Noise Impact Assessment Report to Support Planning Application for change of use and conversion to provide 4 no. residential apartments on first to fourth floors.

44-50 Portland Street Manchester M1 4GS

Draft (2)

20th April 2026

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Summary

The site is located at 44-50 Portland Street Manchester City Centre, The area is best known as Manchester China Town. The property lies in a prominent position on the north eastern row of the Conservation Area, at the junction of Charlotte Street and Portland Street.
The property is currently vacant from ground floor to the fourth floor. The lower Ground floor is still in use as a restaurant and is not part of this application. Please refer to the location plan (marked in red) submitted as part of the application.

The application description of the development is :-
Change of use and conversion to provide class C3 residential use from first to fourth floor. Total 4 no. apartments.. Retention of the retail use, class E for Upper Ground floor.

A noise survey and assessment report has been provided to support a planning application for the change of use to residential accommodation.

The report has provided appropriate sound insulation and mitigation measures to reduce noise emissions inside all habitable rooms. The primary sources of noise affecting the proposed development are road traffic to the south of the site (Portland Street), restaurants from upper and lower ground floors, Kitchen extract ducts and outdoor condenser units from restaurants at the lower ground floor and opposite the site at Reyner Street.

Following British Standard BS 8233:2014, British Standard BS 4142:2014+A1:2019 and guidance given in ProPG: Planning & Noise Guidance, the results of the noise survey, have been used to calculate the required façade sound insulation noise levels. Here is the summary of the noise impact assessment and report:

- **Existing commercial noise impact:** As the opposite commercial noise sources from restaurants are expected to cause a significant adverse impact to accommodation facing to Reyner street, the contribution from the restaurants outdoor plants and kitchen flues has been added to the noise climate. Therefore, mitigation measures to the proposed development are discussed in later Sections of this report.
- **Traffic noise impact:** The front façade of the building is facing the main road, noise is dominated by vehicle movements on Portland and surrounding networks as well as pedestrian activities. Therefore, mitigation measures to the proposed development are discussed in later Sections of this report.
- **Internal noise levels :** An assessment of the sound insulation performance requirements of the floor separating the restaurant from the apartments has been undertaken. It is demonstrated that noise transfer can be controlled such that the requirements of Manchester City Council are achieved.
- Typical suitable glazing and ventilation sound reduction requirements for the building façade design are set out in the tables of this report, the internal noise levels set in British Standard BS 8233:2014 can be achieved.

Note 1: it is recommended that during the design phase, before selecting glazing and ventilation, the client, the main contractor, or the architect should contact their acoustic consultant to clarify if the selected acoustic performance is sufficient.

Note 2: extra internal ambient noise may be introduced through mechanical ventilation to the residential rooms proposed to avoid the internal noise levels being too high; this should also be considered during the design phase.

Note 3: it is recommended that, wherever possible, window openings of habitable rooms (i.e. bedrooms and living areas) are orientated away from the commercial premises and road traffic noise from Portland Street. This will improve the acoustic design and reduce the level of noise impact.

- **Plant Noise Emission Criteria/ Limit :** As per the Manchester City Council's Noise Assessment Guidance, if an MVHR system generates external noise should be 5dB(A) or greater below the typical existing background noise level measured at a representative location of the proposed dwellings, as shown in the later Section of this report.

  Note 1: it is recommended that during the design phase, before selecting the MVHR system, the client, the main contractor, or the architect should contact their acoustic consultant to clarify if the selected acoustic performance is sufficient.

Based on the above, the Planning Application requirements for noise should, therefore, be achieved.

3

Table of Contents

Summary 2/3

Table of Contents 4

1 Introduction and Site description 5

1.1. Figure 1 Arial site photo 6

2 Noise Planning Policy and Criteria 7

2.1. Local Planning Policy 7

2.1.1. Manchester city Council Local Plan 7

2.1.2. Manchester City Council's – Noise Assessment Technical Guidance 7

2.2. National Planning Policy 8

2.2.1. The National Planning Policy Framework (NPPF) 8

2.2.2. National Planning Practice Guidance (NPPG) 9

2.2.3. The Noise Policy Statement for England (NPSE) 10

2.3. British Standards & Guidance 11

2.3.1. ProPG: Planning & Noise – New Residential Development (2017) 12

2.3.2. British Standard BS 8233:2014 – Guidance on Sound Insulation 13

2.3.3. British Standard BS 4142:2014 13

3 Existing Noise Climate 14

3.1. Survey Details 14

3.1.1. Personnel present 14

3.1.2. Instrumentation and Calibration 14

3.1.3. Equipment operation, including the times and dates. 15

3.1.4. Weather conditions 16

3.2. Methodology 16

3.3. Figure 2 noise measurement monitoring location 18

3.4. Noise Measurement Results 19

3.5. Noise climate 20

4 Building Envelope sound insulation 21

4.1. Indoor Ambient Noise Citeria 22

4.2. External noise break-in- assessment) 23

4.3. New Building Services Noise Emissions 24

4.4. Separation between Commercial and Residential units 24

4

1 Introduction

The subject property is located in Manchester city Centre, within the China Town area, and is Grade II listed. The property is currently vacant from ground floor to the fourth floor. Change of use and conversion to provide class C3 residential use from first to fourth floor. Retention of the retail use, class E for Upper Ground floor.

Manchester City Council planning has requested the noise impact assessment to demonstrate that suitable internal noise levels can be achieved for the redevelopment of the site.

The existing noise climate has been measured and assessed, and we will suggest appropriate sound insulation and mitigation measures to reduce noise emissions inside all habitable rooms.

1.1. Site Description

44-50 Portland Street Manchester City Centre. It is bounded by Reyner Street to the north , Portland Street to the south, Charlotte Street to the east , and commercial developments to the west. The area is predominantly commercial in nature including offices , retail and restaurants.

5

Figure 1 shows the location of the proposed redevelopment scheme, which will include 4 No. residential units and the nearest noise sensitive receptors (NSRs).

Figure 1 – Site Boundary Overlay (Source: Google Earth™)

Nearby Noise Sensitive Receptors (NSR)

The nearest noise sensitive receptor is the Britannia Adelphi Hotel, approximately 60m to the south-east. The Clayton Hotel Manchester is located approximately 55m to the south-west.

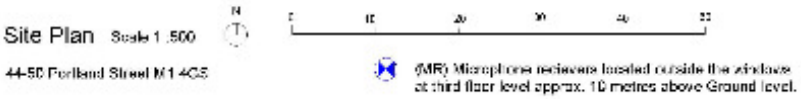
Proposed Development

The proposal seeks to conversion of the upper floors (4 storeys) to residential, and retained the restaurants on the upper and lower ground floors.

Noise Sources

The noise climate around the site is dominated by vehicle movements on Portland Street, Charlotte Street and the surrounding road network as well as pedestrian activities and plant noise from the surrounding commercial properties on Reyner Street, and activity noise from nearby drinking establishments.

Figure 1 – Site Boundary Overlay (Source: Google Earth™)



6

2 Noise Planning Policy and Criteria

2.1. Local Planning Policy

This site falls under the jurisdiction of Manchester City Council (MCC).

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*

MCC has adopted the following internal noise limits for residential properties:

- *Bedrooms (night time 23:00-07:00h) 30 dB$L_{Aeq,8h}$ (individual noise events should not normally exceed 45 dB $L_{Amax,F}$ more than 15 times);*
- *Living Rooms (daytime – 07:00-23:00h) 35 dB$L_{Aeq,16h}$.*

In terms of commercial noise affecting the apartments above, MCC's standard guidance is

> *"…a criterion that would achieve a condition of 'inaudible' / 'virtually inaudible' which is applicable for new residential developments that are structurally connected to entertainment venues (or vice versa) would be:*
>
> *'Music noise levels in the 63Hz and 125Hz octave centre frequency bands (L_{eq}) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (L_{eq}), respectively'.*

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 dB $L_{Ar,Tr}$ below the typical background L_{A90} level at the nearest noise sensitive location.

7

2.2. National Planning Policy

2.2.1. The National Planning Policy Framework (NPPF)

The latest revision of NPPF (July 2021) sets out the Government's vision for sustainable development through economic, environmental, and social planning policies for England.

Paragraph 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 … noise pollution …"

Paragraph 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 this 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;"

NPPF also sets out that any planning policies and decisions should ensure that new development can be integrated effectively.

Paragraph 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."

2.2.2. National Planning Practice Guidance (NPPG)

The Department for Communities and Local Government (DCLG) released a web-based resources at the time of the planning application relate to *'Planning Practice Guidance'*. The guidance advises the following:

"How can noise impact be determined?

Plan-making and decision making need to take account of the acoustic environment and in doing so consider:

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.*

In line with the Explanatory note of the noise policy statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy.

"What are the observed effect levels?

- *Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur.*
- *Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected.*
- *No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.*

Although the word 'level' is used here, this does not mean that the effects can only be defined in terms of a single value of noise exposure. In some circumstances adverse effects are defined in terms of a combination of more than one factor such as noise exposure, the number of occurrences of the noise in a given time period, the duration of the noise and the time of day the noise occurs."

"How can it be established whether noise is likely to be a concern?

At the lowest extreme, when noise is not noticeable, there is by definition no effect. As the noise exposure increases, it will cross the no observed effect level as it becomes noticeable. However, the noise has no adverse effect so long as the exposure is such that it does not cause any change in behaviour or attitude. The noise can slightly affect the acoustic character of an area but not to the extent there is a perceived change in quality of life. If the noise exposure is at this level no specific measures are required to manage the acoustic environment.

As the exposure increases further, it crosses the lowest observed adverse effect level boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise).

Increasing noise exposure will at some point cause the significant observed adverse effect level boundary to be crossed. Above this level the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is above this level the planning process should be used to avoid this effect occurring, by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of

the activity causing the noise, but it is undesirable for such exposure to be caused.

At the highest extreme, noise exposure would cause extensive and sustained changes in behaviour without an ability to mitigate the effect of noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be prevented from occurring.

This table summarises the noise exposure hierarchy, based on the likely average response."

Response	Examples of outcomes	Increasing effect level	Action
Not present	No Effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Response	**Examples of outcomes**	**Increasing effect level**	**Action**
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, 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.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

9

"How can the risk of conflict between new development and existing businesses or facilities be addressed?

Development proposed in the vicinity of existing businesses, community facilities or other activities may need to put suitable mitigation measures in place to avoid those activities having a significant adverse effect on residents or users of the proposed scheme.

In these circumstances the applicant (or 'agent of change') will need to clearly identify the effects of existing

businesses that may cause a nuisance (including noise, but also dust, odours, vibration and other sources of pollution) and the likelihood that they could have a significant adverse effect on new residents/users. In doing so, the agent of change will need to take into account not only the current activities that may cause a nuisance, but also those activities that businesses or other facilities are permitted to carry out, even if they are not occurring at the time of the application being made.

The agent of change will also need to define clearly the mitigation being proposed to address any potential significant adverse effects that are identified. Adopting this approach may not prevent all complaints from the new residents/users about noise or other effects, but can help to achieve a satisfactory living or working environment, and help to mitigate the risk of a statutory nuisance being found if the new development is used as designed (for example, keeping windows closed and using alternative ventilation systems when the noise or other effects are occurring).

It can be helpful for developers to provide information to prospective purchasers or occupants about mitigation measures that have been put in place, to raise awareness and reduce the risk of post-purchase/occupancy complaints."

10

2.2.3. The Noise Policy Statement for England (NPSE)

The Noise Policy Statement for England (NPSE) published in March 2010 sets out the Government's policy on noise and introduced the concepts from toxicology currently being applied to noise impacts by the World Health Organisation. These are:

"• ***NOEL – No Observed Effect Level: This is the level below which no effect can be detected.***

• ***LOAEL – Lowest Observed Adverse Effect Level: This the level above which adverse effects on health and quality of life can be detected.***

• ***SOAEL – Significant Observed Adverse Effect Level: This is the level above which significant adverse effects on health and quality of life occur.***

The first aim of the NPSE is to avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

The second aim of the NPSE is to mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development. This second aim refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life."

2.3. British Standards & Guidance

2.3.1. ProPG: Planning & Noise – New Residential Development (2017)

ProPG: 2017 guidance provides the recommended internal noise levels for various types of residential development, and three relevant bodies jointly created this document: The IOA, CIEH and the ANC.

ProPG is not an official government code of practice, but it does assist with bringing existing noise policies, including NPPF and helps fill in some gaps in knowledge with current guidance.

ProPG has a framework that requires a two-stage approach:

- ***"Stage 1 – an initial noise risk assessment of the proposed development site, and***

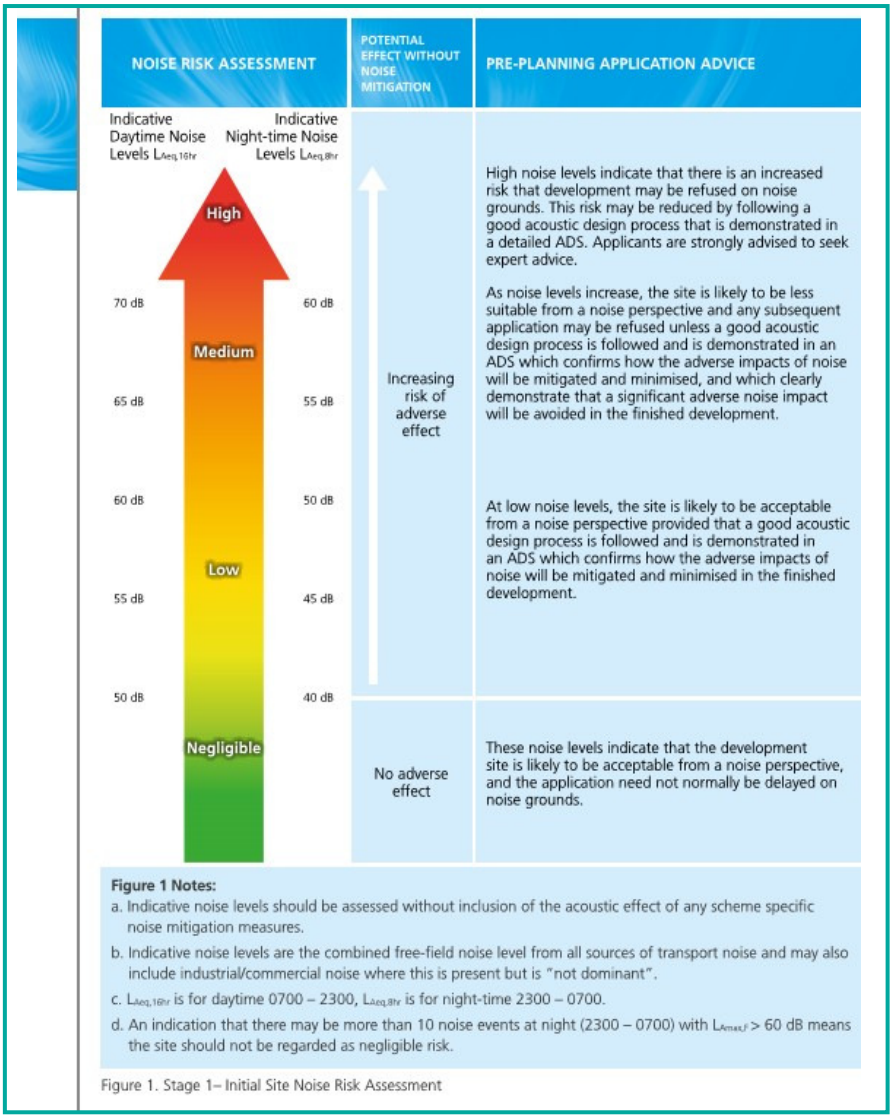


Figure 1. Stage 1– Initial Site Noise Risk Assessment

- ***Stage 2 – a systematic consideration of four key elements. Element 1) demonstrating "Good Acoustic Design Process", Element 2) observing internal "Noise Level Guidelines", Element 3) undertaking an "External Amenity Area Noise Assessment", and Element 4) consideration of "Other Relevant Issues."***

ProPG gives reference to British Standard BS 8233:2014, which is detailed in Section 2.3.2 of this report.

"In the case of sites exposed to commercial noise:

2.13 As stated in the Introduction, the scope of this ProPG is restricted to sites that are exposed predominantly to noise from transportation sources. The key concerns regarding new residential development near existing industrial and/or commercial land uses are:

- *The future occupants of the new noise sensitive development may be subject to adverse effects of noise, and*
- *The existing industrial and/or commercial business may become subject to complaints from future occupants of the new noise sensitive development and at risk of having to modify operations and/or incur additional costs.*

2.14 In the special case where industrial or commercial noise is present on the site but is "not dominant" (i.e. where the impact would be rated as lower than adverse (subject to context) if a BS4142:2014 assessment was to be carried out), its contribution may be included in the noise level used to establish the degree of risk (and if included, this should be clearly stated).

2.15 Where industrial or commercial noise is present on the site and is considered to be "dominant" (i.e. where the impact would be rated as adverse or greater (subject to context) if a BS4142:2014 assessment was to be carried out), then the risk assessment should not be applied to the industrial or commercial noise component and regard should be had to the guidance in BS4142:2014. The judgement on whether or not to undertake a BS4142 assessment to determine dominance should be proportionate to the level of risk. In low risk cases a subjective judgement of dominance, based on audibility, would normally be sufficient."

2.3.2. British Standard BS 8233:2014 – Guidance on Sound Insulation

Residential Internal Design Criteria

Following ProPG reference is made to internal design criteria, and British Standard BS 8233:2014 *'Guidance on Sound Insulation and Noise Reduction for Buildings'* contains guidance for internal design criteria, as shown in the following table.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,\ 16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,\ 16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,\ 16hour}$	30 dB $L_{Aeq,\ 8hour}$ 45 dB $L_{AF,max}$*

* Pro PG: 2017 states; *"NOTE 4: Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A)."*

Appendix A.12 of Pro PG: 2017 also states; *"Consequently, the L_{Amax} of noise events plus the number of events can be used as the basis of assessing impact; although this is subject to an upper limit. For example work which informs the WHO community noise guidelines recommendation that peak noise in bedrooms should not exceed 45 dB L_{Amax} more than 10 to 15 times per night concluded that "It will be noted in particular that the tolerance to noise in regard to sleep passes through a maximum value for an optimum number of 10 to 15 flights per night and that beyond 20 to 25 occurrences of noise per night the aircraft need to be very quiet or the dwellings provided with excellent sound proofing"."*

2.3.3. British Standard BS 4142:2014

British Standard BS 4142:2014 *"Methods for Rating and Assessing Industrial and Commercial Sound"* is used to assess the potential for adverse impact due to an industrial or commercial noise source at the relevant noise-sensitive commercial or residential property. The proposed or existing noise source levels are measured/calculated and compared to the existing background noise level (L_{A90}).

Depending on the noise source characteristics (tonal, intermittent, impulsive, or other), the noise source is given a rating noise level (penalty additions) and compared to the *'lowest'* background noise level (during proposed operating hours). The significance of the proposed or existing noise source can then be given a likelihood of adverse impact, which follows British Standard BS 4142:2014 advice:

"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context. 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."

3 Existing Noise Climate

3.1. Survey Details

3.1.1. Personnel present

Alex Wan

3.1.2. Instrumentation and Calibration

Svantek 971 – Sound Level Meter

Larson Davis CAL200 – Calibrator

Equipment	
Attended Noise Meter (Svantek 971)	
Class 1 Sound Level Meter	Svantek 971 – Serial Number 34390
Microphone	ACO 7052E – Serial Number 54420
Preamplifier	SV18 – Serial Number 32165
Calibrator (Larson Davis CAL200)	
Calibrator	Larson Davis – CAL200 - Serial Number 6003

14

3.1.3. Equipment operation, including the times and dates.

11:45 pm on Thursday 26 March 2026 to 16:00 pm on Monday 30 March 2026

3.1.4. Weather conditions

The weather conditions during noise monitoring at the proposed site are as follows.

Weather conditions throughout the survey period were suitable for environmental measurements with wind speeds of less than 5 m/s. No precipitation was recorded during the noise survey.
Temperatures varied between 5℃ and 15℃.

3.1.5 Methodology

Location of Noise measurement Monitoring: Microphone

receivers located outside

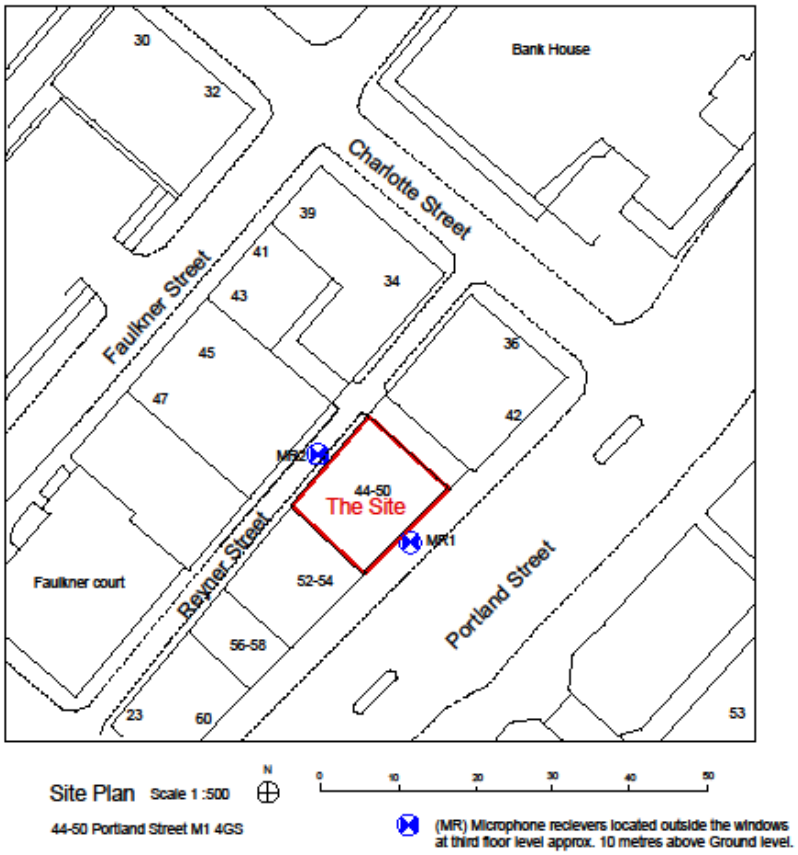
the windows at third floor

level approx.. 10 m above

Ground level

Figure 2 – Noise Measurement Locations

Figure 2 – Noise Measurement Locations MR1 Portland St MR2 Reyner Street



Site Block Plan Drawing showing noise measurement monitoring location

3.4 Environmental Noise survey results

Long Term Measurements

A summary of the day and night-time noise levels measured at the long-term noise monitoring Locations MR1 and MR2 are presented in Tables X and Y, below. All measurements at these locations were façade measurements and hence are corrected by -3 dB to obtain the free-field noise levels incident upon the proposed development.

Table X : Summary of Measured Noise Levels at Long Term Noise Monitoring - Location MR 1 Portland Street

Day/Date	Period (hh:mm)	Ambient Noise Level (dB $L_{Aeq,T}$)	Maximum Noise Level (dB L_{AFmax})	Typical Background Noise Level (dB $L_{A90,\ 15mins}$)
Thursday 26th March 2026	Daytime (11:45-23:00)	68	n/a	66
	Night-Time (23:00-07:00)	69	83	65
Friday 27th March 2026	Daytime (07:00-23:00)	69	n/a	65
	Night-Time (23:00-07:00)	72	88	70
Saturday 28th March 2026	Daytime (07:00-23:00)	74	n/a	72
	Night-Time (23:00-07:00)	73	88	71
Sunday 29th March 2026	Daytime (07:00-23:00)	65	n/a	60
	Night-Time (23:00-07:00)	64	81	61
Monday 30th March 2026	Daytime (07:00-16:00)	65	n/a	60
	Night-Time (23:00-07:00)	61	81	49

16

Table Y: Summary of Measured Noise Levels at Long Term Noise Monitoring - Location MR 2 ReynerStreet

Day/Date	Period (hh:mm)	Ambient Noise Level (dB $L_{Aeq,T}$)	Maximum Noise Level (dB L_{AFmax})	Typical Background Noise Level (dB $L_{A90,\ 15mins}$)
Thursday 26th March 2026	Daytime (11:45-23:00)	65	n/a	61
	Night-Time (23:00-07:00)	63	83	56
Friday 27th March 2026	Daytime (07:00-23:00)	66	n/a	61
	Night-Time (23:00-07:00)	65	88	60
Saturday 28th March 2026	Daytime (07:00-23:00)	66	n/a	62
	Night-Time (23:00-07:00)	65	88	62
Sunday 29th March 2026	Daytime (07:00-23:00)	65	n/a	60
	Night-Time (23:00-07:00)	61	81	52
Monday 30th March 2026	Daytime (07:00-16:00)	65	n/a	60
	Night-Time (23:00-07:00)	61	81	52

3.5 Noise Climate

When attending the site, the current noise climate is dominated by road traffic noise from the main road Portland Street. There is also intermittent commercial noise from the existing restaurants kitchen and plant noise to the rear of the proposed site (Reyner Street).

4. Building Envelope sound insulation

Indoor Ambient Noise Criteria

The indoor noise criteria required to be achieved are detailed in Table 7, below.

Table 7: Internal Ambient Noise Criteria

Daytime (07:00 – 23:00 hrs)	Night-time (23:00– 07:00 hrs)	
$L_{Aeq,\ 16h}$	$L_{Aeq,\ 8h}$	L_{Amax}
35 dB	30 dB	45 dB[1]
[1] It is generally agreed that this limit would not apply to atypical night-time maximum events. The previous version of BS 8233:1999 stated that, "*…individual noise events should not normally exceed 45 dB L_{Amax}.*"		

External Noise Break-in Assessment

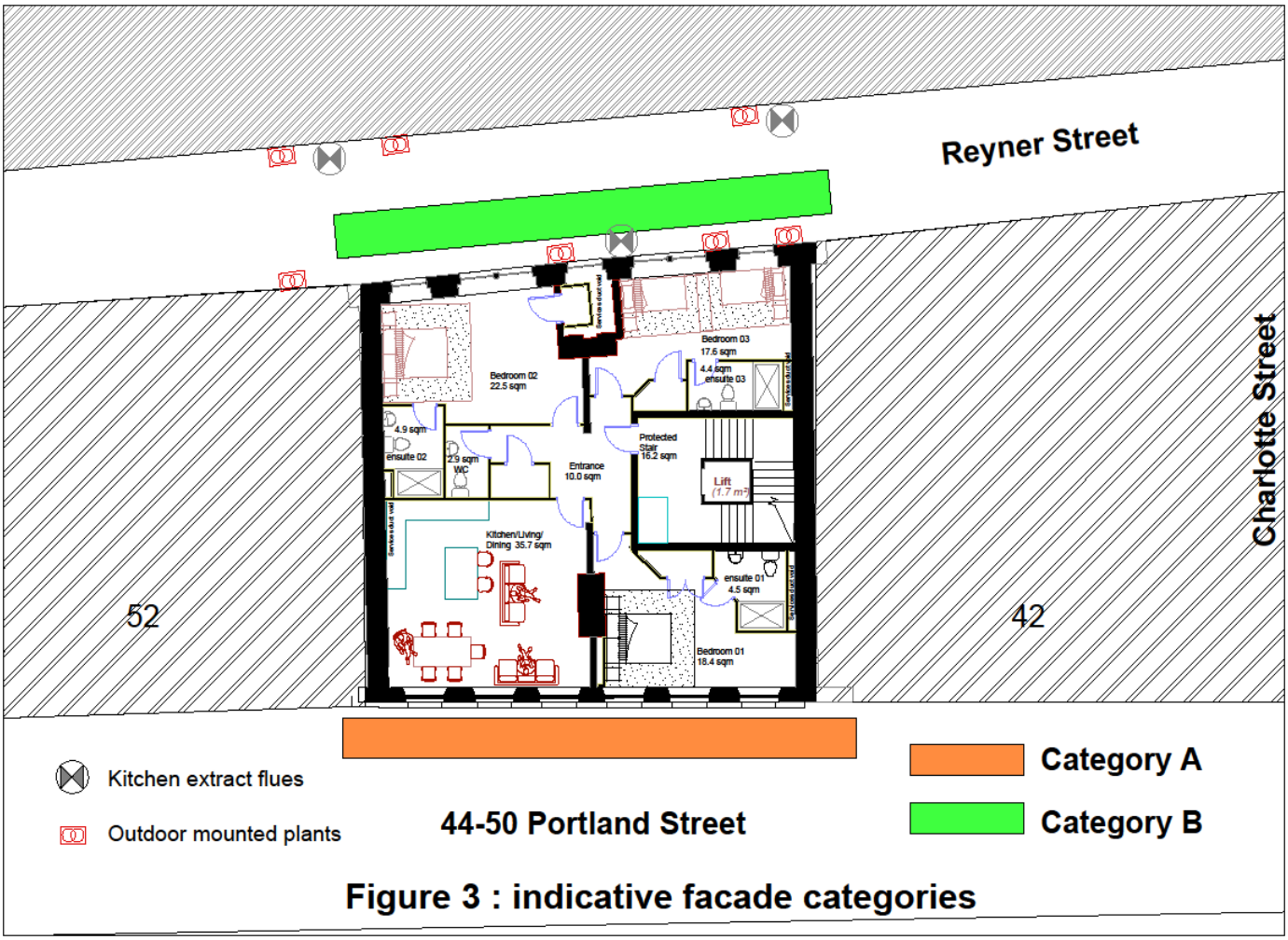
An external noise break-in assessment has been undertaken to assess the suitability of the site for residential development and to specify the minimum sound insulation performance of the façades required to meet the internal noise criteria.

Based on the survey data, a summary of the noise levels used to calculate noise ingress on all facades are detailed in Table 8, and Figure 4, below.

Table 8: Noise Levels per Façade

Façade Direction	Day, $dBL_{Aeq,16hour}$	Night $dBL_{Aeq,8hour}$	Night, $dBL_{Amax,F}$
Category A -Portland Street	63	62	85
Category B- Reyner Street	73	72	85

Figure 3: Indicative Façade Categories



Based on a typical reduction in external noise levels to internal noise levels of 15dB for a partially opened window (based on BS8233), allowable external noise levels for are therefore 50dB$L_{Aeq,T}$ outside living rooms in the day, and 45dB$L_{Aeq,T}$ and 60dB$L_{Amax,F}$ outside bedrooms at night.

With reference to Table 7, and the allowable external noise levels detailed above, it can be seen that for all habitable rooms, the required internal ambient noise levels can only be achieved with closed windows.

Ventilation will therefore need to be provided via alternative means.

Based on the assessment undertaken, the minimum sound reduction indices to be achieved for glazing and ventilators, and examples of typical glazing configurations to meet these requirements are presented in Table 9, below.

Table 9: Glazing and Ventilator Sound Insulation Requirements

Façade	Room	Glazing Sound Insulation Performance, dB R_w (+ C_{tr})	Example Glazing Construction, mm	Ventilator Sound Insulation Performance, dB $D_{n,e,w}$
Category A - Portland Street,	Living Rooms	36 (-7)	10mm/Thermal Cavity/4mm	41
	Bedrooms	42 (-7)	10mm/Thermal Cavity/8.8mm	46
Category B- Reyner Street	Living Rooms	46 (-9)	6.5mm Acoustic Laminate/Thermal Cavity/8.8mm Acoustic Laminate **OR** Secondary Glazing (6mm/≥100mm/4mm)	45
	Bedrooms	49 (-2)	12.8mm Acoustic Laminate /Thermal Cavity/12.8mm Acoustic Laminate **OR** Secondary Glazing (10mm/≥200mm/4mm)	45

- *The stated sound insulation performance must be achieved by the window as a whole, including frames, seals, opening lights etc., as opposed to the glass panels alone.*
- *The glazing configurations shown above are suggestions only, and alternative configurations may be acoustically suitable. If the existing glazing is retained within the proposed development, the above performance may be achieved by introducing secondary glazing (with sufficient airgap).*
- *In all cases, the performances stated in Table 9 can be achieved with secondary glazing (a second layer of at least 6mm glass, forming a cavity of at least 100mm unless stated otherwise) which will also comply with the heritage requirements.*
- *The external wall and roof should achieve a sound insulation performance at least 10dB greater than the glazing. This is not an onerous requirement and would be achieved a cavity masonry construction, and a tiled roof with plasterboard ceiling.*

Overheating

- *At this stage, an overheating assessment has not been completed. This initial guidance is therefore presented on the basis that an overheating condition may arise, but will be reviewed as the scheme progresses.*
- *MCC require that an assessment is made based on guidance in the Association of Noise*
- Consultants' document '*Acoustics, Ventilation and Overheating Guide'* (2020) (AVO). This guidance is not definitive.
- *Primarily, a Stage 1 assessment is undertaken by considering the external noise levels. External daytime noise levels of 50dB$L_{Aeq,T}$ are considered 'negligible risk', while a noise level of 65dB$L_{Aeq,T}$ is considered 'high risk'. At night, these limits are reduced to 45-55dB$L_{Aeq,T}$.*
- *As can be seen from Table 8, all façades would be considered to be within the 'high risk' criteria during daytime and night-time periods.*
- *On this basis, a Level 2 assessment should be undertaken.*
- *For the Level 2 assessment, again, there are no definitive criteria proposed, only a sliding scale of*
- *'Increasing likelihood of impact on reliable speech communication during the day or sleep disturbance at night'.*
- However, internal noise level limits of 50dB$L_{Aeq,16hour}$ in the day, and 42dB$L_{Aeq,8hour}$ and 65dB$L_{Amax,F}$ at
- night are the limits at which '*Noise causes a material change in behavior e.g. having to keep*
- *windows closed most of the time….Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep*.'
- *These limits would therefore appear to be a worst-case upper limit.*
- *Furthermore, any adverse effects relating to noise are affected by both the noise level itself, and the duration (how long overheating occurs) and frequency (how many times per year/month) with which the overheating condition occurs.*
- *The AVO guide also states that the reduction in external noise levels via a partially opened window is 13dB, slightly more cautious than the WHO guidance of 15dB. This therefore relates to worst case allowable external noise levels of 63dB$L_{Aeq,16hour}$ in the day, and 55dB$L_{Aeq,8hour}$ and 78dB$L_{Amax,F}$ at night.*
- *With reference to Table 8, above, therefore, it can be seen that these noise levels are exceeded at all times. The building is therefore likely to require some form of attenuated ventilation, or mechanical ventilation, to control noise ingress during the overheating condition.*
- *The implications of the noise levels under overheating conditions will need to be discussed and agreed with the design team and the Local Authority once full details of the ventilation strategy are known.*

Separation Between Commercial and Residential Units

The upper ground floor of the proposed development will contain a restaurant, directly below the proposed residential units. An assessment has been undertaken to assess the potential noise impact from the restaurant to the vertically adjacent residential units.

As a minimum, the floor will need to achieve a minimum sound insulation performance of 43dB$D_{nT,w}$+C_{tr} to meet Building Control requirements (Approved Document E) as well as the requirements of Manchester City Council with regard to low frequency noise transfer as detailed above.

dBx Acoustics has measured noise levels in a number of restaurants and commercial kitchens, which vary significantly (between 65-85dB$L_{Aeq,T}$).

Calculations have been undertaken using the worst case measured noise levels of 85dB$L_{Aeq,T}$, and the predicted sound insulation performance of an upgraded timber floor construction adequate to meet Approved Document E (floated mass layer ~25kg/m^2, resilient layer, existing timber floorboards, suspended plasterboard ceiling ~25kg/m^2) of around 55dBR_w+C_{tr}.

As can seen in Calculation 1, below, the predicted sound pressure level in the apartment above is around 27dB$L_{Aeq,T}$, and 44dB$L_{eq,T}$ at 63Hz and 35dB$L_{eq,T}$ at 125Hz.

Calculation 1 – Prediction of Restaurant Noise in Apartment Above

NOISE BREAK IN FROM ADJACENT SPACE

Noise Source/Location	First Floor												
Restaurant													
Area		m^2	**Width=**	4.2			**Height=**	5.7	m				
Construction Details													
Receiving Room													
Volume	60.9	m^3	**Width=**	4.2	m		**Length**	5.8	m	**Height=**	2.5	m	
Reverberation Time	0.8	seconds											
Calculation													
			Frequency,Hz	**63**	**125**		**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dBA**
		L1		68	77	76	83	78	76	72	55	**84**	
		10log(S)		14	14	14	14	14	14	14	14		
		10log(A), A=T/0.16V		-11	-11	-11	-11	-11	-11	-11	-11		
		Element SRI		27	45	52	60	69	63	84	80		
		L2		**44**	**35**	**27**	**26**	**12**	**16**	**-9**	**-22**	**27**	

The predicted noise levels are 8dB lower than the MCC daytime indoor noise limits, and 3dB below the night-time indoor noise limits within the residential properties, and also meet MCC's entertainment noise criterion at all times. The predictions are also based on an absolute worst case internal noise level within the restaurant of around 85dB$L_{Aeq,T}$ and hence are typically likely to be significantly lower than predicted.

As it has been determined that the minimum airborne sound insulation performance defined in ADE would also control commercial noise, the standard ADE flanking details would also therefore be appropriate.On this basis all common steelwork should be clad in an enclosure with a minimum mass of 15kg/m^2 (e.g. two layers of 12.5mm WallBoard) with at least 50mm mineral fibre in the enclosure formed. This should be undertaken on both sides of the separating floor.Noise transfer between the restaurant and proposed residential units is therefore not a concern.

New Building Services Noise Emissions

Manchester City Council's 'Planning & Noise Technical Guidance' (October 2022) states that the rated plant noise level should be controlled to 5dB below the background noise level during the periods in which the plant operates.

Consequently, suitable limits to which the cumulative plant noise should adhere have been determined, and are presented in Table 10.

Table 10: Proposed Building Service External Noise Limits

Noise Sensitive Receptors (Figure 1)	**External Building Services Plant Noise Limit ($L_{Ar,Tr}$) dB**	
	Daytime 07:00 – 23:00 hours (T = 1 hour)	**Night-time 23:00 – 07:00 hours (T = 15 minutes)**
All Noise Sensitive Receptors	54 dB	44 dB

The nearest noise sensitive receptor is the Britannia Adelphi Hotel, approximately 55m to the south-east. The Clayton Hotel Manchester is located approximately 65m to the south-west.

On this basis, the allowable noise level would be around 84dB$L_{Ar,Tr}$ @ 1m from the plant in the day, and 74d$L_{Ar,Tr}$ @ 1m at night.

It is unclear exactly where the kitchen plant and exhaust serving the Fraser House kitchen is to be located, but noise from these units should also not affect the residents of the upper floors of the building.

On this basis, noise from the kitchen plant should be controlled to at least 10dB lower than the ambient noise levels of the affected apartments. Achieving this noise limit ensures that glazing and ventilation sound insulation performance requirements derived to control noise ingress from the existing road traffic and plant will also be suitable to control noise ingress from new plant items.

On this basis, a noise limit of 52dB$L_{Ar,Tr}$ outside the nearest affected window would ensure that all new plant would be inaudible at all locations.

This would also ensure compliance with the limits set in Table 10, above, at the surrounding NSRs at the Britannia Adelphi Hotel and Clayton Hotel.