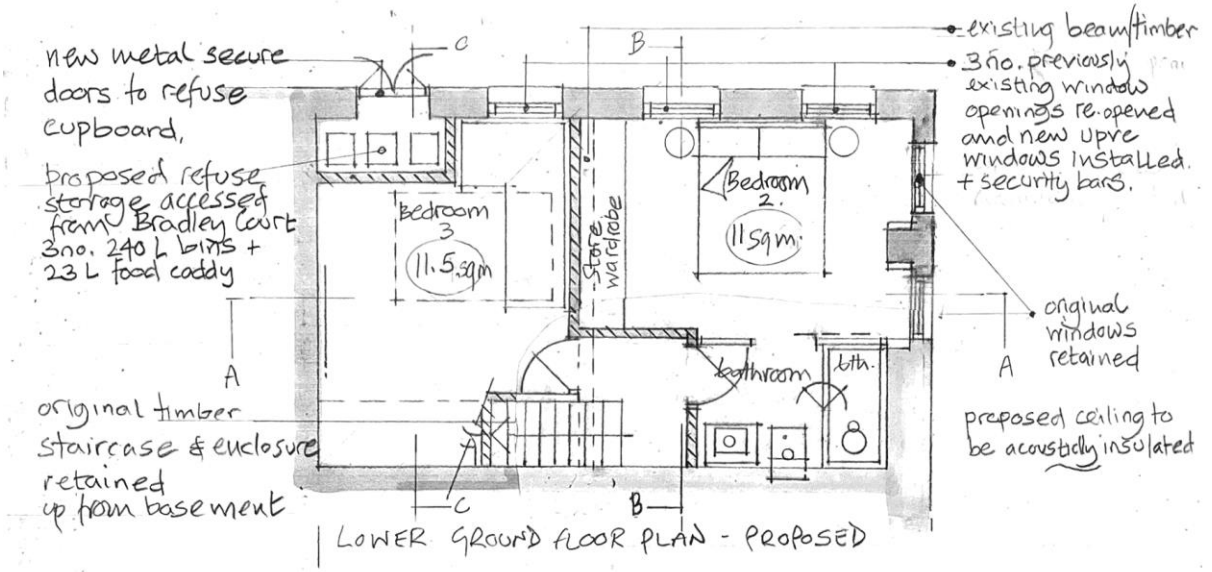
5.1.3 The assessment of internal noise levels identified that noise sensitive spaces overlooking Newton Street and Bradley's Court would require windows to be closed to achieve the internal desirable guideline values from BS 8233 and MCC's internal noise level criteria. It was identified that, provided appropriate glazing and ventilation units are selected, as detailed in **Table 4-1**, the desirable guideline values/MCC criteria can be achieved. The 45 dB L_{AFmax} criterion from the WHO Guidelines is also predicted to be achieved, provided the requirements from **Table 4-1** are achieved.

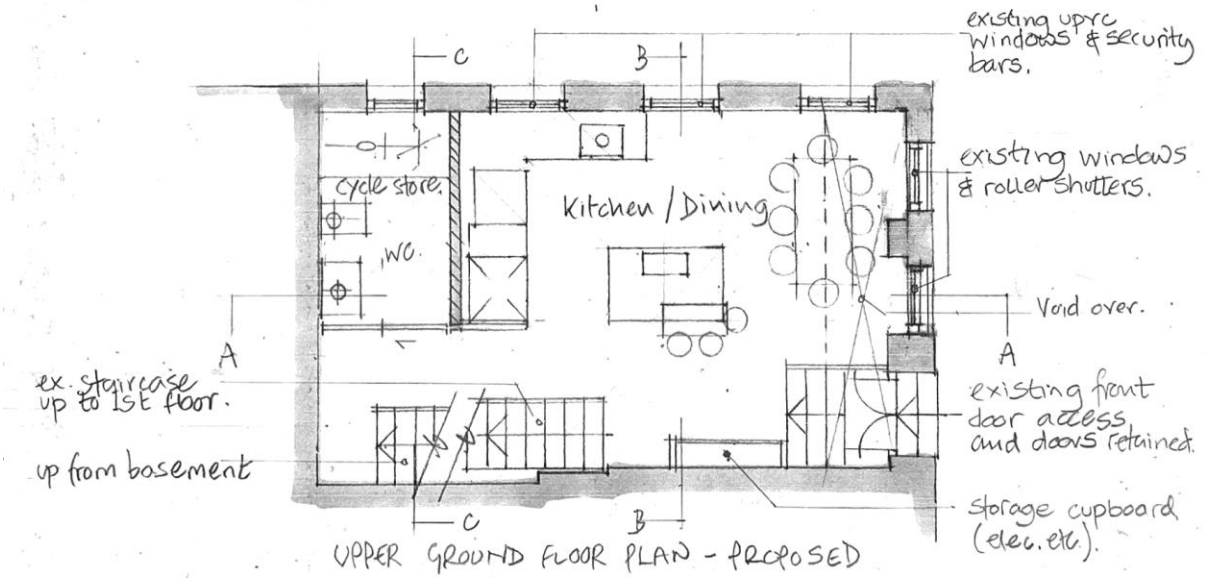
5.1.4 Given the results of this assessment, it is considered that noise need not be a determining factor in granting planning consent for the proposed development.

APPENDIX A: TECHNICAL GLOSSARY

Term	Descriptions
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20 µPa ($20x10^{-6}$ Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds S1 and S2 is given by 20 log10 (S1 / S2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20 µPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5 m.
Façade	At a distance of 1 m in front of a large sound reflecting object such as a building façade.
Fast/Slow Time Weighting	Averaging times used in sound level metres.
Octave Band	A range of frequencies whose upper limit is twice the frequency of the lower limit.

APPENDIX B: SCHEME LAYOUT DRAWINGS



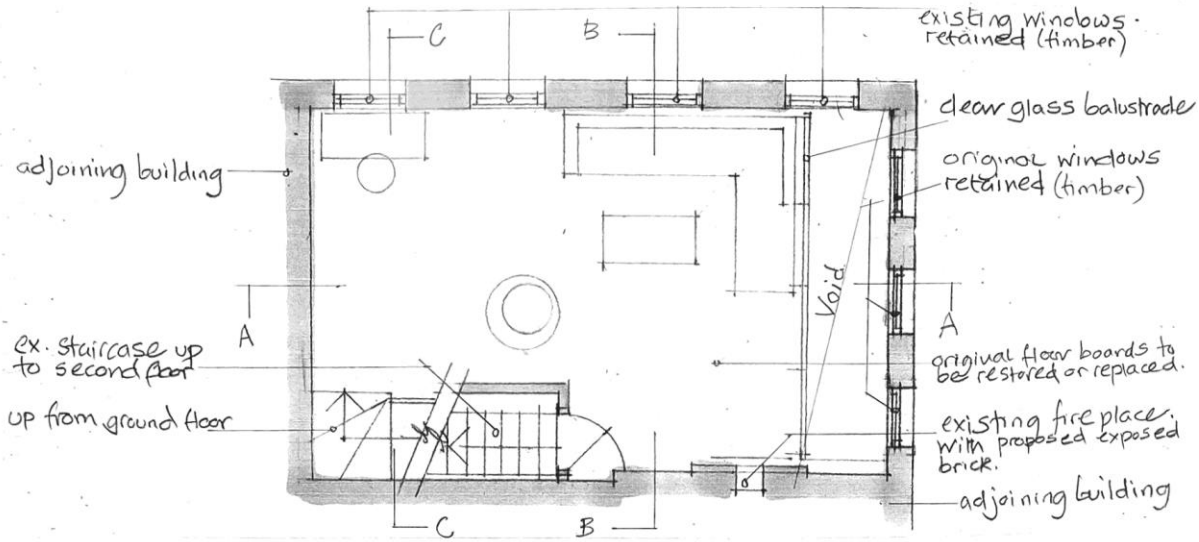


proposed walls

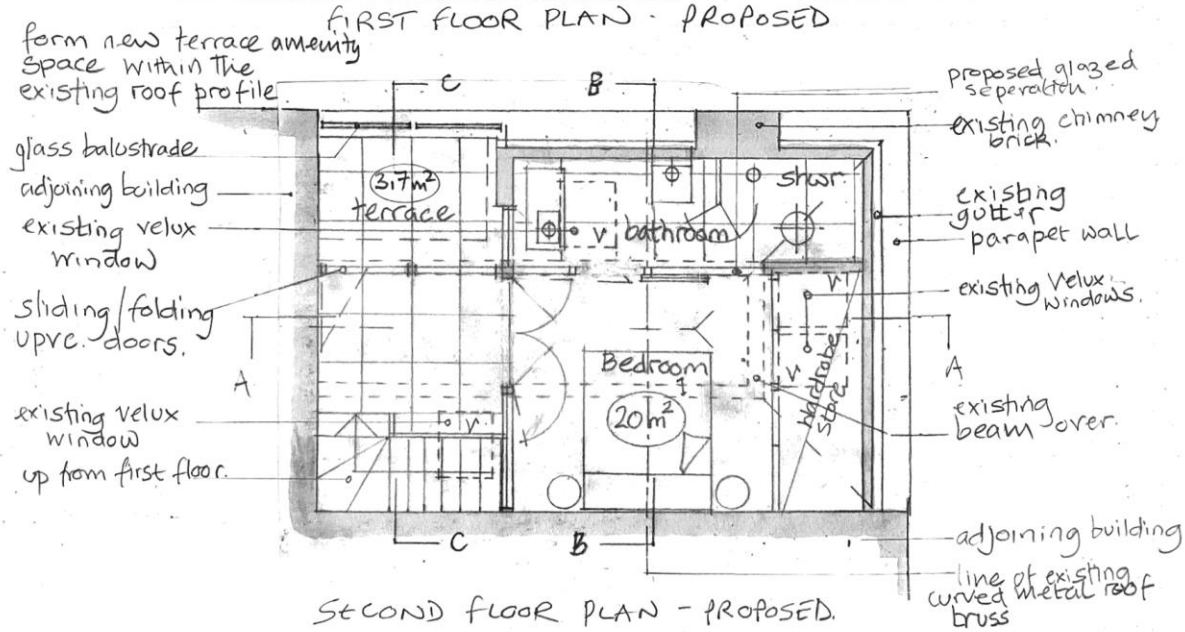
original/historic walls

0 1m 2m 3m 4m 5m

CLIENT SITE ADDRESS	AAIP 55 NEWTON STREET MANCHESTER M11ET	SCALE 1:50 @ A3 DATE May. 2021	LIFE DESIGNS ARCHITECTURE
PROJECT TITLE	Proposed conversion of office into single dwelling	JOB No. 290 DWG No. PL 02 REV	E. info@lifedesigns.spac M (0034) 608 392 748



FIRST FLOOR PLAN - PROPOSED



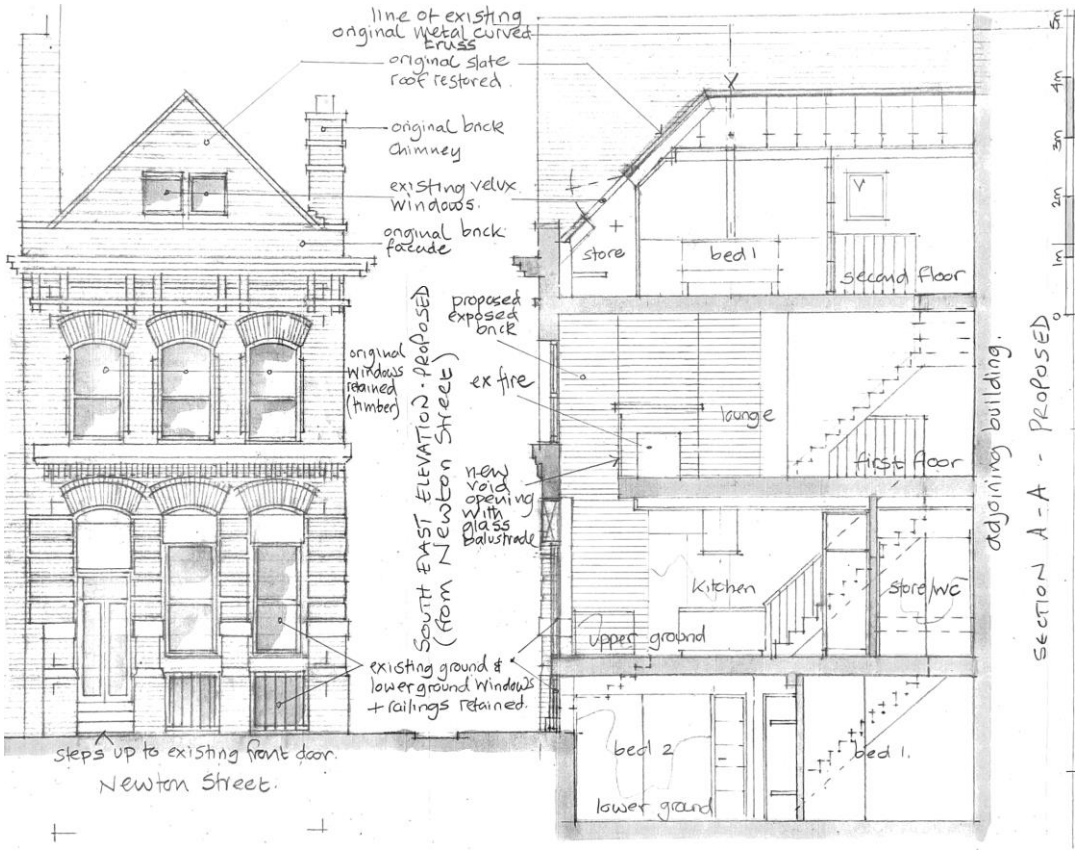
SECOND FLOOR PLAN - PROPOSED.

proposed walls

original/historic walls.

0 1m 2m 3m 4m 5m

CLIENT SITE ADRESS	AAIP 55 NEWTON STREET MANCHESTER M11ET	SCALE 1:50@A3 DATE May 2021	LIFE DESIGNS ARCHITECTURE
PROJECT TITLE	proposed conversion of office into single dwelling	JOB No. 290 DWG No. P.L 03 REV.	E. info@lifedesigns.space M. (0034) 608 392 748


line of existing original metal curved truss
original slate roof restored
original brick chimney
existing velux windows
original brick facade
store
bed 1
second floor
proposed exposed brick
original windows retained (timber)
ex fire
lounge
first floor
new void opening with glass balustrade
kitchen
store/wc
upper ground
existing ground & lower ground windows + railings retained
bed 2
bed 1.
lower ground
steps up to existing front door
Newton Street.
SOUTH EAST ELEVATION - PROPOSED (from Newton Street)
adjoining building.
SECTION A-A - PROPOSED
5m
4m
3m
2m
1m
0

original slate roof restored
original metal curved truss
new terrace cut into existing roof profile, with folding glass doors & part glass balustrade
original brick chimney
bed 3
bath rm
second floor
original windows retained (timber)
living room
first floor
original brick facade
existing UPVC windows + security bars to be retained
kitchen/ dining
upper ground
3no. previously ex. window openings re-opened and new UPVC windows installed + security bars
bed 2
lower ground
adjoining building
SECTION B-B - PROPOSED
Bradley Court.
new secure metal door to bin store
NORTH EAST ELEVATION - PROPOSED (from Bradley Court)
5m
4m
3m
2m
1m
0

APPENDIX C: FULL SURVEY RESULTS

Table B-1: Results from Measurement Location 1, Façade, dB

Start Date and Time	L_{AFmax}	$L_{Aeq,T}$	$L_{A90,T}$	Octave Band Sound Pressure Levels (L_{eq})							
				63	125	250	500	1 k	2 k	4 k	8 k
18/05/2021 12:00	101	76	53	70	66	57	62	73	70	65	57
18/05/2021 12:15	80	62	54	71	67	59	57	58	54	49	42
18/05/2021 12:30	80	62	54	71	66	59	57	58	55	49	47
18/05/2021 12:45	81	62	55	73	70	62	57	57	54	49	43
18/05/2021 13:00	76	62	54	71	65	59	58	58	54	48	41
18/05/2021 13:15	104	79	53	71	66	61	65	76	73	67	57
18/05/2021 13:30	76	61	53	71	66	59	57	58	54	48	41
18/05/2021 13:45	79	63	54	72	71	61	57	58	55	50	44
18/05/2021 14:00	104	75	53	69	63	57	57	66	71	68	57
18/05/2021 14:15	77	60	53	69	62	56	55	56	52	46	39
18/05/2021 14:30	75	60	53	68	61	56	55	56	54	47	38
18/05/2021 14:45	85	62	53	70	64	58	60	58	53	48	42
18/05/2021 15:00	74	61	54	70	64	58	57	57	54	48	44
18/05/2021 15:15	70	59	52	68	62	55	54	55	52	45	39
18/05/2021 15:30	88	64	52	70	63	59	61	60	55	52	47
18/05/2021 15:45	82	62	52	71	65	58	57	58	55	50	44
18/05/2021 16:00	74	62	53	71	66	58	57	58	54	48	44
18/05/2021 16:15	73	61	53	71	64	58	56	57	53	47	40
18/05/2021 16:30	71	60	53	68	63	57	55	57	53	47	41
18/05/2021 16:45	72	60	52	70	64	56	55	56	53	46	40
18/05/2021 17:00	75	60	53	68	62	56	55	57	53	46	40
18/05/2021 17:15	76	59	51	69	62	56	54	56	52	47	41
18/05/2021 17:30	84	63	53	72	69	60	58	59	55	48	43
18/05/2021 17:45	72	59	52	69	62	56	54	55	51	45	40
18/05/2021 18:00	84	62	52	66	64	61	58	58	55	46	40
18/05/2021 18:15	79	60	53	69	66	59	54	56	52	48	51
18/05/2021 18:30	77	60	52	69	66	59	56	56	52	46	42
18/05/2021 18:45	71	59	52	69	66	58	54	55	51	44	38
18/05/2021 19:00	86	63	53	69	69	68	58	57	53	44	40
18/05/2021 19:15	78	60	52	69	63	57	56	57	53	46	40
18/05/2021 19:30	81	62	53	68	64	57	58	58	54	49	42
18/05/2021 19:45	77	61	50	68	69	57	54	56	56	49	39
18/05/2021 20:00	84	61	52	68	65	57	57	56	53	46	43
18/05/2021 20:15	84	62	50	70	69	61	59	57	53	48	40
18/05/2021 20:30	75	59	51	69	61	55	54	56	53	45	38
18/05/2021 20:45	79	59	49	66	61	57	56	56	51	44	37
18/05/2021 21:00	76	59	49	67	60	54	54	55	51	44	46
18/05/2021 21:15	72	59	48	68	63	55	53	55	52	45	38

Start Date and Time	L_{AFmax}	$L_{Aeq,T}$	$L_{A90,T}$	Octave Band Sound Pressure Levels (L_{eq})							
				63	125	250	500	1 k	2 k	4 k	8 k
18/05/2021 21:30	94	72	50	68	65	63	74	62	59	57	51
18/05/2021 21:45	79	62	49	68	66	59	57	57	55	52	51
18/05/2021 22:00	92	65	48	67	71	63	62	60	57	49	42
18/05/2021 22:15	72	59	49	69	64	54	54	56	52	45	38
18/05/2021 22:30	74	58	49	66	58	53	55	55	50	43	35
18/05/2021 22:45	73	59	49	69	62	58	55	55	52	47	42
18/05/2021 23:00	75	57	46	65	58	53	52	54	50	44	45
18/05/2021 23:15	78	60	47	69	65	57	55	57	53	46	42
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18/05/2021 23:45	74	58	46	67	58	53	53	55	51	43	35
19/05/2021 00:00	72	57	43	65	58	52	51	54	49	42	36
19/05/2021 00:15	74	53	42	62	57	51	49	50	45	39	32
19/05/2021 00:30	73	55	43	60	56	50	49	52	48	42	34
19/05/2021 00:45	72	54	41	63	55	50	49	52	47	39	31
19/05/2021 01:00	69	54	40	64	58	52	49	51	47	38	31
19/05/2021 01:15	83	59	40	62	58	56	55	56	51	43	36
19/05/2021 01:30	85	63	41	62	60	59	57	58	57	52	53
19/05/2021 01:45	76	55	40	62	58	51	50	52	47	41	33
19/05/2021 02:00	82	54	40	63	56	50	51	50	46	38	42
19/05/2021 02:15	72	52	39	58	54	48	48	49	45	37	33
19/05/2021 02:30	68	51	40	58	55	47	47	48	44	37	28
19/05/2021 02:45	69	51	38	54	52	45	44	48	44	35	25
19/05/2021 03:00	70	49	38	59	52	45	44	47	42	33	25
19/05/2021 03:15	71	48	39	55	52	45	44	45	39	31	22
19/05/2021 03:30	77	54	40	56	53	49	48	51	47	38	31
19/05/2021 03:45	65	48	40	55	52	46	42	44	41	35	26
19/05/2021 04:00	79	55	41	61	57	51	50	51	48	42	35
19/05/2021 04:15	95	67	41	63	58	52	53	62	60	61	56
19/05/2021 04:30	83	60	42	66	63	57	55	56	53	48	43
19/05/2021 04:45	72	55	42	59	54	48	48	52	48	40	30
19/05/2021 05:00	73	57	45	63	56	51	50	54	50	41	33
19/05/2021 05:15	78	56	45	70	63	54	50	52	49	43	39
19/05/2021 05:30	71	57	45	63	57	51	51	54	50	42	39
19/05/2021 05:45	82	64	48	74	65	60	59	59	56	55	52
19/05/2021 06:00	82	62	48	70	64	58	56	58	55	49	45
19/05/2021 06:15	77	60	50	69	63	56	54	57	54	48	40
19/05/2021 06:30	81	63	50	70	65	60	57	59	56	50	45
19/05/2021 06:45	75	63	51	71	64	59	57	59	55	50	43
19/05/2021 07:00	81	64	52	72	66	62	59	60	56	52	45
19/05/2021 07:15	83	63	53	71	67	61	60	59	56	50	45
19/05/2021 07:30	86	62	53	71	67	63	57	58	55	49	42

Start Date and Time	L_{AFmax}	$L_{Aeq,T}$	$L_{A90,T}$	Octave Band Sound Pressure Levels (L_{eq})							
				63	125	250	500	1 k	2 k	4 k	8 k
19/05/2021 07:45	79	63	53	72	69	61	57	59	56	51	45
19/05/2021 08:00	77	62	52	70	65	60	57	58	55	49	43
19/05/2021 08:15	74	60	51	70	61	56	54	56	53	47	41
19/05/2021 08:30	87	61	51	68	62	55	54	56	54	52	50
19/05/2021 08:45	83	64	53	71	65	60	56	58	60	49	43
19/05/2021 09:00	89	66	56	73	74	69	62	61	58	54	47
19/05/2021 09:15	82	66	54	74	72	65	62	60	61	53	51
19/05/2021 09:30	79	64	53	73	68	60	58	59	57	53	49
19/05/2021 09:45	92	66	54	71	67	59	59	63	60	55	52
19/05/2021 10:00	76	66	56	71	64	58	57	59	60	58	54
19/05/2021 10:15	76	64	54	70	64	59	56	58	58	56	52
19/05/2021 10:30	88	66	55	71	65	62	60	61	59	57	53
19/05/2021 10:45	77	64	54	70	64	59	57	59	58	57	52
19/05/2021 11:00	79	64	54	72	65	58	56	58	58	57	52
19/05/2021 11:15	79	66	55	71	64	58	58	60	60	58	54

Table B-2: Results from Measurement Location 2, Façade, dB

Start Date and Time	L_{AFmax}	$L_{Aeq,T}$	$L_{A90,T}$	Octave Band Sound Pressure Levels (L_{eq})							
				63	125	250	500	1 k	2 k	4 k	8 k
18/05/2021 12:00	99	73	52	72	71	59	60	71	66	63	56
18/05/2021 12:15	81	61	52	71	70	60	56	55	52	49	43
18/05/2021 12:30	76	60	52	67	64	58	55	55	52	48	45
18/05/2021 12:45	78	60	52	70	68	60	56	55	51	47	42
18/05/2021 13:00	74	60	52	69	64	58	57	56	52	46	41
18/05/2021 13:15	101	74	51	67	63	58	58	72	68	63	54
18/05/2021 13:30	73	59	52	67	64	57	54	54	51	46	40
18/05/2021 13:45	77	60	52	69	68	59	55	55	52	47	42
18/05/2021 14:00	100	72	51	66	61	55	54	64	68	67	56
18/05/2021 14:15	76	58	51	66	61	55	53	54	50	45	38
18/05/2021 14:30	69	57	51	65	60	54	52	53	50	45	37
18/05/2021 14:45	84	60	51	66	62	57	59	55	50	46	41
18/05/2021 15:00	73	59	52	68	63	57	54	54	51	46	42
18/05/2021 15:15	69	57	51	65	60	54	53	53	49	44	38
18/05/2021 15:30	83	61	51	67	62	57	58	56	52	49	46
18/05/2021 15:45	80	59	51	68	63	57	55	55	52	49	43
18/05/2021 16:00	75	59	52	68	65	58	55	55	51	46	41
18/05/2021 16:15	73	58	52	67	62	57	54	54	50	45	39
18/05/2021 16:30	75	58	52	65	61	56	54	54	50	46	40
18/05/2021 16:45	74	57	51	67	62	55	53	53	49	44	39
18/05/2021 17:00	73	58	52	65	61	55	53	54	50	44	40
18/05/2021 17:15	75	57	50	65	60	54	52	53	49	44	39

Start Date and Time	L_{AFmax}	$L_{Aeq,T}$	$L_{A90,T}$	Octave Band Sound Pressure Levels (L_{eq})							
				63	125	250	500	1 k	2 k	4 k	8 k
18/05/2021 17:30	81	60	53	68	67	60	56	56	52	46	42
18/05/2021 17:45	69	57	51	65	62	57	52	52	48	43	39
18/05/2021 18:00	82	60	51	64	63	60	57	55	52	45	38
18/05/2021 18:15	77	58	52	68	67	60	53	53	49	46	48
18/05/2021 18:30	75	58	51	69	68	60	54	53	49	44	40
18/05/2021 18:45	68	58	51	68	68	59	53	52	48	43	37
18/05/2021 19:00	83	61	51	68	68	66	57	54	50	43	37
18/05/2021 19:15	74	58	50	66	60	55	53	54	50	44	38
18/05/2021 19:30	76	58	51	65	64	56	54	54	50	45	39
18/05/2021 19:45	74	59	50	67	68	57	52	52	53	48	37
18/05/2021 20:00	76	58	51	66	66	57	54	53	49	44	40
18/05/2021 20:15	82	59	50	67	68	59	57	54	50	46	39
18/05/2021 20:30	71	57	50	66	60	54	52	53	49	43	37
18/05/2021 20:45	76	57	49	63	60	56	53	53	48	43	37
18/05/2021 21:00	78	56	47	63	58	52	52	52	48	42	41
18/05/2021 21:15	73	56	47	64	60	54	51	52	49	43	37
18/05/2021 21:30	92	67	48	65	63	60	68	58	56	55	50
18/05/2021 21:45	76	59	47	64	64	57	54	54	51	49	49
18/05/2021 22:00	71	57	46	64	59	53	52	53	50	44	39
18/05/2021 22:15	89	62	47	65	68	61	59	56	54	46	39
18/05/2021 22:30	69	55	47	63	57	51	51	51	47	41	34
18/05/2021 22:45	71	56	47	64	60	55	53	52	48	44	39
18/05/2021 23:00	70	54	45	62	56	51	50	50	47	41	36
18/05/2021 23:15	82	58	45	66	63	56	52	54	50	44	47
18/05/2021 23:30	84	54	42	60	54	49	48	49	47	47	41
18/05/2021 23:45	71	55	44	63	56	51	50	51	48	41	34
19/05/2021 00:00	69	54	43	61	56	50	49	51	47	40	35
19/05/2021 00:15	71	50	42	59	55	49	47	46	42	37	30
19/05/2021 00:30	71	52	42	58	55	48	48	49	45	39	33
19/05/2021 00:45	70	52	42	59	54	48	48	48	44	37	30
19/05/2021 01:00	66	52	41	60	57	50	48	48	44	36	30
19/05/2021 01:15	79	56	41	59	56	54	53	52	47	41	35
19/05/2021 01:30	81	60	41	59	58	55	55	54	53	51	53
19/05/2021 01:45	71	52	41	59	56	49	48	48	44	38	31
19/05/2021 02:00	76	51	41	60	54	49	48	47	43	37	38
19/05/2021 02:15	69	50	41	57	53	48	46	47	43	36	33
19/05/2021 02:30	65	48	41	55	53	45	45	44	40	34	27
19/05/2021 02:45	70	49	40	53	51	45	45	46	42	34	27
19/05/2021 03:00	68	47	40	57	52	45	44	44	39	31	25
19/05/2021 03:15	69	46	41	54	51	45	44	43	37	30	22
19/05/2021 03:30	75	51	41	54	52	48	47	48	44	37	31

Start Date and Time	L_{AFmax}	$L_{Aeq,T}$	$L_{A90,T}$	Octave Band Sound Pressure Levels (L_{eq})							
				63	125	250	500	1 k	2 k	4 k	8 k
19/05/2021 03:45	63	46	41	54	52	46	43	41	38	33	26
19/05/2021 04:00	70	50	41	57	54	48	45	45	42	37	31
19/05/2021 04:15	94	64	42	62	57	52	52	58	56	59	56
19/05/2021 04:30	81	57	42	63	60	54	52	53	50	46	40
19/05/2021 04:45	70	52	42	57	53	47	47	49	45	38	30
19/05/2021 05:00	72	54	43	60	55	49	48	51	47	39	32
19/05/2021 05:15	73	53	44	66	60	52	48	48	45	41	38
19/05/2021 05:30	70	54	44	61	57	51	49	51	47	42	38
19/05/2021 05:45	80	61	46	68	63	57	56	55	53	52	51
19/05/2021 06:00	78	59	46	68	62	56	54	55	52	47	44
19/05/2021 06:15	75	58	47	68	62	55	52	54	51	48	43
19/05/2021 06:30	79	60	48	67	62	58	55	56	52	48	43
19/05/2021 06:45	73	60	49	68	63	57	55	56	52	48	44
19/05/2021 07:00	77	61	50	68	64	60	57	57	53	49	44
19/05/2021 07:15	82	61	51	69	65	60	58	56	53	48	45
19/05/2021 07:30	78	60	51	68	66	61	56	55	52	48	41
19/05/2021 07:45	74	61	51	70	67	59	55	56	53	49	44
19/05/2021 08:00	77	60	50	68	63	59	56	56	52	47	43
19/05/2021 08:15	70	57	49	67	61	55	52	53	50	45	41
19/05/2021 08:30	82	58	49	65	60	54	52	53	50	48	47
19/05/2021 08:45	78	60	51	68	63	58	55	55	54	46	42
19/05/2021 09:00	87	63	53	72	72	65	61	57	54	51	46
19/05/2021 09:15	78	63	52	70	70	62	59	56	55	51	50
19/05/2021 09:30	79	61	52	71	65	58	56	56	54	51	48
19/05/2021 09:45	82	63	52	67	64	58	57	58	55	54	51
19/05/2021 10:00	77	63	54	67	63	57	55	57	57	57	53
19/05/2021 10:15	75	61	53	68	61	56	54	55	55	55	52
19/05/2021 10:30	86	63	54	68	64	60	58	58	56	56	53
19/05/2021 10:45	75	62	52	67	63	57	55	56	55	55	51
19/05/2021 11:00	73	62	52	68	63	56	54	55	55	55	51
19/05/2021 11:15	75	63	54	67	62	57	55	57	57	57	54