



Azymuth Acoustics UK

Professional Acoustic Services

Approved by: Matthew Gibson
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Noise Assessment Report

Ref: AA0085

Noise assessment for planning of proposed LGBT + Centre Extension.

LGBT + Centre

The Proud Trust

49 – 51 Sidney Street

Manchester

M1 7HB

For

LGBT + Centre

The Proud Trust

49 – 51 Sidney Street

Manchester

M1 7HB



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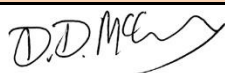
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1.0 Introduction

Azymuth Acoustics UK was appointed by URBED (Urbanism Environment and Design Ltd) to provide a noise assessment of demolition and re-build / extension of the LGTB community centre at 49 – 51 Sidney Street, Manchester, M1 1HR. The existing ground floor will be remodelled to provide a larger café (seating approximately 50 people) opening on to the front elevation. The proposed extension incorporates a 1st floor level which will include offices, meeting rooms and an activity / event space, along with a 2nd floor roof terrace.

The potential operating hours of the centre are understood to be 08:00-23:00hrs 7 days a week. It is understood that the café / restaurant will operate from 09:00–21:00hrs Monday-Saturday, with reduced operating hours on Sundays. As such, the proposed café is assessed as a daytime only operation.

This report addresses the potential impact of noise from the premises on nearby residences (specifically the adjacent and rear residential accommodation), along with analysis and recommendations on the specifications of the building envelope to reduce noise egress to comply with local authority target criteria.

This acoustic assessment includes the following aspects:

- The results of a baseline noise survey at the site in order to assist in the assessment of noise as it might affect the nearest sensitive receptors. These receptors are identified as residences adjacent and to the rear of the LGBT Community centre.
- Criteria developed to set acceptable noise levels at sensitive receptors in nearby properties.
- Assess noise levels from kitchen extract and other mechanical services associated with the premises.

2.0 Baseline Noise Survey

2.1 Measurement Procedures

The instrumentation used for the environmental noise survey consisted of a SvanTek 959 type 1 precision sound level meter. The equipment was calibrated before and after the noise measurements. The sound level meter measured at A-weighted (fast response) noise levels as well as octave bands noise levels for all measurements record.

The ambient noise level survey was undertaken between 23:12 to 00:44hrs on the night of 30th April 2018 and 18:55 to 20:17hrs on the evening of 10th May 2018. The survey covered a baseline noise survey over the maximum proposed operating hours of the premises.

The ambient noise measurements were undertaken using the sound level meter microphone at the Locations shown in figure 1 below.



Figure 1: Measurement Locations marked in red on aerial photograph

2.2 Measurement Results

The results of the noise measurements are summarised below and the full results are set out in Appendix B.

The following table summarises the results of the noise measurements undertaken at the proposed site in terms of averaged statistical levels.

Measurement Location	Time period	L _{Amax}	L _{Aeq}	L _{A1}	L _{A10}	L _{A50}	L _{A90}
1) Sidney Street	Daytime (evening)	82.3	65.9	72.3	67.3	64.5	62.3
2) Rear of existing building	Daytime (evening)	65.5	59.1	64.1	60.8	58.7	57.1
1) Sidney Street	Night	79.1	63.7	70.5	65.6	62.2	58.8
2) Rear of existing building	Night	65.3	57.6	61.7	59.5	57.1	55.7

Table 1: Summary of averaged noise measurement results (dBA)

2.3 Description of Noise Climate

The evening / night noise climate in the area is dominated by road traffic using Oxford Road as well as Sidney Street. Noise from public passers-by also made a contribution to the measured levels. At night the area remains fairly busy with cars, taxis, public buses and passers-by. In addition sound from other local licensed premises contributes to the local general noise climate.

The nearest noise sensitive residential receptors to the proposed centre is understood to be the adjacent and rear residential accommodation located at 111 Oxford Road, and is located at a distance approximately 17m.

3.0 Assessment Criteria

In order to assess the extent of any measures which might be necessary in order to comply with suitable conditions relating to noise, Azymuth Acoustics has reviewed the following guidance documents and standards:

- BS 8233: 2014
- World Health Organisation Guidelines on Community Noise
- BS 4142: 2014
- Manchester City Council Planning & Noise Technical Guidance (Policy Document GD03: Environmental and Public Protection Information for Developers)

3.1 BS 8233: 2014

BS 8233 provides a code of practice for the sound insulation of a variety of building types affected by general environmental noise. It provides recommendations for control of noise in and around buildings and suggests appropriate internal ambient noise level criteria / limits for a variety of different situations including residential properties.

The following table summarises the noise limits suggested by BS 8233 applying to residential properties:

Activity	Room	Good Design Range $L_{Aeq, T}$ dB	
		07:00-23:00hrs	23:00-07:00hrs
Resting	Living rooms	35	-
Dining	Dining room / area	40	-
Sleeping (daytime resting)	Bedroom (at night)	35	30

Table 2: Noise Limits for Residential Properties Suggested in BS 8233

3.2 W.H.O Guidelines on Community Noise

In 1980 the World Health Organisation proposed environmental health criteria for community noise including consideration of noise levels at which sleep disturbance may take place. These guidelines were amended by the World Health Organisation in 1999. The guidance suggests that an internal L_{Aeq} below 30dB is required to preserve the restorative process of sleep. This is equivalent to a free-field level of around 42 to 45dB L_{Aeq} or a façade level of 45 to 48dB L_{Aeq} , assuming open windows.



3.3 Manchester City Council Planning & Noise Technical Guidance (Annex to GD03)

The GD03 guidance document provides developers with information related to Manchester City Council policy on discharging planning conditions imposed by the City Wide Environmental and Public Protection Team. The document has specific sections covering policy on noise from entertainment venues, fixed plant and equipment etc. The document states:

‘A planning application for a new entertainment venue that is structurally detached from other building uses should demonstrate that music noise from the proposal will not be ‘audible’ in nearby residential properties, assuming that the residential properties in question have their windows open.

‘Entertainment noise (LAeq) should be controlled to 10dB below the background noise level (LA90) without the entertainment noise present, in each octave band at the nearest noise sensitive location’.

In relation to proposed entertainment venues structurally connected to residential developments the document provides the following criterion: ‘Noise levels in the 63Hz and 125Hz octave frequency bands should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB respectively’.

As relates noise from externally mounted ancillary plant the document states:

‘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 (LAeq) below the typical background (LA90) level at the nearest noise sensitive location’.

3.4 BS4142: 2014

British Standard 4142: 2014 “Methods for assessing and rating industrial sound” describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

- a) Typically, the greater this difference, the greater the magnitude of the impact.
- b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

BS41424 notes that: *Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.*

It should be noted however, that BS4142 states that the standard is not intended to be applied to the rating and assessment of sound from recreational activities or music and other entertainment. Hence, BS4142 is primarily presented here for guidance and to assist in the assessment of the proposed ventilation and chiller equipment.



3.5 Recommended Noise Assessment Criteria

Based on the guidance above it is recommended that the following criteria would be reasonable with the aim of minimising the impact of the proposed operation:

- A predicted external level due to entertainment noise from the venue 10dB below the lowest measured Background Sound Level ($L_{A90, 5min}$) at the nearest residential receptor.
- Noise levels inside the nearest flat to comply with the 63Hz and 125Hz octave frequency band noise limits so as not to exceed (in habitable rooms) 47dB and 41dB respectively.
- Daytime and night time (23:00 – 07:00) cumulative noise levels from fixed plant or atmosphere connection(s) not greater than 64 dBA @ 1m this equates to not greater than 49 dBA at the nearest residential properties.

4.0 Assessment of Noise Levels

4.1 Typical Noise Levels in restaurants and bars

The following noise levels would typically be expected within entertainment venues (based on Azymuth Acoustics historical survey data and Noise from Pubs and Clubs Phase 1 document):

- Café bars and restaurants during quiet periods, approx. 65-70dB L_{Aeq}
- Café bars and restaurants during busy periods, no music (customer noise only), up to approx. 88dB L_{Aeq}
- Bars playing music (including customer noise), approx. 90-95dB L_{Aeq}
- Dance floor of large night club, up to approx. 105dB L_{Aeq}

The revised noise assessment presented in the following sections of the report are based on the typical absolute worst case octave band noise levels measured within a café / restaurant with all sources combined including background music, chatting, customer / staff activity etc. The quantities were taken from a similar environment located in Levenshulme, Manchester.

Parameter	Octave Band Centre Frequency (Hz)								Total dBA
	63	125	250	500	1k	2k	4k	8k	
Typical worst case source level $L_{Aeq,30sec}$	75	80	82	87	84	81	74	64	88

Table 3: Typical worst case noise Levels inside a busy restaurant / café.

Other zones associated with premise (e.g. the library and offices) are deemed to be low sources of noise and hence have not been assessed in detail in this report. It is understood that the roof terrace and multi-function rooms will involve activities such as meetings, community groups and 'dry' events which are considered not to be entertainment noise sources and as such have not been assessed in detail in this report.

4.2 Review of the Existing and Proposed Building Envelope

4.2.1 Existing and Proposed Building Envelope (Walls, Windows and Doors)

It is understood that the proposed windows to the front of the premises are triple glazed sliding doors to the cafe and tilt and turn triple glazed window units elsewhere. The estimated acoustic rating for this glass is R_w 30 dB (and $R_w + C_{tr}$ 25). It is understood that the proposed external wall construction will be a steel frame with modular insulated panels – 200mm deep U-value approx. 0.18, with masonry outer leaf at ground floor level rear and sides and a metal cladding system at first and second floor (front and wrapped around the sides of the building). It is not anticipated that this construction would require up-rating from a noise-break out perspective.

4.3 Noise Break-out Calculations and Assessment against Criteria

Based on the proposed building envelope as described above, the noise limits for activity noise inside the ground floor restaurant / café area should be 88 dBA or less in order comply with the targets described in Section 3.3. The limits would apply to noise from all sources combined including background music, chatting, customer / staff activity etc.

The following table provides an assessment of calculated noise break-out from the restaurant / café with the bi-fold windows open for evening operation (18:00 – 21:00hrs) compared with background levels in the vicinity.

Parameter	Location	Octave Band Centre Frequency (Hz)							Total dBA
		63	125	250	500	1k	2k	4k	
Typical worst case source level $L_{Aeq,30sec}$	Inside Sidney Street café	75	80	82	87	84	81	74	88
Specific sound pressure level (calculated break-out)	111 Oxford Road @17m	32	37	39	44	41	38	31	45
Typical measured Background Sound Level $L_{A90,5min}$ 19.30hrs	111 Oxford Road	64	58	57	58	60	52	41	62
Specific level compared with BSL	111 Oxford Road @17m	-32	-22	-19	-14	-19	-14	-11	-17

Table 4: Assessment of predicted entertainment noise levels: receptor 111 Oxford Road.

Based on the results set out in table 4 it can be seen that the noise levels are significantly below the 47 dB and 41 dB for the 63Hz and 125Hz octave frequency band criteria contained in Manchester City Council guidance. In addition the individual octave band noise levels are likely to exceed the -10dB target recommended by Manchester city council and as such is compliant with criteria contained in section 3.3.



4.4 Noise Limits for Kitchen Extract and Other External Plant

It is understood that the building will be serviced with a gas boiler and an ASHP (the latter will be located along the alley way facing towards apartments to the rear of 111 Oxford Road) and a kitchen extract. The following assessment is based on generic performance criteria for this type of plant and relevant noise criteria based on BS4142 and the results of the noise measurements.

A cumulative noise limit of 64 dBA @ 1m from (external) atmosphere connection is recommended for all items of plant. Compliance with this noise limit will ensure that the combined noise level at the nearest noise sensitive residential receptors will be at least 5 dB below the existing background sound level (the predicted level from the plant would be 49dB L_{Aeq} and the daytime / night background sound level is typically 55-62 dB L_{A90}).

Based on the information provided by LEDA and Urbed the proposed ASHP, boiler, kitchen extract and other ancillary items of plant are likely to comply with the noise targets presented here.



5.0 Conclusions

Azymuth Acoustics has undertaken an acoustic assessment of potential noise impact from the proposed rebuild and extension of the existing LGTB community centre at 49 – 51 Sidney Street, Manchester, M1 1HR. Night-time noise levels within the vicinity of the premises over the late evening period until 00:39hrs are in the range 57-66dB $L_{Aeq, 5min}$ and 55-62dB $L_{A90, 5min}$. The noise climate in the area is dominated by road traffic using Oxford Road, as well as noise from public passers-by.

The typical absolute worst case internal (ambient) music and customer noise level for this venue has been estimated to be 88 dB $L_{Aeq, 30 sec}$ inside the café / restaurant with all sources combined including background music, chatting, customer / staff activity etc. In practice noise levels inside a café / restaurant of this type are likely to be below the value shown above and as such no significant impacts have been identified in the assessment.

The proposed building envelope would allow music levels and customer noise to operate up to the limits shown in Table 3 above, with the overall break-out noise level being 45 dBA at the nearest receptor (with bi-folding windows fully open) and as such nominally 17 dB below the typical background sound levels in the vicinity of the premises. It is recommended that the bi-folding windows are closed outside of the proposed restaurant / café operating hours (09:00 – 21:00hrs); i.e. generally keep the bi-folding windows closed after 21:00hrs.

The noise break-out levels would also be within the 47 dB and 41 dB limits in the 63 Hz and 125Hz frequency as required in the Manchester city council guidance GD03. Other zones associated with premise (e.g. the library, offices,) are deemed to be low sources of noise and hence have not been assessed in detail in this report. It is understood that the roof terrace and multi-function space(s) will involve activities such as meetings, community groups and 'dry' events which are considered not to be entertainment noise and as such have not assessed in detail in this report.

A cumulative noise limit of 64 dBA @ 1m has been put forward for any items of fixed plant (or atmosphere connections / louvres etc.) associated with the development.





Appendix A – Glossary of Terms

Decibel (dB)

this is the unit used to measure sound. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro Pascal to 100 Pascal).

dB (A)

This is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e. A-weighting) to compensate for the sensitivity of the human ear to sound of different frequencies. The A-weighting curve is implemented in sound level meters using an electronic filter that approximately corresponds to the frequency response of the ear.

Octave Band Noise Level

The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz. The ear is also generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum can be divided into frequency bands. The most commonly used frequency bands are octave bands, in which the mid-frequency of each band is twice that of the band below it.

L_{Aeq}

this is the equivalent steady sound level in dB (A) containing the same acoustic energy as the actual fluctuating sound level over a given time period.

Reverberation Time (RT or sometimes T_{30} or T_{60})

This is the time taken for the reverberant sound energy in an enclosure to decay one millionth of its equilibrium value, i.e. by 60 dB, after the source has been switched off, is known as the reverberation time. The reverberation time is frequency dependent and it is customary to measure its value in octave or one-third octave bands. Reverberation occurs when sound waves are repeatedly reflected from each surface of the room.

Sound Reduction Index (SRI)

Difference measured between the amount of energy flowing towards the wall in the source room and the total amount of energy flowing towards the wall in the source room and the total amount of energy entering the receiving room (usual range 100 - 3150 Hz for one third octave band values). The SRI varies with frequency and is measured in a laboratory in either octave or one-third octave bands.

$$SRI = L1 - L2 + 10 \log (S/A)$$

Where: $L1$ = Noise level in the source room

$L2$ = Noise levels in the receiving room

S = Surface area of test specimen

A = Equivalent acoustic absorption area in the receiving room

Weighted Sound Reduction Index (R_w)

this is a weighted single figure descriptor of the sound insulation performance of a partition measured under laboratory conditions. The procedure used to quantify the R_w is to compare the sound reduction index (SRI) in each of the one-third octave bands from 100Hz to 3150Hz against a set of standard reference curves. Appendix B – Graphical Results of Sound Insulation Tests



Appendix B – Full results of noise measurement survey

Start	Position	Time	L _{Amax}	L _{Aeq}	L _{A1}	L _{A10}	L _{A50}	L _{A90}
30 th April 2018								
23:12'46	1	00:05'00	76.8	63.9	71.5	66.2	62.7	59.8
23:17'46	1	00:05'00	79.3	64	71.7	65.8	62.8	59.3
23:23'12	1	00:05'00	82.6	65	75.7	66.1	63	59.5
23:28'34	1	00:05'00	79.5	63.1	69.5	65.5	61.8	58.1
23:34'00	1	00:05'00	89.3	65.1	71.9	65.9	62.4	58.4
23:39'28	1	00:05'00	80.7	63.6	69.1	65.5	62.2	59.3
23:44'28	1	00:05'00	69.6	62.1	67	64.6	61.5	58.1
23:50'32	1	00:05'00	72.7	62.4	67.3	64.7	62	58.6
23:56'38	1	00:05'00	81.8	63.3	70.7	65.9	61.7	58
00:08'56	2	00:05'00	67.5	57.8	61.8	59.4	57.3	56.1
00:13'56	2	00:05'00	67.8	58	62.7	60.1	57.3	55.8
00:19'12	2	00:05'00	67.3	57.5	60.9	58.9	57.1	55.8
00:24'12	2	00:05'00	62.1	57.7	61.4	59.8	57.1	55.5
00:29'12	2	00:05'00	65.1	57.5	62	59.5	56.8	55.4
00:34'12	2	00:05'00	62.2	57.1	61.4	59.1	56.7	55.5
10 th May 2018								
18:55'58	1	00:05'00	83.1	65.7	71.2	66.9	64.4	62.2
19:00'58	1	00:05'00	83.3	66.1	72.1	68	64.7	62.1
19:05'58	1	00:05'00	87.2	67.4	77	67.9	64.9	62.7
19:11'06	1	00:05'00	74	65.5	70.7	67.2	65	63.3
19:16'06	1	00:05'00	83.7	65.7	72.6	67	64.3	62.4
19:21'06	1	00:05'00	76.4	65.2	70.2	67.1	64.6	62.4
19:26'52	1	00:05'00	84.4	65.4	71.4	67	64	61.4
19:32'16	1	00:05'00	82.3	66.3	74.1	67.8	64.5	62.6
19:37'16	1	00:05'00	86.2	65.7	71.3	66.6	64	62
19:47'10	2	00:05'00	66.4	59.2	64.3	60.9	58.7	57.2
19:52'32	2	00:05'00	64.1	59.1	62.6	60.9	58.8	57
19:57'32	2	00:05'00	64.1	59.1	62.9	60.9	58.6	57
20:02'32	2	00:05'00	64.8	58.6	62.5	60.1	58.3	56.9
20:07'32	2	00:05'00	65.4	58.5	68.7	60.2	58.2	56.7
20:12'46	2	00:05'00	68.3	59.8	63.8	61.6	59.4	57.8