



Residential Noise Assessment

Site Address: 1390 Ashton Old Road, Openshaw, Manchester, M11 1JX

Client Name: Rambla Properties and Investments Ltd

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Authorisation and Version Control

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Delivering sustainable development by promoting good health and well-being through effective management of noise.

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1. Introduction

NOVA Acoustics Ltd has been commissioned to prepare a noise assessment for a residential development ('the proposed development') at 1390 Ashton Old Road, Openshaw, Manchester, M11 1JX ('the site'). The proposed development is for the change of use of a private club (sui generis) to form 4 self-contained residential units.

The applicant has received conditional approval for planning application No. 138198/FO/2023 ('the Application') from Manchester City Council. This report has been prepared to discharge condition 9 imposed by the Local Planning Authority ('LPA').

A noise survey has been undertaken to establish the prevailing sound levels at the proposed development. The findings have been subsequently used to assess the suitability of the site for residential use. Measures required to mitigate noise impacts for the proposed development have been assessed in accordance with the relevant performance standards, legislation, policy, and guidance.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

1.1 Standards, Legislation, Policy & Guidance

The following performance standards, legislation, policy, and guidance have been considered to ensure good acoustic design in the assessment:

- The LPA's conditional approval; specifically, 'Condition 9'.
- National Planning Policy Framework (NPPF, 2024).
- Noise Policy Statement for England (NPSE, 2010).
- British Standard BS8233:2014 – 'Guidance on sound insulation and noise reduction for buildings'.
- Approved Document F: Volume 1 Dwellings (2021).
- Acoustics Ventilation Overheating: Residential Design Guide 2020' (AVO Guide).

Further information on the legislation can be found in Appendix B.

1.2 Proposal Brief

The proposal is for the change of use to form 4 no. residential apartments. The figure below shows the proposed development.



Drawing Ref No. 23020S.02.01-E from DS Squared

Figure 1 – Proposed Development Ground Floor Plans

1.3 Local Planning Authority & Background

The following condition of the approved planning application No. 138198/FO/2023 requires discharging:

“9a) Prior to any above ground works a scheme for acoustically insulating the proposed residential accommodation against noise from Ashton Old Road shall be submitted to and approved in writing by the City Council as local planning authority. There may be other actual or potential sources of noise which require consideration on or near the site, including any local commercial/industrial premises. The approved noise Insulation and ventilation scheme shall be completed before any of the dwelling units are occupied.

Noise survey data shall include measurements taken during a rush-hour period and nighttime to determine the appropriate sound insulation measures necessary.

9b) Prior to first occupation of the residential units, a verification report shall be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post completion testing to confirm that the internal noise criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the internal noise criteria.

Reason - To secure a reduction in noise from traffic or other sources in order to protect future residents from noise disturbance and to reduce the potential for overheating, pursuant to policies SP1 and DM1 of the Manchester Core Strategy (2012) and saved UDP policy DC26.”

2. Environmental Noise Survey

2.1 Measurement Methodology

The following table outlines the measurement dates and particulars.

Location	Survey Dates	Measurement Particulars
MP1	09/09/2025 – 11/09/2025	Equipment mounted protruding from a first-floor window at 1m distance from the building façade overlooking Ashton Old Road.
MP2	09/09/2025 – 11/09/2025	Equipment mounted protruding from a first-floor window at 1m distance from the building façade overlooking the rear yard and Capital Road.

Table 1 – Measurement Methodology

The figure below outlines the site surroundings and measurement locations:



Imagery ©2025 Map data ©2025

Figure 2 – Measurement Locations and Site Surroundings

2.2 Context & Subjective Impression

The proposed development site is located on Ashton Old Road, Openshaw, Manchester. The area surrounding the site consists primarily of residential dwellings in addition to some commercial units. St Clements church is also situated across the road.

The acoustic environment is deemed to be moderate to high in level and the noise profile is dominated by road traffic noise emissions from Ashton Old Road and occasional vehicle pass-bys along Capital Road.

During the site visits noise emissions from a nearby nursery was just audible to the rear of the site with children playing in the front yard of the building, however road traffic noise was deemed as the dominant noise source. It is understood that St Clements Church does not host a traditional bell ringing group and as such the bells are not in regular use. As such it is determined that maximum noise events are derived primarily from vehicle pass-bys on Ashton Old Road.

2.3 Environmental Noise Survey Results

The following section outlines the measured sound levels during the survey. The maximum sound levels ($L_{AFmax,1min}$) exceeded fewer than 10 times during the night-time periods measured are also shown. The time history results can be found in Appendix D.

Location	Measurement Period ('T')	Octave Frequency Band (Hz, $L_{eq,T}$, dB)							$L_{Aeq,T}$ (dB)	'Typical' $L_{AFmax,1min}$ (dB)
		63	125	250	500	1k	2k	4k		
MP1	$L_{eq,16hr}$ (Day)	69	61	60	60	63	60	54	66	--
	$L_{eq,8hr}$ (Night)	62	54	55	57	60	56	46	63	78
MP2	$L_{eq,16hr}$ (Day)	63	55	55	53	53	51	49	58	--
	$L_{eq,8hr}$ (Night)	55	48	49	47	49	44	40	52	73

Table 2 – Sound Level Results Summary

The $L_{AFmax,1min}$ presented in the above table is observed in the measurement data to be exceeded on 8 occurrences at both measurement locations.

3. Noise Break-in Assessment and Sound Insulation Scheme

3.1 Internal Noise Level Criteria

The noise profile of the area is predominantly built up of road traffic noise. The following table outlines the internal acoustic design criteria used in the following assessment.

Activity	Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Resting	Living Room	35 dB $L_{Aeq,16hr}$ / NR30	--
Dining	Dining Room/Area	40 dB $L_{Aeq,16hr}$ / NR35	--
Sleeping (Daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$ / NR30	30 dB $L_{Aeq,8hr}$ / NR25 45 dB L_{AFmax} *

*Note 1: The maximum criteria have been taken from the World Health Organisation (WHO) Guidelines for Community Noise.

*Note 2: ProPG:2017 which is relevant to 'New Residential' states; "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".

Note 3: BS8233:2014 states: "Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved".

Note 4: BS8233:2014 states: "The levels shown in Table 4 (criteria shown above) are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g., 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in Table 4.

Note 5: BS8233:2014 states: "If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.

Table 3 – Internal Acoustic Design Criteria (BS8233)

The measured sound levels at the proposed development are assessed against the relevant criteria and a sound insulation scheme is provided to achieve a good internal acoustic environment.

3.2 Glazing and Background Ventilation Specification

The following section provides a glazing and background ventilation specification that achieves the relevant internal noise criteria. The calculations considering the following sound insulation scheme can be found in Appendix E.

Description	Octave Frequency Band (Hz, dB)							Overall (dB)
	63	125	250	500	1k	2k	4k	
Front and Side Living Rooms & Bedrooms Overlooking Ashton Old Road & Capital Road								
6mm Glass / 16mm Argon Cavity / 8.8mm Optiphon Glass	24	25	27	38	48	47	55	41 R _W (-6 C _{tr})
Greenwoods 2500EA.AC1 (2 No. Trickle)	31	41	40	37	47	43	46	42 D _{ne,W} (-2 C _{tr})
Rear Living Rooms & Bedrooms								
6mm Glass / 6-16mm Air Cavity / 6mm Laminated Glass	20	20	19	30	39	37	46	33 R _W (-5 C _{tr})
Titon Standard Vent + C25 (2 No. Trickle)	--	36	38	36	32	37	39	35 D _{ne,W} (-2 C _{tr})

Table 4 – Glazing & Background Ventilation Specification

The assessment demonstrates that the BS8233 internal noise level criteria are achieved with windows closed. The proposed acoustically attenuated ventilation strategy allows adequate background ventilation to be provided without reliance on opening windows on the noise-exposed façades.

Any other window or ventilation specification capable of providing this attenuation will be suitable provided the glazing suppliers can provide an acoustic test report in accordance with BS EN ISO 10140-2:2010 or an evidence-based calculation.

4. Overheating Screening Assessment

In order to avoid excessively high temperatures and provide adequate levels of thermal comfort within dwellings, an overheating mitigation strategy must be developed. In low noise areas, this strategy can often rely upon opening windows as the primary source of ventilation, however, in areas with higher levels of noise, this would present a risk of adverse effects on health and quality of life.

Considering that the development is a change of use and not new build, it is not a requirement to achieve the criteria defined in Approved Document O ('ADO'). However, to allow for a reasonable living environment, it is recommended that the less onerous criteria given in the 'Acoustics Ventilation and Overheating Design Guide' ('AVO') should be applied. Considering that a partially open window provides approximately 13 dB of attenuation (as stated in 'AVO') the proposed internal and external noise criteria are summarised as follows:

Period	Proposed Criteria (dB)		External Level (dB)	
	Internal	External	Measured	Exceedance
Front Façade				
Daytime ($L_{Aeq,16hr}$)	50 [1]	63	66	+3
Night-time ($L_{Aeq,8hr}$)	42 [1]	55	63	+8
Night-time ($L_{AFmax,T}$) [2]	65 [1]	78	78	0
Rear Façade				
Daytime ($L_{Aeq,16hr}$)	50 [1]	63	58	-5
Night-time ($L_{Aeq,8hr}$)	42 [1]	55	52	-3
Night-time ($L_{AFmax,T}$) [2]	65 [1]	78	73	-5
Notes: [1] Criterion taken from the AVO guide. Above this level, it is stated: "Noise causes a material change in behaviour, e.g., having to keep windows closed most of the time." [2] L_{AFmax} exceeded fewer than 10 times per night.				

Table 5 – External Noise Level Limits for Overheating Criteria

The noise levels measured at the front façade of the site overlooking Ashton Old Road exceed the external noise criteria shown in the table above. As such, it is recommended that risk of overheating is assessed by a suitably qualified person. Should the outcome indicate the site is at low risk of overheating, then a secondary ventilation strategy may not be required. If the outcome is that the site is at moderate to high risk, then it is recommended that openable windows are not used as the primary source of ventilation/cooling.

Alternative forms of ventilation include passive systems (such as acoustic louvres) and mechanical systems (such as 'centralised mechanical extract ventilation' and 'mechanical ventilation with heat recovery'). The installation of passive systems is generally preferable; however, the precise requirements

must be confirmed with a ventilation specialist. Further to this, it must also be ensured that all ventilation strategies are compliant with the requirements of Approved Document F.

It should be noted that this assessment relates exclusively to overheating mitigation, and as such, open windows may be used for purge ventilation without acoustic constraint.

The external noise levels measured at the rear of the proposed development are below the threshold criteria shown in the table above. Given this, it is thought that opening windows can be used as the primary means of mitigating overheating. However, it must also be ensured that all ventilation is compliant with the requirements of Approved Document F.

Further advice can be provided by NOVA Acoustics if required.

5. External Noise Level Assessment

The following table outlines the external acoustic design criteria used in the following assessment.

Activity	Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Relaxation	External Amenity Spaces	50 - 55 dB $L_{Aeq,16hr}$	--

Table 6 – External Acoustic Design Criteria

It is understood that the external amenity areas of the development are proposed to be within the terrace area to the rear and in the from of balconies to the rear on the first and second floors.

The façade noise level at the rear was measured to be 58dB during the daytime period, however this was at the most exposed corner window where contributions from both Ashton Old Road and Capital Road were dominant.

The proposed balconies are to be further away from the local road network and located in the southeastern corner of the proposed development location. This location would be fully screened from Ashton Old Road by the property itself and partially screened from Capital Road by the existing rear extension. Furthermore, it is understood that a 1.8m tall, glazed screen is proposed to encase the balconies. Assuming that the glass balustrade will provide between 5-10dB of attenuation, when residents are seated within the balcony, the adopted criteria will be achieved. Accordingly, no further mitigation measures are deemed necessary.

The ground floor rear gardens are also screened from the local road network by the existing rear extension and boundary fencing. Calculating the additional distance from the monitoring position at MP2 and the centre of the garden areas in addition to the screening effects, the BS8233 criteria is expected to be achieved in the proposed amenity areas.

Therefore, no additional mitigations measures are considered necessary.

6. Conclusion and Action Plan

The proposed development has been assessed against the acoustic design criteria and a sound insulation scheme has been provided to ensure the criteria has been achieved.

The following 'Action Plan' is outlined to ensure the design considerations and specifications from this report are duly implemented:

1. The proposed glazing and background ventilation system, or a suitable alternative, should be installed as shown in Section 3. This includes enhanced glazing and acoustic trickle ventilation.
2. Due to elevated external noise levels at the front of the property facing towards Ashton Old Road, it recommended that an overheating assessment undertaken by a suitably qualified person. Should the outcome indicate a low risk of overheating, then secondary ventilation may not be required. If the outcome is that there is a moderate to high risk. Then it is recommended that openable windows are not used as the primary source of ventilation. This is discussed further in Section 4.
3. Assuming the installation of the proposed screening to the external amenity areas, it is predicted that the noise levels in external amenity areas will meet the BS8233 criteria.

This report presents a sound insulation scheme for the protection of future residents and therefore can be applied for the discharging of condition 9a of the planning approval.

The findings of this report will require written approval from the Local Authority prior to work commencing.

Appendix A – Acoustic Terminology

A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure given by the following formula in decibels (dBA). $L_{pA} = 10 \log_{10} (pA/p_0)^2$. Where: pA is the A-weighted sound pressure in pascals (Pa) and p_0 is the reference sound pressure (20 μ Pa)
Background Sound	Underlying level of sound over a period, T , which might in part be an indication of relative quietness at a given location
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T , has the same mean-squared sound pressure as the sound under consideration that varies with time
Facade level	Sound pressure level 1 m in front of the facade
Free-field level	Sound pressure level away from reflecting surfaces
Indoor ambient noise	Noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants
Noise Criteria	Numerical indices used to define design goals in a given space
Noise Rating (NR)	Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves
Octave Band	Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit
Percentile Level, $L_{AN,T}$	A-weighted sound pressure level obtained using time-weighting “F”, which is exceeded for $N\%$ of a specified time interval
Rating Level, $L_{Ar,Tr}$	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise
Reverberation time, T	Time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped
Sound Pressure, p	root-mean-square value of the variation in air pressure, measured in pascals (Pa) above and below atmospheric pressure, caused by the sound
Sound Pressure Level, L_p	Quantity of sound pressure, in decibels (dB), given by the formula: $L_p = 10 \log_{10}(p/p_0)^2$. Where: p is the root-mean-square sound pressure in pascals (Pa) and p_0 is the reference sound pressure (20 μ Pa)
Weighted sound reduction index, R_w	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies

Appendix B – Standards, Legislation, Policy, and Guidance

This report is to be primarily based on the following standards, legislation, policy, and guidance.

B.1 – National Planning Policy Framework (2024)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2024. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 187e, it states:

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.

Paragraph 198 states:

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 impact 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; and*
- c) Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes, and nature conservation.*

B.2 – Noise Policy Statement for England (2010)

Paragraph 198 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

To achieve this vision the Statement identifies the following three aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- Avoid significant adverse impacts on health and quality of life:
- Mitigate and minimise adverse impacts on health and quality of life:
- Where possible, contribute to the improvement of health and quality of life.

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that “significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development”.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: “all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.”

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise. This can be related to the third aim above, which seeks: “where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.”

This is further expanded using the updated “Noise Exposure Hierarchy Table” which includes an additional level of impact referred to as the ‘No Observed Adverse Effect Level’ (‘NOAEL’). It is stated that at this level: “*noise can be heard, but does not cause any change in behaviour, attitude or other physiological response*”. In addition, noise at this level “*can slightly affect the acoustic character of the area but not such that there is a change in the quality of life*”.

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

B.3 – BS8233:2014 'Guidance on Sound insulation and noise reduction for buildings'

BS8233 provides guidance on noise levels from sources without specific character in the built environment, based on the recommendations of the World Health Organization; specifically, 'WHO Guidelines on Community Noise, 1999'. The Guidelines on Community Noise (1999) document defines community noise to include noise from "industries" and "construction". The desirable criteria levels of steady state, "anonymous" noise in unoccupied spaces within dwellings, from sources such as road traffic, mechanical services and other continuously running plant, are tabulated below.

BS8233:2014 Internal Ambient Noise Level Criteria			
Activity	Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 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_{AFmax}^*

Table 7 – BS8233:2014 Internal Ambient Noise Level Criteria

**ProPG:2017 states that's good acoustic design can be used so that individual noise events do not normally exceed 45 dB L_{AFmax} more than 10 time a night within noise sensitive rooms such as bedrooms. However, where it is not reasonably practicable to achieve the guideline then the judgment 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.*

It is noted, however, that where development is considered necessary or desirable, despite external noise level above WHO guidelines, the above target levels may be relaxed by up to 5 dB.

General recommendations for mitigation to enable these targets to be achieved are provided, including the use of bunds and barriers to reduce external noise and space planning and sound insulation for the control of internal noise levels.

For this assessment, the above criteria are considered to be the 'LOAEL' as defined in the NPSE in Appendix B.

B.4 – Approved Document F Volume 1: Dwellings (2021)

Approved Document F states the following in relation to noise:

- Mechanical ventilation systems, including both continuous and intermittent mechanical ventilation, should be designed and installed to minimise noise. This includes doing all of the following.
 - o Correctly sizing and jointing ducts.
 - o Ensuring that equipment is appropriately and securely fixed, such as using resilient mountings where noise carried by the structure of the building could be a problem.
 - o Selecting appropriate equipment, including following paragraph
- For mechanical ventilation systems, fan units should be appropriately sized so that fans operating in normal background ventilation mode are not overly noisy. This might require fans to be sized so that they do not operate near maximum capacity when in normal background ventilation mode.
- Account should be taken of outside noise when considering whether openable windows are appropriate for purge ventilation.
- If an exposed façade is close to an area of sustained and loud noise (e.g. a main road), then a noise attenuating background ventilator should be fitted.

B.5 – Acoustics Ventilation and Overheating – Residential Design Guide 2020

It is suggested that the desirable internal noise criteria within BS8233:2014 should be achieved considering adequate ventilation as defined by Building Regulations 'Approved Document F' ('ADF') whole dwelling ventilation. However, for a whole dwelling ventilation system such as MVHR it is considered reasonable to allow higher levels of internal ambient noise from transport sources when higher rates of ventilation are required in relation to the overheating condition.

The 'Institute of Acoustics' ('IOA') and the 'Association of Noise Consultant's' ('ANC') have published 'The AVO Guide: 2020' document 2020. It provides guidance for those acousticians involved in the design of buildings to prevent noise ingress to and achieve reasonable internal levels. This provides valuable guidance on ventilation and overheating in support of the "Good Acoustic Design" principle advocated by ProPG. Along with guidance showing an acoustic assessment during the overheating condition, the AVO Guide (2020) provides a framework that has a two-level assessment procedure to estimate the potential impact on occupants:

Level 1 Risk Assessment

AVO 'Level 1' risk assessment criteria guide based on external free field ambient noise levels for dwellings relying on purge ventilation (e.g., opening windows) to prevent summertime overheating. AVO Guide Table 3-2 detailed in the figure below. To assess the possibility of overheating it is reasonable to relax the BS 8233:2014 internal ambient noise levels from opening a window by 5 decibels (5 dB). Also, it is assumed that a partially open window will provide a sound reduction of 13 dB. Therefore, to achieve internal noise levels in line with BS 8233:2014 the façade external noise levels should fall inside the levels shown in Table 3-2.

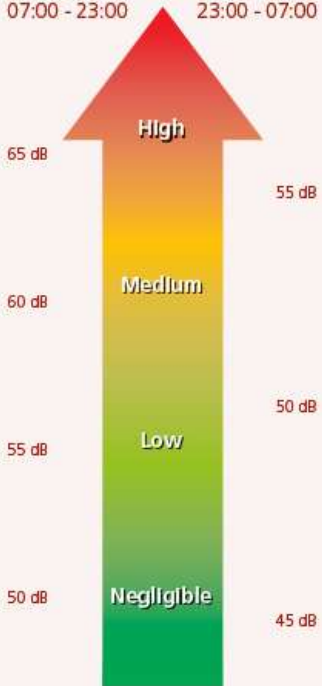
Risk category for Level 1 assessment ^[Note 5]	Potential Effect without Mitigation	Recommendation for Level 2 assessment
LAeq,T ^[Note 3] during 07:00 - 23:00 LAeq,8hr during 23:00 - 07:00  65 dB 55 dB 60 dB 50 dB 55 dB 45 dB 50 dB High Medium Low Negligible	↑ Increasing risk of adverse effect Use of opening windows as primary means of mitigating overheating is not likely to result in adverse effect	Recommended Optional Not required

Table 3-2 of AVO Guide (2020)

Figure 3 – AVO Guide Level 1 Risk Category

The AVO Guide (2020) seeks to determine the level of risk associated with overheating in a new residential development based on the existing noise climate. The AVO risk categories are detailed in the table below with clearer categorisation.

AVO Guide (2020) Level 1 Risk Assessment			
Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)	Risk Category	Mitigation
≥ 63 dB $L_{Aeq,16hour}$	≥ 55 dB $L_{Aeq,8hour}$	High Risk	Level 2 assessment recommended. Windows which are unopenable on grounds of noise will inevitably create issues for the overheating strategy.
57 – 62 dB $L_{Aeq,16hour}$	52 – 54 dB $L_{Aeq,8hour}$	Medium Risk	Level 2 assessment optional to give more confidence regarding the suitability of internal noise conditions.
54 – 56 dB $L_{Aeq,16hour}$	49 – 51 dB $L_{Aeq,8hour}$	Low Risk	
≤ 53 dB $L_{Aeq,16hour}$	≤ 48 dB $L_{Aeq,8hour}$	Negligible Risk	None required – openable windows suitable for ventilation

Table 8 – AVO Guide (2020) Level 1 Risk Assessment

Level 2 Risk Assessment:

A 'Level 2' assessment of noise is recommended where a dwelling using purge ventilation (e.g., open windows) reaches Level 1 'High Risk' or 'Medium Risk'. The Level 2 assessment guidance comments that where internal ambient noise levels are >50 dB $L_{Aeq,16hr}$ (day) or >42 dB $L_{Aeq,8hr}$ (night) then the outcome might be that the noise causes a material change in behaviour, e.g., having to keep windows closed for the majority of the time, or there is the potential for sleep disturbance.

To conduct a Level 2 assessment, the following minimum information is required:

- Statement of the overheating criteria being applied.
- Description of the provisions for meeting the stated overheating criteria. This should include, where relevant, the area of façade opening.
- Details of the likely internal ambient noise levels whilst using provisions for mitigating overheating, and the method used to predict these.
- Estimation of how frequently and for what duration such provisions are required to mitigate overheating.
- Consideration of the effect of individual noise events.
- Assessment of the adverse effect on occupants.

The figure below outlines the AVO Guide (2020) guidance for a Level 2 assessment of noise from transport sources relating to the Overheating Condition.

Internal ambient noise level [Note 2]			Examples of Outcomes [Notes 5]	
$L_{Aeq,T}$ [Note 3] during 07:00 – 23:00 [Note 6]	$L_{Aeq,8h}$ during 23:00 – 07:00	Individual noise events during 23:00 – 07:00 [Note 4]		
> 50 dB	> 42 dB	Normally exceeds 65 dB $L_{A,5max}$	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 noise level			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 8]
≤ 35 dB	≤ 30 dB	Do not normally exceed $L_{A,5max}$ 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 9]. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.

Note 1 The noise levels suggested in Tables 3-2 and 3-3 assume a steady road traffic noise source but may be adapted for other types of transport.

Table 3-3 of AVO Guide (2020)

Figure 4 – AVO Guide Level 2 Internal Ambient Noise Levels

Appendix C – Location Plans



Figure 5 – Location Plans

Appendix D – Environmental Survey

D.1 – Time History Noise Data

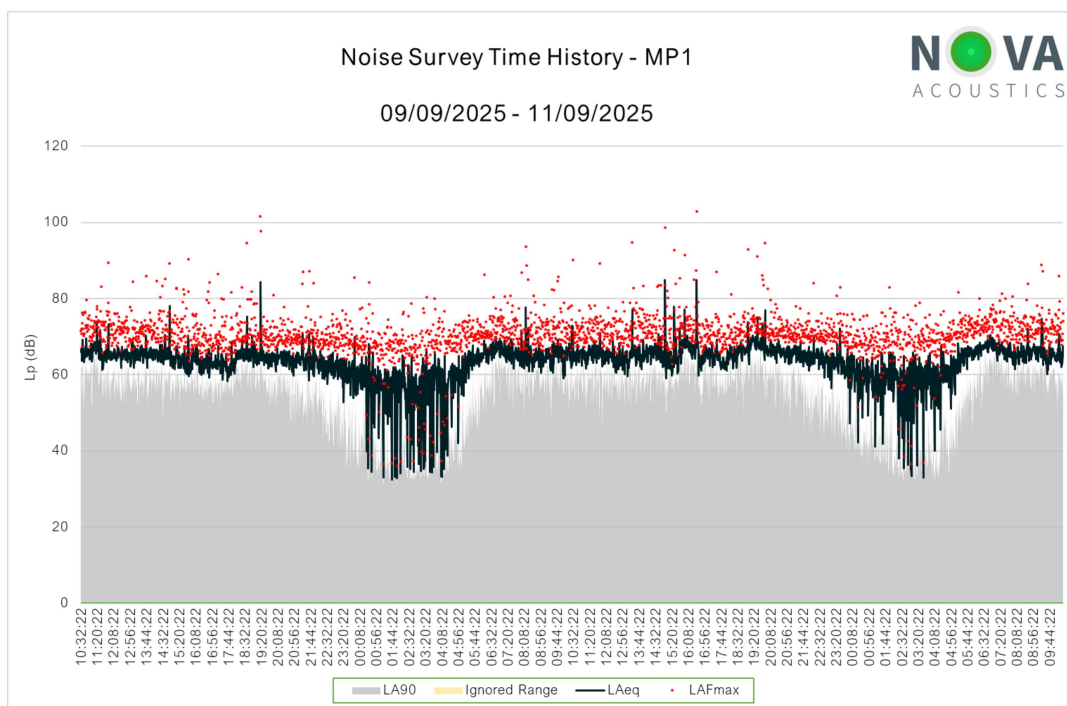


Figure 6 – MP1 Noise Survey Time History

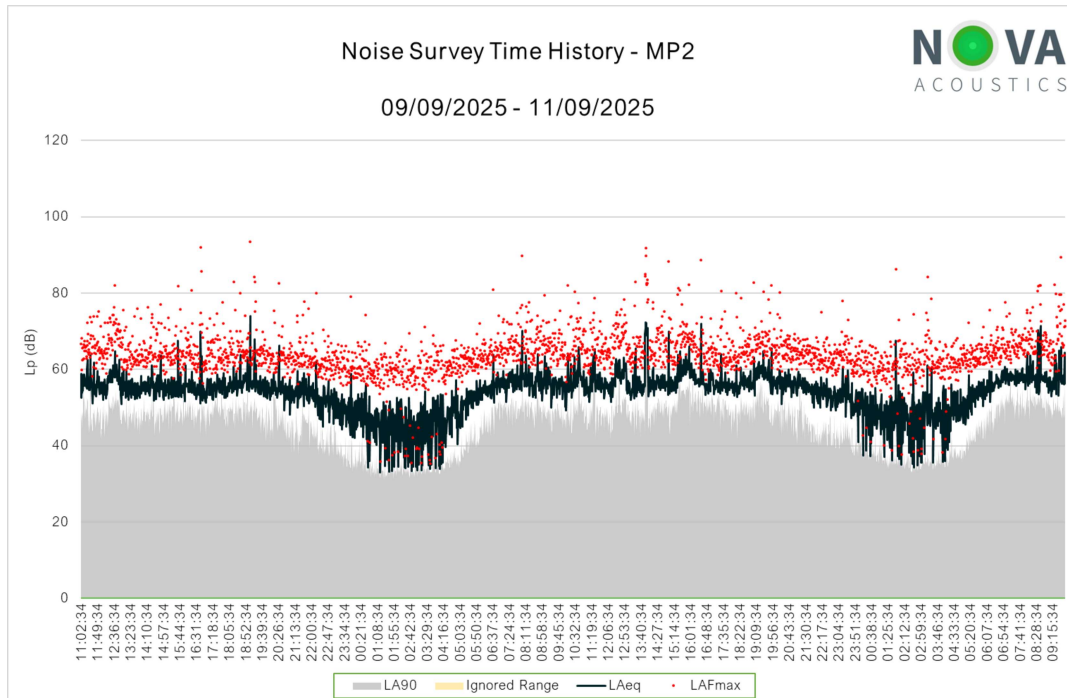


Figure 7 – MP2 Noise Survey Time History

D.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
Svantek SV971A Class 1 Sound Level Meter	141346	≤0.1
Svantek SV33B Class 1 Calibrator	125695	
Svantek SV971A Class 1 Sound Level Meter	141359	≤0.1
Svantek SV33B Class 1 Calibrator	125695	

Table 9 – Surveying Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with a negligible deviation of ≤0.1 dB. All sound level meters are calibrated every 24 months and all calibrators are calibrated every 12 months, by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

D.3 – Meteorological Conditions

As the environmental noise survey was carried out over a long un-manned period no localised records of weather conditions were taken. However, all measurements have been compared with met office weather data of the area, specifically the closest weather station, and the data from the weather station is outlined in the table below. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather Conditions – Salybridge (Approx. 7.2km E of Site)				
Time Period	Air Temp (°C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
09/09/25 – 00:00 – 23:59	10.5 – 19.7	0.0	SE	0.0 – 0.8
10/09/25 – 00:00 – 23:59	11.9 – 18.7	0.0 -0.3	SE	0.0 – 1.7
11/09/25 – 00:00 – 23:59	8.3 – 16.9	0.0 -8.1 ^[1]	W	0.0 – 1.3

^[1] Rainfall occurred after collection of noise monitoring equipment and therefore had no impact on noise monitoring results

Table 10 – Weather Conditions

Appendix E – Noise Break-in Calculations

E.1 – Façades with Background Ventilation

The façade sound reduction and predicted internal noise levels are calculated assuming the following:

- The calculation method for façade sound reduction is in accordance with BS8233:2014 and BS EN 12354-3.
- The reverberation time is typically 0.5 seconds across the relevant frequency range for a furnished living room in the UK. This value is used for both living rooms and bedrooms.
- Window areas of and room volumes used in the calculations for bedrooms and living rooms have been taken based on the technical drawings provided to NOVA Acoustics, The acoustic performance of the façade elements is taken from the relevant manufacturer's technical information, or the sound reduction has been predicted using INSUL 9.0.
- For background trickle ventilation a total Equivalent Area of 5000mm² per habitable room has been used in the calculations, which equates to 2 No. trickle vents (2500mm² each).

Living Room Plot 3 Day Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Leq,T	66	69	61	60	60	63	60	54	50
Glazing Noise Ingress	28	42	34	34	24	17	16	1	-3
Ventilation Noise Ingress	26	40	22	22	25	18	19	10	6
Wall Noise Ingress	8	26	13	10	0	2	-1	-7	-11
Roof Noise Ingress									
Room Absorption Correction		-1	-1	-1	-2	-2	-2	-3	-5
Total Noise Ingress	32	47	37	36	29	22	22	10	5
NR30	35	59	48	39	33	30	26	24	22
Exceedance of Criteria	-3	-12	-11	-3	-4	-8	-4	-14	-17

Bedroom Plot 3 Front Facade Day Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Leq,T	66	69	61	60	60	63	60	54	50
Glazing Noise Ingress	21	38	30	27	16	9	6	-8	-12
Ventilation Noise Ingress	26	40	22	22	26	18	19	10	6
Wall Noise Ingress	8	26	13	10	0	2	-1	-7	-11
Roof Noise Ingress									
Room Absorption Correction		1	1	1	0	0	0	-1	-3
Total Noise Ingress	31	47	35	32	29	22	22	12	7
NR30	35	59	48	39	33	30	26	24	22
Exceedance of Criteria	-4	-12	-13	-7	-4	-8	-4	-12	-15

Bedroom Plot 3 Front Facade Night Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Leq,T	63	62	54	55	57	60	56	46	40
Glazing Noise Ingress	16	32	23	22	12	6	2	-15	-21
Ventilation Noise Ingress	22	34	16	18	22	15	15	3	-4
Wall Noise Ingress	3	19	6	5	-3	-1	-5	-15	-21
Roof Noise Ingress									
Room Absorption Correction		1	1	1	0	0	0	-1	-3
Total Noise Ingress	27	40	28	27	26	19	18	5	-3
NR25	30	55	43	35	28	25	21	19	17
Exceedance of Criteria	-3	-15	-15	-8	-2	-6	-3	-14	-20

Bedroom Plot 3 Front Facade Night Time Max

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Lmax	78	82	73	72	77	74	68	62	55
Glazing Noise Ingress	34	52	41	39	32	20	14	1	-6
Ventilation Noise Ingress	40	53	34	34	42	30	27	18	11
Wall Noise Ingress	20	39	25	22	17	13	7	1	-6
Roof Noise Ingress									
Room Absorption Correction		1	1	1	0	0	0	-1	-3
Total Noise Ingress	45	60	46	44	46	34	30	20	12
NR40	45	67	56	49	43	40	37	34	33
Exceedance of Criteria	0	-7	-10	-5	3	-6	-7	-14	-21

Living Room Plot 1 Day Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Leq,T	58	63	55	55	53	53	51	49	45
Glazing Noise Ingress	26	40	33	33	20	12	11	0	-3
Ventilation Noise Ingress	27		23	20	20	25	17	13	10
Wall Noise Ingress	-1	17	5	2	-10	-10	-13	-14	-18
Roof Noise Ingress									
Room Absorption Correction		-2	-3	-3	-4	-4	-4	-5	-7
Total Noise Ingress	29	41	33	33	22	24	17	11	6
NR30	35	59	48	39	33	30	26	24	22
Exceedance of Criteria	-6	-18	-15	-6	-11	-6	-9	-13	-16

Bedroom Plot 4 Rear Façade Day Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Leq,T	58	63	55	55	53	53	51	49	45
Glazing Noise Ingress	19	32	25	25	12	4	3	-7	-11
Ventilation Noise Ingress	25		21	18	19	23	16	12	8
Wall Noise Ingress	2	20	8	5	-7	-7	-10	-12	-15
Roof Noise Ingress									
Room Absorption Correction		1	1	0	0	0	-1	-2	-3
Total Noise Ingress	29	37	30	29	22	26	18	13	8
NR30	35	59	48	39	33	30	26	24	22
Exceedance of Criteria	-6	-22	-18	-10	-11	-4	-8	-11	-14

Bedroom Plot 4 Rear Façade Night Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Leq,T	52	55	48	49	47	49	44	40	35
Glazing Noise Ingress	13	24	18	20	7	-1	-3	-17	-21
Ventilation Noise Ingress	20		14	13	13	19	9	2	-2
Wall Noise Ingress	-5	12	1	-1	-12	-12	-16	-21	-25
Roof Noise Ingress									
Room Absorption Correction		1	1	0	0	0	-1	-2	-3
Total Noise Ingress	24	29	23	24	17	21	12	4	-2
NR25	30	55	43	35	28	25	21	19	17
Exceedance of Criteria	-6	-26	-20	-11	-11	-4	-9	-15	-19

Bedroom Plot 4 Rear Façade Night Time Max

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Lmax	73	67	69	76	74	65	60	56	50
Glazing Noise Ingress	39	36	39	46	33	16	13	-1	-6
Ventilation Noise Ingress	40		35	39	40	35	25	19	13
Wall Noise Ingress	19	24	22	26	14	5	0	-5	-10
Roof Noise Ingress									
Room Absorption Correction		1	1	0	0	0	-1	-2	-3
Total Noise Ingress	45	40	44	50	43	38	28	20	13
NR40	45	67	56	49	43	40	37	34	33
Exceedance of Criteria	0	-27	-12	1	0	-2	-9	-14	-20



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