BOWKER SADLER ARCHITECTURE

LONGHURST ROAD, BLACKLEY

NOISE ASSESSMENT FOR PLANNING PURPOSES

13 March 2023

AEC REPORT: P4687/R01/RDC

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DOCUMENT STATUS

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1.0 INTRODUCTION

1.1 Acoustic & Engineering Consultants Limited (AEC) has been instructed by Bowker Sadler Architecture on behalf of Great Places Housing Group to undertake a noise assessment for planning purposes in relation to the proposed residential development located at Longhurst Road, Blackley.

1.2 This report details the baseline noise levels measured at the development site, presents the assessment criteria and discusses the implications on the building design, to achieve acceptable internal noise levels as required by the Local Authority.

1.3 Acoustic terminology is discussed in brief in Appendix A.

2.0 BACKGROUND AND SITE DESCRIPTION

Site Location

2.1 The proposed development is located off Longhurst Road, Blackley. An approximate site location plan is presented in Figure 2.1, below.

Figure 2.1 –Site Location

Imagery @2022 Google, Imagery @2022 Infoterra Ltd & Bluesky, Maxar Technologies, The Geoinformation Group, Map Data @2022

2.2 The site is bound by Bee-Safe Manchester to the east, the grounds of Saint Andrew's Church to the south and west, and Longhurst Road to the north.

2.3 Longhurst Road is a 30mph road that provides connections with Victoria Avenue, located approximately 110m away to the north, and Blackley Cemetery, located approximately 350m away to the south-west.

2.4 Bee-Safe Manchester is a martial arts school for adults, teenagers and children which is accessed off Longhurst Road. It has classes every Thursday, between 1330-1430h and 1800-1900h and on Saturdays, between 1000-1200h.

Proposed Scheme

2.5 Based on the Bowker Sadler Architecture drawings, dated September 2021 and July 2022, the proposed development will be comprised of 22 dwellings, consisting of 14 semi-detached houses and two apartments blocks of eight apartments.

2.6 Access to all dwellings will be gained directly off Longhurst Road.

2.7 There will be amenity spaces located to the rear of each dwelling (away from Longhurst Road) and the apartment blocks will have shared amenity spaces.

3.0 NOISE MEASUREMENTS

3.1 Following on-site observations, there were two possible sources of noise affecting the noise climate in the area: road traffic from Longhurst Road and distant roads in the area, and noise possibly associated with classes at Bee-Safe Manchester. Based on this, a noise survey was undertaken at two locations, identified as A and B on the attached Figure 3.1, below.

Figure 2.1 – Proposed Site Location

3.2 Location A was chosen to measure the noise levels from a martial arts class within Bee-Safe Manchester. Location B was chosen to measure the noise levels from road traffic in the area. Further details of each are discussed below.

3.3 All measurements were undertaken under free-field conditions and in general accordance with BS7445-1: 2003 '*Description and measurement of environmental noise. Guide to quantities and procedures*'. A full measurement procedure for the survey is presented in Appendix B and the measured data is presented in Tables B.1 and Graph B.1.

Location A – Bee-Safe Manchester

3.4 An attended noise level survey was undertaken by AEC between 1345 and 1430h on Thursday 09 February 2023. Measurements were undertaken at a time when a martial arts class was taking place within Bee-Safe Manchester.

3.5 Throughout the survey, ambient noise levels ranged from 50 – 53dB$L_{Aeq,T}$ and were entirely due to road traffic on Longhurst Road and distant roads in the area. Noise from the class within Bee-Safe Manchester was not audible and did not add to the noise climate.

Location B – Road Traffic

3.6 An extended unattended noise level survey was undertaken at a single location within the centre of the site at ground floor level, identified as B on Figure 3.1. Full logged data over 15-minute periods is held on file by AEC and is available on request. These measurements were undertaken between 1500h on Thursday 09 February 2023 until 0900h on Friday 10 October 2023.

3.7 A summary of the daytime ambient and night-time ambient and highest maximum noise levels is presented in Table 3.1, below. In relation to night-time maximum noise levels, these were measured over a 1-minute sampling period. The 10th highest maximum noise level is also presented in brackets. This is presented to provide indication of the maximum noise level affecting the site and excluding the influence of erroneous events such as sirens.

Table 3.1 – Summary of Measured Free-field Noise Levels

Period	Time, h	Noise Levels, dB	
		Ambient, $L_{Aeq,T}$	Maximum, $L_{Afmax,F}$
09.02.23	1500 – 2300	50	-
09.02.23 – 10.02.23	2300 – 0700	45	75 (60)
10.02.23	0700 – 0900	52	-

3.8 During the daytime and night-time periods, ambient noise levels were due to road traffic in the area, particularly on Longhurst Road. During the night-time, maximum noise events were due to individual car pass bys on Longhurst Road. Birdsong affected the measurements between approximately 0500 – 0700h.

4.0 BASIS OF ASSESSMENT

National Planning Policy Framework

4.1 Current national planning policies are set out in the National Planning Policy Framework (NPPF) published by the Department for Communities and Local Government, dated March 2012, and last updated in July 2021.

4.2 The planning policies which relate specifically to noise, are presented in paragraphs 174, 185 and 187 of the document and are reproduced below:

"174. Planning policies and decisions should contribute to and enhance the natural and local environment by:

(e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.

185. 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:

(a) 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.

(b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

187. 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."

4.3 Further to the above, the Governments '*Planning Practice Guidance'* (PPG) relating to noise was published on 6 March 2014 and updated on 22 July 2019 states:

'Noise needs to be considered when development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced). When preparing

plans, or taking decisions about new development, there may also be opportunities to make improvements to the acoustic environment. Good acoustic design needs to be considered early in the planning process to ensure that the most appropriate and cost-effective solutions are identified from the outset.'

4.4 In addition, the guidance indicates that, whilst noise can override other planning concerns, it is important to look at noise in the context of the wider characteristics of a development proposal, its likely users, and its surroundings, as these can have an important effect as to whether or not noise is likely to pose a concern.

Internal Noise Level Limits due to External Noise Ingress

4.5 Manchester City Council (MCC) has outlined their requirements for noise assessments to accompany planning applications in '*Planning & Noise – Technical Guidance'* (2022) (PNTG).

Section 3.7.1.1 of this document states "*The Council has adopted the following noise limits for residential properties*:

- *Bedroom (night-time – 23.00 – 07.00) 30dBL_{Aeq} (individual noise events should not normally exceed 45dB$L_{Amax,F}$ by more than 15 times);*
- *Living Rooms (daytime – 07.00 – 23.00) 35dBL_{Aeq}.*"

4.6 These levels are based on guidance presented in BS 8233:2014 '*Guidance on sound insulation and noise reduction for buildings'* (BS8233) and The Association of Noise Consultants (ANC) document Professional Practice Guidance (ProPG) on Planning and Noise '*New Residential Development*' (2017).

In relation to maximum noise levels in bedrooms during the night-time period, Note 4 of ProPG states that "*Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. 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*."

4.7 Based on this AEC would propose to design the façade in order that maximum noise levels in bedrooms do not typically exceed 45dB$L_{Amax,F}$ during the night-time period 2300h to 0700h and any non-typical events such as a one-off emergency siren or noisy motorbike pass-by will be excluded in the assessment.

Ventilation Provision

Whole Dwelling Ventilation

4.8 The above internal noise level limits need to be achieved with whole dwelling ventilation, as defined in Approved Document F '*Ventilation*' (2021) of the Building Regulations (ADF) if being provided to habitable rooms

4.9 Whole dwelling ventilation is typically achieved either via background ventilators (e.g., an open window or trickle ventilators) or mechanical means. ADF states that '*The ventilation provisions will not necessarily meet cooling needs*'.

4.10 ProPG, states that the attenuation of external to internal noise levels provided by a window partially open for ventilation is no more than -15dB. Based on AECs experience, 15dB of attenuation is achieved with a window partially open (slightly ajar) for background ventilation purposes.

4.11 Therefore, for whole dwelling ventilation to be provided via a partially open window, the external noise levels presented in Table 4.1 should not be exceeded.

Table 4.1 – Allowable External Free-field Noise Levels for Whole Dwelling Ventilation via a Partially Opened Window

Activity	Location	Noise Level Limit, dB		
		Daytime 0700 – 2300h $L_{Aeq,16h}$	Night-Time 2300 – 0700h	
			$L_{Aeq,8h}$	$L_{Amax,F}$
Resting	Living Room	50	-	-
Dining	Dining Room/Area	55	-	-
Sleeping (daytime resting)	Bedroom	50	45	60

4.12 ADF states that information about overheating is given in Approved Document O (ADO) *'Requirement 01: Overheating Mitigation Regulations: 40B'* (2021 edition).

4.13 In relation to purge ventilation, ProPG suggests that as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food), the internal desired noise levels are not generally applicable. Therefore, internal noise levels due to windows being opened for purge ventilation has not been discussed further.

Purge Ventilation

4.14 Purge ventilation is manually controlled ventilation of rooms or spaces at a relatively high rate to rapidly dilute high concentrations of pollutants and water vapour released from occasional activities such as painting and decorating or accidental releases such as smoke from burnt food.

4.15 ProPG suggests that as this should only occur occasionally the internal noise limits described above are not generally applicable. Therefore, potential internal noise levels due to windows being opened for purge ventilation has not been discussed further.

Overheating Strategy

4.16 ADF states that information about overheating is given in Approved Document O (ADO) *'Requirement 01: Overheating Mitigation Regulations: 40B'* which came into force on 15 June 2022 (2021 edition).

4.17 ADO states that in locations where external noise may be an issue (e.g. buildings close to busy roads) the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (2300 to 0700h).

4.18 The document then states that windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits:

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

4.19 ADO does not set any daytime noise limits where windows are likely to be kept closed. Meaning there is no statutory requirement in relation to daytime limits.

4.20 To understand how the above internal noise levels, relate to external noise levels, the noise reduction across an open window (or other ventilation opening) needs to be confirmed. Referencing the 'simplified method' of assessment presented in ADO, the free area required from an opening window for the purposes of controlling summertime overheating heating is based on the location of the development.

4.21 ADO divides areas in England into risk categories which area:

a. 'Moderate risk' locations – England, excluding high risk parts of London in (b).
b. 'High risk' locations – urban and some suburban parts of London.

4.22 Full details of 'high risk' locations, which also includes limited areas in Manchester, are presented in Appendix C of ADO.

4.23 For 'high risk' locations, ADO indicates that the minimum free area required for bedrooms would be 13% of the floor area and for 'moderate risk' locations the free area required is 4%. With reference to the ANC's *'Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O'* an approximate reduction across a free area equivalent to 13% and 4% of the floor area would be 5dB and 9dB, respectively.

4.24 With regard to daytime noise levels, AEC has considered guidance presented in the ANC's '*Acoustics, Ventilation and Overheating: Residential Design Guide (2020)'* (AVO). It is important to note that AVO is a design guide only and not a statutory document.

4.25 AVO does not specify absolute limits in relation to allowable internal noise levels but suggests there is an increasing risk of adverse effect with increasing noise levels.

4.26 Table 3.2 of AVO presents an indicative risk category assessment for different free-field external noise levels. The risk categories range from 'Negligible' to 'High'. With reference to this table, an external free-field noise level of approximately 63dB$L_{Aeq,16h}$ is at the upper end of the 'Medium' risk category and therefore this has been chosen as the external daytime noise level limit where windows cannot be relied upon for the control of overheating.

4.27 To understand the likely internal noise levels based on the above external noise level, Table B-5 of AVO indicates that a reduction in noise levels of around 13dB can be expected across a window (or other opening) that is sufficiently open to allow some ventilative cooling (this relates to a free area of approximately 2% of the floor area for a room).

4.28 Based on the above, the free-field external noise level limits above which open windows (or other opening) cannot be relied to control summertime overheating are presented in Table 4.3, below.

Table 4.3 – External Noise Level Limits Above Which Openable Windows Should Not be Used for the Control of Overheating

Period	Minimum Opening Free Area as Percentage of Floor Area	Resulting External to Internal Noise Level Difference, dB	External Free-field Noise Level Limit, dB
Daytime Ambient, $L_{Aeq,16h}$	2%	-13	63
Night-time Ambient, $L_{Aeq,8h}$	4%	-9	49
Night-time Maximum, $L_{Amax,F}$			64

4.29 It is important to note that the above is a simple assessment only and if dynamic thermal modelling is undertaken based on Chartered Institution of Building Service Engineers (CIBSE) TM59 this may demonstrate that free area openings may need to be larger or smaller. As such, whilst this level of assessment is acceptable, the outcome can only be considered approximate and there is a level of uncertainty as to the actual internal noise levels that will occur on completion.

External Noise Level Limits

4.30 For traditional external areas that are used as an amenity space, such as gardens and patios, BS8223 states that it is desirable that ambient noise levels should be not exceed 50dB$L_{Aeq,16h}$ during the daytime, with an upper limit of 55dB$L_{Aeq,16h}$.

4.31 Furthermore, PNTG provides a limit for 50dB$L_{Aeq,16h}$ to stop '*moderate annoyance'*, and an upper limit of 55dB$L_{Aeq,16h}$ for '*serious annoyance*'.

4.32 These noise level limits have been used as the design aim for this assessment.

5.0 ASSESSMENT OF PROPOSED DEVELOPMENT

Determining of External Noise Levels

5.1 As stated above, the main source of noise affecting the site was road traffic on Longhurst Road and from distant roads in the area.

5.2 As noise breakout from Bee-Safe Manchester did not affect the noise climate, these measurements have not been discussed further.

5.3 Based on the above and the noise levels measured at the site, the determined free-field daytime ambient and night-time ambient and maximum noise levels affecting the proposed development are presented on Figure 5.1 and in Table 5.1, below.

Figure 5.1 – Determined Free-Field External Noise Levels

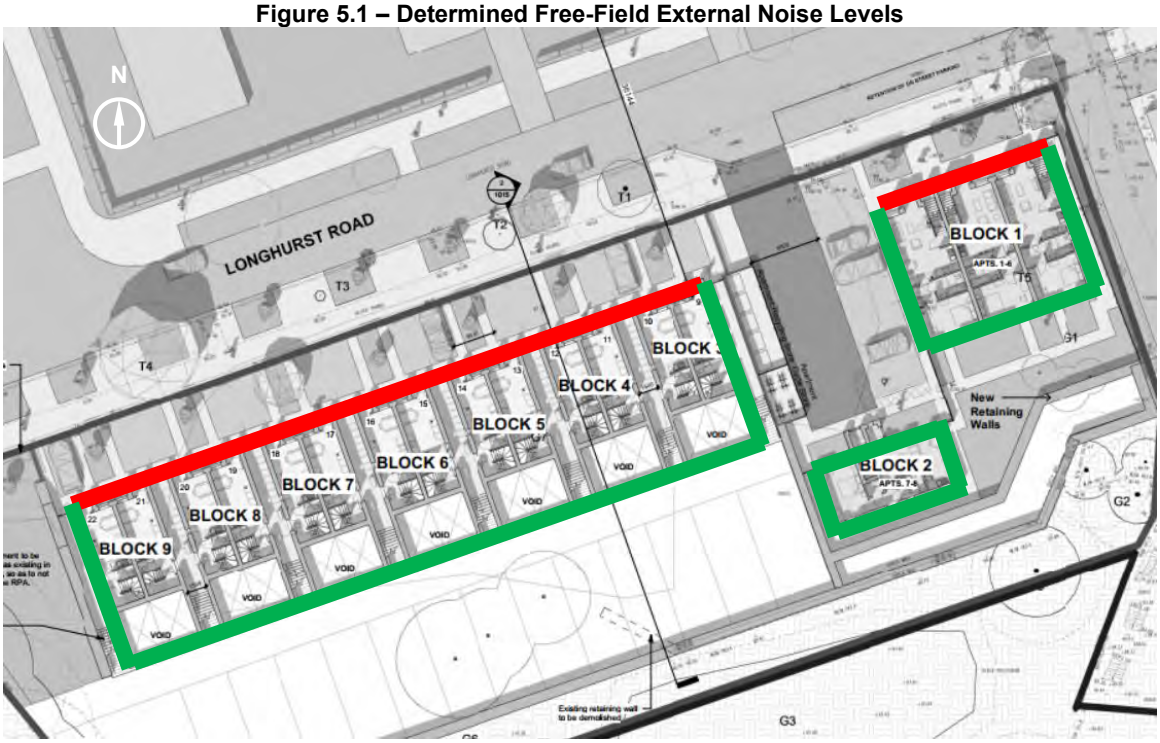


Table 5.1 – Determined Free-Field External Noise Levels

Colour on Figure 5.1	Noise Level, dB		
	Daytime	Night-time	
	Ambient, $dBL_{Aeq,16h}$	Ambient, $dBL_{Aeq,8h}$	Maximum, $dBL_{Amax,F}$
Red	53	46	64
Green	≤ 50	≤ 45	≤ 60

Glazing and Ventilation Requirements

5.4 As stated in Section 3.0, for habitable rooms to have whole dwelling ventilation provided via a window partially open, external noise levels should not exceed 50dB$L_{Aeq,T}$ during the daytime and 45dB$L_{Aeq,T}$ and 60dB$L_{Amax,F}$ at night.

5.5 A comparison between these levels and the determined noise levels presented in Table 5.1, indicates that alternate means of whole dwelling (background) ventilation to openable windows would need to be provided to all habitable rooms on the red elevations. It is assumed that the alternative means of background ventilation provision will be via trickle vents for this scheme.

5.6 Whole dwelling ventilation can be provided via a partially opened windows to the habitable rooms on all other elevations.

5.7 The minimum sound insulation performance requirements of the glazing and ventilators to appropriately control external to internal noise levels has been calculated based on:

- thee octave band centre frequency data of the measured noise levels;
- a single trickle ventilator to each habitable room (where required);
- the glazing and room dimensions identified on the provided drawings (see below).

DRAWING TITLE	REFERENCE
Apartment Plans – 1b2p – Type A	20-043-Bsa-1020 C
Apartment Plans – 1b2p – Type B	20-043-Bsa-1021 B
Apartment Plans – 3b5p – Type C	20-043-Bsa-1022 C
Apartment Plans – 3b5p – Type D	20-043-Bsa-1023 C
Proposed Section Block 4 3b5p	20-043-Bsa-1015 B
Proposed Site Plan – Ground Floor	20-043-Bsa-1002 C
Proposed Site Plan – First Floor	20-043-Bsa-1003 B

5.8 The minimum required sound insulation performances are presented in Table 5.2, below.

Table 5.2 – Outline Requirements of Glazing and Ventilation to Achieve Internal Noise Levels in Habitable Rooms

Elevation / Colour on Figure 5.1	Sound Insulation Performance			
	Daytime (Living rooms etc.)		Night-time (Bedrooms only)	
	Glazing	Ventilator	Glazing	Ventilator
Red	29dBR_w / 25dBR_w + C_{tr}	33dB$D_{n,e,w}$	29dBR_w / 25dBR_w + C_{tr}	33dB$D_{n,e,w}$
Green		N.A.		N.A.

5.9 Example glazing build-ups, to achieve the required sound insulation performances presented in Table 5.2, are provided in Table 5.3 below. Windows will need to remain

closed on the front (red coloured) façades to achieve internal noise levels in line with the requirements of MCC. However, these windows can be openable provided that they are effectively sealed when closed. It is important that frames and seals do not downgrade the acoustic performance of the glazing identified above. Given that the required performances are not high, this should not be an issue with any well fitted good quality window units.

Table 5.3 – Example Glazing Constructions

Sound Insulation Performance	Example Construction
$29dBR_w$ / $25dBR_w + C_{tr}$	4mm Glass / 6-16mm TC* / 4mm Glass

*** Thermal Cavity**

5.10 Prior to any glazing being installed, octave band sound insulation performance data of the glazing build-ups and ventilators selected must be verified by AEC or others.

5.11 The required acoustic performances for the trickle vents are based on the use of a single ventilator per room. If more than one unit is required, such as may be required to satisfy Building Control requirements, the performance of each unit might need to be increased.

Purge Ventilation

5.12 It is assumed that windows will be used for purge ventilation provided that they are effectively acoustically sealed when closed, and it is important that any frames and seals do not downgrade the sound insulation performance of the glazing.

Control of Overheating

5.13 A comparison between the noise levels presented in Table 5.1 and those presented in Table 4.2, indicates that windows can be opened to aid with the control of overheating in all habitable rooms in the development during both the daytime and night-time periods and ADO compliant noise levels should be achieved

Non-Glazed External Envelope

5.14 With regard to non-glazed external envelope elements, these should have a sound insulation performance of at least 10dB higher than the glazing. Therefore, the external walls and roof would need to achieve a sound insulation performance of at least around $39dBR'_w$. This is not a high sound insulation performance requirement and would be readily achieved using masonry wall constructions or rainscreen cladding with an internal lining. Furthermore, a tiled roof with a void and insulation would achieve this.

External Noise Levels in Gardens

5.15 As per Table 5.1, above, daytime ambient noise levels within the gardens of the properties would be $50dBL_{Aeq,16h}$. Based on this, the daytime ambient noise levels in all gardens would not exceed the upper guideline value of $55dBL_{Aeq,16h}$ and, therefore, the requirements would be met.

6.0 SUMMARY & CONCLUSIONS

6.1 Acoustic & Engineering Consultants Limited (AEC) has been appointed by Bowker Sadler Architecture on behalf of Great Places Housing Group to undertake a noise assessment for planning purposes for the proposed residential development located at Longhurst Road, Blackley.

6.2 The proposed development will include 22 dwellings, comprised of 14 semi-detached houses and eight apartments split across two blocks.

6.3 A daytime and night-time noise survey was undertaken by AEC in February 2023 and the main noise source in the area was road traffic on the surrounding roads. Full details of the noise level survey are presented in Appendix B. A summary of the noise levels measured and the sources of noise affecting the proposed development are discussed in Section 3.0. In summary, the measured noise levels are typical for such a location and are not high.

6.4 Based on Manchester City Council (MCC) requirements, it is understood that that internal noise levels in new residential properties should comply with guidance presented in BS8233 and the Association of Noise Consultants (ANC) document *'ProPG: Planning and Noise - New Residential Development*', 2017 (ProPG). This is discussed further in Section 4.0.

6.5 Based on the measured noise levels only standard double glazing is required to appropriately control external to internal noise levels. Windows would need to remain closed on the front facades (refer to Figure 5.1, above) and it is assumed trickle vents will be used to provide background ventilation. Calculations demonstrate that a basic trickle acoustic ventilator would be appropriate in relation to noise. On all other elevations, background ventilation this can be provided using opening windows.

6.6 With regard to control of summertime overheating, the external noise levels are low enough such that opening windows can be relied upon to control overheating and the requirements of ADO should be achieved in relation to noise.

6.7 Based on the above, appropriate planning conditions can be applied to the proposed development to ensure internal noise levels compliant with Manchester City Councils requirements in the proposed accommodation are achieved.

6.8 Based on this assessment, noise should not be considered a determining factor in relation to any planning permission being sought.

APPENDIX A – Acoustic Terminology in Brief

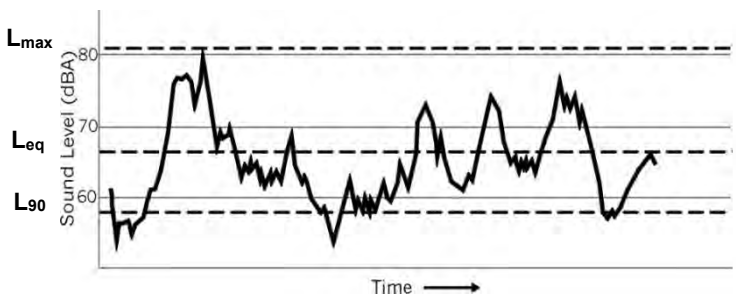
General

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air. The rate at which the pressure fluctuations occur determines the pitch or *frequency* of the sound. The frequency is expressed in Hertz *(Hz)*, that is, cycles per second. The human ear is sensitive to sounds from about 20 Hertz to 20,000 Hertz. Although sound can be of one discreet frequency - a 'pure tone' - most noise is made up of many different frequencies.

The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same subjective way. This is the basis of the A-weighted sound pressure level *dBA,* normally used to assess the effect of noise on people. The dBA weighting emphasizes or reduces the importance of certain frequencies within the audible range

Sound / Noise Units

The figure below shows an example of sound level varying with time. Because of this variation over time the same period of noise can be described by several different levels. The most common of these are described below.



Commonly Used Descriptors for Sound / Noise	
$L_{Amax,F/S}$	The maximum (A-weighted) sound level measured during a given time. 'Fast' or 'Slow' meter response should be cited.
$L_{Aeq,T}$	The equivalent continuous (A-weighted) sound level. It may be thought of as the "average" sound level over a given time, T. It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises. **It can be considered as the "ambient" noise level.**
$L_{A90,T}$	The (A-weighted) sound level exceeded for 90% of a measurement period. **It is the value often used to describe the "background" noise.**
$L_{A10,T}$	The (A-weighted) sound level exceeded for 10% of a measurement period. It is the value often used to describe traffic noise.
Free-field Level	This refers to the sound level measured outside, away from reflecting surfaces.

R'_w	Apparent sound reduction index - Single number rating used to describe the sound reduction index of an on-site construction over a range of frequencies, typically 100-3150Hz.
$D_{n,e,w}$	Element normalised level difference. Single number rating used to describe the sound insulation performance of small elements

APPENDIX B – Noise Survey Details

Date & Time of Survey:	***Unattended***: Thursday 09 February 2023, 1500h to Friday 10 February 2023, 0900h.
	Attended: Thursday 09 February 2023, 1345 – 1430h.
Personnel:	Ross Chamberlain (AEC).
Equipment Used:	***Unattended:*** Cirrus CR:171B Real Time Analyser (AEC Kit 5)
	Attended: Cirrus CR:171B Real Time Analyser (AEC Kit 5)
Calibration:	The sound level analysers, which conforms to BS EN 61672-1: 2013 *'Electroacoustics – Sound level meters - Part 1 Specifications'* for Class 1 Type Z meters, were in calibration and check calibrated before and after the measurement periods using a Brüel & Kjær type 4231 (94dB) calibrator. There was no significant drift of calibration. Calibration certificates are available on request.

Weather Conditions:

Unattended:

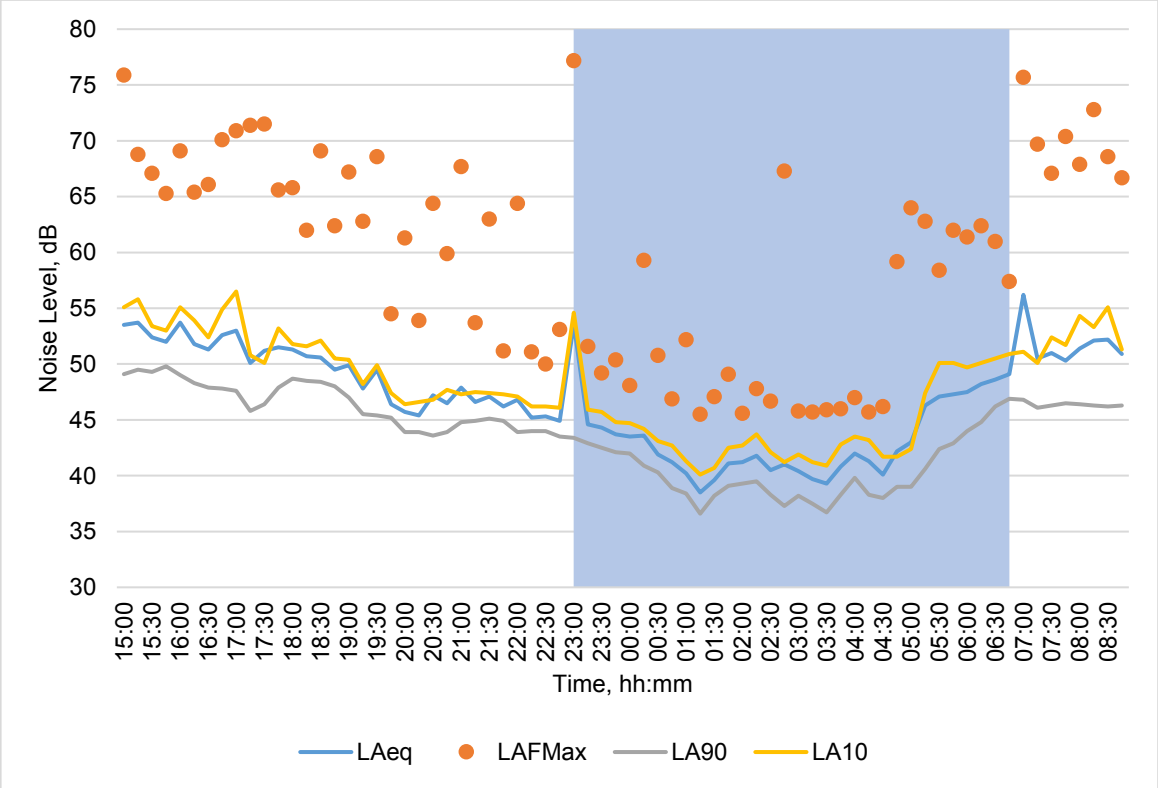
Date	Period	Wet/Dry	Temp°C	Wind Speed & Direction	Cloud Cover
09.02.23	Day	Dry	9°C	2m/s northerly	60%
09.02.23 – 10.02.23	Night		3°C	Negligible	80%
10.02.23	Day		6°C		90%

Attended:

Date	Period	Wet/Dry	Temp°C	Wind Speed & Direction	Cloud Cover
09.02.23	Day	Dry	9°C	2m/s northerly	60%

Measurement Locations:	***Unattended:*** The microphone was connected via an extension cable and fixed externally at ground floor level, 18m from Longhurst Road. Measurement location identified as B on Figure 3.1.
	Attended: Measurements were undertaken at single location, identified as A on Figure 3.1. Location was 20m from Longhurst Road on the eastern boundary of the site.
Measurement Details:	***Unattended:*** Measurements were undertaken over various periods in terms of L_{eq}, L_{10}, L_{90}, and L_{max}. Measurements were logged continuously over 1s for post processing and assessment.
	Attended: Measurements were undertaken over various periods in terms of L_{eq}, L_{10}, L_{90}, and L_{max}.
Façade / Free-Field:	***Unattended:*** Free-field. ***Attended:*** Free-field.
	Full results for the attended measurements are given in Table B1. The measured daytime and night-time periods for the unattended survey is presented on Graph B1.
Measured Data:	Full octave band centre frequency data was obtained for all measurements.

TABLE B1 – Measured Daytime Noise Levels

Location	Period, h	Noise Level, dB				Comments
		L_{Aeq}	L_{A10}	L_{A90}	$L_{Amax, F}$	
A	1345 – 1400	53.2	52.8	48.8	85.4	Ambient noise levels due to road traffic on Longhurst Road and from distant roads in the area.
	1400 – 1415	50.3	52.0	48.1	59.9	
	1415 – 1430	50.0	51.3	48.2	60.6	

Graph B1 – Measured Noise Levels – Location B
1500h, Thursday 09 February 2023 to 0900h, Friday 10 February 2023