



CASSEL & FLETCHER

42-46 DRAKE STREET, ROCHDALE

NOISE ASSESSMENT FOR PLANNING PURPOSES

02 February 2024

AEC REPORT: P5142/R01a/RDC

Acoustic & Engineering Consultants Limited

Suite 316, 3rd Floor, Broadstone Mill, Broadstone Road, Stockport, SK5 7DL
Telephone 0161 449 5900 mail@aecltd.co.uk www.aecltd.co.uk

CONTENTS

	Page
1.0 INTRODUCTION	3
2.0 BACKGROUND AND SITE DESCRIPTION	3
3.0 NOISE CLIMATE	4
4.0 BASIS OF ASSESSMENT	5
5.0 ASSESSMENT OF PROPOSED DEVELOPMENT	11
6.0 SUMMARY & CONCLUSIONS	16
APPENDIX A – Acoustic Terminology in Brief	17
APPENDIX B – Noise Survey Details	18

DOCUMENT STATUS

Prepared by:  R D Chamberlain BSc (Hons) MIOA (Dip)

Rev	Date	Document Details	Author	Check
-	02 February 2024	Original.	RDC	PSK
a	02 February 2024	Minor amendments.	RDC	-

1.0 INTRODUCTION

- 1.1 Acoustic & Engineering Consultants Limited (AEC) has been instructed by Cassel & Fletcher to undertake a noise assessment in relation to the proposed development located at 42-46 Drake Street, Rochdale.
- 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 site is located off Drake Street within the centre of Rochdale. The development will be comprised of a five-storey building including a ground floor commercial unit and 33 apartments spread across the upper floors. A site location plan is shown in Figure 3.1, overleaf.
- 2.2 The site is bound by La Strada to the north (a restaurant that appeared to be closed and undergoing renovations), Drake Street to the east, Nelson Street to the south and a small alleyway serving access to the rear of the Drake Street properties to the west.
- 2.3 Along Drake Street is the Rochdale Railway Station to Rochdale Town Centre Metrolink line. Based on a desktop review, trams run once every 12 minutes between these stops along Drake Street and generally operate no earlier than 0530h and no later than 0100h on any given day. Based on this figure, there would be approximately 80 trams within a daytime 16-hour period and 18 within an 8-hour night-time period.
- 2.4 There is no road traffic on Drake Street other than busses. The bus line operates from approximately 0430 – 0030h on each day.
- 2.5 There are a number of retail and commercial units on Drake Street. Opposite the site is a bridal shop, a pizza delivery takeaway and the River Street Car Park.
- 2.6 Nelson Street is a minor road providing connection between Drake Street and Church Lane which is located approximately 40m to the west of the site. Opposite the site off Nelson Street is The Sanctuary Trust ROC charity shop and the Nelson Street Church.
- 2.7 To the rear of the site facing away from Drake Street is a small private car park.

Proposed Scheme

- 2.8 As previously stated, the proposed development will be comprised of 33 apartments. There will not be any external amenity spaces. Access to the apartments will be off Nelson Street.
- 2.9 At this stage an operator for the ground floor unit has not been confirmed, however, it is understood that it is likely to be a planning class E operator. The hours of operation are

expected to be daytime only 0700 – 2300h. Access to the commercial unit will be via doors off Drake Street.

- 2.10 Also located on the ground floor will be a bin store and plant room.
- 2.11 At this stage it is understood that whole dwelling (background) ventilation will be provided to each apartment via air source heat pumps located internally within each apartment. Therefore, trickle vents / through-the-wall vents will not be required and this assessment assumes as such.

3.0 NOISE CLIMATE

- 3.1 An attended noise level survey was undertaken by AEC between approximately 1300 and 1520h on Tuesday 30 January 2024. Measurements were undertaken at two locations around the development site, identified as A and B on the attached Figure 3.1, below. Measurements were undertaken under free-field conditions. Details of the noise survey is shown in Table B.1 of Appendix B.

Figure 3.1 – Proposed Site Location Showing Monitoring Locations



Imagery @2024 Google, Imagery @2024 Infoterra Ltd & Bluesky, Maxar Technologies, The Geoinformation Group, Map Data @2024

- 3.2 Location A was selected to represent the nearest façade of the proposed development to Drake Street. Location B was chosen to measure noise levels affecting the rear of the site. This measurement was partially screened from noise sources on Drake Street.
- 3.3 A summary of the ambient and maximum noise levels, excluding Tram movements, are presented in Table 3.1, below. The lowest measured background, dBL_{A90} noise levels are also presented. Sound exposure level (SEL) measurements were undertaken of tram movements and these are discussed in Section 3.5. Full measurements are shown in Table B.2 of Appendix B.

Table 3.1 – Summary of Measured Free-field Noise Levels

Measurement Location	Noise Levels, dB		
	Ambient, $L_{Aeq,T}$	Background, $L_{A90,T}$	Maximum, $L_{Amax,F}$
A	64	51	87
B	50	45	70

- 3.4 Noise levels at Location A were dominated by intermittent bus movements on Drake Street. During periods of no transportation movements on Drake Street, the noise climate was due to distant road traffic.
- 3.5 Whilst Location B was partially screened from Drake Street, ambient and maximum noise levels were still due to bus movements. There was no road traffic observed on Nelson Street.
- 3.6 In the absence of any bus movements, background noise levels were affected by very distant road traffic.

Tram Movements

- 3.7 Tram movements were intermittent during the noise survey and were not consistent with the operating times stated on the Metrolink website. During a tram passing by the site, the SEL of the events was typically around 93dB_{LAE} and lasted for approximately 11 seconds. During the survey, maximum noise levels from tram movements were as high as 94dB_{LAmax,F}. Full measurements of the trams are shown in Table B.3 of Appendix B.

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 revised most recently in December 2023.
- 4.2 The planning policies which relate specifically to noise, were updated in July 2021, and are presented in paragraphs 180, 191 and 193 which are reproduced below:

“180. 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*

191. *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 life⁶⁵;*
 - (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.*
193. *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) published on 6 March 2014 and most recently updated in December 2023 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.

Residential

Internal Noise Level Limits due to External Noise Ingress

- 4.5 Based on AEC's experience of assessments previously undertaken for Rochdale Borough Council (RBC), it is understood that they require the scheme to be designed such that internal noise levels are controlled to meet those presented in Section 7 of British Standard 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).
- 4.6 The proposed daytime and night-time noise limit levels to be achieved in habitable rooms due to transportation noise sources are presented in Table 4.1, below.

Table 4.1 – Internal Noise Level Limits within Habitable Rooms

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	35	-	-
Dining	Dining Room/Area	40	-	-
Sleeping (daytime resting)	Bedroom	35	30	45

- 4.7 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.*"
- 4.8 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

- 4.9 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.
- 4.10 Whole dwelling ventilation is typically achieved either via background ventilators (e.g., an open window or trickle ventilators) or mechanical means. Whilst air source heat pumps have been proposed, an assessment of achieving whole dwelling (background) ventilation via openable windows will still be carried out and this is discussed below.
- 4.11 The Association of Noise Consultants (ANC) document '*Professional Practice Guidance on Planning & Noise: New Residential Development*' (ProPG), states that the attenuation of external to internal noise levels provided by a window partially open for ventilation is no more than -15dB.
- 4.12 Therefore, for whole dwelling ventilation to be provided via a partially open window, the external noise levels presented in Table 4.2 should not be exceeded.

Table 4.2 – 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	-	-
Sleeping (daytime resting)	Bedroom	50	45	60

- 4.13 ADF states that information about overheating is given in Approved Document O (ADO) 'Requirement 01: Overheating Mitigation Regulations: 40B' (2021 edition).
- 4.14 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.

Overheating Strategy

- 4.15 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).
- 4.16 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)."
- 4.17 Paragraph 1.11 and Table 1.4 of ADO states that the opening in the external façade of a bedroom should have a minimum free area of 4% of the floor area of the room for medium-risk areas such as this site.
- 4.18 In relation to proposing appropriate internal noise level limits and the control of overheating in residential properties during the daytime, AEC has considered the guidance presented in Association of Noise Consultants' '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 and the Local Authority may have their own requirements.
- 4.19 Whilst AVO does not specify specific limits in relation to allowable internal noise levels, it does suggest a Level 1 risk assessment should be undertaken considering the magnitude of external noise levels. Table 3.2 of AVO provides an indicative risk category assessment for different free-field external noise levels and states that above a free-field external noise level of approximately 63dB $L_{Aeq,16h}$, there is 'increasing risk of adverse impact'. Therefore, this has been chosen as the external daytime noise level limit for which open windows cannot be relied upon for the control of overheating.
- 4.20 To consider the likely internal noise levels based on the above external noise levels, AVO indicates that a reduction in noise levels of around -13dB can be expected across a window that is partially open for ventilation purposes (approximately 2% of the floor area for a room).

Summary

- 4.21 Based on the above guidance from ADO and AVO, the free-field external noise level limits for which openable windows cannot be relied upon as an overheating strategy are presented in Table 4.3, below.
- 4.22 The fraction of the floor area stated by each guidance is also presented to aid in determining the corresponding internal or external noise level.

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

Period	Minimum Fraction of Floor Area Required	Resulting External – Internal Level Difference, dB	Noise Level Limit, dB	
			External Free-field	Internal
Daytime Ambient, $L_{Aeq,16h}$	2%	-13	63	50
Night-time Ambient, $L_{Aeq,8h}$	4%	-9	49	40
Night-time Maximum, $L_{Amax,F}$			64	55

- 4.23 It is important to note that AVO is a design guide only and not a statutory document and the Local Authority may have their own requirements.

Noise from Mechanical Ventilation System

- 4.24 ADF states that “*fan units should be appropriately sized so that fans operating in normal background ventilation mode are not overly noisy*”. ADF provides the following noise level limits for fans when operating under normal conditions and not at boost rates:
- 30dB $L_{Aeq,T}$ for noise-sensitive rooms (e.g. bedrooms and living rooms) when a continuous mechanical ventilation system is running on its minimum low rate.
 - 45dB $L_{Aeq,T}$ in less noise-sensitive rooms (e.g. kitchens and bathrooms) when a continuous operation system is running at the minimum high rate or an intermittent operation system is running.
- 4.25 Where a mechanical system is installed to aid with the control of overheating, AVO suggests the following desirable upper internal ambient noise levels limits:
- Bedrooms 30dB $L_{Aeq,T}$ (± 5 dB)
 - Living / Dining Rooms 35dB $L_{Aeq,T}$ (± 5 dB)

Noise Transfer from Non-Residential Areas

- 4.26 Based on the provided drawings, the following spaces could potentially have a noise impact on the residential units nearby and each are discussed subsequently below:
- Commercial unit;
 - plantrooms;
 - refuse stores.

Commercial Unit

- 4.27 In order to comply with the 2010 Building Regulations, the separating floors between this space and the adjacent apartments should comply with the minimum sound insulation performance requirements of Approved Document E (ADE).
- 4.28 However, based on AEC’s experience, it is recommended that noise from this spaces is controlled so as to not exceed a maximum noise level of no greater than NR30 L_{max} in habitable rooms during the daytime and NR25 L_{max} in bedrooms at night in the adjacent apartments.

Plantrooms

- 4.29 In terms of the plant rooms, it is suggested that 'average' dBL_{eq} noise from these areas should be controlled to no greater than NR20 in adjacent habitable rooms for continuous plant noise. A relaxation would be appropriate for emergency plant.

Refuse Store

- 4.30 Controlling noise from the refuse store to a limit of $40dBL_{Amax,F}$ in lounges and $35dBL_{Amax,F}$ in bedrooms is considered appropriate.

Noise Breaking-Out from Commercial Units

- 4.31 In relation to the ground floor the commercial unit, there is no specific national or local guidance in relation to control of noise breaking out of this type of space.
- 4.32 Based on AECs experience, it is proposed that ambient and maximum noise levels breaking out of the spaces (for sources other than loud amplified music) are controlled to not exceed the existing background and ambient noise level at the nearest noise sensitive receptors, respectively.
- 4.33 Maximum noise levels from amplified music should be controlled to no greater than the existing background noise level at the nearest noise sensitive receptor. This would result in noise from these sources being just perceptible at times and would generally not be considered intrusive in most instances.

Atmospheric Plant Noise Emissions

- 4.34 Based on AEC's experience, RBC require that noise from external building services plant is controlled to not exceed 5dB below the existing background noise level external to the nearest noise sensitive receptor during the daytime and night-time periods.

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 bus and tram movements on Drake Street.
- 5.2 In summary, ambient and maximum noise levels affecting the site from bus movements alone were approximately 64dB_{L_{Aeq,15min}} and 87dB_{L_{Amax,F}}, respectively.
- 5.3 In order to determine the ambient noise levels affecting the site from tram movements, Equation 1, below, has been used.

Equation 1

$$L_{Aeq,T} = SEL - 10 \log(t) + 10 \log(n)$$

Where:

L_{Aeq,T} = the daytime (16h) or night-time (8h) ambient noise level

SEL := the measured LAE (93dB)

t = seconds within assessment period (57,600 during the day and 28,800 at night)

n = number of activities within the assessment period (80 during the day and 18 at night)

- 5.4 Based on the above, daytime and night-time ambient noise levels from tram movements would be 65dB_{L_{Aeq,T}} and 61dB_{L_{Aeq,T}} for the daytime and night-time periods, respectively. Maximum noise levels were as high as 94dB_{L_{Amax,F}} from trams.
- 5.5 AEC has measured tram movements on the Metrolink around the Greater Manchester network and maximum noise levels typically range from 84 – 91dB_{L_{Amax,F}} at 5m. Therefore, the above measurements are deemed representative.
- 5.6 Comparing the tram noise levels with those from busses would, therefore, indicate that noise from the trams forms the dominant noise source affecting the site and the glazing and ventilation strategy below is based on this.
- 5.7 It is not anticipated that the La Strada restaurant to the north could be significantly noise generative, however, this may not be the case where there is amplified music and any external plant items. As the restaurant was closed and undergoing renovations, this was not possible to confirm, however, this will require a review during the design stages of the development.
- 5.8 A summary of the determined free-field daytime ambient and night-time ambient and maximum noise levels affecting the proposed development are presented in Table 5.1, below. These have been based on distance attenuation, angle of view to the noise source and screening, where applicable.

Table 5.1 – Determined Free-Field External Noise Levels

Elevation	Noise Level, dB		
	Daytime	Night-time	
	Ambient, dBL _{Aeq,16h}	Ambient, dBL _{Aeq,8h}	Maximum, dBL _{Amax,F}
East (Facing Drake Street)	68	66	94
South (Facing Nelson Street) / North	65	≤ 63	≤ 88
West (Facing away from Drake Street)	≤ 50	≤ 45	≤ 60

Glazing Requirements and Ventilation Requirements

- 5.9 As previously stated, whole dwelling (background) ventilation will, therefore, be provided via air source heat pumps located internally within each apartment.
- 5.10 However, 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 50dBL_{Aeq,T} during the daytime and 45dBL_{Aeq,T} and 60dBL_{Amax,F} at night.
- 5.11 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 all elevations, with the exception of those on the western elevation. On this elevation whole dwelling ventilation can be provided via a partially opened window.
- 5.12 The minimum sound insulation performances of the glazing to meet the required internal noise levels limits for each noise source have been calculated based on the source noise levels and assumed glazing and room sizes (33% glazing for daytime rooms and 33% for bedrooms). The minimum sound insulation performances are presented in Table 5.2, below.

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

Elevation	Sound Insulation Performance	
	Daytime (Living rooms etc.)	Night-time (Bedrooms only)
East (Facing Drake Street)	35dBR _w / 29dBR _w + C _{tr}	48dBR _w / 44dBR _w + C _{tr}
South (Facing Nelson Street) / North	35dBR _w / 29dBR _w + C _{tr}	46dBR _w / 40dBR _w + C _{tr}
West (Facing away from Drake Street)	29dBR _w / 25dBR _w + C _{tr}	29dBR _w / 25dBR _w + C _{tr}

- 5.13 Example double glazing build-ups, to achieve the required sound insulation performances presented in Table 5.2, are provided in Table 5.3 below. Consideration of frames and seals is more critical where the glazing acoustic performance requirement is 40dBR_w or higher, in these instances consideration should be given to secondary glazed systems or alternative means of controlling noise break-in.

Table 5.3 – Example Glazing Constructions

Sound Insulation Performance	Example Construction
48dBR _w / 44dBR _w + C _{tr}	12mm Glass / 20mm Argon / 12.8mm Stadip Silence Glass
46dBR _w / 40dBR _w + C _{tr}	10mm Glass / 20mm Argon / 8.8mm Optiphon Glass
35dBR _w / 29dBR _w + C _{tr}	8mm Glass / 6-16mm TC / 6mm Glass
29dBR _w / 25dBR _w + C _{tr}	4mm Glass / 6-16mm TC / 4mm Glass

- 5.14 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.

Internal Plant Noise Levels

- 5.14 As stated above, air source heat pumps will be installed within all apartments and, therefore, any system will need to ensure that the internal ambient noise levels presented in Section 4 are achieved.
- 5.15 As a 'ventilative cooling' or 'comfort cooling' system is to be installed, AVO states that the '*desirable upper internal ambient noise level limit*' is 30dBL_{Aeq}, and 35dBL_{Aeq}, for bedrooms and living / dining rooms, respectively. As per guidance stated in AVO, there is a +/-5dB tolerance within these desirable limits and this will be taken into consideration when carrying out any potential verification measurements.
- 5.16 Based on these provisional limits however, to control airflow generated noise in ductwork systems, the maximum duct velocities are presented in Table 5.4, below.

Table 5.4 – Maximum Ductwork Airflow Velocities

Noise Level, dB(A)	Duct Velocity, m/s		
	Main Duct	Branch Duct	Final Runout
30 (NR25)	5.0	4.5	2.5
35 (NR30)	6.5	5.5	3.25

- 5.17 In addition to the control of airborne noise, structure-borne noise also needs to be controlled by effectively isolating plant from the primary structure. This will require development.

Control of Overheating

- 5.18 If it is determined by others that there is a need to control overheating within the development, 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 on some elevations and these are shown in Table 5.5, below. Where noise levels are too high, an alternative method of cooling the dwellings during periods of overheating would be required and these elevations are also shown in Table 5.5.
- 5.19 This would only be applicable should the development be deemed as being at risk of overheating and this would need to be confirmed by others. This will require development during the design stages of the project.

Table 5.5 – Overheating Assessment

Elevation	Can windows be open to aid with the control of overheating?	
	Daytime (Living room etc.)	Night-time (Bedrooms)
East (Facing Drake Street)	No	No
South (Facing Nelson Street) / North	Yes	No
West (Facing away from Drake Street)	Yes	Yes

External Envelope

- 5.20 To maintain the sound insulation performance of the external envelope the remainder of the façade construction 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 59dB_{R'w}. How this will be achieved will need to be discussed further during the design stages of the development.

Noise Transfer from Non-Residential Areas

Commercial Unit

- 5.21 In AEC's experience, it would be appropriate to control maximum noise levels to no greater than NR30L_{max} in the rooms above during the daytime periods, which would mean that noise may be just audible but not intrusive. Similarly, at night, it is considered to be appropriate to control maximum noise levels in bedrooms to no greater than NR25L_{max}.
- 5.22 Based on an assumed 225mm thick solid concrete slab (with an assumed density of 2350kg/m³) between the ground floor commercial unit and apartment, calculations indicate that the floor would achieve an airborne sound insulation performance of approximately 55dB_{Dw}. This level of sound insulation performance would allow for shops or cafes to operate with low level background music and still comply with the above suggested noise limits.
- 5.23 However, if the ground floor unit was to have a noisier operator, such as a restaurant or gym with amplified music, a mass barrier ceiling may be required. This would be developed as part of the detailed design.
- 5.24 In terms of noise breaking out of the external envelope, any glazing that achieves a sound insulation performance of at least 31dB_{Rw} should control noise break-out from retail / café use. However, if the tenant wanted to play amplified music, enhanced glazing may be required and doors may need to be lobbied. Consideration should be made in relation to noise break-in to the proposed operator and this will need to be considered at the design stage. Any glazing strategy to the commercial unit would need to be reviewed during the design stages as this is dependent on the size of the glazing proposals.

Plantroom & Refuse Store

- 5.25 Based on a minimum 225mm thick concrete slab between the ground floor plant rooms and first floor apartments, provided that noise levels are controlled to no greater than NR75 in the plant room (which is a realistic limit for the majority of plant areas) noise in the habitable rooms above would be limited to NR15-20 and as such, comply with the suggested limit. This will be developed further during the design stages of the site.
- 5.26 In relation to the criteria for the Refuse Store, this floor build-up would also be appropriate to meet the proposed noise level limits.

Atmospheric Plant Noise Emissions

- 5.27 Atmospheric plant noise should be controlled to the limits presented in Table 5.6, below, which are free-field and are approximately 5dB below the lowest measured background noise level.
- 5.28 It is assumed that the night-time background noise level would be no lower than 40dBL_{A90,T}. This has been based on a reduction from the lowest daytime background noise levels (45dBL_{A90,T}).

Table 5.6 – Plant Noise Level Limits (At nearest residential window)

Period	Plant Noise Limit, dBL _{Aeq,T}
Daytime (0700h to 2300h)	40
Night-time (2300h to 0700h)	35

- 5.29 The above noise limits need to be achieved at the nearest residential receiver and assume that there is no acoustic character associated with the mechanical services plant (e.g. tonality or intermittency).
- 5.30 These overall noise limits would apply to the total plant noise from all plant associated with the building combined.

6.0 SUMMARY & CONCLUSIONS

- 6.1 Acoustic & Engineering Consultants Limited (AEC) has been appointed by Cassel & Fletcher, to undertake a noise assessment for the proposed development located at 42-46 Drake Street, Rochdale.
- 6.2 The proposed development will include a ground floor commercial unit and 33 apartments spread across of a five-storey development.
- 6.3 A daytime noise survey was undertaken by AEC in January 2023 and the main noise source in the area was road traffic and tram movements on Drake Street. 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.
- 6.4 Based on AEC's experience of noise assessments with Rochdale Borough Council (RBC), 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, alongside other appropriate guidance documents are discussed further in Section 4.0.
- 6.5 An assessment of the noise levels measured and affecting the proposed development is presented in Section 5.0. Based on this assessment, the sound insulation requirements of the building envelope and ventilation have been determined and are presented in Table 5.2. In brief, acoustically enhanced glazing is required on the elevations with line of sight of Drake Street.
- 6.6 Noise level limits to be achieved from the building services plant located in the plant rooms is also discussed in Section 5.
- 6.7 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

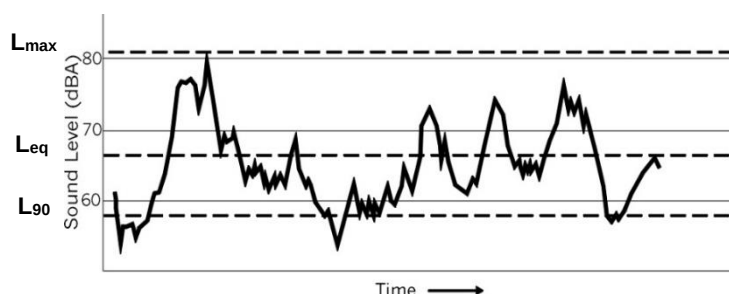
General

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 discrete 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_{AE}	The sound exposure level is a notional noise level and describes the average L_{Aeq} noise level of an event over a given time period as if it occurred during a one second period. This allows the L_{Aeq} to be determined over a time period with a number of distinct events
Free-field Level	This refers to the sound level measured outside, away from reflecting surfaces.
NR	Noise rating – a graphical method for assigning a single number rating to a noise spectrum and is often use to specify noise level limits for mechanical services.
R_w	Single number rating used to describe the <u>laboratory</u> airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
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

Table B.1 – Noise Survey Details

Date & Time of Survey:	1300 – 1518h on Tuesday 30 January 2024.					
Personnel:	Ross Chamberlain (AEC).					
Equipment Used:	B&K 2250 lite Real Time Analyser (AEC Kit 4).					
Calibration:	The sound level analysers, which conforms to BS EN 61672-1: 2013 ' <i>Electroacoustics – Sound level meters - Part 1 Specifications</i> ' for Class 1 Type Z meters, was 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:	Date	Period	Wet/Dry	Temp°C	Wind Speed & Direction	Cloud Cover
	30.01.24	Day	Dry	6°C	Negligible	50%
Measurement Locations:	Measurements were undertaken at two locations around the development site. Identified as A and B on Figure 3.1 and described below. A – 3.5m from the edge of Drake Street. B – at the end of the small alleyway 4m behind the 2m high brick wall.					
Measurement Details:	Measurements at Locations A and B were undertaken under free-field conditions. Measurements were undertaken over various periods in terms of L_{eq}, L_{10}, L_{90}, and L_{max} and were logged continuously over 1s for post processing and assessment. Full results for the attended measurements are given in Table B.2. Full results of the tram individual measurements are given in Table B.3.					
Measured Data:	Full octave band centre frequency data was obtained for all measurements.					

Table B.2 – Measured Daytime Noise Levels

Location	Period, h	Noise Level, dB				Comments
		L _{Aeq}	L _{A10}	L _{A90}	L _{Amax, F}	
A	1300 – 1312	59.1	62.0	51.4	77.3	Noise climate due to bus movements on Drake Street and very distant road traffic. Measurements did not include any tram movements. 1300 – 1312 measurement only included two bus movements.
	1312 – 1319	64.9	65.3	51.3	86.8	
	1400 – 1415	63.3	65.2	51.4	83.4	
	1416 – 1431	62.0	65.4	50.9	81.4	
	1503 - 1518	63.3	68.2	51.6	80.2	
B	1330 – 1345	51.4	54.5	44.5	69.7	Ambient noise levels due to bus movements on Drake Street and no tram movements.
	1433 - 1442	49.1	51.7	44.6	67.1	

Table B.3 – Measured Tram Noise Events

Location	Period, h	Noise Level, dB			Comments
		L _{Aeq}	SEL	L _{Amax, F}	
A	11s	81.8	92.2	89.4	High tram noise levels observed from perceived banging on track.
	10s	83.1	93.1	94.2	