Azymuth Acoustics UK

Professional Acoustic Services

Noise Impact Assessment
Ref: Z59199 RevE

Grey Mare Lane
Manchester

On behalf of

Bowker Sadler Architecture
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Stockport,

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Contents

1.0 Introduction 4
2.0 Baseline Noise Survey 5
2.1 Measurement Procedures 5
2.2 Summary of Azymuth Noise Measurements 7
2.3 Summary of Buro Happold Noise Measurements 9
3.0 Assessment Criteria 10
3.1 ProPG: Planning and Noise - May 2017 10
3.2 National Planning Policy Framework (NPPF) 2023 10
3.3 British Standard 8233: 2014 10
3.4 World Health Organisation Environmental Noise Guidelines (ENG) 2018 11
3.5 British Standard 4142:2014+A1:2019 11
3.6 IOA Guide to Noise Requirements of Approved Document O 2024 12
3.7 Acoustics Ventilation and Overheating Residential Design Guide 2020 12
3.8 Manchester City Council: Guidance on Noise Control for Open Air Concerts and Events 12
3.9 Manchester City Council: Planning and Noise Technical Guidance 13
3.10 Recommended Noise Assessment Criteria 13
4.0 Assessment of Results 14
4.1 Assessment of Noise Risk 14
4.2 SoundPLAN Model 15
4.3 Assessment of Entertainment Noise from Mary D's bar 23
4.4 Assessment of Noise in External Amenity Spaces 23
5.0 Recommendations for Noise Mitigation 24
5.1 Recommended Glazing Specification 24
5.2 Recommended Ventilation Specification 25
5.3 Mitigation Specifications 25
5.4 Other Elements of Building Envelope 26
5.5 Noise Limits for External Plant 26
6.0 Summary 27
Appendix A – Glossary of Acoustic Terms 28
Appendix B – Noise Survey Data 29
Appendix C – Buro Happold Graphed Noise Data (ES Appendix 11.4 noise survey results) 33
Appendix D – BS 8233 Break-in Calculations 35

1.0 Introduction

Azymuth Acoustics UK (henceforth Azymuth) has been contracted by Bowker Sadler Architecture to perform a Noise Impact Assessment (NIA) in relation to 82no. proposed new build dwellings situated off Grey Mare Lane, Manchester. The site is located south of the A662 Ashton New Road and ~130m from the Etihad football stadium, home of Manchester City Football Club.



Figure 1 – Site plan of proposed development

This noise impact assessment is intended to provide information relating to potential noise levels affecting the site in order to support the detailed planning application for the residential development. In particular, the report sets out the following details:

- The results of a baseline noise survey undertaken in the vicinity of Grey Mare Lane
- The appropriate assessment criteria and guidance relating to noise in the environment as associated with this kind of development
- Recommendations to meet the targets as set out by the assessment criteria

It is assumed that all drawings and information provided by the client is up to date and correct.

Azymuth have reviewed the following additional information when carrying out the noise assessment:

- Drawings provided by Bowker Sadler for the floor plans and elevations of the proposed buildings (drawings issued February 2025)
- An Environmental Statement covering 'Project North Stand' for the Etihad (Manchester City) Stadium prepared by Deloitte dated April 2023. This document contains a noise assessment (undertaken by Buro Happold) of the operational noise from activity at the stadium. Data from this assessment has been used to inform the noise levels in this report, especially as it relates to noise from football match days and from music events at the stadium. A summary of the measured noise levels can be found in Section 2.3.

2.0 Baseline Noise Survey

Azymuth has conducted multiple noise surveys at various noise measurement positions to gain an accurate description of the current noise climate effecting the proposed development. Azymuth has taken into account noise from multiple different sources when assessing the total noise impact, these are highlighted below.

As the site is located close to the Etihad Stadium the noise levels from both football matches and occasional music events have been assessed, as well as nearby Mary D's bar.

The site is also located close to multiple main roads (A662/Ashton New Road, A6010/Alan Turing Way and Grey Mare Lane), the noise levels from these roads have also been assessed.

A previous noise assessment has been undertaken by Buro Happold (prepared for Project North Stand), Azymuth has used data identified within Buro Happold's report to compare and develop the data sets for their own assessment.

2.1 Measurement Procedures

The instrumentation used for the NIA consisted of a SvanTek 971 and SvanTek 977 type 1 precision sound level meters. The equipment was calibrated before and after measurements. The sound level meters measured A-weighted (fast response) noise levels as well as octave bands noise levels for all measurement record.

Initial daytime noise level measurements were undertaken between 10:30hrs and 13:10hrs on Wednesday 5th June 2024. The night-time measurements were undertaken between 23:00hrs and 23:53hrs on Wednesday 5th June and between 00:30hrs and 01:52hrs on Thursday 20th June 2024.

Additional daytime noise measurements were taken on Thursday 22nd August 2024 between 16:23hrs and 18:13hrs. This was supplemented with night-time noise measurements undertaken between 23:00hrs and 00:08hrs on Tuesday 3rd / Wednesday 4th September 2024.

Measurements were taken on Saturday 14th September 2024 between 14:58hrs and 16:21hrs during the Manchester City home match against Brentford.

Measurements were taken on Tuesday 4th March 2025 between 07:46hrs and 09:21hrs to capture the morning rush hour traffic.

Measurements were taken on Tuesday 20th May 2025 between 19:19hrs and 19:55hrs to capture potential entertainment noise emanating from Mary D's bar, before the Manchester City home match against Bournemouth.

The noise measurements were undertaken using the sound level meter at the position(s) shown in Figure 2 below:

- Position 1: Jenkyn Walk (~17m from Ashton New Road)
- Position 2: Grey Mare Lane 1, footpath (~0.5m from roadside)
- Position 3: Ashton New Road ginnel (~6.5m from roadside)
- Position 4: Grey Mare Lane 2, layby (~3.9m from cycle lane, ~5m from main carriageway)
- Position 5: Ashton New Road / Jenkyn Walk ginnel (~6.5m from roadside)
- Position 6: Howarth Close, outside Mary D's back entrance (~2.5m from roadside)

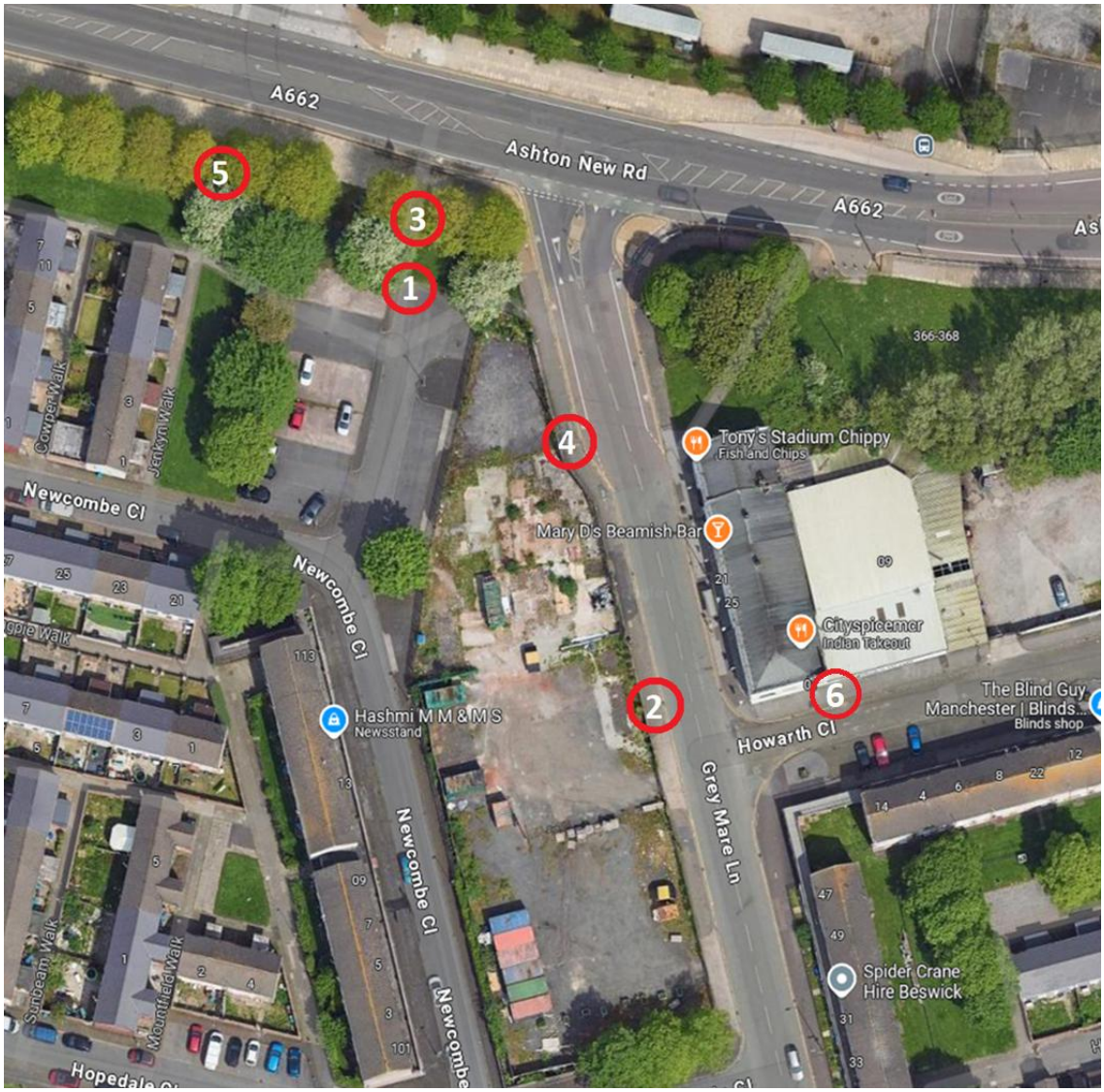


Figure 2 – Noise measurement position(s)

2.2 Summary of Azymuth Noise Measurements

2.2.1 General Environmental Noise Survey Data

The following table summarises the results of the noise measurements undertaken at the proposed site in terms of the average daytime and night-time noise levels in absence of any football match or live event at the Etihad Stadium i.e. encapsulating only general road traffic noise. Undertaken in June, August and September 2024, and March 2025.

Location	Period	L_{AFmax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
1) Jenkyn Walk	Day	68.0	58.9	61.5	58.0	53.8
1) Jenkyn Walk	Night	62.5	52.6	56.4	48.4	42.6
2) Grey Mare Lane 1	Day	79.7	62.5	64.6	55.0	52.3
2) Grey Mare Lane 1	Night	68.4	52.8	48.4	40.9	38.8
3) Ashton New Road	Day	85.2	72.4	73.8	63.8	57.2
3) Ashton New Road	Night	74.6	61.5	66.0	54.5	44.6
4) Grey Mare Lane 2	Day	84.4	67.2	67.7	63.6	56.8
4) Grey Mare Lane 2	Night	66.0	50.6	53.8	45.6	41.1
5) Ashton Nw Rd / Jenkyn Wk	Day	73.6	67.2	69.8	66.8	60.9

Table 1 – Summary of Azymuth Acoustics noise measurements (general day/night traffic)

2.2.2 Weekend Match-Day Noise Survey Data

The results of the football match-day noise survey are summarised below, taken on Saturday 14th September 2024 during the Manchester City home match against Brentford.

Location	Period	L_{AFmax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
3) Ashton New Road Match Day	Day	91.9	73.5	75.5	66.8	57.6
3) Ashton New Road Match Day (Goal Scored)	Day	93.9	74.3	74.9	66.9	57.6
4) Grey Mare Lane 2 Match Day	Day	88.1	66.7	68.8	63.4	54.7

Table 2 – Summary of Azymuth Acoustics noise measurements during a football match

2.2.3 Mid-week Evening Match-Day Noise Survey Data (Inc. Mary D's)

The results of Mary D's entertainment noise survey are summarised below, taken on Tuesday 20th May 2025 before the Manchester City home match against Bournemouth.

Location	Period	L_{AFmax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
3) Ashton New Road Match Day	Day / early evening	79.3	64.2	66.2	62.1	59.5
6) Outside Mary D's back entrance	Day / early evening	76.9	63.5	66.0	60.4	56.7
4) Grey Mare Lane 2 Match Day	Day / early evening	80.2	65.9	68.3	63.4	59.9

Table 3 – Summary of Azymuth Acoustics noise measurements (Mary D's entertainment noise)

Azymuth assumes that all noise levels measured on-site during the baseline noise survey are typical of the site.

Full results of the noise levels recorded during the course of the survey are included in Appendix B of this report.

2.2.4 Entertainment Noise (Mary D's) Octave Band Data

The following table summarises the octave band noise levels measured outside Mary D's bar on Tuesday 20th May 2025 before the Manchester City home match against Bournemouth.

Location	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
6) Outside Mary D's back entrance	61.4	59.7	60.2	62.3	58.7	54.4	48.8	40.2

Table 4 – Summary of octave band noise measurements (Mary D's entertainment noise)

2.2.5 Assessment of Night-time L_{Amax} Data

Azymuth has carried out an assessment of the available night-time L_{Amax} noise level data for the Grey Mare Lane site at measurement positions 1 and 2. Position 1 is referenced to ~17m from the roadside (Ashton New Road) whereas Position 2 was referenced to ~0.5m from the roadside.

The highest measured L_{Amax} value at Position 1 was 67.2dB and the duration of the night-time survey was exactly 65 minutes, hence it is estimated that the 10th highest L_{Amax} value over the entire 8hr night-time period is likely to be around 65dB or slightly lower.

The highest measured L_{Amax} value at Position 2 was 81.8dB and the duration of the night-time survey was exactly 65 minutes, hence it is estimated that the 10th highest L_{Amax} value over the entire 8hr night-time period is likely to be around 79dB or slightly lower.

2.2.6 Description of General Noise Climate

The main source of noise affecting the site originates from traffic along both Ashton New Road and Grey Mare Lane, these roads see a consistent flow of traffic throughout the day up until around midnight as observed during the measurement procedures.

Heightened noise levels are to be expected during both match days and any other events at the Etihad Stadium, typical noise levels associated with this venue have been modelled in Section 4.2 using data collected by Buro Happold and measured by Azymuth.

Nearby fish and chip shops (Mr Macs fish and chips etc.) were open and busy during the survey, however no significant noise levels were observed from these venues. The associated external plant was not audible.

The weather during the daytime and night-time surveys was dry with average wind speeds between 5 and 10mph.

2.2.7 Description of Noise Climate during Football Match

The noise climate affecting the proposed development, during a match, is still dominated by road traffic along both Ashton New Road and Grey Mare Lane. Periodic heightened noise levels were observed during key events in the match (goals scored) although this did not significantly influence the ambient noise level at each measurement position. This can be seen by comparison of the average daytime noise levels both on the matchday (Table 2) and

the general road traffic noise levels (Table 1) where the L_{Aeq} levels differ by less than 1dB even when a goal is scored.

2.2.8 Description of Mary D's Noise Climate

The noise climate affecting the proposed development during Mary D's pre-match celebrations is still dominated by traffic along both Ashton New Road and Grey Mare Lane.

Entertainment noise from the venue was not audible on Ashton New Road or Grey Mare Lane. Faint music could be heard directly outside the front/back entrances and partly open windows of the venue, which appeared to originate from a karaoke set-up. However, the acoustic singing was louder than the speaker output.

Inside the main bar area were ~11no. ~30cm by ~35cm wall mounted speakers evenly spread across the top of the perimeter walls assumed to service the ~6no. TVs, and 1no. ~40cm by ~25cm speaker assumed to service the karaoke set-up. Many of the speakers were not in use during the survey. Outside in the beer garden area were ~3no. ~40cm by ~25cm speakers, not in use during the survey.

2.3 Summary of Buro Happold Noise Measurements

2.3.1 Bura Happold Survey Data

Azymuth has reviewed noise data taken from the Buro Happold assessment dated November 2022 (full graphical data can be found in Appendix C). From the graphical data Azymuth has inferred the noise levels measured at the receivers contained in the environmental statement to be as follows:

Location	Period	L_{AFmax}	L_{Aeq}	L_{A10}	L_{A90}
L1: On Ashton New Rd Opposite Biscay Close / Cromarty Walk	Day	80 – 85	74	76	69
	Night	78 – 84	68	69	65
L2: West side of Alan Turing Way, opposite The Cube	Day	81 – 93	74	76	62
	Night	79 – 90	64	65	47

Table 5 - Summary of noise data recorded by Buro Happold for the Project North Stand ES

The exact locations of the noise measurements employed by Buro Happold can also be found in Appendix C.

The noise measurement position L1 at Biscay Close / Cromarty Walk is estimated to be at a similar set-back distance from Ashton New Road when compared to Azymuth's Position 3. The resulting noise levels are in relatively close agreement, thus demonstrating the statistical reproducibility of the noise measurements.

Measurement L2 is in close proximity to Alan Turing Way and as such is not directly applicable to Azymuth's Grey Mare Lane measurement positions.

The additional noise measurements undertaken by Azymuth, along with those undertaken by Buro Happold, provide additional supporting noise data for the wider noise climate.

3.0 Assessment Criteria

In order to assess the extent of any measures required in order to comply with suitable conditions relating to potential noise sources, Azymuth Acoustics UK has reviewed various guidance documents and standards, these include:

- ProPG: Professional Practice Guidance on Planning and Noise (New residential development)
- National Planning Policy Framework (NPPF 2023)
- British Standard 8233:2014
- World Health Organisation Guidelines on Community Noise
- British Standard 4142:2014+A1:2019
- IOA Guide to Noise Requirements of Approved Document O 2022
- Acoustics Ventilation and Overheating Residential Design Guide 2020
- Manchester City Council: Guidance on Noise Control for Open Air Concerts and Events
- Manchester City Council: Planning and Noise Technical Guidance

3.1 ProPG: Planning and Noise - May 2017

This Professional Practice Guidance on Planning and Noise (ProPG) has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England. The National Planning Policy Framework (NPPF) encourages improved standards of design. The CIEH, IOA and the ANC have worked together to produce this guidance which encourages better acoustic design for new residential development and aims to protect people from the harmful effects of noise.

The Professional Practice Guidance on Planning and Noise States 'The recommended approach is intended to give the developer, noise practitioner, and decision maker an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of acoustic issues that would be faced'. It is important that acoustic design is reviewed at an early stage of the development process.

3.2 National Planning Policy Framework (NPPF) 2023

The NPPF provides guidance to local authorities taking into account noise in making planning decisions. Paragraph 185 of the National Planning Policy Framework (NPPF) states that planning policies and decisions should aim to:

- Mitigate and reduce to a minimum to a minimum potential adverse impacts resulting from new development – and avoid noise giving rise to significant adverse impacts on health and 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;

The NPPF states that the planning system should distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework. In addition, NPPF states that the planning system should 'prevent both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability'.

3.3 British Standard 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 Room	35	-
Dining	Dining Room / Area	40	-
Sleeping (daytime resting)	Bedroom (at night)	35	30

Table 6 – Noise Limits for Residential Properties Suggested in BS 8233

BS 8233 also states that traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$, which would be acceptable in noisier environments.

3.4 World Health Organisation Environmental Noise Guidelines (ENG) 2018

The main purpose of the 2018 WHO guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from the following sources: transportation (road traffic, railway and aircraft), wind turbines and leisure activities.

The guidelines set out to define recommended exposure levels for environmental noise in order to protect population health. Exposure limits are average levels defined over a period of one year, measured outdoors in free field at the most exposed façade. It should be noted that the document does not provide guideline limit values for multiple noise sources in combination.

The 2018 guidelines supersede the Community Noise Guidelines from 1999. Nevertheless, the document recommends that all CNG indoor guideline values and any values not covered by the current guidelines should remain valid. As such, the following guidance would remain appropriate:

For protection against sleep disturbance inside dwellings, night-time noise levels should not exceed 30dB L_{Aeq} for continuous noise and 45dB L_{Amax} for typical single sound events (which are exceeded 15 times or more per night – see ProPG Appendix A.12 for more details).

To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise (interpreted as noise from all sources combined) should not exceed 55dB L_{Aeq} on balconies, terraces and in outdoor living areas.

It should be noted that exposure levels defined in ENG and CNG are for guidance purposes as relates potential adverse health impacts and should not be interpreted as absolute limits or regulations.

3.5 British Standard 4142:2014+A1:2019

"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.

- Typically, the greater the difference between background sound and industrial/commercial noise, the greater the magnitude of the impact.
- 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.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

BS 4142 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."

3.6 IOA Guide to Noise Requirements of Approved Document O 2024

Approved Document O 'Overheating' was released in December 2021 and came into effect in England on 15th June 2022. It introduces requirements for various types of residential premises to limit unwanted solar gains in summer and provide an adequate means to remove heat from the indoor environment (Requirement O1 (1)). Requirement O1(2)(a) of the regulation requires that account must be taken of the safety of an occupant, and their reasonable enjoyment of the residence. There is also a requirement (O2(b)) that mechanical cooling may only be used where sufficient heat cannot be removed from the indoor environment without it.

The guide aims to set out a method to demonstrate compliance to the Building Control Body of the noise constraints in Approved Document O. This guide provides clarity for practitioners and regulators so that assessments can be carried out consistently, and the outcome is repeatable and reliable.

Paragraph 3.3 of Approved Document O states that windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits:

- 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am)
- 55dB L_{AFmax}, more than 10 times a night (between 11pm and 7am)

3.7 Acoustics Ventilation and Overheating Residential Design Guide 2020

The Acoustics, Ventilation and Overheating Guide (AVO) is intended to be used by acoustic practitioners as well as all those involved in the planning, development, design and commissioning of new dwellings.

It recommends an approach to acoustic assessments for new residential developments that take due regard of the interdependence of provisions for acoustics, ventilation and overheating. Application of the AVO Guide is intended to demonstrate good acoustic design as described in the ProPG, when considering internal noise level guidelines.

3.8 Manchester City Council: Guidance on Noise Control for Open Air Concerts and Events

The aim of this document is to provide event organisers, noise consultant, residents and other interested parties with guidance on noise control for open air concerts and events.

The Music Noise Levels (MNL) when assessed at the prediction stage or measured during sound checks or concerts should not exceed the guidelines shown in Table 1 at 1 metre from the façade of any noise sensitive premises for events held between the hours of 09:00 and 23:00.

Concert Days per Calendar Year, Per Venue	Venue	Guideline
1 to 3	Urban Stadia or Arenas	The MNL should not exceed 75dB $L_{Aeq,15min}$
1 to 3	Other Urban & Rural Venues	The MNL should not exceed 65dB $L_{Aeq,15min}$
4 to 12	All Venues	The MNL should not exceed the background noise level by more than 15dBA over a 15 minute period

Table 7 – Music noise guidelines

3.9 Manchester City Council: Planning and Noise Technical Guidance

The 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. The document states:

"Music noise levels in the 63Hz and 125Hz octave centre frequency bands (L_{eq}) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (L_{eq}) respectively."

3.10 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 environmental noise on the proposed new residential accommodation:

- Daytime noise levels not to exceed 35dB $L_{Aeq,\ 16hr}$ in living rooms / bedrooms
- Daytime noise levels not to exceed 40dB $L_{Aeq,\ 16hr}$ in dining room / kitchen
- Night-time noise levels in bedrooms not to exceed 30dB $L_{Aeq,\ 8hr}$
- Night-time single sound events in bedrooms not to exceed 45dB L_{Amax} more than 15 times a night
- Noise levels in external amenity spaces to not exceed 50dB $L_{Aeq,T}$, with an upper guideline of 55dB $L_{Aeq,T}$ in noisier environments

Table 4, Note 5 of BS 8233:2014 states: 'If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.'

Based on the guidance above (Section 3.9) it is recommended that the following criteria would be reasonable with the aim of minimising the impact of entertainment noise on the proposed new residential accommodation:

- Not exceeding 47dB at 63Hz inside nearby habitable rooms of proposed dwellings, equivalent to 60dB at 63Hz outside a part open window
- Not exceeding 41dB at 125Hz inside nearby habitable rooms of proposed dwellings, equivalent to 54dB at 125Hz outside a part open window

4.0 Assessment of Results

4.1 Assessment of Noise Risk

The following noise and overheating risk assessment highlights the level of risk of an adverse effect based on the guidance from the ProPG and AVO guidance documents. The table summarises the results of the noise assessment for general day/night environmental (primarily traffic) noise at various elevations around the proposed site.

Azymuth have simulated the predicted noise levels in SoundPLAN before taking the worst-case results for different elevations of the development in the assessment below.

Location	Time of Day	Measured / Calculated Noise Levels (dBA)	ProPG Risk of Adverse Effect	AVO Guide Risk (overheating) Category
Elevations facing Ashton New Road	Day $L_{Aeq, 16hr}$	66	Medium/High	High
	Night $L_{Aeq, 8hr}$	58	Medium/High	High
Elevations facing Grey Mare Lane	Day $L_{Aeq, 16hr}$	63	Medium	Medium/High
	Night $L_{Aeq, 8hr}$	53	Low/Medium	Medium
Rear elevations (facing Newcombe Close)	Day $L_{Aeq, 16hr}$	54	Low	Low
	Night $L_{Aeq, 8hr}$	48	Low	Low

Table 8 – Noise risk assessment for Grey Mare Lane

As shown above, the façades facing directly onto Ashton New Road would represent the most significant risk in terms of potential adverse impact. The Grey Mare Lane elevation experiences noise levels resulting in a medium to high risk of over-heating (owing to occupants needing to close their windows to achieve favourable internal acoustic conditions). These are north and east facing elevations and as such would indicate that there is a moderately elevated risk of overheating requiring enhanced ventilation that would normally be offered by opening windows. Hence, the noise risk assessment indicates that relying on opening windows would result in significant noise intrusion, thus disrupting normal sleep.

The AVO guide gives the following example outcomes for noise that may be perceived as present and disruptive:

"Having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area."

It should be noted that ProPG does not account for daytime L_{Amax} instances that may arise from vehicles passing by. These instances may cause annoyance during the day to the potential residents. As such, extra mitigation has been recommended in order to minimise noise complaints to the premises.

4.2 SoundPLAN Model

Azymuth has undertaken acoustic modelling with the SoundPLAN 9.1 noise modelling software to predict and visualise the impact of all noise sources on the proposed development site. These include general environmental (traffic) noise as well noise associated with the Etihad Stadium during a football match and during a live music event, and entertainment noise from Mary D's bar.

4.2.1 Environmental Noise – Road Traffic

Azymuth have used measurements undertaken during June, August and September 2024, and March 2025 to inform the SoundPLAN noise model.

Grid Noise Maps (GNM)

The following GNMs show the effect of day and night traffic noise on the development.

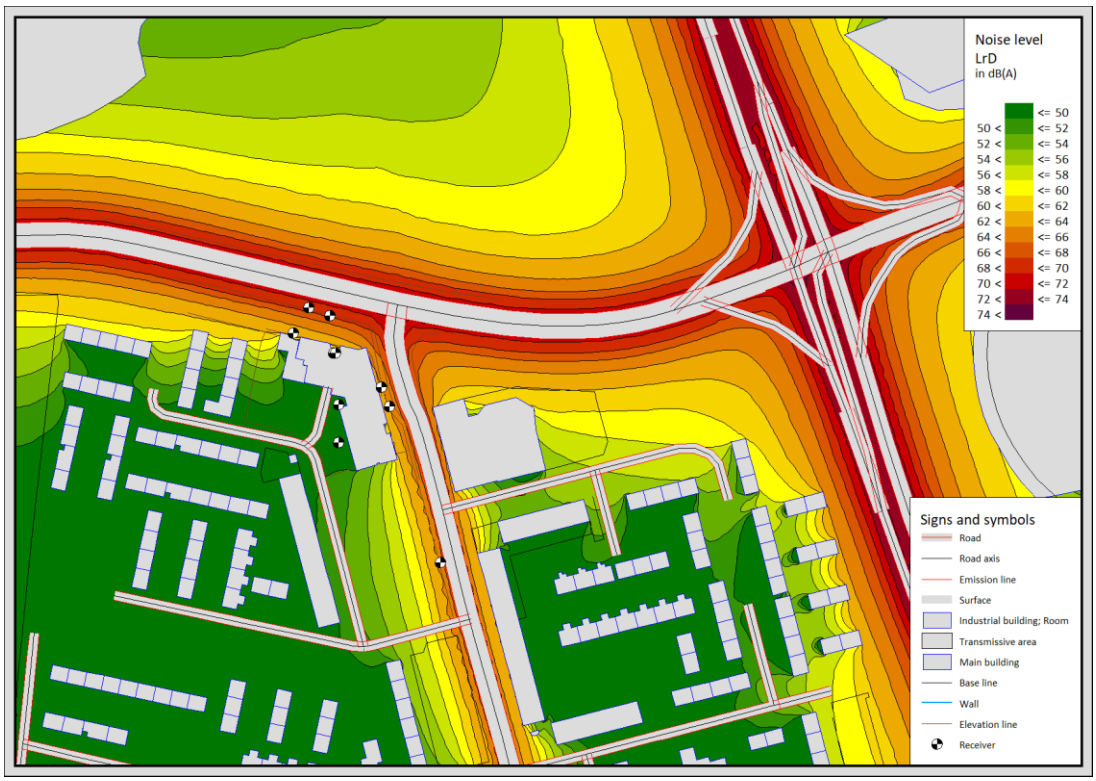


Figure 3 – Daytime traffic GNM

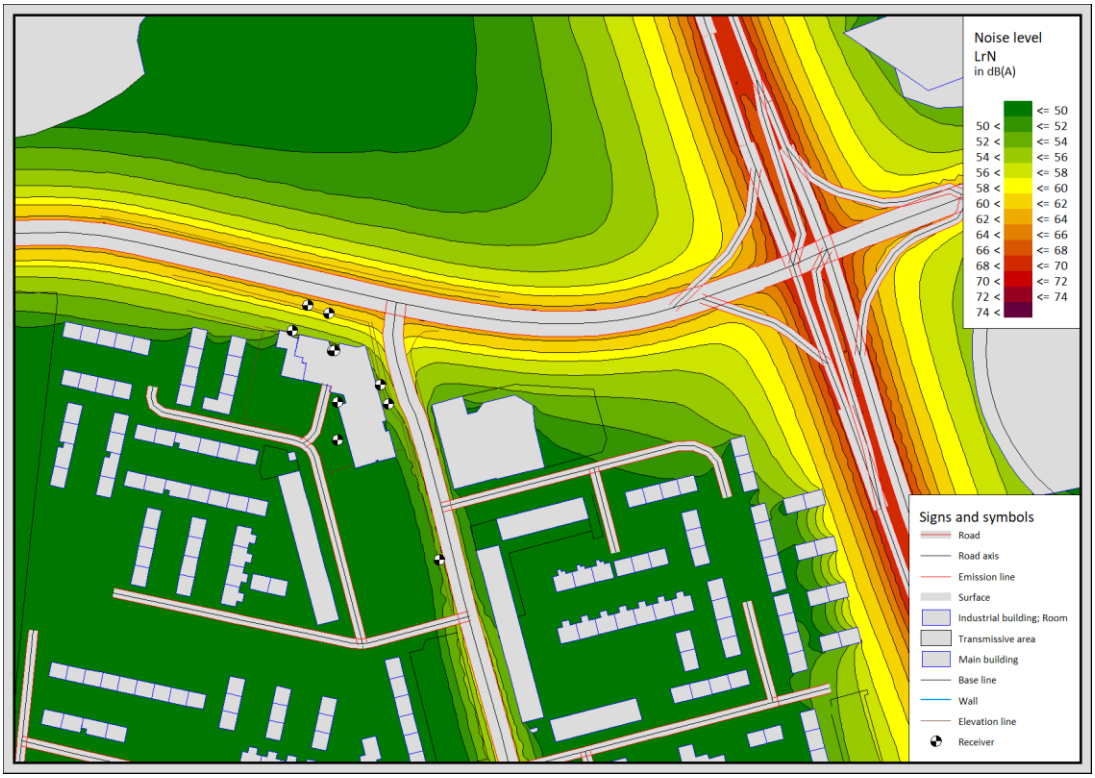


Figure 4 – Night-time traffic GNM

Façade Noise Maps (FNM)

The following FNMs show the effect of day and night traffic noise on the development.

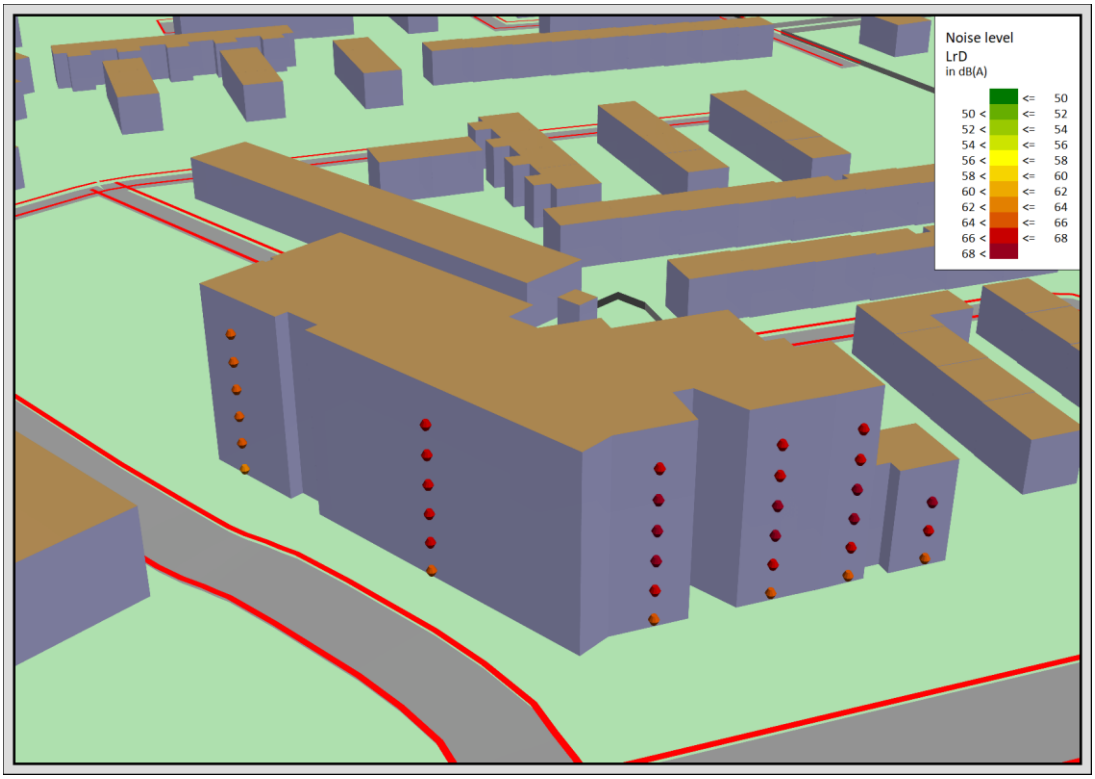


Figure 5 – Daytime traffic FNM

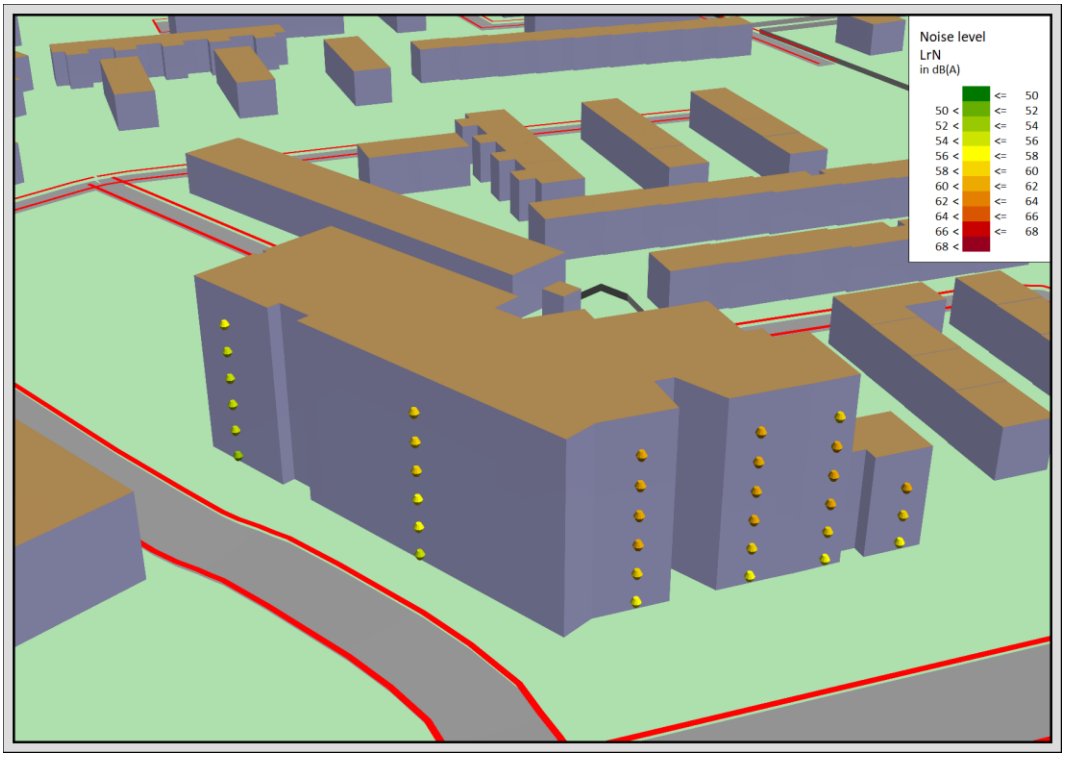


Figure 6 – Night-time traffic FNM

4.2.2 Stadium Noise – Football Match

Azymuth have used data from the Buro Happold report along with their own measurements undertaken during the Saturday 14th September 2024 match-day survey to inform the SoundPLAN noise model.

Grid Noise Map (GNM)

The following GNM shows the effect of noise from the Etihad Stadium on the development.

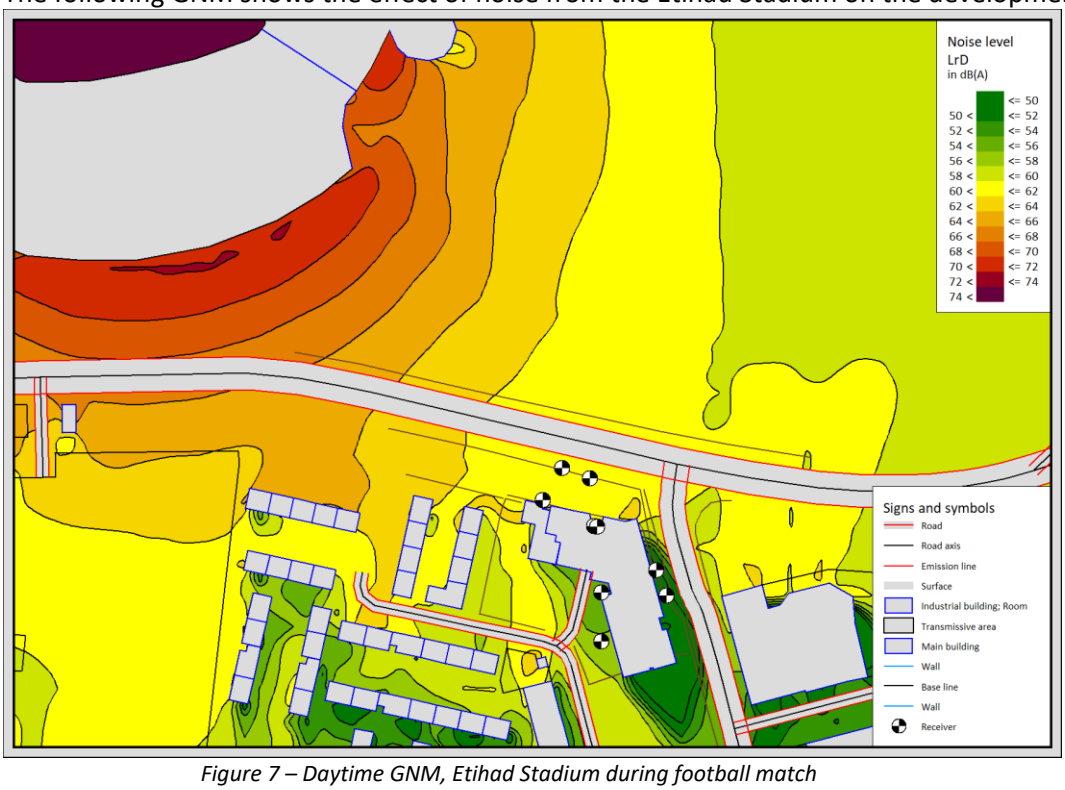


Figure 7 – Daytime GNM, Etihad Stadium during football match

Façade Noise Map (FNM)

The following FNM shows the effect of noise from the Etihad Stadium on the development.

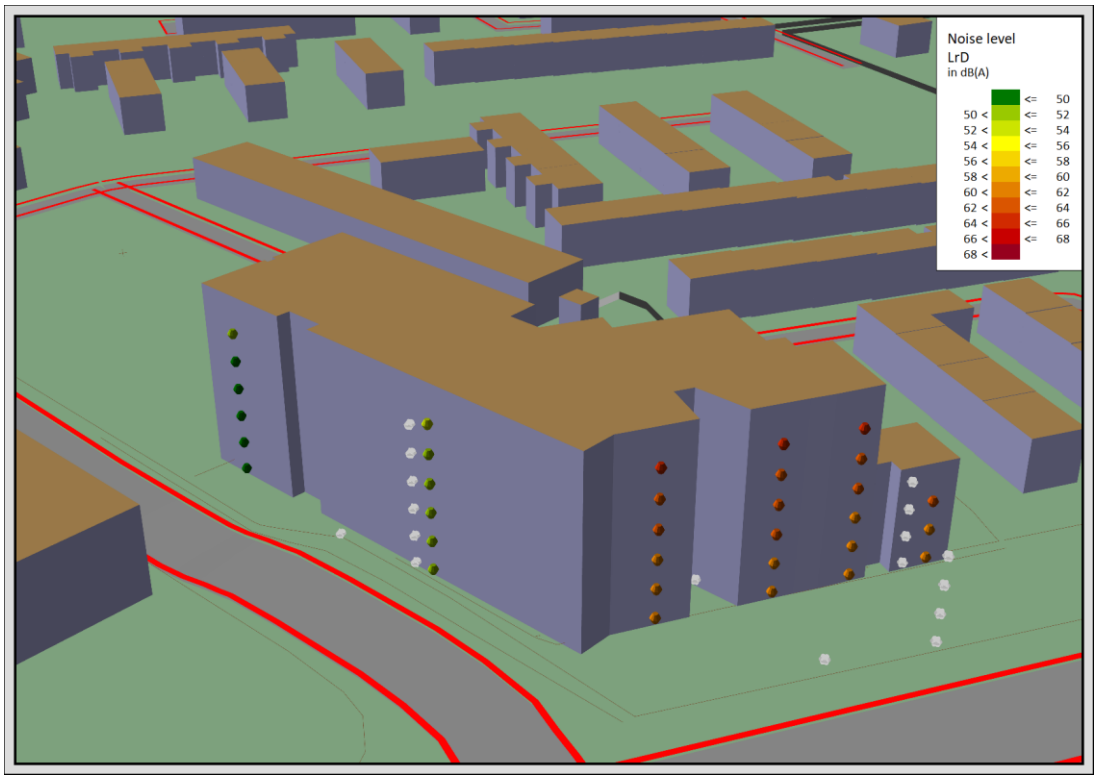


Figure 8 – Daytime FNM, Etihad Stadium during football match

Based on the results from the SoundPLAN model the crowd noise levels from a football match have been calculated to be in the range of 61-63dBA (or less) at the Ashton New Road elevation. This is between 3-6dB (at least) lower than the general daytime traffic noise levels and as such would have little influence on the overall noise levels. The sound from the football will be audible but is not deemed to be at a level that additional noise mitigation would be necessary.

4.2.3 Stadium Noise – Music Event

Using the same methodology as Section 4.2.2, Azymuth have used data from the Buro Happold noise assessment to produce a SoundPLAN noise model for a typical live music event at the Etihad Stadium.

Grid Noise Map (GNM)

The following GNM shows the effect of noise from the Etihad Stadium on the development during a live music event.

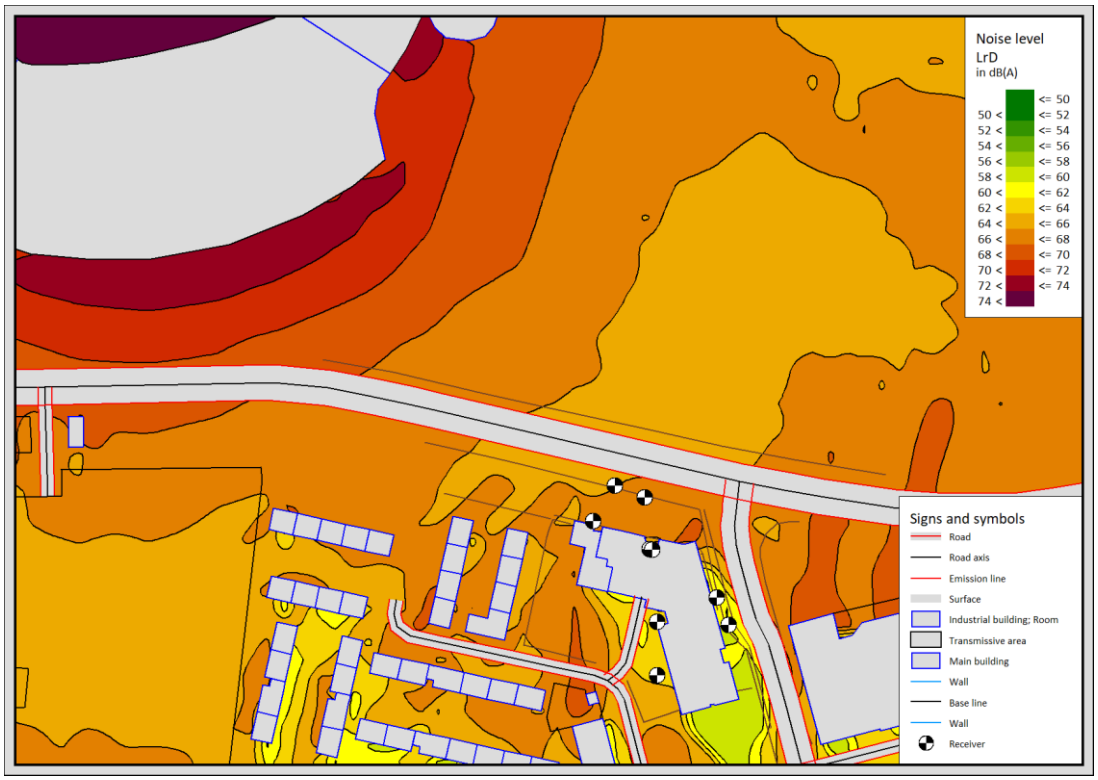


Figure 9 – Daytime GNM, Etihad Stadium during live music event

Façade Noise Map (FNM)

The following FNM shows the effect of noise from the Etihad Stadium on the development during a live music event.

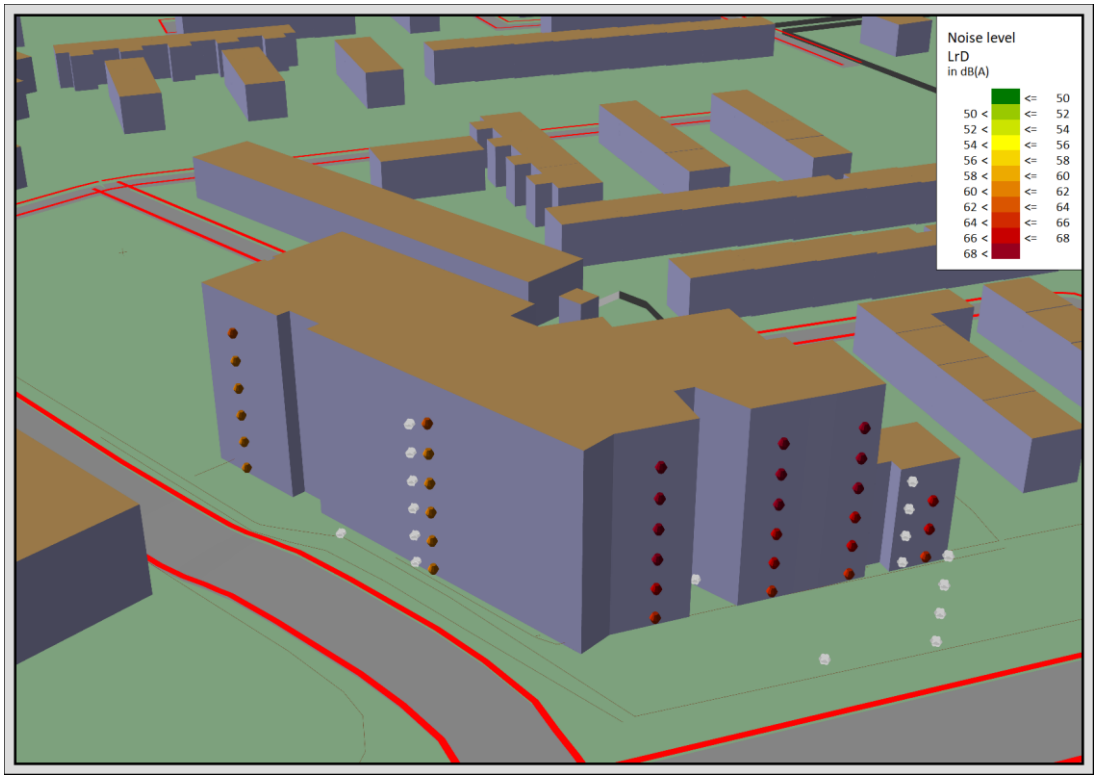


Figure 10 – Daytime FNM, Etihad Stadium during live music event

The sound levels from a live music at the Etihad Stadium have been calculated to be between 67-70dBA at the nearest façade of the development. The calculated noise levels would imply that music events will be clearly audible. The noise levels from music events at the Etihad Stadium would normally be controlled by a noise monitoring strategy and a set of operational noise limits.

Azymuth has Reviewed ConcertArchives.org to obtain an estimate of the number of live music events, which has historically been in the range of 3 to 8 events per year. However, this was prior to the opening of the Coop Live Arena and 3 to 4 events per year at the Etihad Stadium would now seem to be more likely in practice.

4.2.4 Entertainment Noise – Mary D's bar

Azymuth have used measurements undertaken during Tuesday 20th May 2025 to inform the SoundPLAN noise model.

A worst-case scenario has been modelled with a typical event running at full capacity throughout daytime and night-time hours. The published opening hours of the premises vary from 12:00hrs to 17:00hrs but closing at 00:00hrs each day.

Grid Noise Maps (GNM)

The following GNM shows the effect of entertainment noise on the development.



Figure 11 – GNM, Mary D's entertainment noise

It can be seen from the grid noise map in Figure 11 that the noise propagated by the Mary D's venue is very limited and that it has little influence on the local noise climate beyond 2 or 3m from the venue itself.

Façade Noise Maps (FNM)

The following FNM shows the effect of entertainment noise on the development.

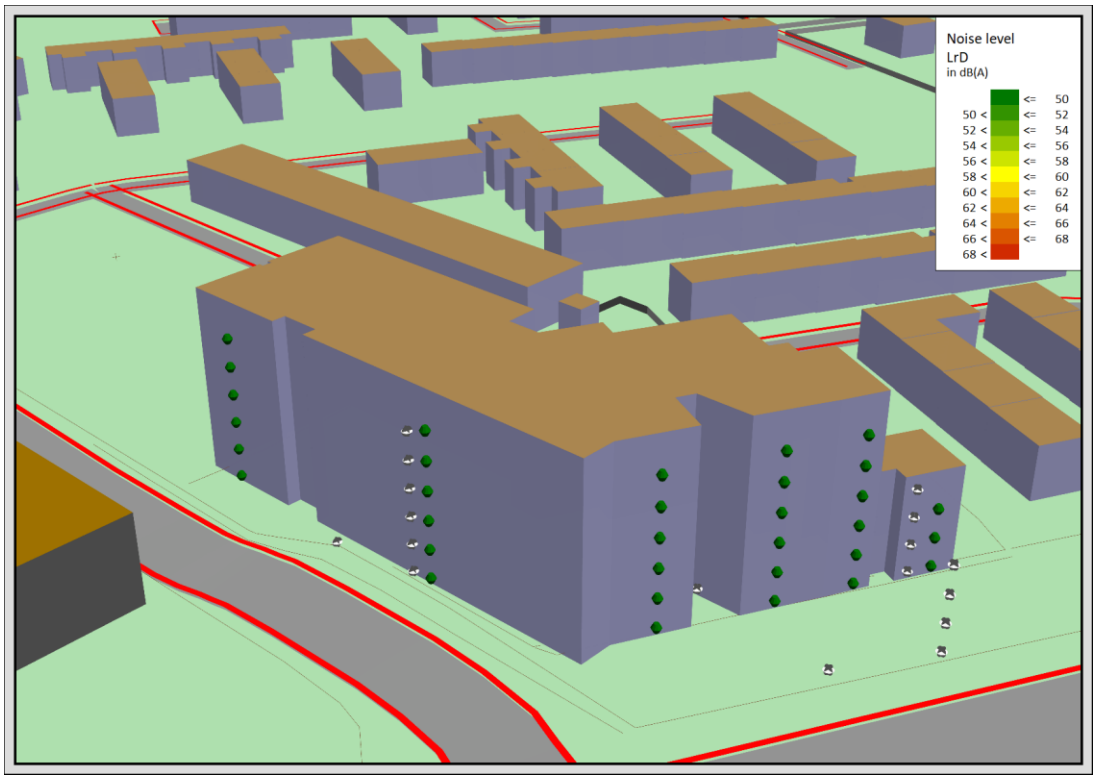


Figure 12 – FNM, Mary D's entertainment noise

4.3 Assessment of Entertainment Noise from Mary D's bar

The measured sound level immediately outside Mary D's bar is ~64dBA. This level is representative of a typical event at the bar (pre-match celebrations). The below table identifies the octave band spectra measured and predicted by Azymuth during a typical Mary D's bar event at the proposed development. Each measured/calculated value has been colour coded as to indicate if the levels exceed the MCC targets (≤60dB at 63Hz and ≤54dB at 125Hz).

Receptor	Octave Band Centre Frequency (Hz)								Total dBA
	63	125	250	500	1k	2k	4k	8k	
Outside MaryD's back entrance (measured = predominanyl road traffic noise)	61.4	59.7	60.2	62.3	58.7	54.4	48.8	40.2	63.5
Elevation facing Grey Mare Lane, Ground Floor (calculated)	36.4	30.0	26.3	31.1	30.5	26.4	19.7	7.2	34.0
Elevation facing Grey Mare Lane, 2nd Floor (calculated)	36.4	29.4	30.2	34.1	30.9	26.3	19.7	7.2	35.2
Rear elevation, Ground Floor (calculated)	34.7	28.1	23.9	29.2	28.8	24.6	17.6	4.4	32.2
MCC guidance values for entertainment noise	60	54							49 – 5dB = 44
Estimated background sound level for period 1900-2300hrs	51	47	45	43	44	39	31	24	47
Worst case noise (2nd floor facing Grey Mare Lane) – background sound level	-15	-17	-14	-9	-13	-12	-11	-16	-12

Table 9 – Entertainment noise octave band levels at proposed development

The predicted noise levels at elevations closest to Mary D's bar do not exceed MCC targets for the 63Hz and 125Hz octave centre frequency bands as set out in Section 3.9. The predicted total dBA levels are all below the predicted evening background level (49dBA) – 5dB which is 44dBA. It can also be seen from the above table that all of the octave bands between 63Hz and 8kHz are deemed to be at least 9 dB below the background sound level during the evening period. As such, it has been found entertainment noise from the venue does not pose an adverse noise impact on the proposed development site.

4.4 Assessment of Noise in External Amenity Spaces

The sound levels in the communal garden areas of the proposed development have been calculated to be between 48-50dBA and as such would comply with the assessment criteria contained within Section 3.10.

5.0 Recommendations for Noise Mitigation

Based on survey data and the predicted noise levels derived from SoundPLAN, Azymuth have produced the following recommendations in order to mitigate the effects of noise within the proposed development. If these recommendations are followed, noise levels within the development will satisfy the criteria as set out in Section 3.10.

NB all recommended mitigation specifications are subject to good workmanship and for materials to be installed as the manufacturer intends. Any poor workmanship may lead to weaknesses in the sound attenuation provided by the building elements.

Recommendations have been colour coded relating to Section 5.3.

Azymuth have included detailed BS 8233 break-in calculations in Appendix D.

5.1 Recommended Glazing Specification

The following specifications supersede those contained within previous versions of this report and represent minor amendments to the previous recommendations. The specifications outlined below provide a greater degree of comfort to ensure there will be no heightened noise levels upon pre-completion testing.

The table below outlines the glazing specifications Azymuth would recommend in order to achieve the specified internal ambient noise level targets.

Location (Habitable Spaces)	Glazing Specification	Appropriate Glazing Types
Ashton New Road Elevations	Any building regulations approved min. 35dB R_W and 30dB R_W+C_{tr}	Acoustic glazing e.g 6/16 /10mm laminated good quality double glazed units
Grey Mare Lane Elevations	Any building regulations approved min. 32dB R_W and 27dB R_W+C_{tr}	Acoustic glazing e.g 8/16 /6mm good quality double glazed units
Newcombe Close Elevations	Any building regulations approved min. 30dB R_W and 25dB R_W+C_{tr}	Any good qualiity double glazing

Table 10 – Azymuth recommended glazing specification for Grey Mare Lane

NB it is very important to ensure that the whole glazing system achieves the minimum acoustic ratings as specified above, this includes glass, frames, doors and all associated seals. Failure to achieve these ratings will result in noise levels that exceed the specified limits.

5.2 Recommended Ventilation Specification

The table below outlines the recommended ventilation that should be paired with the glazing specifications to ensure the appropriate sound insulation targets are met. With reference to the AVO and ProPG guidance, Azymuth recommends the following ventilation specification to ensure sufficient air flow to dwellings whilst also achieving internal noise level targets.

Location (Habitable Spaces)	Ventilation Specification	Appropriate Ventilation Types
All dwellings facing Ashton New Road or Grey Mare Lane	Building Regulations Part F mechanical ventilation with heat recovery (MVHR) with boost function	No trickle vents. All air inlets and outlets should be appropriately attenuated
Newcombe Close Elevations	MEV with trickle vents rated at min. 34dB D_{new}	Part F compliant trickle vents min. 34dB D_{new}, e.g Titon SF Xtra Sound Attenuator

Table 11 – Azymuth recommended ventilation specification for Grey Mare Lane

5.3 Mitigation Specifications

The following sketch summarises the recommended glazing and ventilation specifications for the proposed scheme (applicable to dwellings on all relevant floor levels):

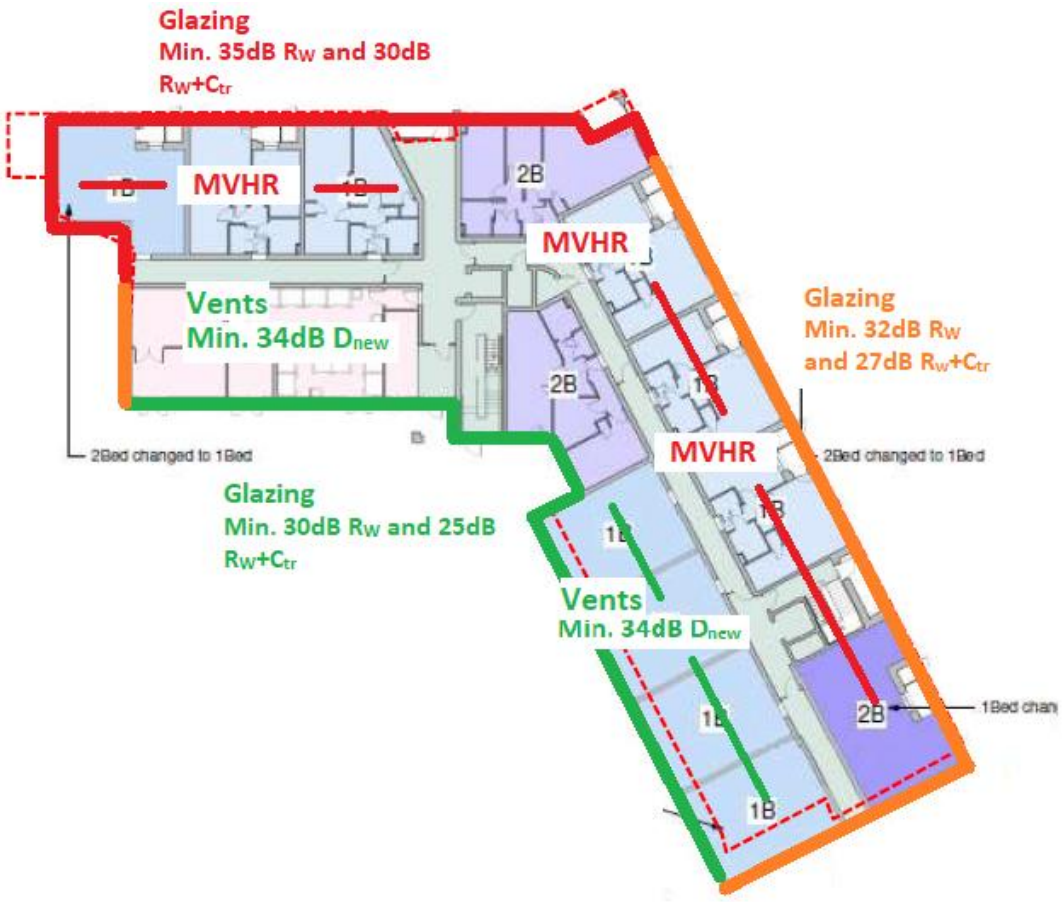


Figure 13 – Glazing and Ventilation Specification for all facades and all floor levels.

5.4 Other Elements of Building Envelope

Other elements of the building envelope should have the following sound insulation performance:

- External Walls: minimum sound insulation 55dB R_W. This minimum is likely to be significantly exceeded by a normal brickwork façade. Where alternative external wall types (eg composite cladding panels / Metsec build-ups) are proposed on habitable areas it will be appropriate to check whether they comply with the target55dB R_W.
- Roof: minimum sound insulation 45dB R_W. This minimum would likely be exceeded with a traditional slate or tile roof with mineral wool loft insulation above plasterboard ceilings or by a suitably insulated concrete roof or composite flat roof. (NB for composite flat roof build-ups a minimum 200mm roof void and 100m mineral wool insulation would be recommended over and above the rigid insulation required to provide the required levels of thermal insulation).

5.5 Noise Limits for External Plant

Azymuth would recommend a noise limit of 60dBA at 1m from any external plant. It is understood that the only mechanical plant associated with the heating systems at the development will consist of hot water heat pumps with air (supply and return) being ducted to small grills to the external walls of the apartments. The type of unit currently specified is a Edel Dimplex type and these have a quote sound power level of 38dBA which would be equivalent to ~ 30-32dBA @ 1m external to the building and as such will be substantially below the recommended 60dBA at 1m limit recommended above.

6.0 Summary

A baseline noise survey has been undertaken in the vicinity of the site. Daytime ambient noise levels were measured to be between 59-73dB $L_{Aeq,16hr}$, the night-time noise levels were measured to be between 53-61dB $L_{Aeq,8hr}$.

An additional baseline noise survey was undertaken on match day to quantify whether any additional crowd noise would have any adverse effects on the development site. Ambient noise levels were measured to be between 66-73dB L_{Aeq} during the match with maximum values of 93.9dB L_{AFmax} when a goal had been scored.

An additional baseline noise survey was undertaken on match day to quantify whether entertainment noise from Mary D's bar would have any adverse effects on the development site. Ambient noise levels were measured to be between 64-66dB L_{Aeq}.

The development generally possesses a medium to high risk of adverse noise effect and overheating as per the ProPG and AVO guidance documents respectively.

Azymuth have produced a noise model in SoundPLAN 9.1 to better predict and visualise the effect of noise from traffic, events from the Etihad Stadium and Mary D's bar on the development.

Data used for the modelling of the stadium noise for both football and music events has been derived/interpretated from the Burro Happold report as well as Azymuth's own measurement data.

Azymuth have provided the following recommendations to mitigate the effects of external noise in the internal areas of the development.

<u>Glazing</u>

- Elevations facing onto/towards Ashton New Road: min. 35dB R_W and 30dB R_W+C_{tr}
- Elevations facing onto/towards Grey Mare Lane: min. 32dB R_W and 27dB R_W+C_{tr}
- All other elevations: min. 30dB R_W and 25dB R_W+C_{tr}

<u>Ventilation</u>

- All dwellings with Elevations facing onto/towards Ashton New Road/Grey Mare Lane: MVHR with boost function
- All other dwellings: MEV, trickle vents min. 34dB D_{new}

<u>Other Elements of Building Envelope</u>

- External walls: min. 55dB R_W
- Roof: min. 45dB R_W

If the recommendations are to be adhered to then the internal noise levels (under normal conditions) shall satisfy the assessment criteria contained within Section 3.9.

Appendix A – Glossary of Acoustic 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 20Hz to 20kHz. 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 60dB, after the source has been switched off. 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 entering the receiving room (usual range 100 - 3150Hz 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 – Noise Survey Data

Start	Position	Time	L_{Amax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
Wednesday 5th June 2024							
10:35:00	1	00:05:00	65.9	58.8	61.9	57.6	53.2
10:40:00	1	00:05:00	66.1	59.2	61.8	58.9	53.6
10:45:00	1	00:05:00	64.7	58.8	62.1	57.3	53
10:50:00	1	00:05:00	68.5	60	62.9	58.9	53.6
10:55:00	1	00:05:00	67.9	59.4	62.3	58.2	54
11:00:00	1	00:05:00	67.1	58.8	61.2	58.4	54
11:05:00	1	00:05:00	70.6	59.1	61.9	58.1	53.9
11:10:00	1	00:05:00	63.8	58.3	60.9	57.7	53.6
11:15:00	1	00:05:00	66.7	59.4	62.1	58.4	54
11:24:00	2	00:05:00	78.5	61.8	63.3	54.1	52
11:29:00	2	00:05:00	86.1	64.9	66.4	55.7	52.4
11:34:00	2	00:05:00	78.3	62.2	64.6	54.7	52.3
11:39:00	2	00:05:00	77.9	61.5	64.2	55.1	52.4
11:44:00	2	00:05:00	76.5	62.1	65.6	54.8	51.7
11:49:00	2	00:05:00	80.4	62.8	65.2	56.6	53.1
11:54:00	2	00:05:00	79.2	61.7	63.7	54.9	51.1
11:59:00	2	00:05:00	85	62.6	63.3	55.1	52.3
12:04:00	2	00:05:00	85.5	63.8	62.6	55.7	52.3
12:12:00	1	00:05:00	75.3	58.9	60.7	57.6	54.2
12:17:00	1	00:05:00	68.5	58.4	60.9	57.9	54.5
12:22:00	1	00:05:00	69.2	59.3	61.4	58.5	54.6
12:27:00	1	00:05:00	66.1	58.3	61.3	57.4	53.5
12:32:00	1	00:05:00	71.7	58.5	60.6	57.6	54
12:37:00	1	00:05:00	67.6	58.3	61.2	57.2	52.9
12:45:00	2	00:05:00	74.6	60.7	64.4	54	51.5
12:50:00	2	00:05:00	76.7	62.1	64.8	54.3	51.9
12:55:00	2	00:05:00	78.6	63.8	68.2	56	53
13:00:00	2	00:05:00	81.9	61.6	61.8	54.2	52.3
13:05:00	2	00:05:00	75.7	60.5	64.6	54.5	53
13:10:00	2	00:05:00	80.4	62.7	66	55	52.5
23:05:00	1	00:05:00	67.2	54.3	57.7	51.6	45.9
23:10:00	1	00:05:00	61	53.5	57.5	51.1	45.2
23:15:00	1	00:05:00	62.1	52.8	57.9	46.5	41.5
23:20:00	1	00:05:00	64.4	54.3	58.2	52.1	42.8
23:25:00	1	00:05:00	64.5	54.5	57.9	52.7	44.3
23:33:00	2	00:05:00	81.8	58.6	55.3	44.6	41.3
23:38:00	2	00:05:00	75	56.3	55.9	43.8	41.3
23:43:00	2	00:05:00	72.4	53.7	55.1	44.8	40.5
23:48:00	2	00:05:00	54.9	44.1	47.3	42.1	40.1
23:53:00	2	00:05:00	76.4	56.4	56	42.5	40.7
Thursday 20th June 2024							
00:35:00	1	00:05:00	62.5	53.2	56.7	51.2	45
00:40:00	1	00:05:00	63.1	53	57.1	49.5	42.4
00:45:00	1	00:05:00	62.6	52.5	57.3	48.3	41.1
00:50:00	1	00:05:00	61.9	51.7	56.1	47.3	42

Start	Position	Time	L_{Amax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
00:55:00	1	00:05:00	59.8	49.7	54.4	45.1	40.9
01:00:00	1	00:05:00	61.8	50	54.4	44.7	40.6
01:05:00	1	00:05:00	60.8	51	55.1	46.8	41.7
01:10:00	1	00:05:00	60.3	48.5	52.6	42.7	40.7
01:17:00	2	00:05:00	76.3	53.1	45.8	39.5	38
01:22:00	2	00:05:00	76.8	52.4	47.4	40.3	38.2
01:27:00	2	00:05:00	71.2	48.8	45.9	40.9	38.1
01:32:00	2	00:05:00	54.5	40.8	42	38.2	36.9
01:37:00	2	00:05:00	51.5	41	42.8	39.1	37.5
01:42:00	2	00:05:00	64.2	44.6	44.3	38.8	37.5
01:47:00	2	00:05:00	66.6	47	46.2	39.4	38
01:52:00	2	00:05:00	67	46.9	45.1	38.1	36.8
Thursday 22nd August 2024							
16:23:00	3	00:05:00	92.1	77.9	82	70.8	56.9
16:28:00	3	00:05:00	89.3	71.4	74.9	59	49.4
16:33:00	3	00:05:00	92.4	75.2	78	62.1	51.6
16:38:00	3	00:05:00	91.3	72.2	74.5	69	60.4
16:43:00	3	00:05:00	92.7	76	77.8	70.6	64.1
16:48:00	3	00:05:00	85	70.4	72.1	68.7	64.2
16:58:00	3	00:05:00	92.8	74.3	75.9	69.4	61.6
17:03:00	3	00:05:00	89.2	72.1	73.7	56.8	48
17:08:00	3	00:05:00	89.9	70.6	73.4	51.2	44.6
17:13:00	3	00:05:00	94.9	71.7	74.5	50	43.8
17:18:00	3	00:05:00	91.0	73.2	75.7	62.8	54.5
17:23:00	3	00:05:00	89.9	71.3	74.6	57.1	57.7
17:28:00	4	00:05:00	86.1	64.9	66.4	55.7	52.4
17:33:00	4	00:05:00	89.1	66.4	66.9	70.8	56.9
17:38:00	4	00:05:00	85.3	65.1	66.9	59	49.4
17:43:00	4	00:05:00	92.4	66.2	67.3	62.1	51.6
17:48:00	4	00:05:00	91.3	67.2	68.5	69	60.4
17:53:00	4	00:05:00	92.7	69	70.8	70.6	64.1
17:58:00	4	00:05:00	85	66.4	67.1	68.7	64.2
18:03:00	4	00:05:00	86.8	65.5	66.7	61.8	52.9
18:08:00	4	00:05:00	89.6	66.9	68.1	66.4	58.6
Tuesday 3rd September 2024							
23:05:00	3	00:05:00	73.1	61	65.6	53.6	45.2
23:10:00	3	00:05:00	78.1	62.6	66.6	52.4	43.4
23:15:00	3	00:05:00	77.8	62.7	66.6	57.6	45
23:20:00	3	00:05:00	72.6	60.3	65.1	54	44.3
23:25:00	3	00:05:00	75.2	61.8	66.6	55.4	46.6
23:30:00	3	00:05:00	70.5	60	65.3	54.2	43.3
23:38:00	4	00:05:00	65.6	51.8	55.2	47.7	42.6
23:43:00	4	00:05:00	65	49.5	52.9	46.2	40.8
23:48:00	4	00:05:00	65.5	49.8	52.9	45.2	42.2
23:53:00	4	00:05:00	67.6	51.6	54.4	44.7	40.9
23:58:00	4	00:05:00	67.9	51	54.5	44.4	40.2
00:03:00	4	00:05:00	64.3	49.3	53	45.2	39.7

Table B1 – Fully tabulated noise measurement results 2024

Start	Position	Time	L_{Amax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
Saturday 14th September 2024 (Football Match)							
15:03:00	3	00:05:00	93.1	73.6	75.4	65.3	55.4
15:08:00	3	00:05:00	96.5	75.8	78.3	64.9	54.1
15:13:00	3	00:05:00	89.6	70.5	73.6	66.9	61
15:18:00	3	00:05:00	94	73.7	76.6	70.4	61.7
15:23:00	3	00:05:00	88.1	73.3	77.2	71.2	63.9
15:28:00	3	00:05:00	92.3	73.5	77.4	70.1	62.3
15:33:00	3	00:05:00	94.6	75.6	72.7	65.1	55.6
16:01:00	3	00:05:00	92.3	74.2	76.4	63	48.8
16:06:00	3	00:05:00	89.7	71.3	74	66.1	56.8
16:11:00	3	00:05:00	88.4	70	73.4	65.2	56.7
15:38:00	4	00:05:00	91	63.2	65.4	56.7	46.8
15:43:00	4	00:05:00	86.5	64.5	67.9	57.5	49.4
15:48:00	4	00:05:00	88.2	66	69.3	60.3	51.8
15:53:00	4	00:05:00	87.5	69.2	72.9	64.6	58
16:16:00	4	00:05:00	85.4	69.8	73.6	66.5	58.7
16:21:00	4	00:05:00	92.4	66.2	67.3	62.1	51.6
16:26:00	4	00:05:00	85	66.4	67.1	68.7	64.2
16:31:00	4	00:05:00	88.7	63.8	66.9	70.8	56.9

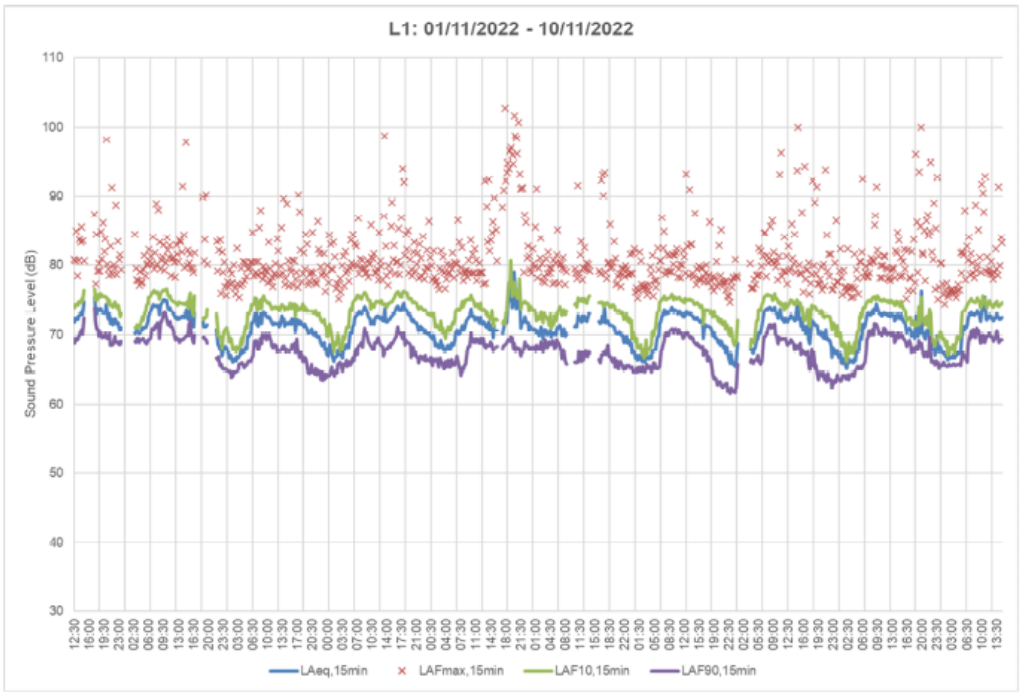
Table B2 – Fully tabulated football match-day noise measurement results

Start	Position	Time	L_{Amax}	L_{Aeq}	L_{A10}	L_{A50}	L_{A90}
Tuesday 4th March 2025							
07:51:00	5	00:05:00	75.1	67.3	70	66.8	60.9
07:56:00	5	00:05:00	73	67.6	70.1	67.3	62
08:01:00	5	00:05:00	74.1	68	71	67.5	59
08:09:00	4	00:05:00	73.9	64.9	68.9	62.1	57.3
08:14:00	4	00:05:00	88.9	74.4	73.3	65.7	57.9
08:19:00	4	00:05:00	74.3	64.7	68.6	62	57.4
08:27:00	5	00:05:00	73.8	66.7	69.2	66.1	62
08:32:00	5	00:05:00	71.8	66.3	68.6	66.1	60.5
08:39:00	3	00:05:00	72.9	66.4	69	65.6	62.1
08:44:00	3	00:05:00	74.4	67.4	70.3	66.2	62.7
08:49:00	3	00:05:00	75.6	66.8	69.4	66.1	61.8
08:55:00	4	00:05:00	83.9	62.7	65.1	60.4	58
09:00:00	4	00:05:00	73.4	62.1	65.4	59.9	56.3
09:05:00	4	00:05:00	73.4	62.5	65.9	59.5	55.1
09:11:00	3	00:05:00	74.4	68.9	71.2	68.3	65.2
09:16:00	3	00:05:00	76	67.6	70.6	66.7	58.5
09:21:00	3	00:05:00	74.4	68.9	71.5	68.4	62.3
Tuesday 20th May 2025							
19:24:00	3	00:05:00	82.4	64.9	66.2	61.8	59.1
19:29:00	3	00:05:00	80.9	63.9	66.1	62.1	59.6
19:34:00	3	00:05:00	74.6	63.7	66.2	62.4	59.9
19:38:00	6	00:01:00	72.5	61.8	64.6	59.1	56.2
19:39:00	6	00:01:00	78.7	64.4	66.9	61.9	59.2
19:40:00	6	00:01:00	80.6	65	67	60.6	56.7
19:41:00	6	00:01:00	77	63.5	66.9	60.6	56.1
19:42:00	6	00:01:00	74.6	63.5	66.8	60.4	56
19:43:00	6	00:01:00	78	62.2	63.7	59.7	56.1
19:50:00	4	00:05:00	81.6	64.1	66.3	62.1	58.7
19:55:00	4	00:05:00	78.8	67.1	70.3	64.7	61

Table B3 – Fully tabulated noise measurement results 2025

Appendix C – Buro Happold Graphed Noise Data (ES Appendix 11.4 noise survey results)

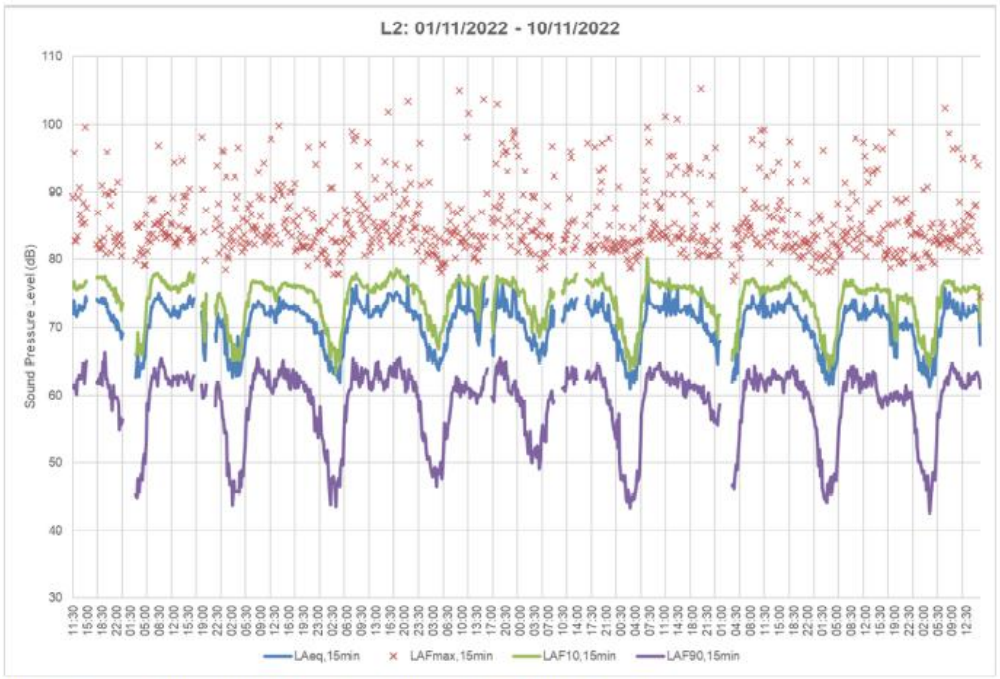
Appendix 11.4
Noise Survey Results



Note: measured noise data affected by adverse weather conditions has been removed.

Figure C1 – Buro Happold graphed noise data, measurement position L1

Appendix 11.4
Noise Survey Results



Note: measured noise data affected by adverse weather conditions has been removed.

Figure C2 – Buro Happold graphed noise data, measurement position L2



Figure C3 – Buro Happold noise measurement positions

Table 11.8: Typical background sound levels at receptors

Receptor	Typical background sound level (dB $L_{A90,15min}$)*	
	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
R1: 6 Cromarty Walk	52	49
R2: 12 Biscay Close		
R3-R4: The Cube	57	42
R5-R6: The Drum		
* *Typical background sound levels based on measurements undertaken at 2 m above ground level*		

Figure C4 – Buro Happold Background Sound Levels

Appendix D – BS 8233 Break-in Calculations

Azymuth has undertaken a selection of BS 8233 noise break-in calculations for the worst affected dwellings/elevations of the development which are typically found on the third and fourth floors. The noise levels used are the calculated worst-case and encapsulate noise from all sources.

NOISE BREAK-IN CALCULATION											Azymuth *Acoustics UK Ltd*
JOB NO.:	AA0627				**PROJECT:**	Grey Mare Lane, Manchester					
Room :	Living Room							**ROOM VOLUME:**	**50**	m3	
Floor:	3	(0 = GND)									
Elevation:	North							**Criteria :**	**35**	dBA	
Period:	Day										
	Octave Band Centre Frequency (Hz)				**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**
					FREE FIELD EXTERNAL LEVELS (dB)						
	AREA				**69.4**	**64.2**	**63.0**	**62.5**	**62.5**	**57.1**	**50.0**
GLAZING SPEC	**Swi:**				**OCTAVE BAND SOUND REDUCTION**						
1 **i/10mm lam**	**3.42**	m2	Rwi:		20	24	25	33	39	40	49
TRICKLE VENT	**A0:**										
2	0	m2	Dne:								
EXTERNAL WALL	**Sew:**										
3	**5.58**	m2	Rew:		32	47	56	65	76	83	88
ROOF/CEILING	**Srr:**										
4	0	m2	Rrr:								
	Sf:										
	9	m2									
	S:										
	9	m2									
	COMPOSITE SRI OF FACADE				-23.8	-28.2	-29.2	-37.2	-43.2	-44.2	-53.2
						REVERBERATION TIME					
					0.5	0.5	0.5	0.5	0.5	0.5	0.5
	ABSORPTION AREA				***16***	***16***	***16***	***16***	***16***	***16***	***16***
	TOTAL INTERNAL LEVEL (SPL)				49	39	37	29	23	16	0
	A-WEIGHTED LEVELS				23	23	28	26	23	17	1
	A-WEIGHTED OVERALL LEVEL				32.34	dBA					

Figure D1 – Break-in calculation, Ashton New Road Elevation, Living Room, Daytime

NOISE BREAK-IN CALCULATION											Azymuth Acoustics UK Ltd
JOB NO.:	AA0627				**PROJECT:**	Grey Mare Lane, Manchester					
Room :	Bedroom					**ROOM VOLUME:**	**30**	m3			
Floor:	3	(0 = GND)									
Elevation:	North						**Criteria :**	**30**	dBA		
Period:	**Night**										
	Octave Band Centre Frequency (Hz)				**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**
					FREE FIELD EXTERNAL LEVELS (dB)						
		AREA			**62.4**	**58.3**	**56.1**	**53.0**	**54.5**	**49.2**	**42.1**
GLAZING SPEC		**Swi:**			**OCTAVE BAND SOUND REDUCTION**						
1 **3/16 argon/6**		**3.49**	m2	Rwi:	20	24	25	33	39	40	49
TRICKLE VENT		**A0:**									
2		0	m2	Dne:							
EXTERNAL WALL		**Sew:**									
3		**3.75**	m2	Rew:	32	47	56	65	76	83	88
ROOF/CEILING		**Srr:**									
4		0	m2	Rrr:							
		Sf:									
		7.248	m2								
		S:									
		7.248	m2								
	COMPOSITE SRI OF FACADE				-22.9	-27.1	-28.2	-36.2	-42.2	-43.2	-52.2
						REVERBERATION TIME					
					0.5	0.5	0.5	0.5	0.5	0.5	0.5
		ABSORPTION AREA			***10***	***10***	***10***	***10***	***10***	***10***	***10***
	TOTAL INTERNAL LEVEL (SPL)				44	36	33	22	17	11	-5
	A-WEIGHTED LEVELS				18	20	24	19	17	12	-4
	A-WEIGHTED OVERALL LEVEL				27.30	dBA					

Figure D2 – Break-in calculation, Ashton New Road Elevation, Bedroom, Night-time

NOISE BREAK-IN CALCULATION											Azymuth *Acoustics UK Ltd*
JOB NO.:	AA0627				**PROJECT:**	Grey Mare Lane, Manchester					
Room :	Living Room					**ROOM VOLUME:**	**58**	m3			
Floor:	3	(0 = GND)									
Elevation:	East						**Criteria :**	**35**	dBA		
Period:	**Day**										
	Octave Band Centre Frequency (Hz)				**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**
					FREE FIELD EXTERNAL LEVELS (dB)						
		AREA			**63.3**	**61.8**	**58.5**	**58.3**	**60.5**	**56.0**	**47.7**
GLAZING SPEC		**Swi:**			**OCTAVE BAND SOUND REDUCTION**						
1 8/16/10 lam		**5.17**	m2	Rwi:	20	20	20	32	38	36	46
TRICKLE VENT		**A0:**									
2		0	m2	Dne:							
EXTERNAL WALL		**Sew:**									
3		**8.23**	m2	Rew:	32	47	56	65	76	83	88
ROOF/CEILING		**Srr:**									
4		0	m2	Rrr:							
		Sf:									
		13.4	m2								
		S:									
		13.4	m2								
	COMPOSITE SRI OF FACADE				-23.7	-24.1	-24.1	-36.1	-42.1	-40.1	-50.1
						REVERBERATION TIME					
					0.5	0.5	0.5	0.5	0.5	0.5	0.5
		ABSORPTION AREA			***19***	***19***	***19***	***19***	***19***	***19***	***19***
	TOTAL INTERNAL LEVEL (SPL)				44	42	39	27	23	20	2
	A-WEIGHTED LEVELS				18	26	30	24	23	21	3
	A-WEIGHTED OVERALL LEVEL				33.10	dBA					

Figure D3 – Break-in calculation, Grey Mare Lane Elevation, Living Room, Daytime

NOISE BREAK-IN CALCULATION											Azymuth *Acoustics UK Ltd*
JOB NO.:	AA0627				**PROJECT:**	Grey Mare Lane, Manchester					
Room :	Bedroom					**ROOM VOLUME:**	**33**	m3			
Floor:	3	(0 = GND)									
Elevation:	East						**Criteria :**	**30**	dBA		
Period:	**Night**										
	Octave Band Centre Frequency (Hz)				**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**
					FREE FIELD EXTERNAL LEVELS (dB)						
		AREA			**60.4**	**54.9**	**51.4**	**48.2**	**49.6**	**43.1**	**37.8**
GLAZING SPEC		**Swi:**			**OCTAVE BAND SOUND REDUCTION**						
1 8/16/10 lam		**3.69**	m2	Rwi:	20	20	20	32	38	36	46
TRICKLE VENT		**A0:**									
2		0	m2	Dne:							
EXTERNAL WALL		**Sew:**									
3		**4.36**	m2	Rew:	32	47	56	65	76	83	88
ROOF/CEILING		**Srr:**									
4		0	m2	Rrr:							
		Sf:									
		8.05	m2								
		S:									
		8.05	m2								
	COMPOSITE SRI OF FACADE				-23.1	-23.4	-23.4	-35.4	-41.4	-39.4	-49.4
						REVERBERATION TIME					
					0.5	0.5	0.5	0.5	0.5	0.5	0.5
		ABSORPTION AREA			***11***	***11***	***11***	***11***	***11***	***11***	***11***
	TOTAL INTERNAL LEVEL (SPL)				42	36	33	18	13	8	-7
	A-WEIGHTED LEVELS				16	20	24	15	13	9	-6
	A-WEIGHTED OVERALL LEVEL				26.47	dBA					

Figure D4 – Break-in calculation, Grey Mare Lane Elevation, Bedroom, Night-time