



Residential Noise Assessment

Site Address: Chancellors Court, Moseley Road, Manchester M14 6ZU

Client Name: Red Brick (1) GP Ltd.

Project Reference: NP-012351



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 Chancellors Court, Moseley Road, Manchester M14 6ZU ('the site'). The site is subject to road traffic noise from Moseley Road.

The applicant has received conditional approval for planning application ref. 140070/FO/2024 ('the Application') from Manchester City Council. This report has been prepared to address condition 3a imposed by the Local Planning Authority ('LPA'), Manchester City Council.

A noise survey has been undertaken to establish the prevailing sound levels at the proposed development site. The findings have been used to assess the suitability of the site for residential use. Measures required to mitigate noise impacts 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

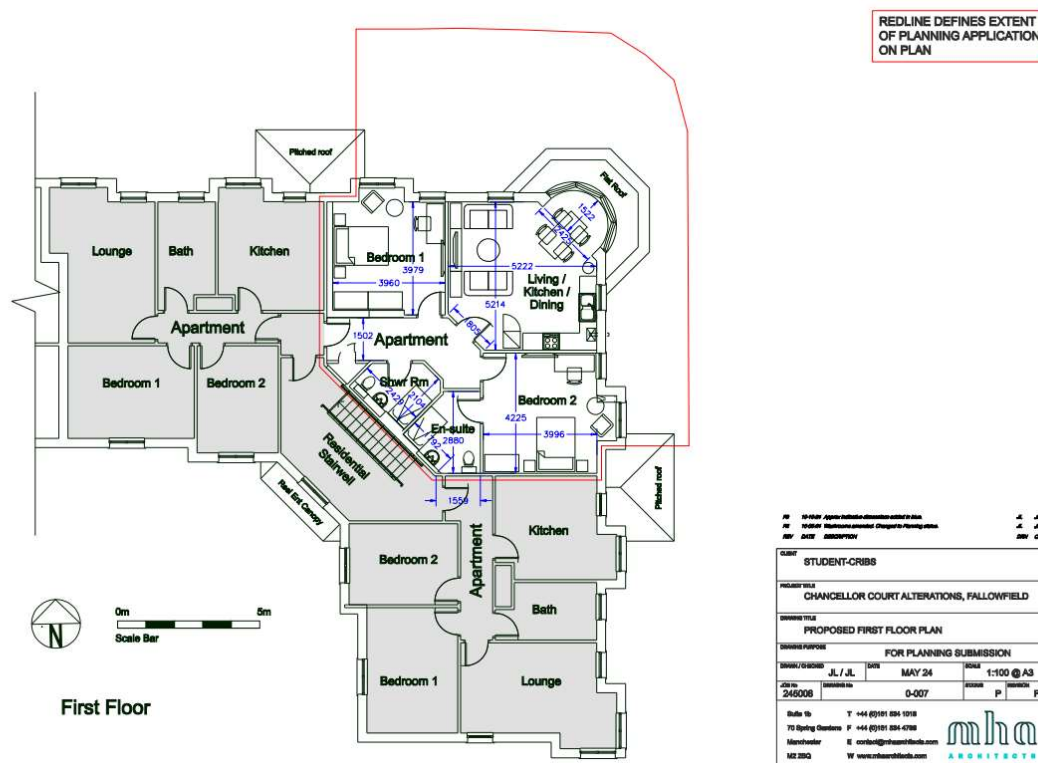
The following performance standards, legislation, policy, and guidance have been considered to ensure good acoustic design in the assessment:

- The LPA's conditional approval; specifically, 'Condition 3a'
- National Planning Policy Framework (2024)
- Noise Policy Statement for England (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 conversion of an existing first-floor office space into a single self-contained residential dwelling, with a management office directly beneath at ground floor level. The figure overleaf shows the first floor layout.



Drawing Ref No. 0-007 from 'MHA Architects'

Figure 1 – Proposed First Floor Plan

1.3 Local Planning Authority & Background

The following condition of the approved planning application No. 140070/FO/2024 requires discharging:

140070/FO/2024 – Creation of ground floor management suite, and change of use of first-floor office (Class E) to create 1 apartment (Class Sui Generis)

Condition 3a:

“Before the development commences a scheme for acoustically insulating the proposed residential accommodation against noise from Moseley Road and the ground floor Management Suite 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 potential for overheating shall also be assessed and the noise insulation scheme shall take this into account. Any necessary scheme to address overheating shall be completed before any of the dwelling units are occupied.

Noise survey data shall include measurements taken during a rush-hour period and night-time to determine the appropriate sound insulation measures necessary. The following noise criteria shall be required to be achieved:

- Bedrooms (night-time – 23.00 – 07.00) 30dB L_{Aeq} (individual noise events shall not exceed 43dB $L_{Amax,F}$ by more than 15 times).
- Living Rooms (daytime 07.00 – 23.00) 35dB L_{Aeq} .

2. Environmental Noise Survey

2.1 Measurement Methodology

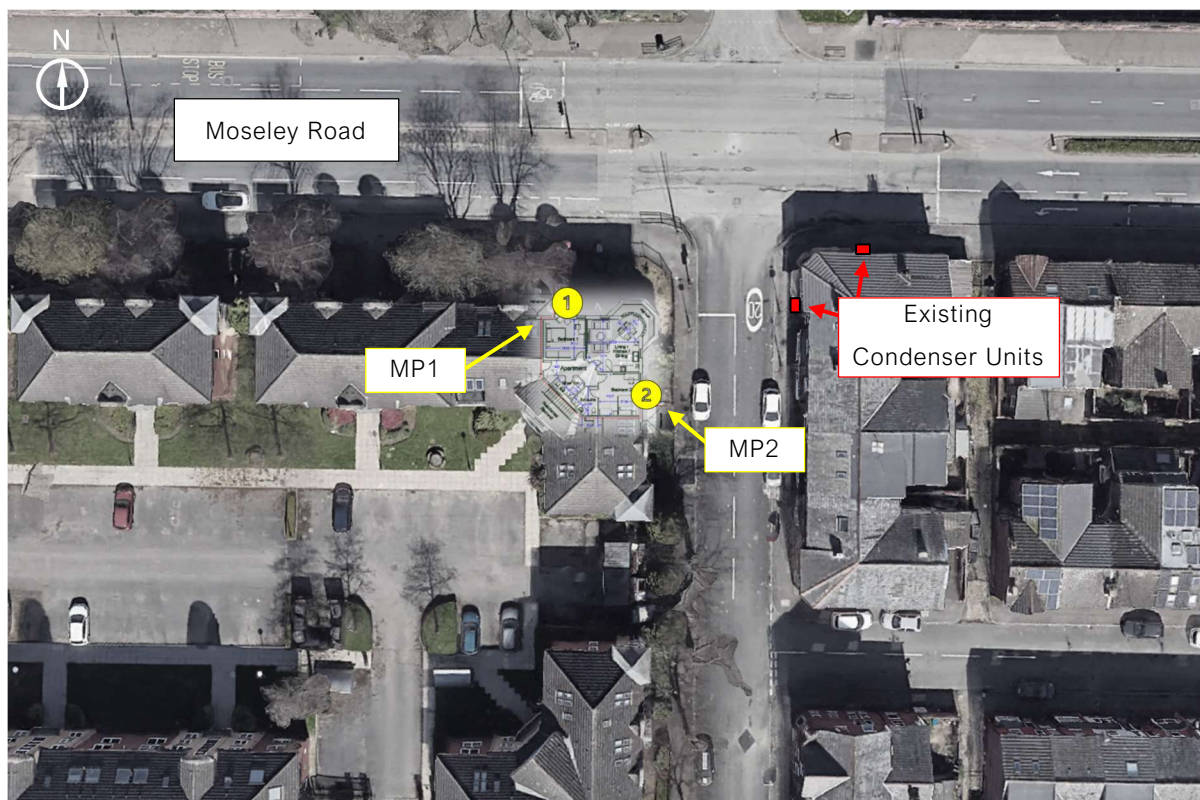
The following table outlines the measurement dates and particulars.

For all measurements, a 130mm diameter windshield was fitted to both microphones and the equipment was field calibrated before and after the survey. All equipment were positioned 1m from the closest building façade.

Location	Survey Dates	Measurement Particulars
MP1	11 – 13/03/2025	Equipment protruding out of the proposed 'Bedroom 1' first-floor window overlooking Moseley Road.
MP2		Equipment protruding out of the proposed 'Bedroom 2' first-floor window overlooking Balmoral Road.

Table 1 – Measurement Methodology

The figure below outlines the site surroundings and measurement locations:



Imagery ©2025 Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map data ©2025

Figure 2 – Measurement Locations and Site Surroundings

2.2 Context & Subjective Impression

The proposed development site is located on Moseley Road, a busy dual carriageway where traffic passings were highly consistently high. The area is predominantly residential in nature, with a single convenience store located directly to the east.

The acoustic environment is deemed to be moderate in level, with the noise profile dominated by road traffic noise emissions from the Moseley Road and occasional vehicle idling on Balmoral Road. The Armitage Sports Centre is located to the north-east of the development, however no activity was noted across any of the sports pitches during the site visits. Considering that the road traffic noise is significantly dominant, and that there is a large distance to the closest pitch, it is expected that any sport activity would be completely inaudible at the development site.

Two plant units are mounted on the north and east facing facades of the adjacent 'One Stop Shop' commercial premises.

2.3 Environmental Noise Survey Results

A summary of the noise levels measured during the survey is shown in the table below. 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) [1]
		63	125	250	500	1k	2k	4k		
MP1	$L_{eq,16hr}$ (Day)	66	61	60	60	63	60	51	66	--
	$L_{eq,8hr}$ (Night)	59	55	55	55	59	56	47	62	78
MP2	$L_{eq,16hr}$ (Day)	64	59	57	56	59	56	48	62	--
	$L_{eq,8hr}$ (Night)	56	51	52	50	54	50	43	57	77

Notes:

[1] The 'typical' $L_{AFmax,1min}$ is the value exceed fewer than 10 times during the night-time periods, as per ProPG guidance.

Table 2 – Sound Level Results Summary

3. Plant Noise Assessment

As there are plant units in vicinity of the proposed development (highlighted in figure 2), an assessment of plant noise has been undertaken.

When plant noise is dominant in an environment, this often presents as a 'flat line' in the L_{A90} (background noise) measurement, as the plant noise forms a 'noise floor'. Further to this, noise from fixed mechanical plant is often noticeable in the low frequency measurement. A time history graph of these measurement parameters is shown below (taken from the measurement position closest to units, MP2).

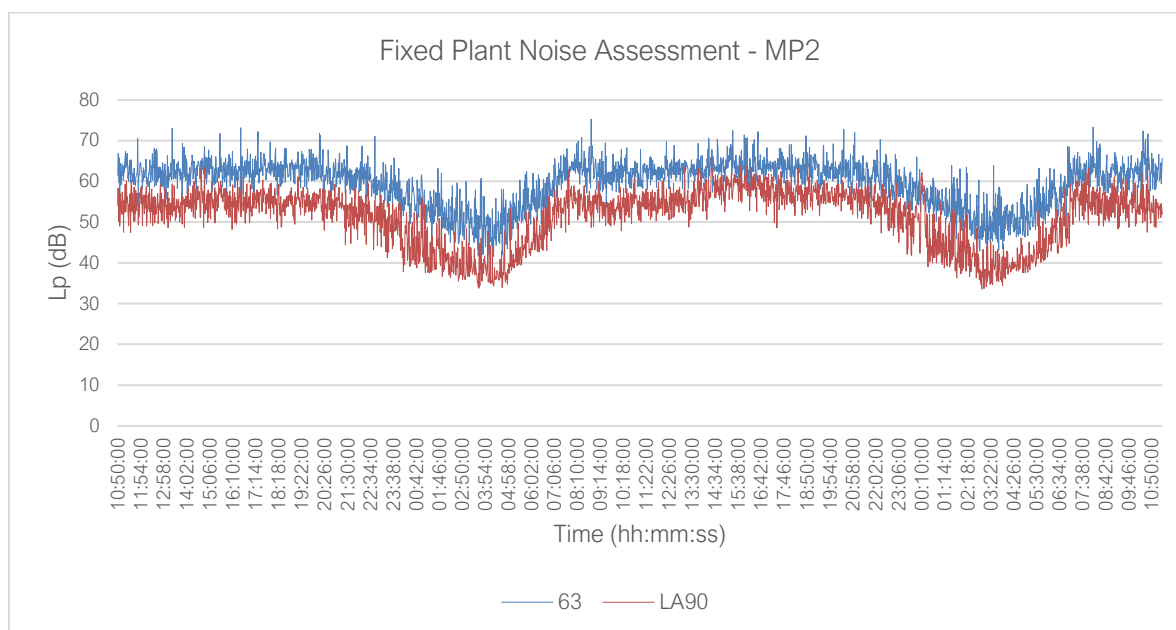


Figure 3 – L_{A90} and 63Hz Time History Graph

As can be seen, the measurement follows a diurnal pattern, with 'typical' peaks and troughs during the daytime and night-time periods. This is generally the case when traffic noise is significantly dominant in an environment.

Regarding instances such as this where plant noise forms part of the acoustic environment but is unlikely to cause adverse impact, the following is stated in section 2.14 of the ProPG (2017):

"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."

Given this, it is thought that the plant noise should be considered as part of the general non-characterful noise environment rather than as a separate impactful noise source.

Lastly, there are existing dwellings located closer to the condenser units. This indicates that there is some level of control to avoid existing residential dwellings experiencing significant noise disturbance. Therefore, it is reasonable to conclude that the proposed development would similarly not be adversely affected by noise emissions.

4. Noise Break-in Assessment and Sound Insulation Scheme

4.1 Internal Noise Level Criteria

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

BS8233:2014 Acoustic Design Criteria			
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

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

4.2 Glazing and Background Ventilation Specification

A glazing and background ventilation specification that achieves the relevant internal noise criteria is shown in the table below. Full calculations can be found in Appendix E and F.

Sound Insulation Scheme – All Facades								
Description	Octave Frequency Band (Hz, dB)							Overall (dB)
	63	125	250	500	1k	2k	4k	
8mm Glass / 16mm Air Cavity / 4mm Glass (SRI)*	21	22	21	28	38	40	47	33 (R_w) 29 ($R_w + C_{tr}$)
Greenwoods 2500EA.AC1 (2 No. Trickle) ($D_{n,e}$)*	31	41	40	37	47	43	46	42 ($D_{n,e,w}$) 40 ($D_{n,e,w} + C_{tr}$)

Table 4 – Glazing & Background Ventilation Specification

*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.

5. 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.

5.1 Overheating Criteria

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 13dB 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
Overlooking Moseley Road				
Daytime ($L_{Aeq,16hr}$)	50 [1]	63	66	+3
Night-time ($L_{Aeq,8hr}$)	42 [1]	55	62	+7
Night-time ($L_{AFmax,T}$) [2]	65 [1]	78	78	0
Overlooking Balmoral Road				
Daytime ($L_{Aeq,16hr}$)	50 [1]	63	62	-1
Night-time ($L_{Aeq,8hr}$)	42 [1]	55	57	+2
Night-time ($L_{AFmax,T}$) [2]	65 [1]	78	77	-1
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

5.2 Assessment

The noise levels measured on site exceed the external noise criteria shown in the table above. As such, an assessment of whether the development is at risk of overheating would need to be undertaken 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.

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.

Further advice can be provided by NOVA Acoustics if required.

6. Noise Breakthrough Assessment and Sound Insulation Scheme

6.1 Noise Breakthrough Criteria

The proposed residential development will structurally adjoin a residential management suite via a separating floor. BS8233:2014 states that the internal noise criteria includes 'overall noise' which is the sum of structure borne and airborne noise sources. Noise breaking through from structurally adjoining commercial property will be considered to ensure the cumulative noise does not exceed the proposed acoustic design criteria. Guidance on sound insulation between adjoining domestic and non-domestic dwellings is discussed in Approved Document E (ADE) of the Building Regulations. The following is stated in section 0.8 of Part E:

"The performance standards set out in Tables 1a and 1b are appropriate for walls, floors and stairs that separate spaces used for normal domestic purposes. A higher standard of sound insulation may be required between spaces used for normal domestic purposes and communal or non-domestic purposes. In these situations, the appropriate level of sound insulation will depend on the noise generated in the communal or non-domestic space. Specialist advice may be needed to establish if a higher standard of sound insulation is required and, if so, to determine the appropriate level."

The higher standard of sound insulation required is dependent on the level of noise generated within the commercial property. Noise from structurally adjoining commercial sources can lead to elevated impact and as such further consideration is given to the level of audibility, dominance, attention grabbing features, spectral distribution, regularity, change in level, duration, and time of day the sound is occurring.

6.2 Testing Summary Results

Airborne sound insulation testing was conducted on site between the two areas. The testing was conducted following the procedures and guidance specified within Annex B of the Building Regulations Approved Document E (ADE) 2003 edition which incorporates 2004, 2010, 2013 and 2015 amendments. The results are shown in the table below and the sound insulation certificate can be found in Appendix A.

Test No.	Source Room	Receiving Room	Measured Level
NP-012351 - A	Proposed Management Suite	Proposed Bedroom 2	52dB $D_{nT,w}$ (-5; C_{tr})

Table 6 – Sound Insulation Testing Results

As shown above, the existing ceiling achieves the minimum performance criteria provided in Approved Document E. The following section presents a specific noise break-through assessment based on the predicted levels within the ground-floor management suite.

6.3 Adopted Criteria

The standard criterion for residential dwellings during the daytime (07:00 to 23:00 hours) is NR30 L_{Aeq} . As previously stated, this internal criterion represents the 'overall noise' which will also include external noise breaking in through the windows (i.e. from transportation sources). Therefore, it is proposed that the contribution from the management suite should be designed to achieve 5dB below the standard criterion (NR25 L_{Aeq}). This should safeguard residents from potential noise impact and reduce the likelihood of complaints.

6.4 Noise Breakthrough Assessment

The predicted unweighted sound pressure levels (L_{eq}) that are typical of an office environment are presented in the table below. The levels are taken from a previous NOVA Acoustics project for a medium sized office space, with mid-level conversation and background music present.

Sound Source	1/1 Octave Band Sound Pressure Level (Hz, L_{eq} dB)							Overall (dBA)
	63	125	250	500	1k	2k	4k	
Predicted Management Suite Noise	61	55	52	51	50	48	43	55

Table 7 – Assumed Internal Sound Level of Management Suite

The predicted internal noise level within the flat due to noise breaking through from the office is shown in the table below.

Description	1/1 Octave Band (Hz, dB)							Overall (dB)
	63	125	250	500	1k	2k	4k	
Predicted Internal Noise (L_{eq})	61	55	52	51	50	48	43	55 (A)
Measured Sound Reduction of Floor (D)	34	35	39	46	52	58	63	52 $D_{nT,w}$
Predicted Internal Noise Level within Residential Above (L_{eq})	29	21	13	6	-1	-11	-21	10 (A)
NR25 Criteria (dB)	55	44	35	29	25	22	20	30 (A)
Exceedance of Criteria	-26	-23	-22	-23	-26	-33	-31	-20

Table 8 – Noise Breakthrough Assessment

As can be seen, the existing ceiling system is anticipated to result in suitable internal levels within the above residential property. As such, no additional upgrades are considered necessary.

7. 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 3.2.
2. An assessment of whether the development is at risk of overheating should be undertaken 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. Further information is included in section 4.2.
3. The existing sound insulation performance of the separating floor is deemed to be sufficient on the provision the ground floor area will be used as a Management Suite.

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 9 – 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
<p>LAeq,T ^[Note 3] during 07:00 - 23:00 LAeq,8hr during 23:00 - 07:00</p> <p>High 65 dB 55 dB</p> <p>Medium 60 dB 50 dB</p> <p>Low 55 dB 50 dB</p> <p>Negligible 50 dB 45 dB</p>	<p>Increasing risk of adverse effect</p>	<p>Recommended</p> <p>Optional</p>
	<p>Use of opening windows as primary means of mitigating overheating is not likely to result in adverse effect</p>	<p>Not required</p>

Table 3-2 of AVO Guide (2020)

Figure 4 – 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 10 – AVO Guide (2020) Level 1 Risk Assessment

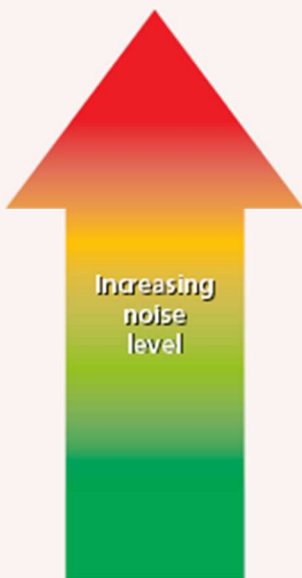
Level 2 Risk Assessment:

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.

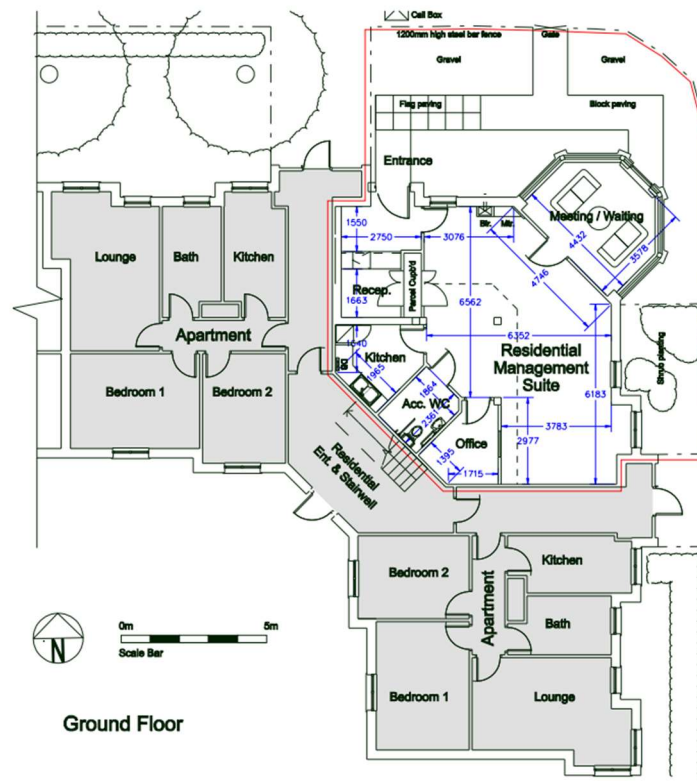
Internal ambient noise level ^[Note 2]			Examples of Outcomes ^[Note 5]	
$L_{Aeq,T}$ ^[Note 3] during 07:00 – 23:00 ^[Note 6]	$L_{Aeq,8h}$ during 23:00 – 07:00	Individual noise events during 23:00 – 07:00 ^[Note 4]		
> 50 dB	> 42 dB	Normally exceeds 65 dB $L_{A,max}$	Noise causes a material change in 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.
 <p>Increasing noise level</p>			Increasing likelihood of impact on reliable speech communication during the day or sleep disturbance at night	<p>At higher noise levels, more significant behavioural change is expected and may only be considered suitable if occurring for limited periods.</p> <p>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.</p> <p>At lower noise levels, limited behavioural change is expected unless conditions are prevalent for most of the time.^[Note 8]</p>
≤ 35 dB	≤ 30 dB	Do not normally exceed $L_{A,max}$ 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.

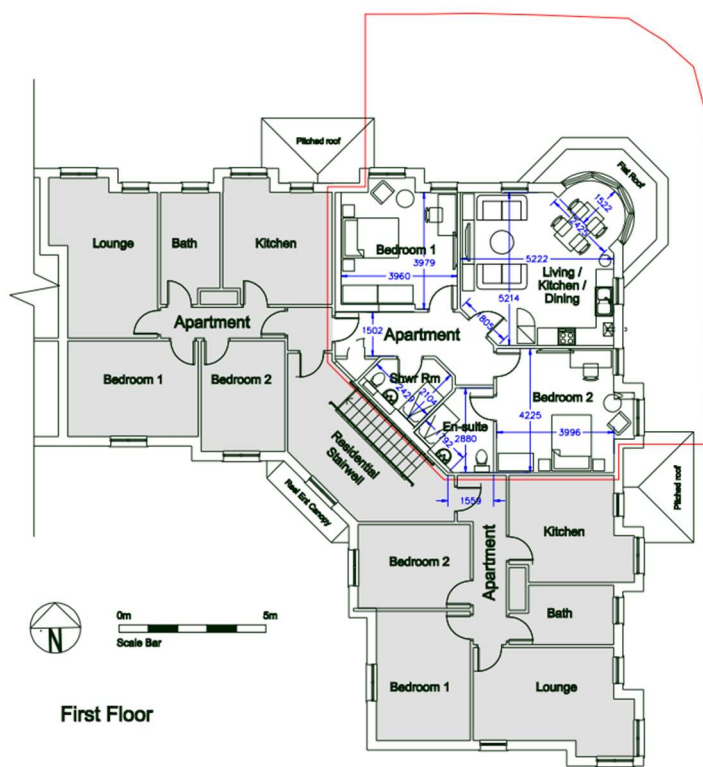
Table 3-3 of AVO Guide (2020)

Figure 5 – AVO Guide Level 2 Internal Ambient Noise Levels

Appendix C – Site Plans



10.0000: Approx. Indication of location of site		A. A.
10.0000: Approx. Indication of location of site		A. A.
REV	DATE	DESCRIPTION
1	01/05/2024	Initial Design
CLIENT STUDENT-CRIBS		
PROJECT TITLE CHANCELLOR COURT ALTERATIONS, FALLOWFIELD		
PROPOSED GROUND FLOOR PLAN		
FOR PLANNING SUBMISSION		
DATE	DATE	SCALE
JL / JL	MAY 24	1:100 @ A3
24/05/2024	0-008	P
Studio 1b T: +44 (0)161 834 1018 70 Spinning Gardens F: +44 (0)161 834 4788 Manchester M: 0161 834 4788 102 2RD W: www.mharchitects.com		



10.0000: Approx. Indication of location of site		A. A.
10.0000: Approx. Indication of location of site		A. A.
REV	DATE	DESCRIPTION
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PROJECT TITLE CHANCELLOR COURT ALTERATIONS, FALLOWFIELD		
PROPOSED FIRST FLOOR PLAN		
FOR PLANNING SUBMISSION		
DATE	DATE	SCALE
JL / JL	MAY 24	1:100 @ A3
24/05/2024	0-007	P
Studio 1b T: +44 (0)161 834 1018 70 Spinning Gardens F: +44 (0)161 834 4788 Manchester M: 0161 834 4788 102 2RD W: www.mharchitects.com		



Figure 6 – Site Plans

Appendix D – Environmental Survey

D.1 – Time History Noise Data

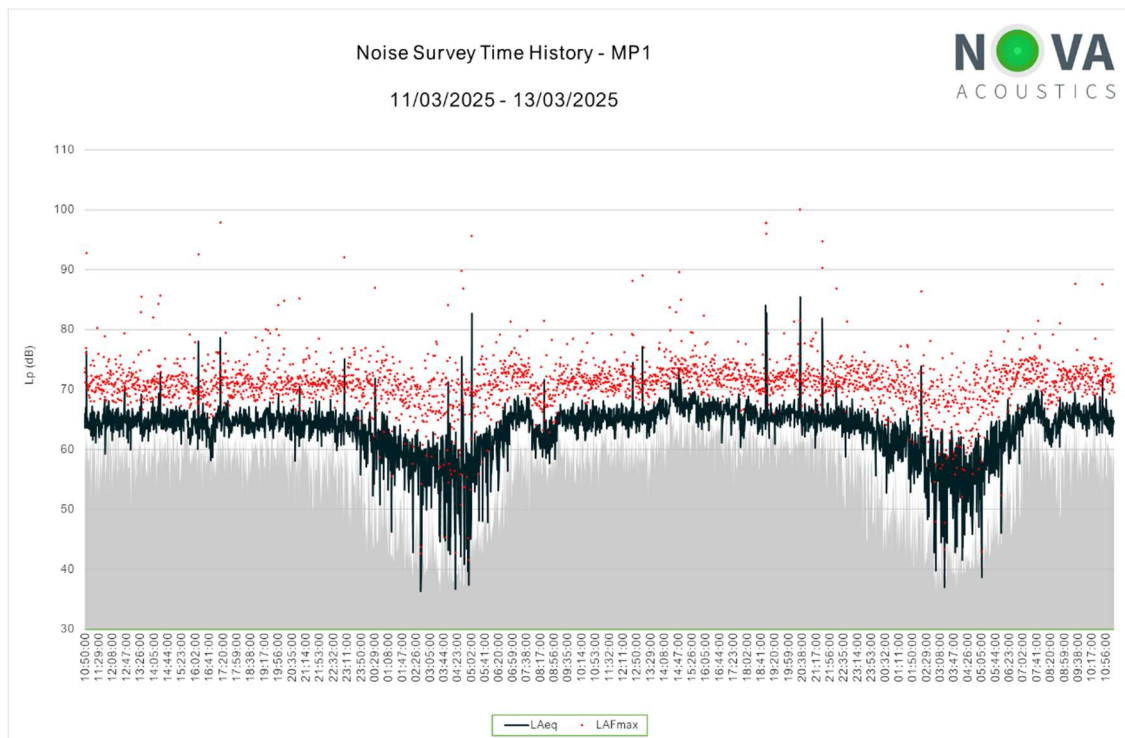


Figure 7 – MP1 Noise Survey Time History

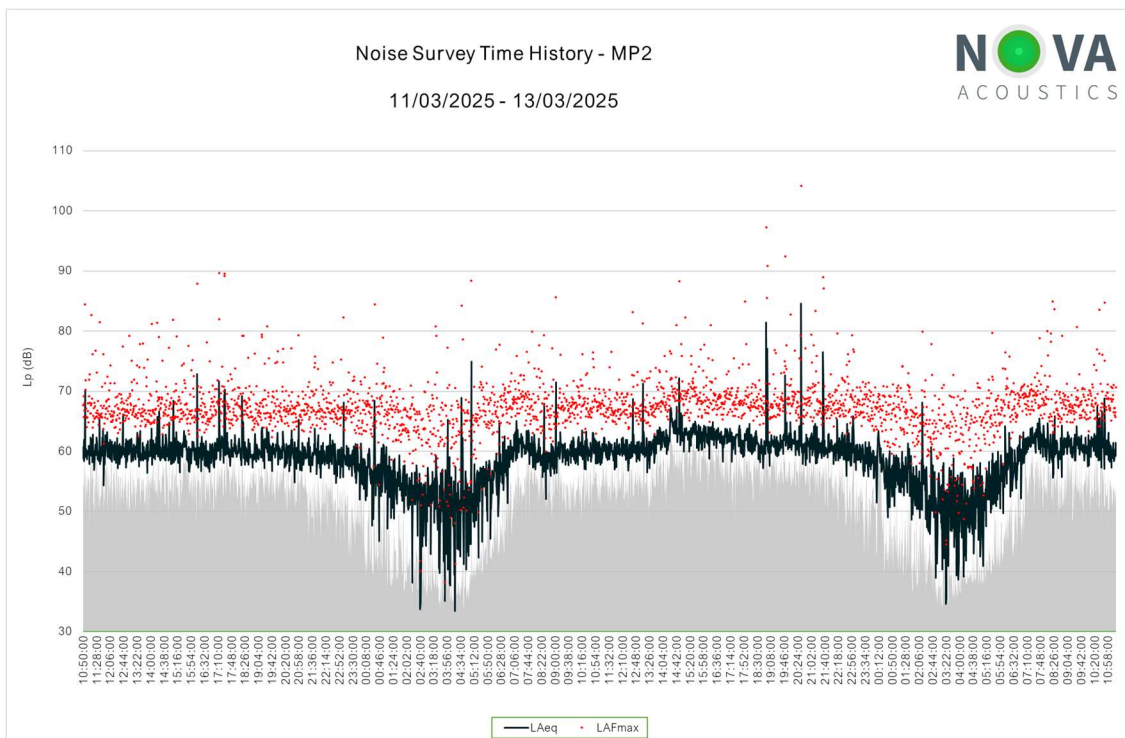


Figure 8 – MP2 Noise Survey Time History

D.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation (dB)
Svantek SV971A Class 1 Sound Level Meter	141427	≤0.1
Svantek SV33B Class 1 Calibrator	125774	
Svantek SV971A Class 1 Sound Level Meter	141346	
Svantek SV33B Class 1 Calibrator	125774	
Svantek SV977 Class 1 Sound Level Meter	97494	
Svantek SV33B Class 1 Calibrator	125774	

Table 11 – 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 ≤0.1dB. 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 – Hilton (Approx. 6.5km SW of Site)				
Time Period	Air Temp (°C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
11/03/25 – 00:00 – 23:59	1.3 – 6.3	0.0	SSW	0.0 – 1.3
12/03/25 – 00:00 – 23:59	-0.6 – 6.0	0.0 – 1.5	SSE	0.0 – 1.3
13/03/25 – 00:00 – 23:59	-0.1 – 5.7	0.0 – 0.3	S	0.0 – 1.3

Table 12 – 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.
- Based on the technical drawings provided to NOVA Acoustics, window areas of 4m² and room volumes of 34m³ are used in the calculations for bedrooms as a worst-case scenario. For living rooms, the calculations are based on a window area of 11m² and room volume of 60m³ as a worst-case scenario.
- 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).

Appendix F – Noise Ingress Calculations

Living / Kitchen / Dining Day Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Leq,T	66	66	61	60	60	63	60	51	46
Glazing Noise Ingress	33	44	39	38	31	25	20	4	-2
Ventilation Noise Ingress	26	37	23	22	25	19	19	8	2
Wall Noise Ingress	4	15	12	8	0	-2	-10	-19	-24
Roof Noise Ingress									
Room Absorption Correction		-1	-1	-2	-2	-2	-2	-4	-5
Total Noise Ingress	35	47	41	40	33	27	23	9	1
NR30	35	59	48	39	33	30	26	24	22
Exceedance of Criteria	0	-12	-7	1	0	-3	-3	-15	-21

Bedroom 1 Day Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Leq,T	66	66	61	60	60	63	60	51	46
Glazing Noise Ingress	30	41	36	35	28	22	17	1	-5
Ventilation Noise Ingress	27	38	24	23	26	20	21	9	3
Wall Noise Ingress	11	22	20	15	7	6	-2	-11	-17
Roof Noise Ingress									
Room Absorption Correction		-2	-2	-3	-3	-3	-3	-5	-6
Total Noise Ingress	32	44	37	36	30	24	22	8	1
NR30	35	59	48	39	33	30	26	24	22
Exceedance of Criteria	-3	-15	-11	-3	-3	-6	-4	-16	-21

Bedroom 1 Night Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Leq,T	62	59	55	55	55	59	56	47	40
Glazing Noise Ingress	26	35	30	31	24	18	13	-3	-10
Ventilation Noise Ingress	23	32	17	19	21	16	17	5	-2
Wall Noise Ingress	7	16	13	11	2	2	-6	-15	-22
Roof Noise Ingress									
Room Absorption Correction		-2	-2	-3	-3	-3	-3	-5	-6
Total Noise Ingress	28	38	31	31	26	20	18	4	-5
NR25	30	55	43	35	28	25	21	19	17
Exceedance of Criteria	-2	-17	-12	-4	-2	-5	-3	-15	-22

Bedroom 1 Night Time Max

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Lmax	78	68	71	70	72	75	70	62	54
Glazing Noise Ingress	42	43	46	46	40	34	26	11	4
Ventilation Noise Ingress	38	40	34	34	38	32	30	19	12
Wall Noise Ingress	23	24	30	26	19	18	7	-1	-8
Roof Noise Ingress									
Room Absorption Correction		-2	-2	-3	-3	-3	-3	-5	-6
Total Noise Ingress	43	46	47	47	42	36	31	18	10
NR40	45	67	56	49	43	40	37	34	33
Exceedance of Criteria	-2	-21	-9	-2	-1	-4	-6	-16	-23

Bedroom 2 Day Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Leq,T	62	64	59	57	56	59	56	48	44
Glazing Noise Ingress	27	39	33	32	24	17	12	-3	-7
Ventilation Noise Ingress	23	36	21	20	22	15	16	5	1
Wall Noise Ingress	8	20	17	12	3	1	-7	-14	-19
Roof Noise Ingress									
Room Absorption Correction		-2	-2	-3	-3	-3	-4	-5	-6
Total Noise Ingress	28	42	34	32	26	19	17	4	-2
NR30	35	59	48	39	33	30	26	24	22
Exceednce of Criteria	-7	-17	-14	-7	-7	-11	-9	-20	-24

Bedroom 2 Night Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Leq,T	57	56	51	52	50	54	50	43	35
Glazing Noise Ingress	21	31	26	27	19	12	7	-8	-15
Ventilation Noise Ingress	17	28	14	15	16	10	11	0	-8
Wall Noise Ingress	3	12	10	7	-2	-4	-12	-20	-27
Roof Noise Ingress									
Room Absorption Correction		-2	-2	-3	-3	-3	-4	-5	-6
Total Noise Ingress	23	34	27	27	20	14	11	-1	-10
NR25	30	55	43	35	28	25	21	19	17
Exceednce of Criteria	-7	-21	-16	-8	-8	-11	-10	-20	-27

Bedroom 2 Night Time Max

Item / Description	dB(A)	63	125	250	500	1k	2k	4k	8k
Measured Lmax	77	70	70	66	70	74	71	67	58
Glazing Noise Ingress	39	46	45	42	38	32	27	16	8
Ventilation Noise Ingress	37	43	32	29	36	30	31	24	16
Wall Noise Ingress	21	27	29	22	18	16	8	5	-4
Roof Noise Ingress									
Room Absorption Correction		-2	-2	-3	-3	-3	-4	-5	-6
Total Noise Ingress	41	48	45	42	40	34	31	23	13
NR40	45	67	56	49	43	40	37	34	33
Exceednce of Criteria	-4	-19	-11	-7	-3	-6	-6	-11	-20

Appendix G – Sound Insulation Test Certificate

Standardized Level Difference According to Resistance to the Passage of Sound Approved Document E Field measurements of airborne sound insulation between rooms			
			Date of test: 2025-03-11
Client:	Student Cribs		
Description:	See Pages 1 & 2		
Area of common partition:	12.0 m ²	Note:	Floor
Receiving room volume:	26.0 m ³	Name:	Proposed Bedroom 2
Source room volume:	40.0 m ³	Name:	Existing Office Area

Frequency <i>f</i> Hz	D _{nT} (1/3 octave) dB
50	
63	
80	
100	37.8
125	34.4
160	36.2
200	39.1
250	41.7
315	43.4
400	45.3
500	49.1
630	51.8
800	54.9
1000	55.0
1250	55.9
1600	57.6
2000	60.4
2500	61.2
3150	61.2
4000	
5000	

— Measured characteristic
- - - Frequency range according to the
— Curve of reference values (ISO 717-1)
- - - Shifted curve

The graph plots D_{nT} in dB on the y-axis (20 to 80) against frequency f in Hz on a logarithmic x-axis (63 to 4000). A red line represents the measured characteristic, a blue solid line represents the ISO 717-1 reference curve, and a blue dashed line represents the shifted curve. Vertical dashed lines indicate the frequency range from 100 Hz to 3150 Hz.

* ISO 140 - 4 maximum background noise correction applied

Rating according to ISO 717-1			
D _{nT,w} (C; Ctr) =	52 (-1 ; -5) dB	C ₅₀₋₃₁₅₀ = -1 dB	C ₅₀₋₅₀₀₀ = 0 dB
		C _{tr,50-3150} = -6 dB	C _{tr,50-5000} = -6 dB
			C ₁₀₀₋₅₀₀₀ = 0 dB
			C _{tr,100-5000} = -5 dB

Evaluation based on field measurement results obtained by an engineering method

No. of test report: NP-012351 - A	Name of test institute: NOVA Acoustics Ltd
Date: 2025-03-11	Signature:



NOVA
ACOUSTICS