



Rochdale Road Phase 2, Manchester

Acoustic Planning Report

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25092-R01D-BT Rochdale Road Phase 2

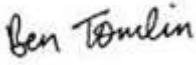
Client: McGoff Construction

Date: 27/03/2026

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REVISION HISTORY

Revision	Date	Revision Details	Author	Checked
R01	31/10/2025	Initial Issue	Ben Tomlin BSc MIOA	Susan Witterick BSc MIOA
R01A	05/12/2025	Updated following comments	Ben Tomlin BSc MIOA	Susan Witterick BSc MIOA
R01B	12/03/2026	Updated to consider revised scheme	Ben Tomlin BSc MIOA	Susan Witterick BSc MIOA
R01C	27/03/2026	Updated following comments	Ben Tomlin BSc MIOA	Susan Witterick BSc MIOA
R01D	27/03/2026	Updated following comments	 Ben Tomlin BSc MIOA	 Susan Witterick BSc MIOA

INTRODUCTION

- 1.1 dBx Acoustics Ltd has been appointed by McGoff Construction to undertake noise impact assessment for the proposed Rochdale Road Phase 2 residential development.
- 1.2 The development comprises the erection of a 17-storey residential apartment building (Use Class C3 (a), with associated access, amenity, landscaping, public realm, infrastructure and other associated works. Demolition of existing vacant building on site, comprising of ground floor retail and a first floor apartment.
- 1.3 This report updates previous assessments to reflect the revisions to the scheme.
- 1.4 The local planning authority is Manchester City Council (MCC).
- 1.5 The intent of this report is to present the results of noise surveys undertaken at the site, to detail the subsequent noise impact assessment, and to provide outline guidance on appropriate acoustic requirements for façade, glazing, and ventilation build-ups to control noise intrusion in line with MCC's standard planning conditions.
- 1.6 Plant noise limits are also set based on achieving Manchester City Council requirements.
- 1.7 A glossary of acoustic terminology has been supplied in Appendix A to assist the reader.

ACOUSTIC DESIGN CRITERIA

Local Authority Criteria

- 2.1 This site falls under the jurisdiction of Manchester City Council (MCC).
- 2.2 Manchester City Council's *Planning & Noise Technical Guidance* (October 2022) sets out Manchester City Council's requirements with regard to current guidance and policy, with the aspiration that new developments achieve the highest standards without compromising the health and wellbeing of residents.
- 2.3 The guidance refers to the WHO Guidelines for Community Noise 1999, BS 8233:2014, BS 4142:2014, NPPF and NPSE as described within this report.
- 2.4 MCC also requires that externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of $5\text{dBL}_{\text{Ar,Tr}}$ below the typical background LA_{90} level at the nearest noise sensitive location.

BS 8233:2014: 'Guidance on Sound Insulation and Noise Reduction for Buildings'

Indoor Ambient Noise Levels within Habitable Rooms

- 2.5 BS 8233 gives guidance for noise levels within residential properties for noise without a specific character. It discusses appropriate criteria for reasonable rest and sleep conditions and provides noise levels which are considered to provide appropriate conditions in accordance with WHO guidelines. The guidance on limits from the standard is reproduced in Table 1.

Table 1: Indoor Ambient Noise Limits (BS 8233)

Activity	Location	Daytime Ambient Noise Limit (07:00 – 23:00 hrs)	Night-time Ambient Noise Limit (23:00 – 07:00 hrs)
Resting	Living room	$35\text{dBL}_{\text{Aeq,16h}}$	-
Dining	Dining room/area	$40\text{dBL}_{\text{Aeq,16h}}$	-
Sleeping (daytime resting)	Bedroom	$35\text{dBL}_{\text{Aeq,16h}}$	$30\text{dBL}_{\text{Aeq,8h}}$

- 2.6 It should be noted that these limits represent the average noise level over the 16-hour day or 8-hour night-time period. This potentially means that higher noise levels may be experienced internally over a shorter period of time (e.g. individual passing trains or vehicles). These equivalent noise levels over the full day and night time period are the best representation of the average noise level and are generally the main focus when it comes to evaluating noise exposure.

- 2.7 To assess the maximum noise levels, the World Health Organisation (WHO) document 'Guidelines for Community Noise: 1999' recommends that maximum noise levels ($\text{dBL}_{\text{AFmax}}$) do not exceed $45\text{dBL}_{\text{AFmax}}$ more than 10-15 times a night.

Outdoor Noise Levels in External Amenity Areas

- 2.8 BS 8233: 2014 and the World Health Organisation (WHO) document 'Guidelines for Community Noise: 1999' present guidance for external noise levels within outdoor amenity areas of residential properties to be no greater than $55\text{dBL}_{\text{Aeq},16\text{h}}$.
- 2.9 It is, however, noted that compliance with these levels may not always be practical, and that the benefits of a development in other areas may take precedence over achieving external amenity noise levels.

The Building Regulations 2010: Overheating: Approved Document O

- 2.10 Section 3 of Overheating: Approved Document O (ADO) states the following;

3.2 In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

3.3 Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

A. $40\text{dBL}_{\text{Aeq},T}$, averaged over 8 hours (between 11pm and 7am).

B. $55\text{dBL}_{\text{AFmax}}$, more than 10 times a night (between 11pm and 7am).

3.4 Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants' Measurement of Sound Levels in Buildings with the overheating mitigation strategy in use.

- 2.11 It is also highlighted that guidance on reducing the passage of external noise into buildings can be found in the Association of Noise Consultants' 'Acoustics, Ventilation and Overheating: Residential Design Guide' (2020).

Acoustics, Ventilation and Overheating: Residential Design Guide 2020 (AVO)

- 2.12 AVO outlines a two-level procedure to estimate the potential impact on occupants in the case of the overheating condition.
- 2.13 The AVO Level 1 assessment is used to determine the 'Potential Effect without Mitigation' and to establish if there is a requirement for a Level 2 Assessment.
- 2.14 A level 1 assessment is undertaken by comparing the external noise levels measure to the values shown on Table 3-2 of AVO, reproduced as Figure 1, below.

Figure 1 : AVO Table 3-2, Guidance for Level 1 Site Risk Assessment

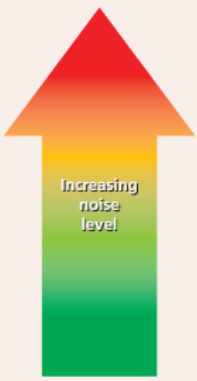
Table 3-2 Guidance for Level 1 site risk assessment of noise from transport noise sources ^(Note 1) relating to overheating condition

Risk category for Level 1 assessment ^(Note 5)	Potential Effect without Mitigation	Recommendation for Level 2 assessment
^(Note 2) ^(Note 3) ^(Note 4) 65 dB High 60 dB Medium 55 dB Low 50 dB Negligible 45 dB	Increasing risk of adverse effect	Recommended Optional
	Use of opening windows as primary means of mitigating overheating is not likely to result in adverse effect	Not required

- 2.15 If required, a Level 2 assessment is then undertaken by comparing the predicted internal noise levels to Table 3-3 of AVO, reproduced as Figure 2, below.

Figure 2 : AVO Table 3-3, Guidance for Level 2 Assessment

Table 3-3 Guidance for Level 2 assessment of noise from transport noise sources^[Note 1] relating to overheating condition

Internal ambient noise level ^[Note 2]			Examples of Outcomes ^[Note 3]	
$L_{Aeq,T}$ ^[Note 4] during 07:00 – 23:00 ^[Note 4]	$L_{Aeq,T}$ during 23:00 – 07:00	Individual noise events during 23:00 – 07:00 ^[Note 4]		
> 50 dB	> 42 dB	Normally exceeds 65 dB $L_{Aeq,Tmax}$	Noise causes a material change in behaviour e.g. having to keep windows closed most of the time	Avoiding certain activities during periods of intrusion. 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.
			Increasing likelihood of impact on reliable speech communication during the day or sleep disturbance at night	At higher noise levels, more significant behavioural change is expected and may only be considered suitable if occurring for limited periods. As noise levels increase, small behaviour changes are expected e.g. turning up the volume on the television; speaking a little more loudly; having to close windows for certain activities, for example ones which require a high level of concentration. Potential for some reported sleep disturbance. Affects the acoustic environment inside the dwelling such that there is a perceived change in quality of life. At lower noise levels, limited behavioural change is expected unless conditions are prevalent for most of the time. ^[Note 4]
≤ 35 dB	≤ 30 dB	Do not normally exceed $L_{Aeq,Tmax}$ 45 dB more than 10 times a night	Noise can be heard, but does not cause any change in behaviour	Noise can be heard, but does not cause any change in behaviour, attitude, or other physiological response ^[Note 4] . Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.

- 2.16 It can be seen from the figures above that there are no strict numerical limits for an acceptable level of noise within residences during the overheating condition.
- 2.17 Table 3-3, however, does suggest that night-time noise levels of $\geq 42\text{dB}_{L_{Aeq,8\text{hour}}}$, or $65\text{dB}_{L_{Amax,F}}$ can be considered upper limits for acceptable noise levels in rooms in which overheating is controlled by the use of open windows.

BS 4142:2014+A1:2019 'Methods for Rating and Assessing Industrial and Commercial Sound'

- 2.18 BS 4142:2014+A1:2019 sets out a procedure for assessing noise impact whereby a Noise Rating Level is determined and compared with the existing local Background Sound Level.
- 2.19 The Rating Level ($dB_{L_{Ar,Tr}}$) is evaluated from the Specific Noise Level by including cumulative corrections to account for factors such as distinguishable tone, impulsivity, intermittency or other readily distinguishable sound characteristics.
- 2.20 The assessment of the impact depends upon the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level. An initial estimate of the impact of the specific sound is made by subtracting the Background Sound Level from the Rating Level, while considering the following points:
- a) Typically, the greater this difference, the greater the magnitude of the impact.
 - b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
 - c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
 - d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

SITE DESCRIPTION

- 3.1 The proposed Rochdale Road Phase 2 building is to be located as indicated in Figure 3, below.

Figure 3: Site Plan

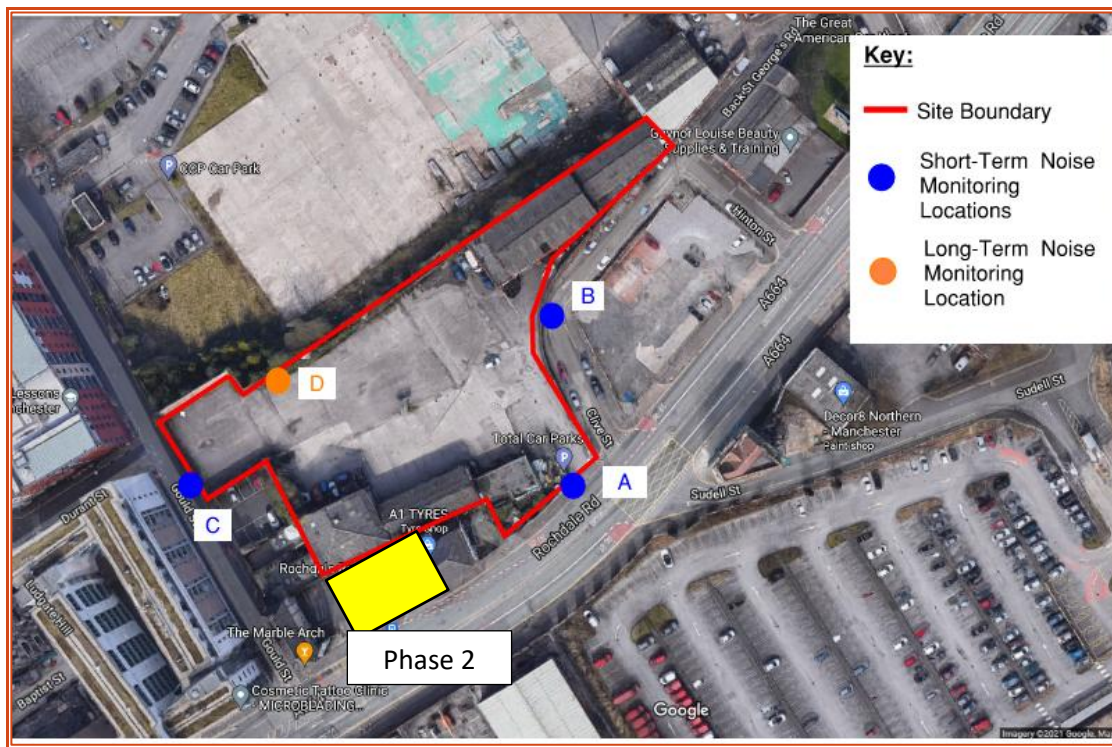


- 3.2 Rochdale Road Phase 1 is located directly to the north, identified as (2) above. The Marble Arch public house is located to the south-west (1).
- 3.3 There are apartments located on the far side of Gould Street.

EXISTING NOISE CLIMATE

- 4.1 Rochdale Road Phase 1 is currently under construction, and is located directly adjacent to Phase 2 (less than 20m).
- 4.2 Construction activity currently dominates the noise climate at the proposed site. It is not therefore possible to undertake appropriate noise measurements at the Phase 2 site.
- 4.3 dBx Acoustics undertook noise measurements to support planning for Phase 1 in 2021 to establish the existing ambient and background noise levels affecting the site and its surroundings.
- 4.4 It was found that the dominant noise source was road traffic on Rochdale Road. No significant change in road traffic noise would be have expected in the intervening period.
- 4.5 An unattended environmental noise survey was undertaken between Thursday 1st July 2021 and Monday 4th July 2021, at Location D indicated on Figure 4, below. Additional short term attended measurements were undertaken at three locations on Tuesday 18th May 2021 and Thursday 20th May 2021, at Locations A-C indicated on Figure 4, below.

Figure 4: Noise Monitoring Locations



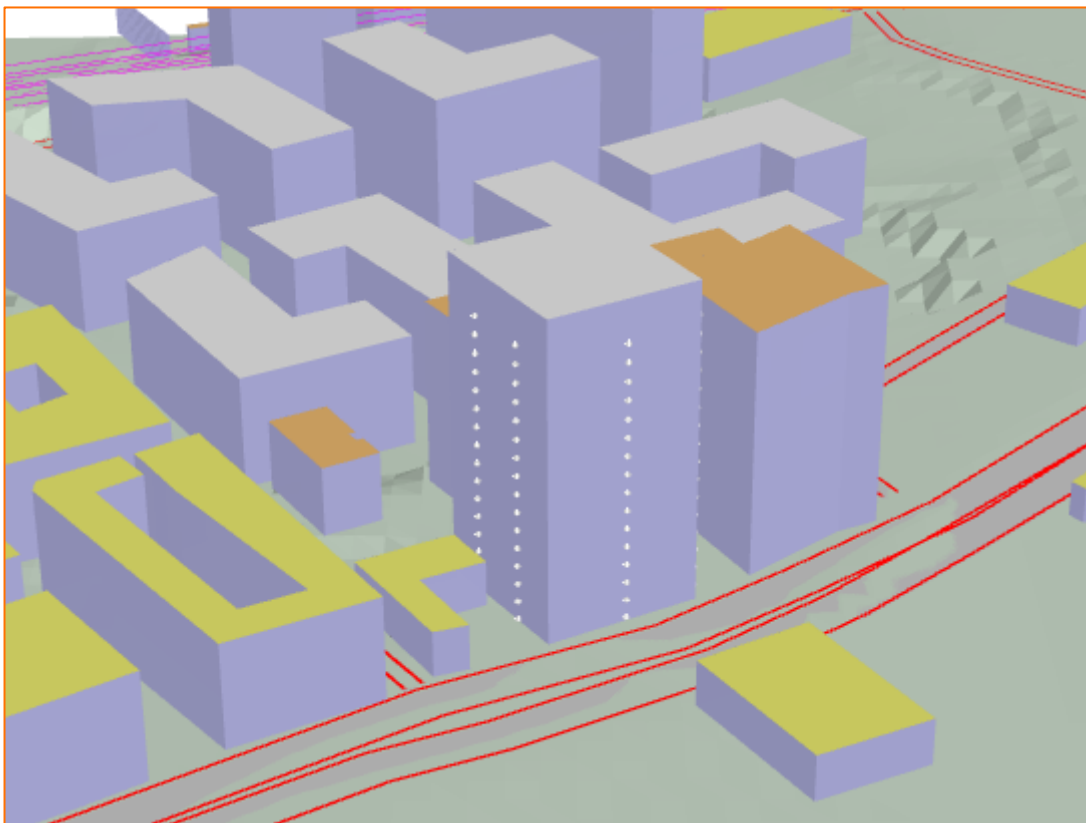
- 4.6 Measurements were made during the day, evening, and night-time periods (including rush hour periods) in order to establish the worst case for noise impact upon the site.
- 4.7 The dominant noise source at this site is road traffic on Rochdale Road. Contributions from road traffic on surrounding road networks and train/tram movements to and from Victoria train station were also observed.

4.8 Full details of the survey are presented in Appendix B of this report.

Noise Model

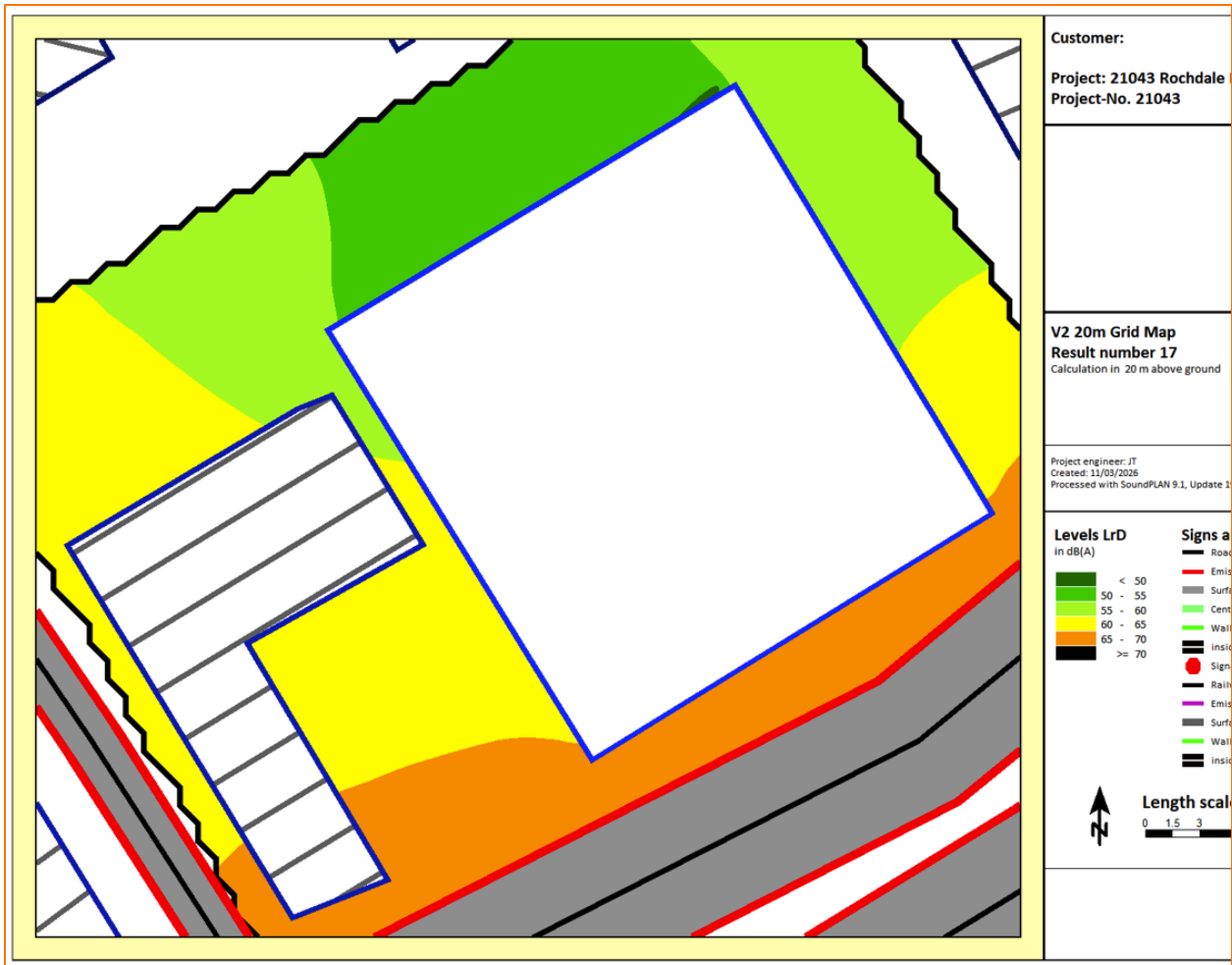
- 4.9 At the time of the Phase 1 planning application, the results of the surveys were used to create a noise model of the Phase 1 site using Soundplan modelling software, to predict the noise levels affecting the various elevations of the proposed buildings.
- 4.10 The noise model has been updated and extended to incorporate the Phase 2 building, and the effect of the completed Phase 1 buildings on noise levels around the site.
- 4.11 An image of the 3D model is shown as Figure 5, below.

Figure 5: 3D Model



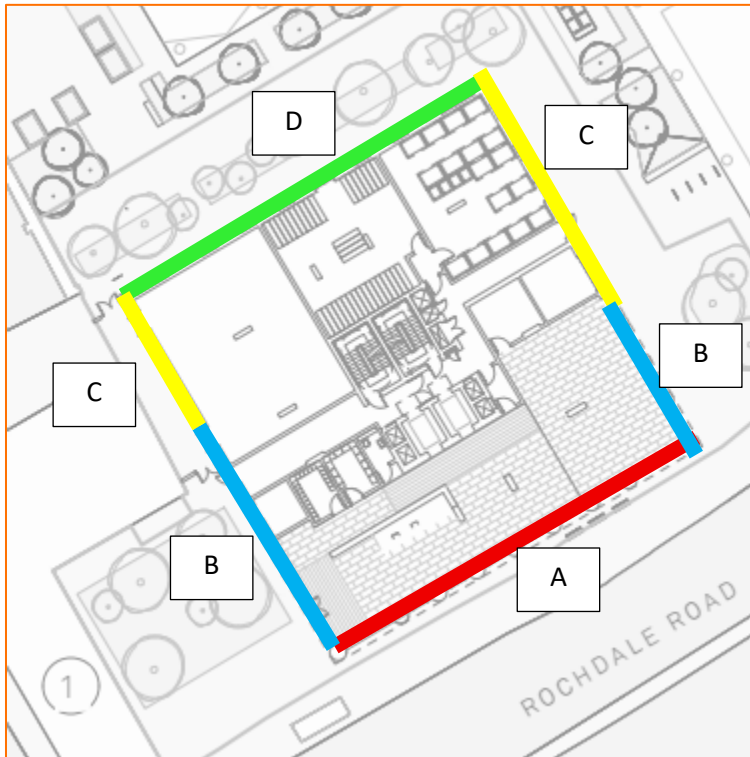
4.12 An example of the noise model output at 20m above ground level is shown as Figure 6, below.

Figure 6: Example Acoustic Model Output



- 4.13 The results of the acoustic modelling have been used to categorise the facades of the proposed residential dwellings in terms of their noise exposure as identified in Figure 7.

Figure 7: Indicative Façade Categories



- 4.14 The model indicates that the that noise levels only vary by 1-3dB between ground floor level and the top floor level of the proposed buildings. This is not a significant enough change to affect the envelope requirements, and hence the worst-case predicted noise level has been used for the assessment of each façade category.

- 4.15 Table 2, below, presents the predicted daytime and night-time noise levels used for the noise ingress assessment.

Table 2: Predicted Typical Worst-case External Noise Levels at Facades

Facade	Predicted Daytime Ambient Noise Level (dBL _{Aeq,16 hours})	Predicted Night-time Ambient Noise Level (dBL _{Aeq,8 hours})	Predicted Night-time Maximum Noise Level (dBL _{AFMax,8 hours})
Category A (Red)	73	71	84
Category B (Blue)	67	65	78
Category C (Yellow)	62	59	72
Category D (Green)	55	52	67

EXTERNAL NOISE BREAK-IN ASSESSMENT

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- 5.1 Based on a reduction in external noise levels to internal noise levels of 15dB for a partially opened window (per BS 8233:2014), allowable external noise levels are therefore 50dBL_{Aeq,16hr} outside living rooms and bedrooms in the day, and 45dBL_{Aeq,8hr} and 60dBL_{Amax,F} outside bedrooms at night.
- 5.2 With reference to the predicted levels at the building facades presented in Table 2, and the allowable external noise levels detailed above, it can be seen that the required internal ambient noise levels can only be achieved with closed windows.
- 5.3 Background ventilation will therefore need to be provided via alternative means; it is understood that mechanical ventilation (likely MVHR) is currently under consideration throughout the development.
- 5.4 In order to maintain the required indoor ambient noise levels, mechanical services should be designed to achieve a noise level 3dB lower than the noise breaking in via the windows – i.e. 32dBL_{Aeq,T} in living rooms, and 27dBL_{Aeq,T} in bedrooms.
- 5.5 Windows can be openable for purge ventilation but must be well sealed when closed. It is important to ensure that the alternative source of ventilation does not compromise the overall sound insulation performance of the external envelope, or the internal noise level design criteria within habitable rooms.

- 5.6 Based on the predicted noise levels on each elevation, the requirements for the glazing required to achieve the internal ambient and maximum noise level limits have been calculated, as detailed in Table 3, below.

Table 3: Glazing Sound Insulation Requirements

Façade Category	Room	Glazing Sound Insulation Performance, $dBR_w (C_{tr})$	Example Glazing Construction, mm
A	Living Rooms	43 (-6)	6.5A/TC/8.5A
	Bedrooms	46 (-7)	6.5A/TC/13A
B	Living Rooms	40 (-6)	10/TC/6.4PVB
	Bedrooms	44 (-7)	8.5A/TC/12
C	Living Rooms	38 (-6)	10/TC/6
	Bedrooms	38 (-6)	10/TC/6
D	Living Rooms	31 (-6)	4/TC/4
	Bedrooms	31 (-6)	4/TC/4

A= Acoustic Laminate glass; TC = Thermal Cavity; PVB= Polyvinyl Butyral

- 5.7 The sound insulation performance must be achieved by the glazing unit as a whole, including frames, seals, opening lights etc, as opposed to the glass panels alone.
- 5.8 The external walls should achieve a sound insulation performance at least 10dB greater than the glazing. The roofs should achieve a sound insulation performance 5dB greater than the windows.

Overheating

- 5.9 An overheating assessment has been undertaken by Base Energy, and detailed in their report ref 13436 RevE, dated 17/03/2026.
- 5.10 Their assessment concludes that overheating will be appropriately controlled with the proposed MVHR/mechanical services ventilation, and hence windows will not be required to be openable to control overheating.

EXTERNAL AMENITY AREAS

- 6.1 Based on MCC's Noise and Planning guidance, daytime noise levels of 55 dB $L_{Aeq,16\text{ hour}}$ are to be targeted in outdoor amenity areas.
- 6.2 Based on the architectural layouts it is understood there is an amenity space at the rear of the building, at ground floor level, as shown as Figure 8, below.

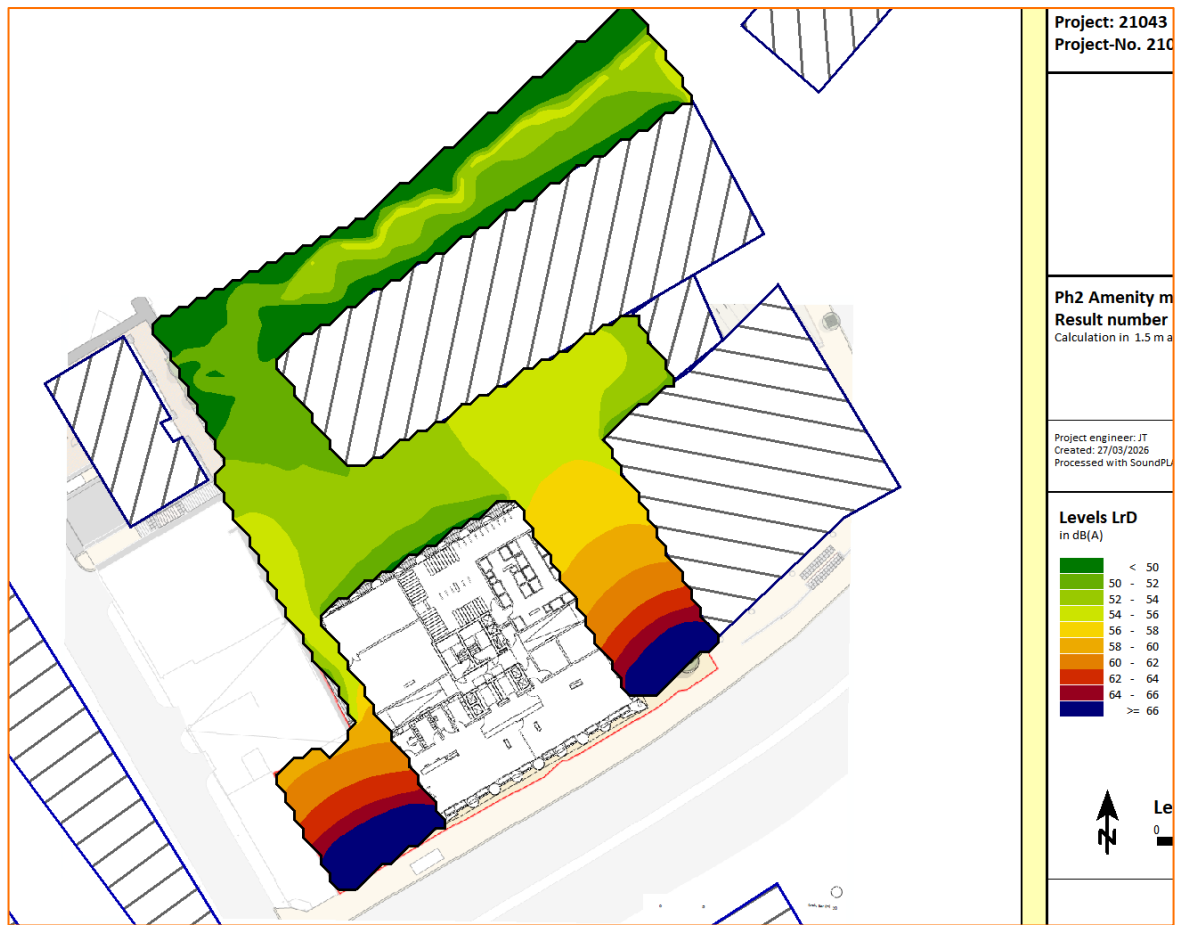
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Figure 8: Ground Floor Plan



6.3 The noise map for this area at ground floor level is shown as Figure 9, below.

Figure 9: Ground Floor Noise Map



- 6.4 As can be seen, the majority of amenity area is subject to noise levels of around 55dB_{LrD} or lower, and hence meets MCC's criterion.
- 6.5 There is a small area to the east which may be subject to noise levels of up to around 58dB_{LrD} , but given that the majority of the area is lower than this, it is unlikely to be an issue.

BUILDING SERVICES NOISE EMISSIONS

Plant Noise Emission Limits

- 7.1 Manchester City Council requires that the rated plant noise levels, assessed in accordance with BS4142:2019, are controlled to 5dB below the background noise level at the nearest noise sensitive location during the periods in which the plant operates.
- 7.2 Based on the noise surveys undertaken by dBx Acoustics at the planning stage for the Phase 1 development, detailed in report ref 21043 - 87 Rochdale Road R01B, dated 25th August 2021, the typical background noise levels around the site around 45dBL_{A90,T} in the day, and 40dBL_{A90,T} at night.
- 7.3 It is unlikely that noise levels will have decreased since 2021; if anything, background noise levels are likely to have increased.
- 7.4 On this basis, the plant noise emission limits are detailed in Table 4, below.

Table 4: Proposed Building Services External Noise Limits

Noise Sensitive Receptors	External Building Services Plant Noise Limit dBL _{Ar,Tr}	
	Daytime 07:00 – 23:00 hours (T = 1 hour)	Night-time 23:00 – 07:00 hours (T = 15 minutes)
Nearest Noise Sensitive Properties	40dB	35dB

SUMMARY AND CONCLUSIONS

- 8.1 dBx Acoustics Ltd has been appointed by McGoff Construction to undertake a noise impact assessment for the proposed Rochdale Road Phase 2 residential development.
- 8.2 The development comprises a 17 storey residential apartment building (Use Class C3 (a)), with associated access, amenity, landscaping, public realm, infrastructure and other associated works. As part of the works, the existing vacant retail unit on site is to be demolished.
- 8.3 An assessment of the proposed development in terms of noise ingress and indoor ambient noise levels, façade and glazing sound insulation requirements, and noise emissions from plant has been undertaken, primarily based on meeting all criteria detailed in Manchester City Council's *Planning & Noise Technical Guidance* (October 2022).
- 8.4 A noise model of the site has been created, based on noise survey data obtained by dBx Acoustics to support planning for the Phase 1 site, directly adjacent. The noise model has been used to determine the noise levels around the proposed Phase 2 building, and hence the acoustic requirements for the external envelope.
- 8.5 It has been determined that natural ventilation by means of openable windows will not be acoustically appropriate for the site; however, windows may be openable at residents' discretion for purge ventilation.
- 8.6 It is understood that mechanical ventilation using MVHR units is proposed. Minimum sound insulation requirements for glazing have been provided.
- 8.7 The overheating assessment for the scheme indicates that an overheating condition does not occur.
- 8.8 The amenity space will achieve Manchester City Council's criterion for daytime noise levels.
- 8.9 Plant noise limits have been set in line with Manchester City Council requirements, and such that plant noise at the nearest noise sensitive properties would not be expected to affect residential amenity.
- 8.10 Overall, noise should not be a limiting factor in the planning application.

APPENDIX A – GLOSSARY OF ACOUSTIC TERMINOLOGY

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (L_p) the reference quantity is 2×10^{-5} N/m ² . The sound pressure level existing when microphone measured pressure is 2×10^{-5} N/m ² is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (L_p) or Sound Power Level (L_w).
Frequency	Number of cycles per second, measured in hertz (Hz), related to sound pitch.
A-weighting	Arithmetic corrections applied to values of L_p according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of L_p actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of L_p actually measured.
$L_{n,T}$	L_p which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
L_{Fmax}	The instantaneous maximum sound pressure level which occurred during the measurement. F indicates that the fast time-weighting is used.
L_{AFmax}	The instantaneous maximum A weighted sound pressure level which occurred during the measurement. F indicates that the fast time-weighting is used.
$L_{Ar,Tr}$	The rating level: the equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise.
Reverberation Time, T	The time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped. The descriptor T, often includes other nomenclature to describe the type of reverberation time measurement or if the reverberation time is an average taken for specific frequencies. For example, a T_{mf} is the mid-frequency reverberation time.
Absorption Coefficient, α	The fraction of reverberant sound energy absorbed by a material. It is expressed as a value between 1.0 which equates to perfect absorption and 0 which equates to zero absorption.
Acoustic Class, A - E	Classification of sound absorbers into Sound Absorption Classes A-E, according to BS EN ISO 11654, including frequencies 200-5000 Hz
NRC	A single-number rating system used to compare the sound-absorbing characteristics of building materials. A measurement of the acoustical absorption performance of a material, calculated by averaging its Sound Absorption Coefficients at 250, 500, 1000 and 2000 Hz
STI	Speech Transmission Index , Metric ranging between 0 and 1 representing the transmission quality of speech with respect to intelligibility by a speech transmission channel
R	Sound Reduction Index , the laboratory measured sound insulation properties of a material or building element in octave or third octave bands.
R_w	Weighted Sound Reduction Index , a single number which represents the sound reduction of a material. It is derived by plotting the sound reduction index against a set of reference curves. The curves are shifted until a best-fit is established and the curve which best fits the sound reduction spectrum is used to represent the single figure value.

D_w	Weighted Level Difference , the weighted level difference between a pair of rooms, stated as a single figure.
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D_{nT}	Standardised Level Difference, a frequency-dependent measurement of airborne sound insulation, calculated using the following formula: $D_{nT} = L_1 - L_2 + 10\log(T/T_0)$ dB Where: L_1 is the energy-averaged sound pressure level due to the pink noise source measured in the source room using a sweep technique. L_2 is the energy-averaged sound pressure level measured in the receiving room using a sweep technique. T is the mean receiving room reverberation time (derived from T_{30} measured in seconds). T_0 is the reference reverberation time (= 0.5s for dwellings).
$D_{nT,w}$	Weighted Standardised Level Difference , a single-figure value of airborne sound insulation performance, derived according to procedures in BS EN ISO 717-1, based on the D_{nT} values at different frequencies (100-3150 Hz third octave bands).
$D_{nF,w}$	Weighted, Normalised Flanking Level Difference , the normalised, weighted difference in sound level between a pair of rooms via a flanking element, such as mullion or ceiling detail. The level difference in octave bands is first normalized to a reference amount of absorption and then plotted against a set of reference curves to establish a single figure value.
D_{ne}	Normalised Element Level Difference . The normalised difference in sound level between a pair of rooms via a small element such as a trickle ventilator. The level difference in octave bands is normalized to a reference amount of absorption.
$D_{n,e,w}$	Weighted, Normalised Element Level Difference . The normalised, weighted difference in sound level between a pair of rooms via a small element such as a trickle ventilator, stated as a single figure. The level difference in octave bands is normalized to a reference amount of absorption and then plotted against a set of reference curves to establish a single figure value.
C_{tr}	Spectrum Adaptation Term , a correction term applied to the sound insulation single-number values (R_w , D_w , and $D_{nT,w}$) in accordance with BS EN ISO 717-1. Applying the C_{tr} penalises a construction's performance if its low frequency performance is poor in relation its performance at higher frequencies.
Impact Sound	The noise generated by an impact on a structure. This is normally used to describe the noise created by people walking or moving furniture on a floor structure.
L_{nT}	Standardised Impact Sound Pressure Level, a frequency dependent measurement of impact sound insulation, calculated using the following formula: $L_{nT} = L_1 + 10\log(T/T_0)$ dB Where: L_1 is the mean sound pressure level due to the tapping machine measured in the receiving room using a sweep technique. T is the mean receiving room reverberation time (derived from T_{30} measured in seconds). T_0 is the reference reverberation time (0.5s for dwellings)
$L'_{nT,w}$	Weighted Standardised Impact Sound Pressure Level , a single-figure value (@ 500 Hz) of impact sound insulation, performance, derived according to BS EN ISO 717-2, based on the L_{nT} values at different frequencies (100Hz- 3150 Hz third octave bands).
Insertion Loss, IL	The reduction of noise level due to the presence of a noise control device such as an attenuator, excluding any regeneration noise created by its presence.
NR	The Noise Rating level . This is a single figure value derived by plotting a noise spectrum against a set of curves. The curve under which the spectrum fits is the resulting NR level.

APPENDIX B – ORIGINAL NOISE SURVEY DATA

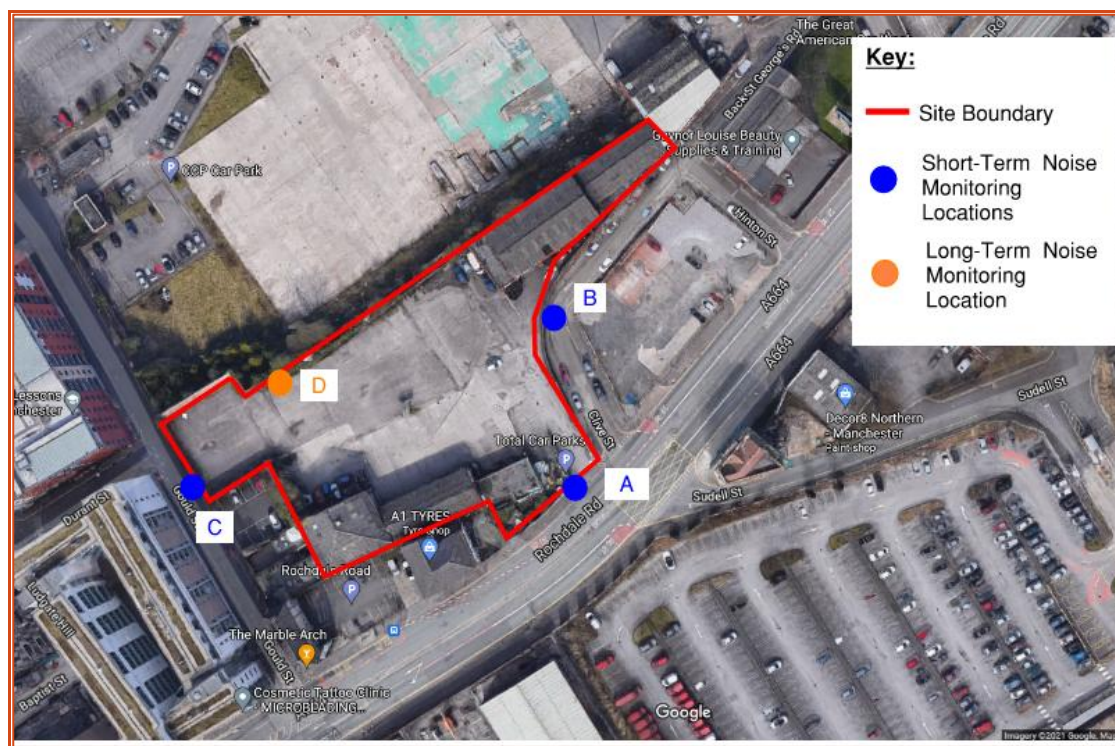
Excerpt from dBx Acoustics report ref 21043 - 87 Rochdale Road R01B, dated 25th August 2021.

Methodology

dBx Acoustics has undertaken noise measurements at the site to establish the existing ambient and background noise levels affecting the site and its surroundings.

An unattended environmental noise survey was undertaken between Thursday 1st July 2021 and Monday 4th July 2021, at Location D indicated on Figure 3, below. Additional short term attended measurements were undertaken at three locations on Tuesday 18th May 2021 and Thursday 20th May 2021, indicated as Locations A-C on Figure B1, below.

Figure B1– Noise Monitoring Locations



Measurements were made during the day, evening and night-time periods (including rush hour periods) in order to establish the worst case for noise impact upon the site.

The measurement locations were selected to establish the existing noise climate around the site and also to allow accurate calibration of the noise model.

All measurements were undertaken in accordance with BS 7445-1:2003 *Description and Measurement of Environmental Noise*, with microphones located at approximately 1.3 metres above the local ground

level and at least 3.5 metres away from reflective surfaces other than the ground which can be considered as in free field conditions.

Weather Conditions

Weather conditions during the measurement period at short-term noise monitoring locations were generally cool and cloudy, with scattered clouds.

At long-term noise monitoring Location D, based on the historical weather data, it is understood that it rained between 02:00-03:00 hours on Saturday 3rd July 2021. The noise levels measured during this period are excluded from the assessment. At the beginning and end of the survey, there was noted to be no rainfall, with a minimally cloudy sky.

Wind speeds were within suitable parameters for the measurement of environmental noise (i.e. generally under 5 ms⁻¹). All microphones were protected with a windshield for the duration of the survey.

Equipment

The equipment used during the environmental noise survey is detailed in Table B2, below.

Table B2– Equipment Used in the Environmental Noise Survey

Measurement Locations (Figure 3)	Equipment	Manufacturer & Part No.	Serial Number
Locations A, B, and C	Sound Level Meter	Norsonic Nor140	1405619
	Microphone	Norsonic 1225	168247
	Calibrator	Norsonic 1251	33827
Location D	Sound Level Meter	Casella C633C	3921025
	Microphone	CEL 251	000847
	Calibrator	CEL 120/1	2045151

The sound level meters were calibrated before and after measurements, with no significant drift recorded. An accredited laboratory calibrated the equipment not more than two years prior to the measurements being made, with the exception of the calibrators, which had been calibrated not more than one year prior to the survey.

ENVIRONMENTAL NOISE SURVEY RESULTS

Attended Noise Survey - Daytime Noise Levels

A summary of the daytime noise levels measured at the short-term noise monitoring positions is presented in Table B3, below. Measurements were taken over 15-minute periods, in 3 consecutive hours between 10:00h and 17:00h, in accordance with the shortened measurement procedure in Calculation of Road Traffic Noise (CRTN). Additional noise level measurements were undertaken during the rush hour period between 17:00h and 18:26h.

Table B3: Summary of Noise Survey results at Short-term Noise Monitoring Positions

Location (Figure 3)	Start Date and Time (hh:mm)	Duration (hh:mm)	L _{Aeq} (dB)	L _{A10} (dB)	L _{A90} (dB)
A	18/05/2021 14:07	00:15	69	73	56
	18/05/2021 15:06		70	74	55
	18/05/2021 16:07		72	75	57
	18/05/2021 17:00		72	76	56
	18/05/2021 17:52		72	76	57
	18/05/2021 18:43		71	75	50
B	18/05/2021 14:24		56	58	48
	18/05/2021 15:24		55	58	46
	18/05/2021 16:24		58	61	48
	18/05/2021 17:16		58	61	48
	18/05/2021 18:08		58	62	48
C	18/05/2021 14:42		60	62	47
	18/05/2021 15:42		66	68	48
	18/05/2021 16:42		61	62	48
	18/05/2021 17:35		63	63	48
	18/05/2021 18:26		61	62	49

All figures rounded to the nearest whole decibel.

All measurements were free-field.

Based on the CRTN methodology, the data shown in Table 5, above, can be used to determine the 16-hour daytime ambient noise level.

The logarithmic average of the dBL_{A10} values provides the 3-hour average, dBL_{A10,3hour}. This is converted to the 18-hour dBL_{A10,18hour} value by subtracting 1dB. This is then converted to the 16-hour ambient noise level, dBL_{Aeq,16hour}, by subtracting a further 2dB. The results of these calculations are presented in Table B4, below, compared with the logarithmic average of the ambient noise levels measured during 10:00h-18:26h (including during the rush hour period). The higher value of the two has been used in the assessment.

Table B4– Comparison of Ambient Noise Levels (Daytime)

Location (Figure 3)	Average Ambient Noise Level, dBL _{Aeq,T}	CRTN Ambient Noise Level, dBL _{Aeq,16hour}	Value Used in Assessment, dBL _{Aeq,16hour}
A	71	71	71
B	57	56	57
C	62	61	62

Attended Noise Survey - Night-Time Noise Levels

A summary of the night-time noise levels measured is presented in Table B5, below. The measurements were carried out between 05:00h and 07:00h, representative of the noisiest period at night. Although night-time noise levels will reduce further in the period 23:00-05:00h, these levels have been considered representative of the entire 8-hour period, in order to provide a robust, worst-case assessment for noise intrusion to residential properties.

Table B5: Summary of Night-time Measured Noise Levels at Short-term Noise Monitoring Positions

Location (Figure 3)	Start Time (hh:mm)	Duration (hh:mm)	dB, L _{Aeq,T}	dB, L _{A10,T}	dB, L _{A90,T}	dB, L _{Amax,F}
A	20/05/2021 05:00	00:15	65	69	49	81
	20/05/2021 05:53		69	73	54	85
	20/05/2021 06:45		71	74	58	86
B	20/05/2021 05:16		57	62	47	69
	20/05/2021 06:10		58	62	48	69
C	20/05/2021 05:34		51	54	43	71
	20/05/2021 06:29		60	61	45	83

Again, all measurements were taken in free-field conditions.

Unattended Noise Levels

The daytime and night-time averaged ambient noise levels are shown in Table 8 below, alongside the representative daytime and night-time background noise levels, for the unattended measurement location. The complete results of the environmental noise survey are available on request.

Appendix B of this report presents a time history graph showing the ambient, background and maximum noise levels measured at the unattended measurement Location D, throughout the noise survey.

Table B6: Summary of Noise Survey Results at Long-term Noise Monitoring Position

Measurement Location (Figure 3)	Daytime Levels (T = 0700 – 2300h), dB		Night-time Levels (T = 2300 – 0700h), dB		
	L _{Aeq,16hour} ¹	L _{A90,15min} ²	L _{Aeq,8hour} ¹	L _{A90,15min} ²	L _{AFMax} ³
D	52	45	48	40	62

Notes: ¹ Logarithmic average over the day / night survey periods; ² Lowest modal value presented and considered representative over the day / night survey periods. ³ L_{Fmax} noise levels selected based on 10-15 occurrences per night-time (23:00 – 07:00 hours). All figures rounded to the nearest whole decibel.

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