

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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Eliza Yard, Back of Ancoats

Planning noise report

London, Manchester, Edinburgh, Birmingham, Belfast

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Summary

Sandy Brown has been commissioned by Manchester Life Development Company 2 Limited to provide an assessment of noise in relation to the proposed development at Eliza Yard, Jersey Street, Ancoats.

Two environmental noise surveys have been carried out to determine the existing sound levels in the area. The noise surveys were carried out on 6 and 10 August 2020 and between 25 February and 5 March 2021. Due to the current restrictions due to the Covid-19 pandemic, measured noise levels have been compared to historic noise data in the vicinity of the site and to Defra traffic flow data.

The assessment undertaken provides a robust estimate of the environmental noise climate and is in line with the *“Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments”* produced by the Association of Noise Consultants and the Institute of Acoustics.

The representative background sound levels from the noise survey were $L_{A90,15min}$ 44-45 dB during the day, and $L_{A90,15min}$ 39 dB during the night. The noise survey took place during travel restrictions during the Covid-19 pandemic, therefore further analysis of historic noise levels in the general area has been carried out to determine the background noise level during ‘normal conditions’.

Relevant plant noise egress limits have been determined in accordance with the requirements of the Local Authority at the worst affected existing noise sensitive premises (NSPs). These are L_{Aeq} 40 dB during the day, and L_{Aeq} 34 dB during the night to NSPs to the east and south and L_{Aeq} 39 dB during the day, and L_{Aeq} 34 dB during the night to NSPs to the north and west.

If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features will be applied, and the limits will be more stringent than those set.

Predicted external ambient noise levels at the residences vary from L_{Aeq} 47 to 62 dB during the day and L_{Aeq} 40 to 62 dB during the night.

Internal limits have been set in commercial and amenity spaces to control noise transfer to apartments above and to the surrounding noise sensitive receptors.

An initial assessment has been carried out to determine required acoustic performances for the facades. Mechanical ventilation will be used to all apartments.

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1 Introduction

Sandy Brown has been commissioned by Manchester Life Development Company 2 Limited to provide an assessment of noise in relation to the proposed development at Eliza Yard, Jersey Street, Ancoats.

An environmental noise survey has been carried out to establish:

- background sound levels around the site and by nearby noise sensitive premises
- ambient and maximum noise levels at the site.

The background sound levels measured during the survey are used as the basis for setting limits for noise emission from proposed building services plant. These limits are set in accordance with the requirements of Manchester City Council (MCC).

Ambient and maximum noise levels are used to assess building envelope sound insulation requirements to achieve appropriate internal noise levels for residences. These follow standards set in accordance with MCC guidelines.

This report provides details of the noise survey, including measurement results, and provides recommendations.

2 Site description

2.1 The site and its surrounding

The site location in relation to its surroundings is shown in Figure 1. The Site is bounded by Poland Street to the west, Jersey Street to the south, the City Court Trading Estate to the north, and a surface car park to the east. The Site can be accessed by pedestrians and vehicles via Jersey Street. The site is highlighted in red in Figure 1.



Figure 1 Aerial view of site (courtesy of Google Earth Pro)

2.2 Adjacent premises

The nearby premises are mixed use of residential and commercial units. A summary of the nearby premises are set out below in reference to Figure 1:

1. Residential premises on Jersey St, Rodney St and Mozart Close (highlighted in brown)
2. Residential premises at Flint Glass Wharf (highlighted in aqua blue)
3. Residential premises at Canal Point, Navigation Street, Burgess House, Avro House, 3 New Union St (highlighted in navy blue)
4. Trading estate at City Court (highlighted in orange)
5. Flint Glass Works, 62-64 Jersey St understood to be commercial (highlighted in green)
6. Warehouse at 66 Jersey St (highlighted in yellow)
7. Commercial area including site offices and depot (highlighted in pink)
8. Factories on George Leigh St and Naval St (highlighted in purple).

3 Development proposals

3.1 Description of the development

Development of land bounded by Poland Street to the west and Jersey Street to the south to deliver 118 residential units, ground floor commercial floorspace, and ancillary amenity space within an 8 storey building, cycle parking provision, hard and soft landscaping, access and servicing and other associated works.

3.2 Potential noise sources within the development

The potential noise sources within the scheme can be broadly divided into two categories:

- Building services plant
- Internal activity in commercial units including the loading bay.

The potential impact of these sources has been assessed and mitigation measures have been proposed to minimise impact on existing noise sensitive premises around the development.

4 Assessment criteria

4.1 NPPF and NPSE

The National Planning Policy Framework, February 2019 (NPPF) sets out the UK government's planning policies for England. It supersedes previous guidance notes such as PPG24. No specific noise criteria are set out in the NPPF, or in the Noise Policy Statement for England (NPSE) to which it refers.

The NPPF states:

'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.'*

and

'Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have

unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.'

The NPSE states that its aims are as follows:

'Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *Avoid significant adverse impacts on health and quality of life*
- *Mitigate and minimise adverse impacts on health and quality of life and*
- *Where possible, contribute to the improvement of health and quality of life.'*

As such, neither document sets out specific acoustic criteria for new residential developments, but they require consideration of the effect of existing noise on the new development and the effect of noise from the development on the surroundings.

4.2 ProPG

ProPG *Planning & Noise (Professional Practice Guidance on Planning & Noise), New Residential Development, 2017* provides guidance to the management of noise within the planning system in England. It is restricted to consideration of new residential developments that will be exposed predominantly to airborne noise from transport sources.

The two stages of the approach are given below

- Stage 1 – Initial noise risk assessment of the proposed development site
- Stage 2 – Systematic consideration of four key elements
 - Element 1 – Demonstrating a "Good Acoustic Design Process"
 - Element 2 – Observing internal "Noise Level Guidelines"
 - Element 3 – Undertaking an "External Amenity Area Noise Assessment"
 - Element 4 – Consideration of "Other Relevant Issues".

Following this approach, there are four possible recommendations, the choice of recommendation is as follows:

- Grant without conditions
- Grant with conditions
- Avoid
- Prevent.

Guidance provided in ProPG has been used to assess the proposed development site and recommend mitigation measures to reduce noise levels.

4.3 Noise egress

4.3.1 Standard guidance

BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* (BS 4142) provides a method for assessing noise from items such as building services plant against the existing background sound levels at the nearest noise sensitive premises.

BS 4142 suggests that if the noise level is 10 dB or more higher than the existing background sound level, it is likely to be an indication of a significant adverse impact. If the level is 5 dB above the existing background sound level, it is likely to be an indication of an adverse impact. If the level does not exceed the background level, it is an indication of having a low impact.

If the noise contains 'attention catching features' such as tones, bangs etc, a penalty, based on the type and impact of those features, is applied.

4.3.2 Local Authority criteria

Manchester City Council (MCC) provides guidance in relation to plant noise emissions in *Planning and Noise Technical Guidance* document dated December 2015. It states the following in relation to plant noise egress:

'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 5 dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.'

4.4 Noise ingress

4.4.1 Manchester City Council Guidance and BS8233

Guidance on acceptable internal noise levels in residential dwellings is given in Manchester City Council's *Planning and Noise Technical Guidance*. This also references BS 8233:2014 *Sound insulation and noise reduction for buildings*.

Manchester City Council's guidance includes the following internal noise limits for residential properties:

- 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} .

These internal levels are based on BS8233 criteria which uses annual average data. It is normal to exclude occasional events, such as fireworks night or New Year's Eve.

Where development is considered necessary or desirable, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

For external amenity areas, such as gardens and patios, BS8233 states:

'it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.'

4.4.2 ProPG

Internal noise ingress criteria in ProPG are the same as in BS 8233:2014 but additional guidance is provided. In relation to regular individual noise events the following additional guidance is provided:

'In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.'

5 Survey method

5.1 Noise survey method

The survey included unattended and attended noise measurements.

5.1.1 Attended measurements

Attended sample measurements were taken by Jessica Wright on 6 August 2020 and Jessica Wright and Daniel Shaw on 10 August 2020 at 4 locations around the site. These are indicated in Figure 1 as positions 1 to 4.

At each position the microphone was mounted on a tripod approximately 1.2 m above the ground level and at least 3 m from any other reflective surface for positions 1-3 and at facade level at position 4. Details of the equipment used and the noise indices measured are provided in Appendix A.

Dominant noise sources occurring during the measurements were noted.

Photographs of Positions 1 and 2 are set out in Figure 2 and Positions 3 and 4 in Figure 3.



Figure 2 Photographs of Positions 1 and 2



Figure 3 Photographs of Positions 3 and 4

5.1.2 Unattended measurements

Unattended measurements were carried out by Jose Gonzalez and Kane Mitchell between 25 February and 5 March 2021 at 2 locations around the site. These are indicated in Figure 1 as positions A and B.

At position A the microphone was mounted on a tripod approximately 1.2 m above the ground level and at least 3 m from any other reflective surface. At position the microphone was mounted 1 m from the facade out of a first-floor window. Measurements were carried out in 15 minute periods. Photographs of the locations are provided in Figure 4 and Figure 5.

Details of the equipment used and the noise indices measured are provided in Appendix A.



Figure 4 Photograph of measurement position A



Figure 5 Photograph of measurement position B

5.2 Weather conditions

Weather conditions during the survey are described in Appendix A.

6 Measurement results

6.1 Observations

The dominant noise sources observed at the site during the survey were from occasional road traffic noise and constant plant noise from the commercial unit site to the north (reference 4 in Figure 1).

Less significant noise sources included construction noise and distant plant noise from other locations.

6.2 Noise measurement results

6.2.1 Unattended measurements

Graphs showing the results of the unattended measurements are provided in Appendix B.

Day and night-time ambient noise levels measured during the unattended survey are presented in Table 1.

Table 1 Ambient noise levels measured during the unattended survey at position A

Date	Daytime (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Thursday 25 February 2021	-	49
Friday 26 February 2021	55	52
Saturday 27 February 2021	53	48
Sunday 28 February 2021	55	51
Monday 1 March 2021	54	51
Tuesday 2 March 2021	56	50
Wednesday 3 March 2021	54	48
Thursday 4 March 2021	53	48
Average	55 ^[1]	50 ^[1]

^[1] Calculated from un-rounded values

Table 2 Ambient noise levels measured during the unattended survey at position B

Date	Daytime (07:00 – 23:00)	Night (23:00 – 07:00)
	$L_{Aeq,16h}$ (dB)	$L_{Aeq,8h}$ (dB)
Thursday 25 February 2021	-	52
Friday 26 February 2021	54	52
Saturday 27 February 2021	52	49
Sunday 28 February 2021	49	50
Monday 1 March 2021	54	49
Tuesday 2 March 2021	54	50
Wednesday 3 March 2021	53	53
Average	53	51

Analysis of night-time maximum noise levels indicates that the night-time maximum noise level not normally exceeded 15 times a night is L_{AFmax} 69 dB for both positions.

In line with BS 4142:2014+A1:2019, representative background sound levels have been determined using statistical analysis of the continuous measurements.

Daytime and night time statistical analysis of representative values for the site are given in Figure 6 to Figure 9.

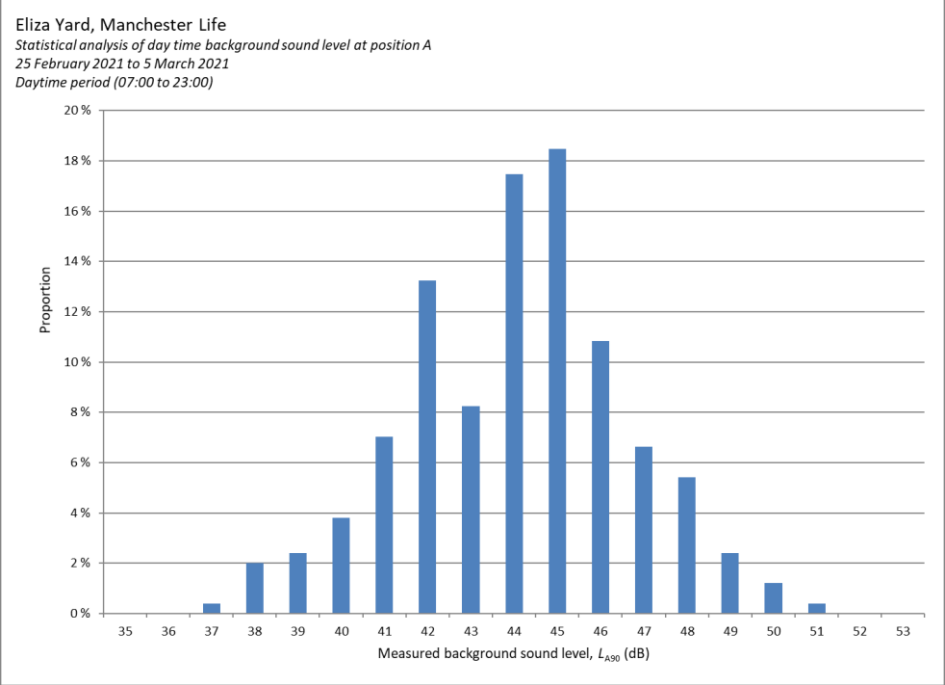


Figure 6 Histogram of daytime background noise levels measured at position A in the free field

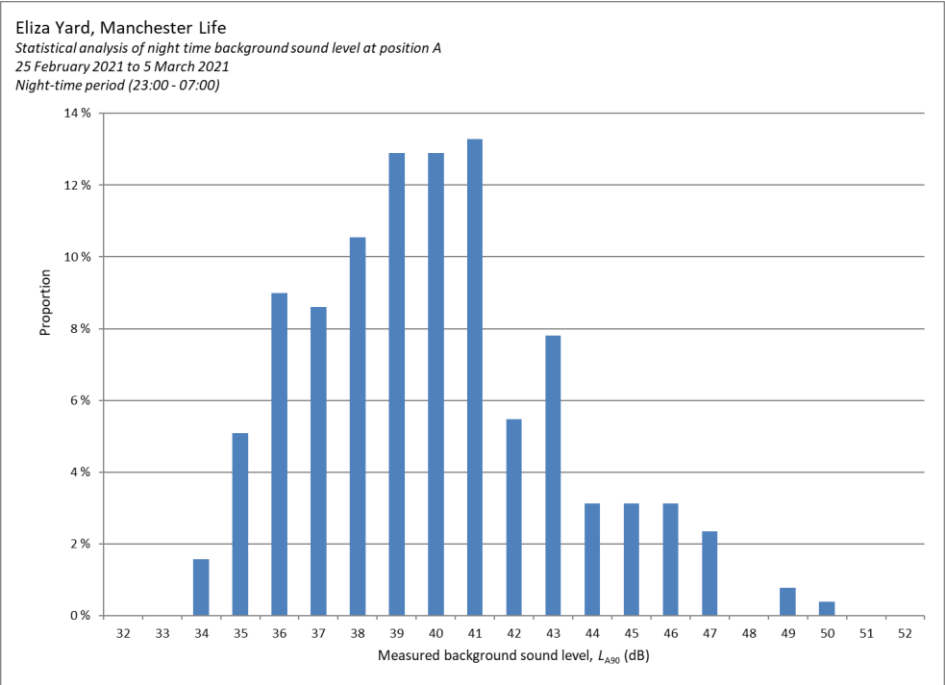


Figure 7 Histogram of night-time background noise levels measured at position A in the free field

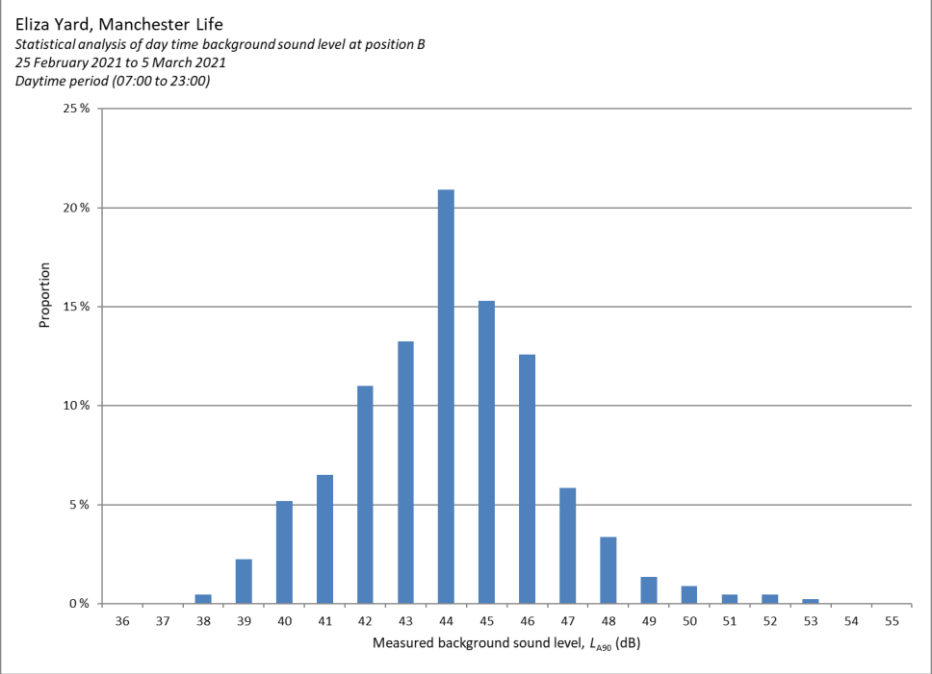


Figure 8 Histogram of daytime background noise levels at position B at the facade

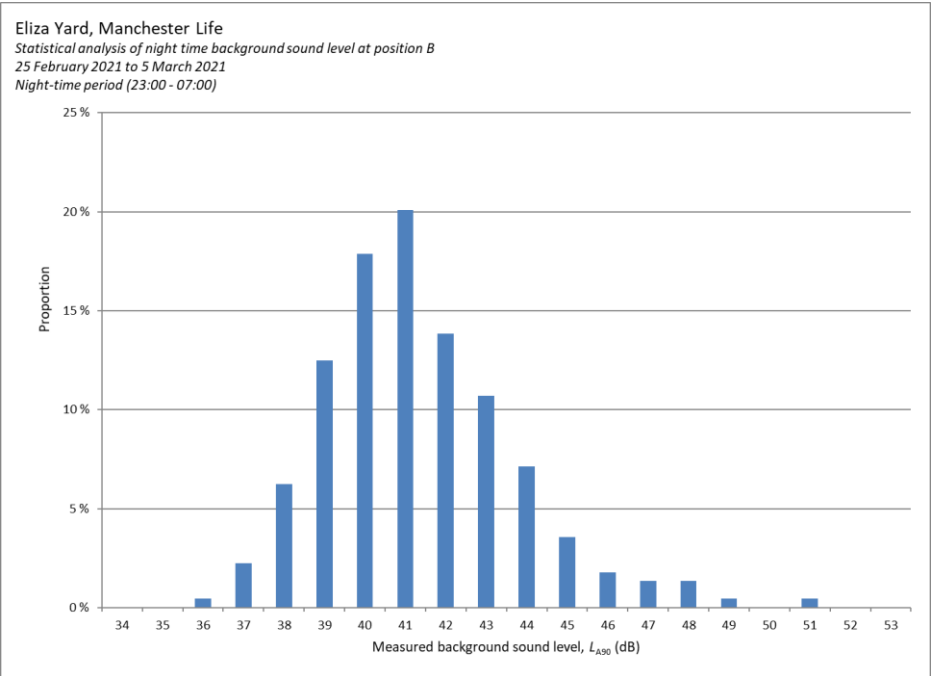


Figure 9 Histogram of night-time background noise levels at position B at the facade

Based on the above levels, the representative background noise levels measured during the survey are:

- Jersey Street (free field)
 - L_{A90} 42 dB daytime (L_{A90} 45 dB equivalent facade level)
 - L_{A90} 36 dB night-time (L_{A90} 39 dB equivalent facade level)
- Poland Street (facade)
 - L_{A90} 44 dB daytime
 - L_{A90} 39 dB night-time

6.2.2 Daytime attended measurement results

Noise levels and key sources recorded during the attended measurements are summarised in Table 3.

Table 3 Daytime noise levels and key noise sources from attended measurements

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{A90,15min}$	
1	16:15	52	76	48	Constant noise from plant from site to the north dominates. Some road traffic noise. Distant construction. Max likely caused by car speeding.
1	17:35	50	63	48	Constant noise from plant from site to the north dominates. Occasional road traffic noise.
2	16:15	52	73	49	Constant noise from plant from site to the north dominates. Occasional road traffic noise. Distant construction.
2	17:35	51	64	49	Constant noise from plant from site to the north dominates. Occasional road traffic noise.
3	16:30	54	70	48	Constant noise from plant from site to the north, less dominant than position 2. General construction noise, infrequent banging. Car passbys dominate when they occur.

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{A90,15min}$	
3	17:55	54	72	48	Constant noise from plant from site to the north, less dominant than position 2. Car passbys dominate when they occur.
4	16:35	55	75	47	Occasional road traffic noise. Distant construction noise from site to the north west. Distant siren. Max likely caused by a car accelerating up the road. Very distant plant noise.
4	17:55	55	72	46	Occasional road traffic noise. Distant plant noise.

6.2.3 Night-time attended measurement results

Noise levels and key sources recorded during the attended measurements are summarised in Table 4.

Table 4 Night-time noise levels and key noise sources from attended measurements

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{A90,15min}$	
1	23:15	47	59	46	Constant noise from plant from site to the north.
1	01:10	50	75	46	Constant noise from plant from site to the north, very occasional road traffic noise from Poland Street. Max caused by car pass by.
2	23:20	49	56	49	Constant noise from plant from site to the north.
2	01:10	51	70	47	Constant noise from plant from site to the north, very occasional road traffic noise from Poland Street. Max caused by car pass by.

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{A90,15min}$	
3	23:35	46	60	45	Constant fan noise from site to the north dominating, very occasional distant traffic noise. Max likely caused by car pass by.
3	01:30	46	53	45	Constant fan noise from site to the north dominating.
4	23:55	46	66	41	Distant plant noise from Jersey Street, very distant road traffic noise from Oldham road. Max likely caused by car pass by on Jersey Street.
4	01:50	46	72	40	Distant plant noise from Jersey Street, very distant road traffic noise from Oldham road. Max likely caused by car pass by on Jersey Street.

7 Historic noise climate estimation

The survey has been carried out during a period of restricted movements due to the Covid-19 pandemic and consequently background noise levels are lower than they would be under usual conditions.

A robust estimate of the environmental noise climate is therefore required, in line with the *“Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments”* produced by the Association of Noise Consultants and the Institute of Acoustics.

Historic noise data from other surveys in the vicinity of the site has therefore been reviewed. This is from acoustic reports available of the Manchester City Council planning portal. The details of these surveys are summarised below.

7.1 Survey details

A) New Little Mill (Arup)	8 and 21 October 2014 and 11 November and 1 December 2016
B) 162-166 Oldham Street (Hoare Lea)	11 to 15 August 2016
C) Bengal Street (ADT)	2 to 7 February 2017
D) Blossom Street (Arup)	14 to 21 July 2015

The approximate measurement location and for each survey are shown in Figure 10.

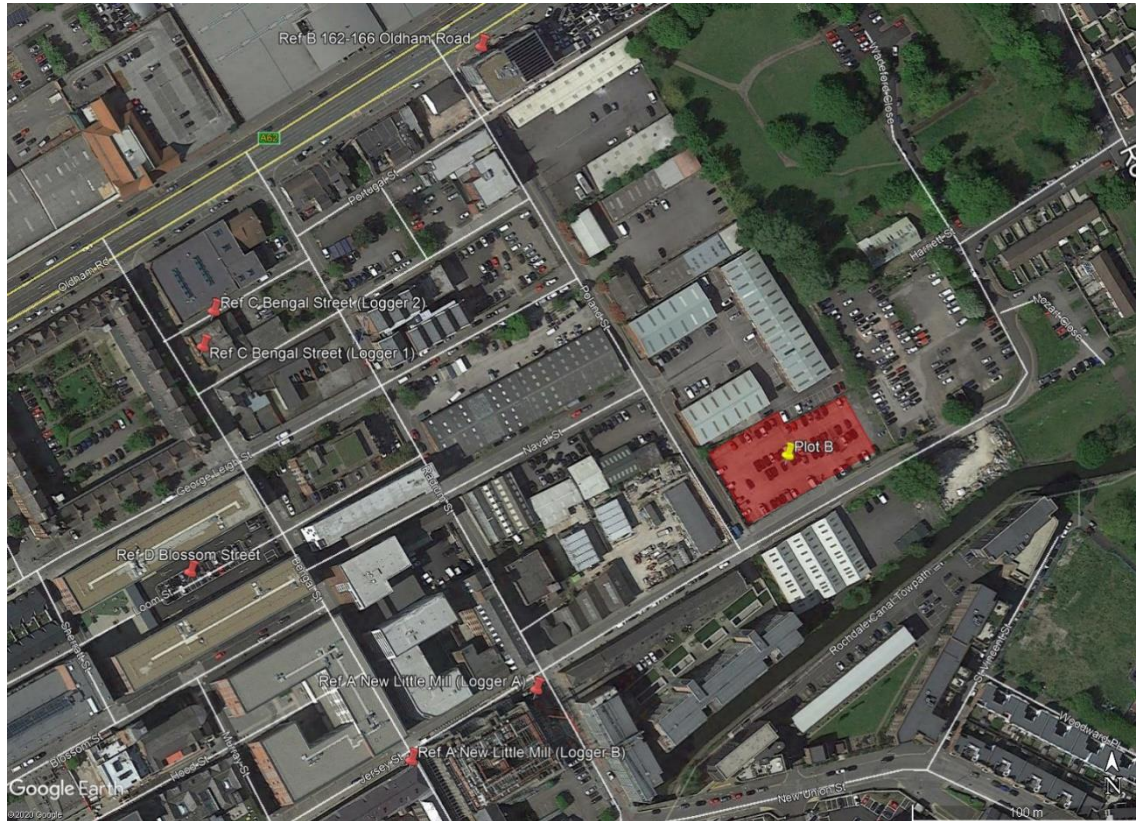


Figure 10 Historical noise survey measurement locations

The minimum background noise levels recorded during each survey are summarised in Table 5.

Table 5 Minimum background noise levels

Location	Daytime (07:00 – 19:00) (dB)	Night (23:00 – 07:00) (dB)
A) New Little Mill (Arup) Logger A	$L_{A90,T}$ 45	$L_{A90,T}$ 38
A) New Little Mill (Arup) Logger B	$L_{A90,T}$ 44	$L_{A90,T}$ 41
B) 162-166 Oldham Street (Hoare Lea)	$L_{A90,1hr}$ 49	$L_{A90,15min}$ 47
C) Bengal Street (ADT) Logger 1	$L_{A90,16 hr}$ 50-59	$L_{A90,8 hr}$ 43-47
C) Bengal Street (ADT) Logger 2	$L_{A90,16 hr}$ 49-57	$L_{A90,8 hr}$ 42-46
D) Blossom Street (Arup)	$L_{A90,15min}$ 42	$L_{A90,15min}$ 37

Based on the results summarised in Table 5, the background noise levels measured during the attended and unattended survey are mostly in line with previous measurements in the vicinity.

7.2 Defra traffic data

Traffic flow data from the Department of Food and Rural Affairs (Defra) shows that during the unattended measurements the national traffic rate was 70% of what would normally be expected. As such, a 1.5 dB correction is to be applied to the average noise levels to account for this. Background and maximum noise levels would not be affected in the same way, and as such are kept the same in line with the above assessment.

8 Control of noise egress

8.1 Basic limits

Based on the above criteria and the measurement results, the cumulative noise level from the operation of all new plant should not exceed the limits set out in Table 6.

The limits apply at 1 m from the worst affected windows of the nearest noise sensitive premises and are presented as facade levels. These have been corrected relative to the measured free-field background noise levels by the addition of 3 dB where necessary. In this case these limits would apply at locations set out in Section 2.2.

Table 6 Plant noise limits at 1 m from the nearest noise sensitive premises

NSP ref from Section 2.2	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)	
	Daytime (07:00-23:00)	Night-time (23:00-07:00)
1, 2, 3, 5, 6	40	34
4, 7, 8	39	34

[1] The limits set out in Table 6 do not include any attention catching features. Penalty corrections for attention catching features may be significant and will need to be considered as the building services design progresses. This is discussed in Appendix C.

8.2 Emergency plant limits

Relaxations of 10 dB over the limits given in Table 6 may be considered for emergency plant items operating for a short period, as accepted on other projects in Manchester. It is proposed that this be adopted for the rooftop emergency generator, subject to agreement with Manchester City Council.

8.3 Plant noise assessment

All building services plant will be designed to achieve the noise limits set out above, including any corrections for attention catching features.

As an initial assessment, the main item of external plant is a proposed backup generator with an enclosure and a quoted A-weighted sound pressure level of 76 dB at 1 m. The generator is not overlooked within the development, and is not expected to be overlooked by the nearest noise sensitive receptors.

Calculations indicate the facade noise level from the generator at the worst affected window at Flint Glass Wharf is around L_{Aeq} 34 dB. This meets the standard plant noise egress limits, and as such is unlikely to be an issue. Final selections will be chosen to meet the overall plant noise egress limits.

There is currently no other relevant external plant proposed.

8.4 Commercial unit activity noise

It is recommended that deliveries and collections to the commercial units be limited to be daytime only to minimise the risk of noise disturbance.

8.4.1 Commercial spaces

The commercial units are expected to be for a variety of uses, including workspaces and retail, with the potential for restaurant or cafe uses. As such operational noise egress due to background music or patrons within the units is likely to be sufficiently controlled to minimise disturbance to surrounding noise sensitive receptors and apartments above.

The proposed sound insulation performance of the floor between the commercial spaces and the apartments above is $D_{nT,w}+C_{tr}$ 53 dB, which is to be achieved with a 250 mm solid concrete slab. If a tenant wishes to generate high operational noise levels, they would be required to carry out sound insulating works to avoid disturbance to other occupants of the building. Measures would typically include installation of sound insulating ceilings and formation of external lobbied doors. These mitigation measures would need to be confirmed with Manchester City Council.

8.4.2 Residential amenity

The residential amenity area may wish to utilise amplified sound. This needs to be controlled to ensure the following:

- Noise breakout due to this is controlled to meet with the requirements of Manchester City Council.
- Noise transfer to adjacent internal areas of the development does not cause disturbance.

8.4.3 Breakout criteria

Manchester City Council require amplified sound egress to be 10 dB below the typical background noise level in octave bands outside the nearby noise sensitive premises. These limits are provided below based on the noise survey data:

Table 7 Maximum amplified sound egress limits

Period	Maximum sound pressure level at 1m from noise sensitive premises (dB)						
	Octave-band centre frequency (Hz)						
	63	125	250	500	1k	2k	4k
Daytime (07:00-23:00)	37	33	30	28	26	16	6
Night (23:00-07:00)	35	30	26	24	21	12	3

Amplified sound breakout outside the nearest apartment windows within the development shall be no higher than 5 dB above these limits, capped at 52 dB at 63Hz and 46 dB at 125 Hz.

8.4.4 Transfer criteria

Amplified sound transfer from the residential amenity space or commercial areas to adjacent apartments shall be controlled to meet NR 15 ($L_{eq,5mins}$).

8.4.5 Guidance on maximum internal amplified sound levels

Maximum internal amplified sound limits will need to be set in the residential amenity space and commercial units using electronic limiters to ensure that the amplified sound egress limits are not exceeded. These should be set following pre-completion testing to establish the sound insulation provided.

Based on the proposed minimum standards of sound insulation for the floor and facades, and the proposed breakout/transfer criteria, guidance on maximum amplified sound limits in these areas.

Table 8 Guidance on maximum amplified sound limits in residential amenity area and commercial units

Period	Guidance on maximum internal sound pressure levels $L_{eq,5mins}$ (dB)						
	Octave-band centre frequency (Hz)						
	63	125	250	500	1k	2k	4k
Daytime (07:00-23:00)	70	75	69	73	79	82	74
Night-time (23:00-07:00)	70	75	67	68	79	82	74

8.4.6 Loading bay noise egress

Loading bay noise egress will be controlled through the management of hours of operation and through the selection of quietly operating doors, to reduce noise when opening and closing.

9 Facade sound insulation – noise ingress

This section describes an assessment of facade sound insulation to control noise ingress. The required facade specification largely depends on the external noise levels and the internal noise criteria.

The following assessment is based on achieving the internal noise criteria from Manchester City Council, which are set out in Section 4.4.

9.1 External noise levels

A summary of the average noise levels measured during day and night-time periods is provided in Table 9. Maximum levels from car pass-bys along Jersey Street and Poland Street were measured in the range of L_{Amax} 53 to 86 dB during the night-time, with the typical maximum not normally exceeded being L_{Amax} 69 dB.

Table 9 Summary of average day and night levels

Position	Daytime L_{Aeq} (dB)	Night-time L_{Aeq} (dB)
1 (North)	50 to 52	47 to 50
2 (East)	51 to 52	49 to 51
3/A (Jersey St) ^[1]	55 (57)	50 (52)
4/B (Poland St) ^[1]	53 (55)	51 (53)

^[1] 1.5 dB correction shown to account for differences in traffic flows compared to normal – rounded to 2 dB

Initial modelling of the building has been carried out to determine expected noise levels at the facades. This accounts for screening provided by the building itself. The model has been used to assess outline facade sound insulation requirements.

Noise levels to the North were dominated by existing plant serving adjacent buildings and there will be discussion about whether attenuation can be applied to these.

9.1.1 3D noise modelling

A 3D environmental noise model of the site and its surrounds has been generated using CadnaA (version 2020) software by Datakustik.

The software carries out calculations using a ray tracing technique. This accounts for the effects of topography, reflections, screening and distance attenuation for noise sources to predict noise levels in three dimensions. Calculations are carried out in accordance with ISO 9613 “Attenuation of sound during propagation outdoors”.

The 3D noise model has been based on the noise surveys carried out around the site and the Stage 3 architectural drawings and model received throughout February 2021.

Screenshots taken from the 3D noise model are presented in Figure 11 to Figure 14. Predicted external ambient noise levels at the residences vary from L_{Aeq} 47 to 62 dB during the day and L_{Aeq} 40 to 62 dB during the night.

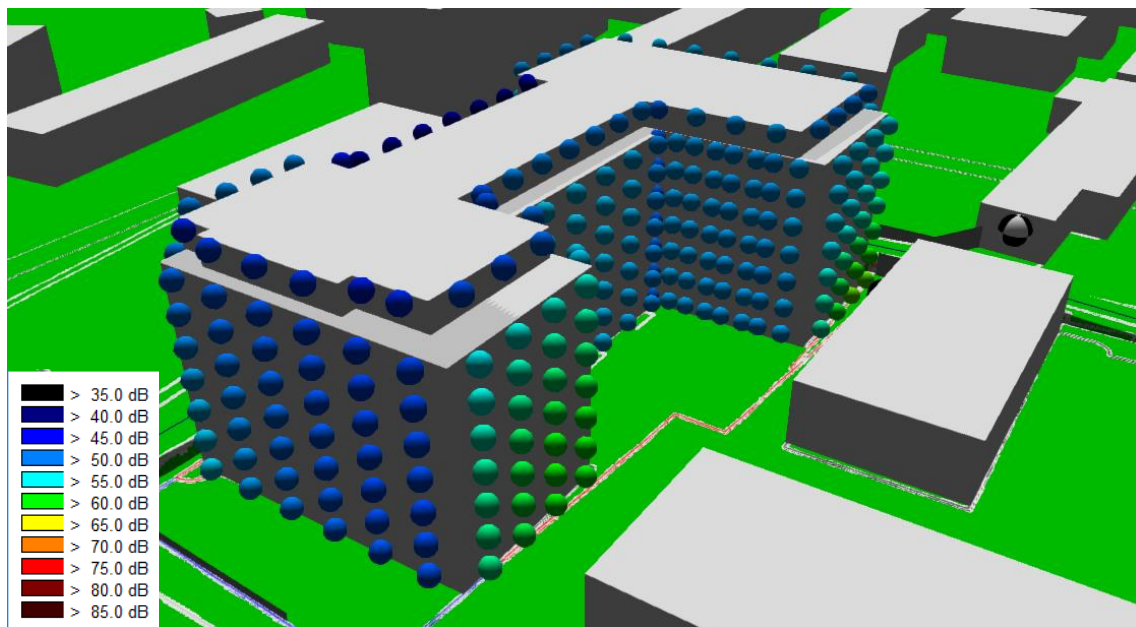


Figure 11 3D image from environmental noise model – east side, daytime

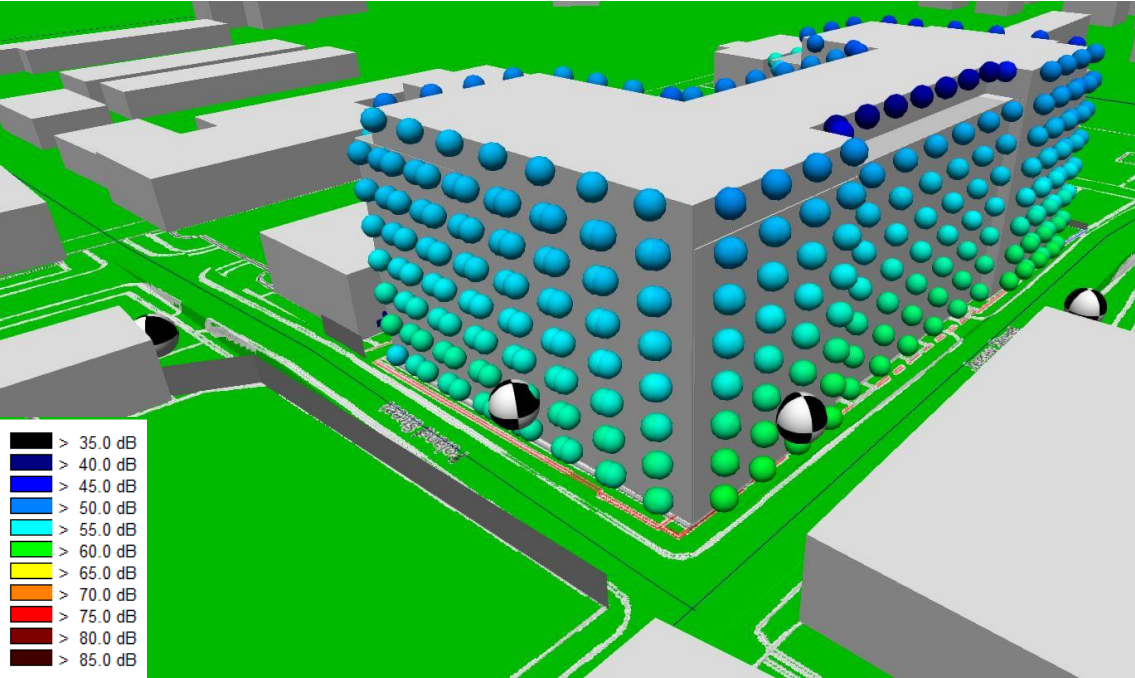


Figure 12 3D image from environmental noise model – west side, daytime

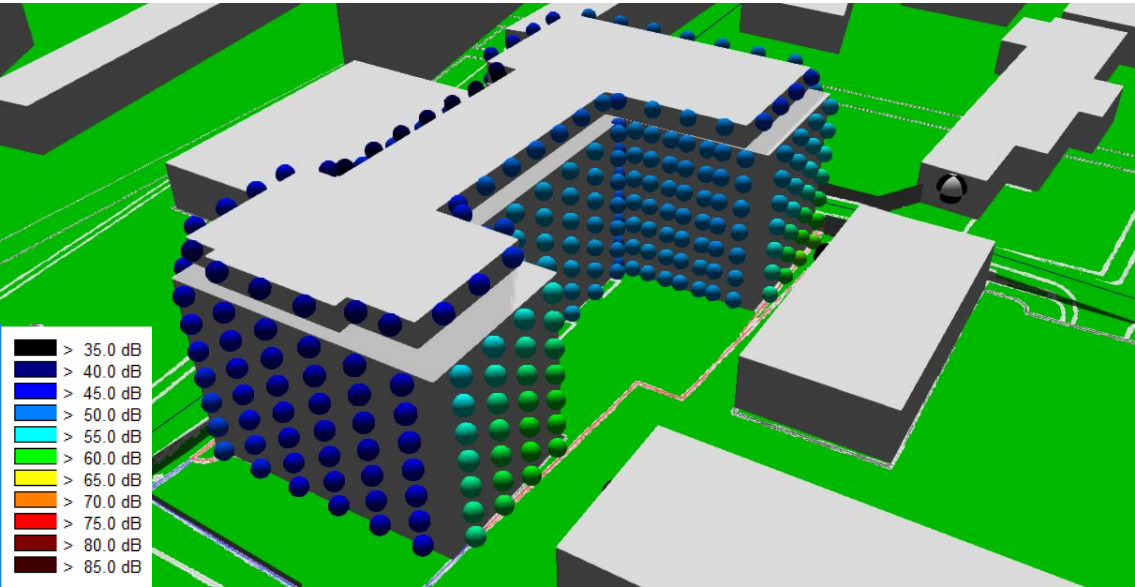


Figure 13 3D image from environmental noise model – east side, night time

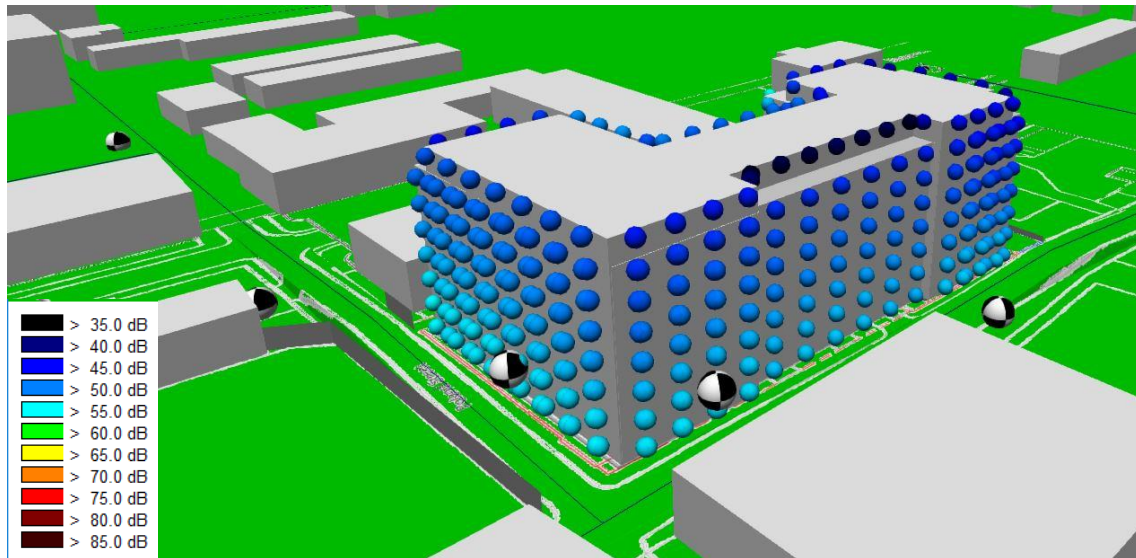


Figure 14 3D image from environmental noise model – west side, night time

9.1.2 External noise levels outside facades

The predicted external noise levels at each facade of the proposed development have been rationalised and presented as facade zones.

Table 10 provides predicted external noise levels for each facade zone. The locations of each facade zone are provided as mark-ups in Appendix D.

Table 10 Predicted daytime external sound pressure levels

Ref (see Appendix D)	Predicted ambient external sound pressure level, L_{Aeq} (dB)
	60-62
	56-59
	51-55
	46-50
	≤ 45

Maximum noise levels from passing cars on Jersey Street and Poland Street measured during the night were in the range L_{AFmax} 53 to 86 dB, with the not normally exceeded value being L_{AFmax} 69 dB.

The environmental noise model does not currently include noise from plant associated with the development, though this would be designed such that the noise levels are not

significantly increased. Nor does it include any increased likelihood of single events such as late-night taxis or traffic associated with the development of the area. These levels do not account for any attenuation which may be applied to the plant in the adjacent units.

9.2 Facade sound insulation

9.2.1 Minimum overall sound insulation

Based on the predicted facade noise levels, minimum recommended overall facade sound insulation performances have been assessed based on the internal noise criteria set out in Table 11. This is also based on the floor to ceiling height of 2.65 m.

Minimum overall facade sound insulation requirements for residences are provided in Table 11 which correspond to the facade zone mark-ups provided in Appendix E.

Table 11 Recommended minimum overall facade sound insulation performance

Ref. (see Appendix E)	Minimum overall sound insulation performance $R'_w + C_{tr}$ (dB)
A 	29
B 	25
C 	20
D 	15

Where there are dual aspect bedrooms on level 7, and dual aspect living rooms throughout, the overall sound insulation performance requirement has been increased to the zone above.

The facade sound insulation requirements in general are driven by the ambient noise levels, L_{Aeq} . For bedrooms overlooking Jersey St and Poland St they have been determined by controlling maximum noise levels from passing cars during the night. These requirements do not account for any attenuation which may be applied to the plant in the adjacent units.

9.2.2 Glazing requirements

To meet the overall facade requirements as set out above, the minimum glazing requirements have been calculated based on typical glazed areas, and an external wall sound insulating rating at least 10 dB higher than the glazing:

- Bedrooms $\leq$ 30% glazed facade to each room
- Living rooms $\leq$ 60% glazed facade to each room.

Based on the above glazed areas, it is recommended that the following minimum acoustic ratings for glazing be allowed for, as shown in Table 12.

Table 12 Guidance glazing sound insulation requirements to meet overall facade performance

Facade sound insulation	Minimum glazing sound insulation performance $R'_w + C_{tr}$ (dB)	
	Living rooms	Bedrooms
A 	27	25
B 	23	21
C 	18	16
D 	13	11

All apartments will be mechanically ventilated and will not rely on openable windows for background ventilation.

Table 13 sets out some examples of glazing configurations that could achieve the required sound insulation performances.

Table 13 Example glazing configurations

Glazing sound insulation, $R'_w + C_{tr}$ (dB)	Example glazing configuration
11-27	6 mm glass/16 mm cavity/6 mm glass
29	6.8 mm acoustic laminate/16 mm cavity /6 mm glass

The performance required by each element will depend on the relative areas of glazed and non-glazed elements, and the ventilation strategy. As a guide, for a mechanically ventilated room with a 50% glazed facade, the glazing sound insulation requirement would typically be 3 dB lower than the overall facade sound insulation requirement. This is provided the non-glazed external wall elements provide at least 10 dB more sound insulation than the glazed elements.

The glazing is currently specified to be high performance triple glazing for thermal reasons, and as such is likely to exceed the minimum requirement.

A more detailed facade assessment will be needed as the design develops to ensure the overall performance requirements are met.

10 Conclusion

The representative background sound levels from the noise survey were $L_{A90,15min}$ 44-45 dB during the day, and $L_{A90,15min}$ 39 dB during the night. The noise survey took place during travel restrictions during the Covid-19 pandemic, therefore further analysis of historic noise levels in the general area has been carried out to determine the background noise level during 'normal conditions'.

Relevant plant noise egress limits have been determined in accordance with the requirements of the Local Authority at the worst affected existing noise sensitive premises (NSPs). These are L_{Aeq} 40 dB during the day, and L_{Aeq} 34 dB during the night to NSPs to the east and south and L_{Aeq} 39 dB during the day, and L_{Aeq} 34 dB during the night to NSPs to the north and west.

These limits are cumulative, and apply with all plant operating under normal conditions. If plant items contain tonal or attention catching features, the limits will be more stringent than those set out above. If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features will be applied.

An initial assessment of the proposed plant items associated with the development has been carried out. The proposed plant items are expected to comply with the relevant noise limits.

Predicted external ambient noise levels at the residences vary from L_{Aeq} 47 to 62 dB during the day and L_{Aeq} 40 to 62 dB during the night. Minimum facade sound insulation standards have been determined to achieve the relevant internal noise limits. Mechanical ventilation is proposed to all apartments to provide background ventilation.

Appendix A

Survey details

Equipment

The attended and unattended noise measurements were taken using Rion NL-52 sound level meters. Calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	NL-52/00932326	Rion	13 Mar 21	TCRT19/1179
Microphone	UC-59/05549	Rion	13 Mar 21	TCRT19/1179
Pre-amp	NH-25/32354	Rion	13 Mar 21	TCRT19/1179
Calibrator	NC-74/34125432	Rion	13 Mar 21	TCRT19/1178
Sound level meter	NL-52/01143564	Rion	15 Dec 22	TCRT18/1993
Microphone	UC-59/10153	Rion	15 Dec 22	TCRT18/1993
Pre-amp	NH-25/43581	Rion	15 Dec 22	TCRT18/1993
Calibrator	NC-74/34257023	Rion	15 Dec 22	TCRT18/1991

Calibration of the meters used for the measurements is traceable to national standards. Calibration certificates for the sound level meters used in this survey are available upon request.

Calibration checks were carried out on the meters and their measurement chains at the beginning and end of the survey. No significant calibration deviation occurred.

Noise indices

Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period, T, with a fast time weighting.
- $L_{ASmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period, T, with a slow time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures*.

Weather conditions

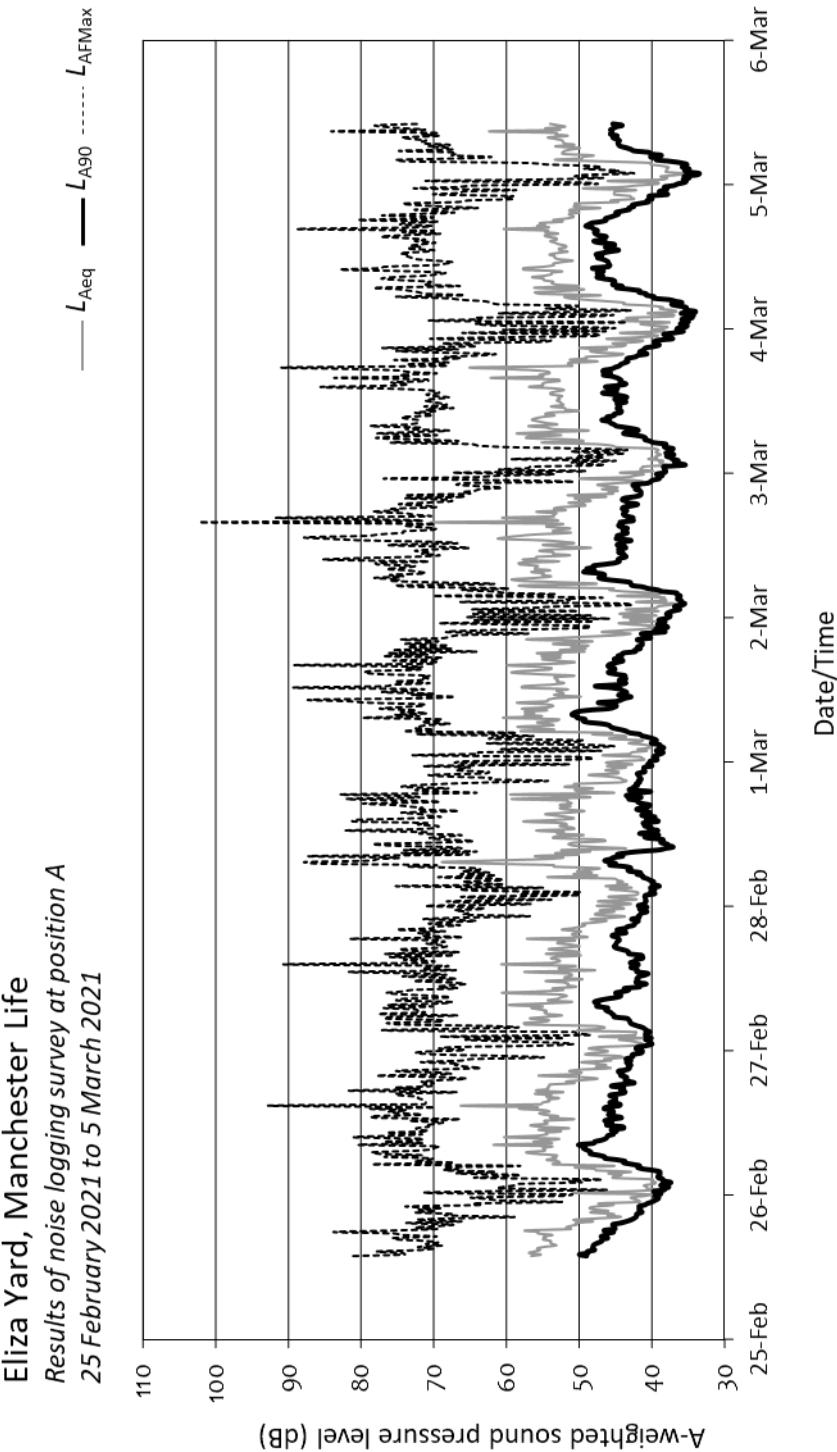
During the attended noise measurements, the weather was generally clear and dry, and no rain occurred. Wind speeds were less than 5 m/s.

During the unattended noise measurements, weather reports for the area indicated that temperatures varied between -3°C at night and 12°C during the day, and the wind speed was less than 4 m/s.

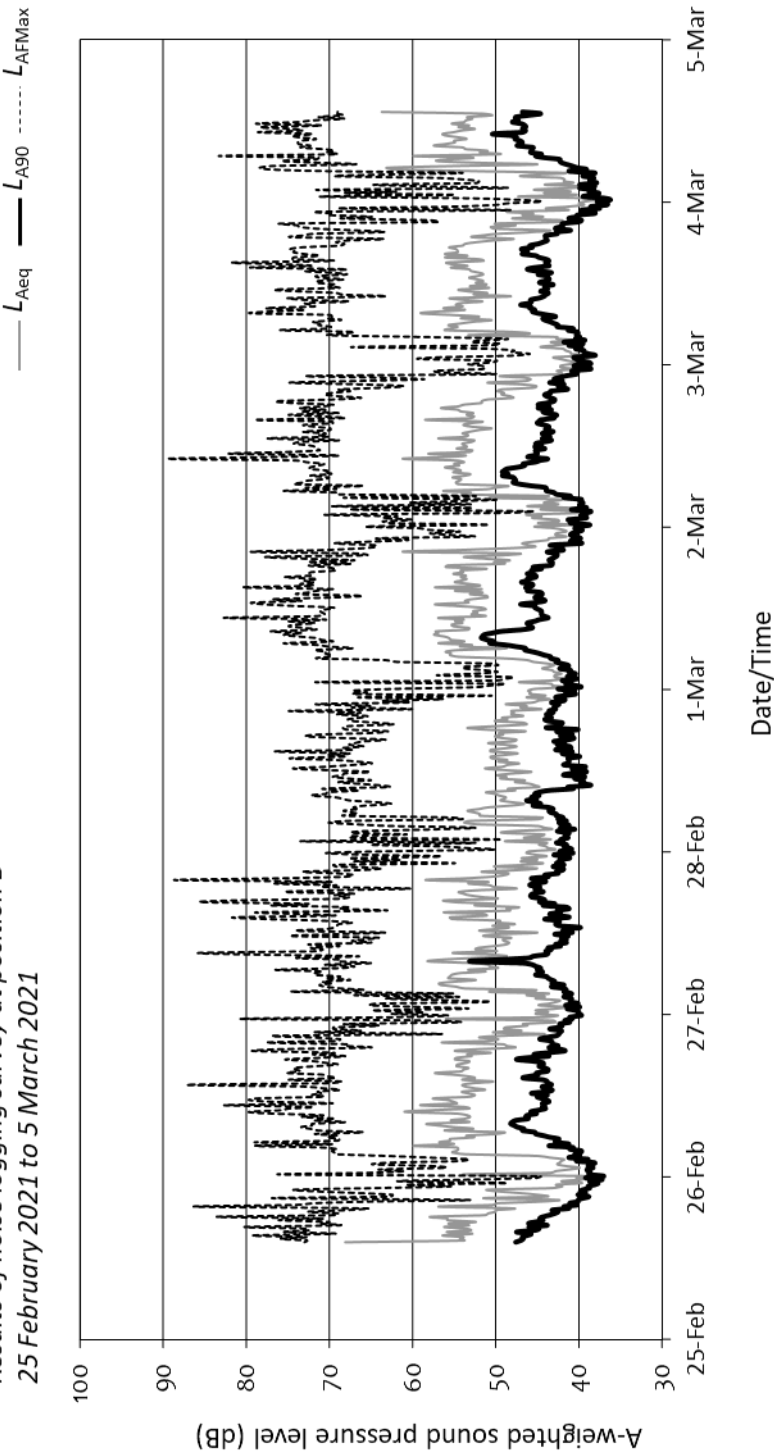
These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

Measurement results from unattended measurement positions



Eliza Yard, Manchester Life
Results of noise logging survey at position B
25 February 2021 to 5 March 2021



Appendix C

BS 4142 corrections for attention catching features

The following applies where plant noise is assessed in accordance with BS 4142:2014+A1:2019.

If the proposed plant noise contains attention catching features (such as tonal elements, whines, whistles, bangs etc), penalty corrections should be applied based on the type and impact of the features.

If appropriate, a subjective assessment of the plant features can be adopted. Where the plant noise contains tonal elements, the following corrections can be made depending on how perceptible the tone is at the noise receptor:

- 0 dB where the tone is not perceptible
- 2 dB where the tone is just perceptible
- 4 dB where the tone is clearly perceptible
- 6 dB where the tone is highly perceptible.

Where the plant noise is impulsive, the following corrections can be made depending on how perceptible the impulsivity is at the noise receptor:

- 0 dB where the impulse is not perceptible
- 3 dB where the impulse is just perceptible
- 6 dB where the impulse is clearly perceptible
- 9 dB where the impulse is highly perceptible.

For noise which is equally both impulsive and tonal, then both features can be accounted for by linearly summing the corrections for both characteristics.

If the plant has other distinctive characteristics, such as intermittency, then a 3 dB correction can be made.

If a subjective assessment of tonality is not appropriate, an objective assessment can be made by analysis of time-averaged, third-octave band sound pressure levels. A noise source is deemed to be tonal if the level in a third-octave band exceeds the level in adjacent third-octave bands by the level differences given below:

- 15 dB in the low frequency third-octave bands (25 Hz to 125 Hz)
- 8 dB in the mid frequency third-octave bands (160 Hz to 400 Hz)
- 5 dB in the high frequency third-octave bands (500 Hz to 10000 Hz).

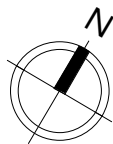
If an objective assessment identifies the plant noise to be tonal then a 6 dB correction must be made.

Appendix D

Predicted facade noise levels



Note:
Do Not Scale from this drawing.
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Planning Development Boundary

Title	Daytime external noise level mark-ups Level 1
Project	Manchester Life - Plot B
Project no.	20290
Version	D
Marked-up by	Daniel Shaw
Reviewed by	James Atha
Date	1 April 2021

Noise levels

- L_{Aeq} 60-62 dB
- L_{Aeq} 56-59 dB
- L_{Aeq} 51-55 dB
- L_{Aeq} 47-50 dB
- $L_{Aeq} \leq 45$ dB

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3	18 12 20	PB	Stage 3 Issue
2	11 12 20	PB	Issue to Deloitte
1	19 11 20	PB	Revised core arrangement
0	23 09 20	PB	Stage 2 Issue

Rev	Date	Intls	Details
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Project Title	Eliza Yard
Client	MLDC
Location	Manchester

Drawing ref	1st - 5th Floor - Proposed
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Checker	PB	Orig Paper Size	A2

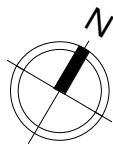
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Project:	Origin:	Zone:	Level:	Type:	Disc:	Number:	Rev:
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Planning Development Boundary

Title	Daytime external noise level mark-ups Level 6
Project	Manchester Life - Plot B
Project no.	20290
Version	D
Marked-up by	Daniel Shaw
Reviewed by	James Atha
Date	1 April 2021

Noise levels

- 60-62 dB
- 56-59 dB
- 51-55 dB
- 47-50 dB
- ≤ 45 dB

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Client MLDC
Location Manchester

Drawing ref 6th Floor - Proposed

Date 18/12/2020 15:22:37 Scale 1 : 200
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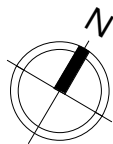
Job No: 9033 Status Stage 3

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Planning Development Boundary

Title	Daytime external noise level mark-ups Level 7
Project	Manchester Life - Plot B
Project no.	20290
Version	D
Marked-up by	Daniel Shaw
Reviewed by	James Atha
Date	1 April 2021

Noise levels

- L_{Aeq} 60-62 dB
- L_{Aeq} 56-59 dB
- L_{Aeq} 51-55 dB
- L_{Aeq} 47-50 dB
- $L_{Aeq} \leq 45$ dB

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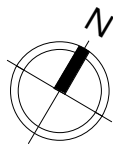
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Project: Origin: Zone: Level: Type: Disc: Number: Rev:

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Planning Development Boundary

Title	Night-time external noise level mark-ups Level 1
Project	Manchester Life - Plot B
Project no.	20290
Version	D
Marked-up by	Daniel Shaw
Reviewed by	James Atha
Date	1 April 2021

Noise levels

- L_{Aeq} 60-62 dB
- L_{Aeq} 56-59 dB
- L_{Aeq} 51-55 dB
- L_{Aeq} 47-50 dB
- $L_{Aeq} \leq 45$ dB

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Location	Manchester

Drawing ref	1st - 5th Floor - Proposed
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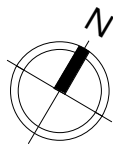
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Planning Development Boundary

Title	Night-time external noise level mark-ups Level 6
Project	Manchester Life - Plot B
Project no.	20290
Version	D
Marked-up by	Daniel Shaw
Reviewed by	James Atha
Date	1 April 2021

Noise levels

- L_{Aeq} 60-62 dB
- L_{Aeq} 56-59 dB
- L_{Aeq} 51-55 dB
- L_{Aeq} 47-50 dB
- $L_{Aeq} \leq 45$ dB

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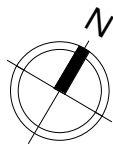
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Project: Origin: Zone: Level: Type: Disc: Number: Rev:

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Planning Development Boundary

Title	Night-time external noise level mark-ups Level 7
Project	Manchester Life - Plot B
Project no.	20290
Version	D
Marked-up by	Daniel Shaw
Reviewed by	James Atha
Date	1 April 2021

Noise levels

- 60-62 dB
- 56-59 dB
- 51-55 dB
- 47-50 dB
- ≤ 45 dB

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Date 18/12/2020 15:12:37 Scale 1 : 200
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Job No: 9033 Status Stage 3

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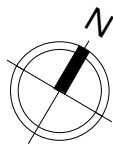
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Appendix E

Facade sound insulation requirements



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Planning Development Boundary

Title	Facade sound insulation requirements Level 1
Project	Manchester Life - Plot B
Project no.	20290
Version	D
Marked-up by	Daniel Shaw
Reviewed by	James Atha
Date	1 April 2021
Facade sound insulation	
R'_w+C_{tr} 29 dB	
R'_w+C_{tr} 25 dB	
R'_w+C_{tr} 20 dB	
R'_w+C_{tr} 15 dB	
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1	19 11 20	PB	Revised core arrangement
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Project Title	Eliza Yard
Client	MLDC
Location	Manchester

Drawing ref	1st - 5th Floor - Proposed
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Date	18/12/2020 15:22:31	Scale	1 : 200
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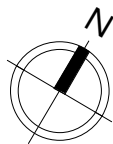
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Project:	Origin:	Zone:	Level:	Type:	Disc:	Number:	Rev:
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Planning Development Boundary

Title	Facade sound insulation requirements Level 6
Project	Manchester Life - Plot B
Project no.	20290
Version	D
Marked-up by	Daniel Shaw
Reviewed by	James Atha
Date	1 April 2021
Facade sound insulation R'_w+C_{tr} 29 dB R'_w+C_{tr} 25 dB R'_w+C_{tr} 20 dB R'_w+C_{tr} 15 dB	
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1	19 11 20	PB	Revised core arrangement
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Client	MLDC
Location	Manchester

Drawing ref	6th Floor - Proposed
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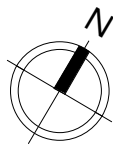
Job No:	9033	Status	Stage 3
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Project:	Origin:	Zone:	Level:	Type:	Disc:	Number:	Rev:
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Planning Development Boundary

Title	Facade sound insulation requirements Level 7
Project	Manchester Life - Plot B
Project no.	20290
Version	D
Marked-up by	Daniel Shaw
Reviewed by	James Atha
Date	1 April 2021
Facade sound insulation	
R'_w+C_{tr} 29 dB	
R'_w+C_{tr} 25 dB	
R'_w+C_{tr} 20 dB	
R'_w+C_{tr} 15 dB	
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Rev Date Intls Details

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Project Title Eliza Yard
Client MLDC
Location Manchester

Drawing ref 7th Floor - Proposed

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Checker PB Orig Paper Size A2

Job No: 9033 Status Stage 3

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