



Residential Noise Assessment

Site Address: 20 Oxford Place, Rochdale, OL16 5LU

Client Name: The Wellfield Club

Project Reference No: NP-009350



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 20 Oxford Place, Rochdale, OL16 5LU ('the Site'). The proposed development is for a 1 no. 4 bedroom HMO from storage. The site is subject to noise from existing plant.

The applicant is preparing a planning application ('the Application') to be submitted to Rochdale Borough Council. This technical report has been prepared to support the planning application to be submitted to Rochdale Borough Council.

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:

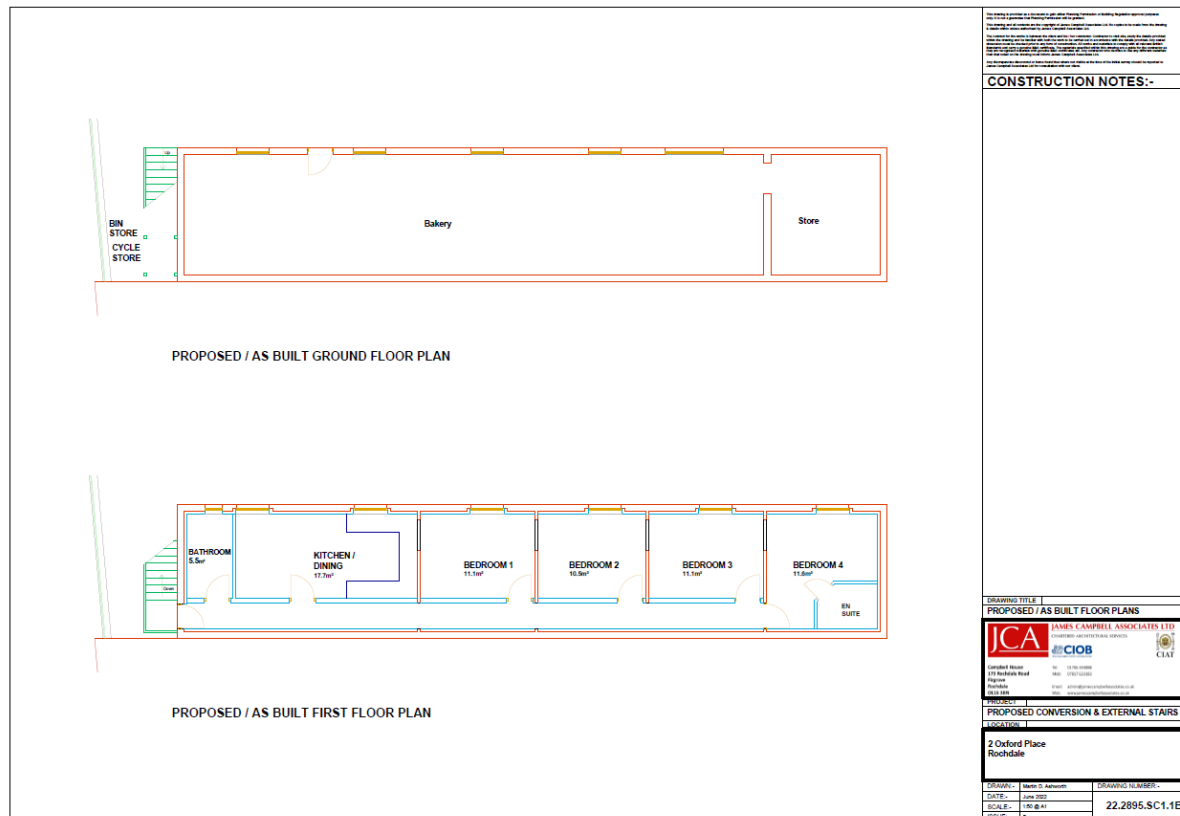
- National Planning Policy Framework (2021)
- Noise Policy Statement for England (2010)
- British Standard BS8233:2014 – 'Guidance on sound insulation and noise reduction for buildings'
- ProPG: 'Planning and Noise 2017' (including supplementary documents 1 & 2).
- Approved Document F: Volume 1 Dwellings (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 of storage space for the ground floor bakery into a 4-bedroom HMO on the first floor. An existing bakery 'Whippey's Bakery' adjoins the proposed development at ground floor level. In addition, there is a working men's club in the adjacent property on Prince Street. The operational times of the ground floor bakery are 08:00 – 16:00 Wednesday to Friday, and 11:00 – 23:30 for the working men's club. Existing mechanical plant from the surrounding commercial premises can be found to the front of the property.

The figure below shows the proposed development.



Drawing Ref. 22.2895.SC1.1B from 'James Campbell Associates Ltd'

Figure 1 – Proposed Development

2. Environmental Noise Survey

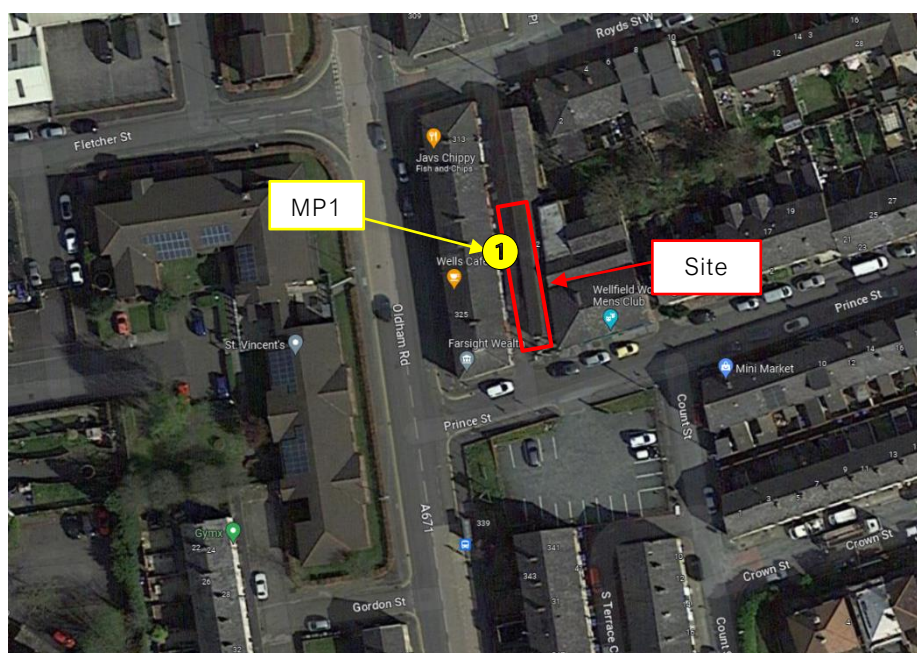
2.1 Measurement Methodology

The following table outlines the measurement dates and particulars.

Location	Survey Dates	Measurement Particulars
MP1	12/05/2023 – 15/05/2023	Equipment mounted protruding from a first-floor window at 1m distance from the building façade on Oxford Place.

Table 1 – Measurement Methodology

The figure below outlines the site surroundings and measurement locations:



Imagery ©2023 Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map data ©2023

Figure 2 – Measurement Locations and Site Surroundings

2.2 Context & Subjective Impression

The proposed development site is located in Rochdale on Oxford Place. The area surrounding the site is primarily residential in nature, with commercial buildings including takeaways and convenience stores directly adjacent to the west.

The acoustic environment is deemed to be moderate in level and the noise profile is dominated by noise coming from the surrounding road network. It is also understood that working men's club is licenced to operate until 23:30 hours at weekends and live music is played from 19:00 on Sundays.

In addition, various plant units from the neighbouring commercial premises where the primary noise source, such as that noted to the front of the proposed development. The dominant source to the rear is understood to be an extraction unit associated with the nearby commercial units.

2.3 Environmental Noise Survey Results

The following section outlines the sound levels measured during the survey. The 'typical' $L_{AFmax,1min}$ level is defined by that which is not normally exceeded more than 10 times during the night-time. 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	Highest $L_{eq,16hr}$ (Day)	61	55	55	51	54	53	49	59	--
	Highest $L_{eq,1hr}$ (Day)	63	58	54	49	51	48	43	59	
	Highest $L_{eq,8hr}$ (Night)	54	48	48	44	46	42	36	49	69
	Highest $L_{eq,1hr}$ (Night)	61	53	54	49	51	48	43	55	

Table 2 – Sound Level Results Summary

3. Plant Noise Assessment

The proposed development is heavily influenced by noise emissions from a nearby extract system. This is evident when reviewing the time history graph at MP1, as shown below.

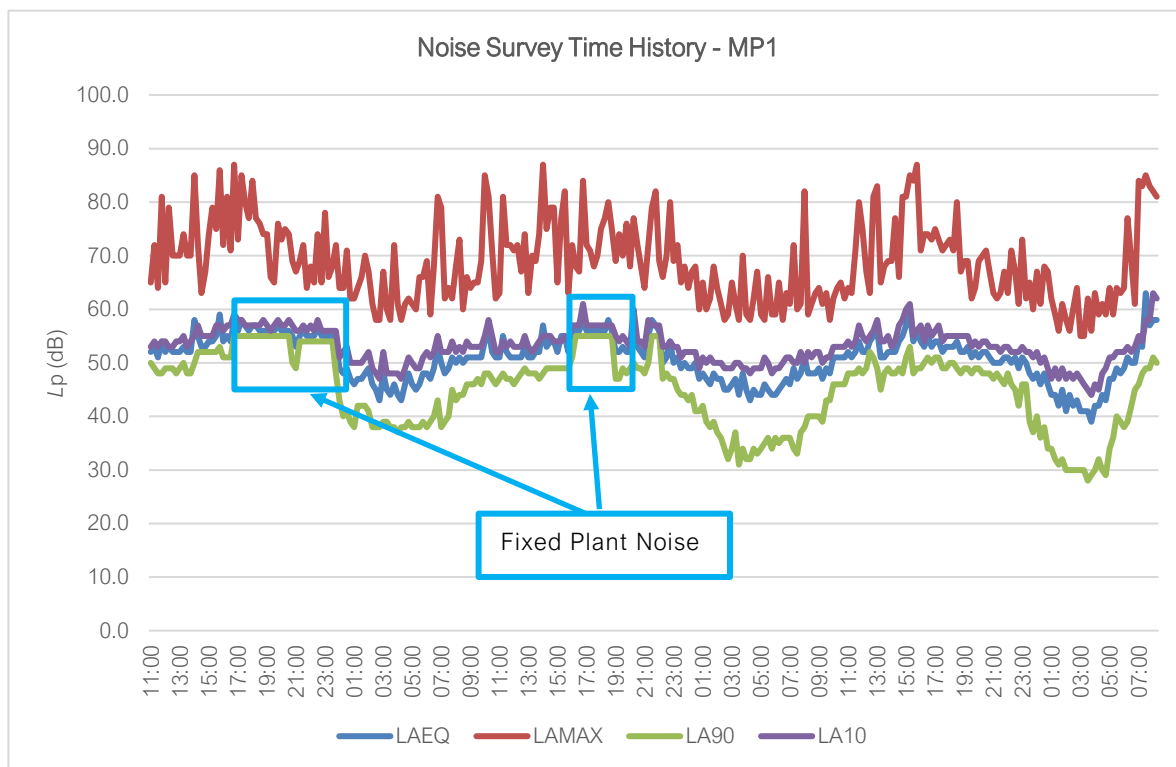


Figure 3 – MP1 Time History Graph

As the dominant noise sources affecting the proposed residential development are associated with existing businesses, the 'Agent of Change' principle must be considered. Paragraph 182 of the NPPF states:

"Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

Therefore, to mitigate against plant noise, it is advised that the following hierarchy is followed:

- 1) Firstly, look to employ mitigation in the form of sound reduction at source. This would involve reducing the noise emissions from the plant units using acoustic enclosures and silencers. This would need to be calculated with a full BS4142 assessment prior to being implemented.
- 2) If the above option is not feasible, then appropriate internal noise levels can be achieved by installing an enhanced façade sound insulation treatment. For this option, the sound reduction of the façade would be specified using the measured plant noise levels recorded at MP1 against more stringent Noise Rating Curve criteria (NR25 during the daytime and NS20 during the night-

time) to account for any uncertainty in prevalent acoustic features and to further reduce the likelihood of adverse effects at the proposed development.

It is noted that the bedrooms at the proposed development directly overlook the plant associated with the nearby commercial premises therefore, the existing plant is likely to adversely affect residential amenity if windows were openable and the plant noise had not been sufficiently mitigated at source.

If windows within the proposed residential development were to be opened, the commercial noise emissions would be clearly audible inside the property, meaning that future occupants may complain about noise generated by the neighbouring business.

We consider that reasonable internal noise levels could be achieved, but this would rely upon closed windows, acoustic glazing, and alternative ventilation strategies. As such, installing forced closed windows would be the only option available to guarantee the noise break-in is adequately controlled. It is at the Local Authority's discretion as to whether forced closed windows provides a suitable living condition or whether the Local Authority's is willing to accept the associated risk of windows being openable at the occupant's choice. This will depend on how desirable the location is for residential development. It must be noted that anyone moving to the area is likely to be highly aware of the neighbouring mechanical plant, which may limit the level of impact, but this should not be relied upon.

4. Noise Break-in Assessment and Sound Insulation Scheme

4.1 Internal Noise Level Criteria

The following table outlines the BS8233 internal noise criteria.

Activity	Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Resting	Living Room	35 dB $L_{Aeq,16hr}$	--
Dining	Dining Room/Area	40 dB $L_{Aeq,16hr}$	--
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$ 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 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 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 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 above BS8233 criteria typically applies to "anonymous" steady state noise. However, as previously mentioned, the proposed development is heavily influenced by noise from mechanical plant associated with the nearby existing commercial premises.

Therefore, to the further reduce the likelihood of adverse impact, noise levels from the loudest 1-hour during the daytime and night-time will be assessed against more stringent Noise Curve criteria, reflecting the periods when the mechanical plant is in operation.

Activity	Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Resting	Living Room	NR25 (30dB $L_{Aeq,T}$)	--
Dining	Dining Room/Area	NR30 (35dB $L_{Aeq,T}$)	--
Sleeping (daytime resting)	Bedroom	NR25 (30dB $L_{Aeq,T}$)	NR20 (25dB $L_{Aeq,T}$) 45 dB L_{AFmax}

Table 4 – Adopted Internal Acoustic Design Criteria

4.2 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.

Living Rooms and Bedrooms									
Description	Octave Frequency Band (Hz, dB)							Overall (dB)	
	63	125	250	500	1k	2k	4k		
6mm Glass / 16mm Air Cavity / 4mm Glass	20	21	20	26	38	37	39	31 (R_w)	27 ($R_w + C_{tr}$)
Greenwoods 2500EA.AC1 (Trickle Ventilation)	31	41	40	37	47	43	46	42 (D_{ne})	40 ($D_{ne} + C_{tr}$)

Table 5 – Glazing and 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.

4.3 Alternative Ventilation Strategy (Overheating)

The AVO Guide advises that if windows are open regularly to provide higher rates of ventilation to mitigate overheating, this will lead to elevated internal noise levels which could lead to undesirable living conditions. If windows are opened rarely the occupants may be able to tolerate elevated noise levels due to the inherent benefits of natural ventilation.

However, as previously mentioned, due to the prominence of noise from existing commercial premises at the site it is advised that windows remain closed to protect the amenity of future occupants.

Therefore, as windows cannot be used for the primary means of ventilation, an alternate ventilation strategy is required that is capable of a higher rate of ventilation. A mechanical extract ventilation system should be installed to provide 'Whole Dwelling Ventilation' in accordance with Approved Document F. It is understood that continuous MEV extract fans installed in accordance with the specified trickle ventilators to allow the ingress of fresh air will be adequate. The ventilation system should be designed by an appropriately qualified person to ascertain compliance with the relevant Building Regulations. Special consideration should be given to 1.5 to 1.7 of Approved Document F to assist in the design of the ventilation system and to ensure the self-generated noise levels from the MEV extract fans to not exceed the specified criteria.

5. Noise Breakthrough Assessment and Sound Insulation Scheme

5.1 Noise Breakthrough Criteria

The proposed development structurally adjoins a bakery via a separating floor and the working men's club via a separating wall, however, it should be noted that the working men's club adjoins the corridor of the proposed development and is therefore not considered a main living space.

BS8233 states that the internal noise criteria include '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 total noise from both structurally adjoining commercial properties and external noise ingress, 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, section 0.8 of Part E states.

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. The commercial properties 'Use Classes' can assist in defining a suitable higher standard of sound insulation.

5.2 Noise Breakthrough Assessment and Specification

The following table outlines the expected level of risk associated with the 'Class Use' of the structurally adjoining commercial property and provides a required sound insulation standard including a discussion to justify the standard.

Planning Class	Level of Risk from Noise	Required Sound Insulation Standard (dB)
E(b) Sale of food and drink for consumption (mostly) on the premises	Medium	53 $D_{nT,w} + C_{tr}$

Discussion: The noise emissions associated with the adjoining bakery are anticipated to include noise from patrons and general conversation. As such, there is not likely to be a significant of low frequency noise and a level of 10dB above the building regulations criteria should be sufficient.

Table 6 – Noise Breakthrough Assessment Criteria

It is understood that the existing flooring system at the site consist of timber joists and a lathe and plaster ceiling.

Considering the existing construction of the separating floor and the limitations regarding upgrading from the floor-side exclusively, the majority of standard upgrades are not possible. In order to have the best possibility of achieving the criteria, it is thought a bespoke product from HUSH Acoustics could be installed. The construction of the partition is shown below.

HD1006 – HUSH System 1

- 18mm Chipboard
- HUSH-FELT 25 resilient joist strips
- HUSH-FILL 60 heavy pugging
- HUSH-MESH firewire
- Plywood shelf on noggins
- HUSH-SLAB 100 sound absorber
- Lathe and plaster ceiling

It should be noted that the performance of the above construction cannot be predicted in modelling software due to the bespoke nature of the products used. As such, NOVA Acoustics cannot guarantee the performance stated by the manufacturer. It should be noted however that HUSH Acoustics state they have test data showing that the partition construction can achieve $53\text{dB } D_{nT,w} + C_{tr}$.

The above is an indicative specification that can achieve the required acoustic performance and considers that all flanking routes for sound have been appropriately suppressed. As with any construction project, the ability to meet the specification will rely upon the quality of the built structure. As such the works should be carried out to a high standard of workmanship to ensure that any sound insulation measures are not breached, for example by installing a rigid connection across an isolated connection. The development cannot achieve compliance until sound insulation testing is carried out by a UKAS accredited sound insulation testing company upon completion and assessed against the required sound insulation standard.

Although the corridor at first-floor level will act as a buffer between the living spaces and the working men's club, it is recommended that an independent timber stud wall is erected to further protect from amplified music noise during live music events. The stud wall should not be affix to the existing partition wall with the working men's club and should be lined with 2 no. sound-rated plasterboards.

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 4.
2. To avoid potential overheating conditions, a mechanical extract ventilation system should be installed to provide 'Whole Dwelling Ventilation' in accordance with Approved Document F. It is understood that continuous MEV extract fans installed in accordance with the specified trickle ventilators to allow the ingress of fresh air will be adequate.
3. The separating floors and walls between the structurally adjoining commercial property and the proposed development should be designed to achieve the required sound insulation. An indicative specification has been provided in Section 6.
4. Early sound insulation testing should be undertaken on the separating floor partition between the ground floor bakery and the first-floor residential uses to ensure that suitable upgrades are installed to achieve the adopted internal noise criteria. Further design assistance can be provided by NOVA Acoustics Ltd if required.
5. As shown in the Local Planning Authority initial comments, validation testing will be applicable after the sound insulation scheme has been implemented.

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
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 (2021)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2021. 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 174e, 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 185 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 185 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.”

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.

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 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 – ProPG: Planning and Noise (2017)

ProPG Planning and Noise published May 2017 by the Association of Noise Consultants (ANC) was produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England. ProPG aims to encourage better acoustic design of new residential developments promoting good health and wellbeing through the effective management of noise. It therefore outlines four key elements which should be considered in the assessment of noise:

- Element 1 – demonstrating a “Good Acoustic Design Process”.
- Element 2 – observing internal “Noise Level Guidelines”.
- Element 3 – undertaking an “External Amenity Area Noise Assessment”; and
- Element 4 – consideration of “Other Relevant Issues”.

The ProPG supplementary document 2 provides the following 'Good Acoustic Design' hierarchy of noise management measures which LPAs should encourage. These are shown below, In descending order of preference:

Order of Preference	Noise Management Measure
1	Reduction of the noise generated at source by redesign, relocation, or containment. *
2	Maximising the spatial separation of noise source(s) and receptor(s).
3	Using existing topography and existing structures (that are likely to last the expected life of the noise-sensitive scheme) to screen the proposed development site from significant sources of noise.
4	Investigating the necessity and feasibility of reducing existing noise levels and relocating existing noise sources.
5	Incorporating noise barriers as part of the scheme to screen the proposed development site from significant sources of noise.
6	Using the layout of the scheme to reduce noise propagation across the site.
7	Using the orientation of buildings to reduce the noise exposure of noise sensitive rooms.
8	Using the building envelope to mitigate noise to acceptable levels.

Table 8 – Hierarchy of Noise Management Measures

*Not from ProPG

B.5 – Approved Document O: Overheating (2021)

Approved Document O states the following in relation to noise:

1. In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).
2. Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.
 - a. 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).
 - b. 55dB L_{AFmax} , more than 10 times a night (between 11pm and 7am).
3. Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants' Measurement of Sound Levels in Buildings with the overheating mitigation strategy in use.

NOTE: Guidance on reducing the passage of external noise into buildings can be found in the National Model Design Code: Part 2 – Guidance Notes (MHCLG, 2021) and the Association of Noise Consultants' Acoustics, Ventilation and Overheating: Residential Design Guide (2020).B.6 - Acoustics Ventilation and Overheating – Residential Design Guide 2020

B.6 – Acoustics Ventilation and Overheating – Residential Design Guide 2020

It is suggested that the desirable internal noise criteria within BS8233 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.

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 9 – AVO Guide (2020) Level 1 Risk Assessment

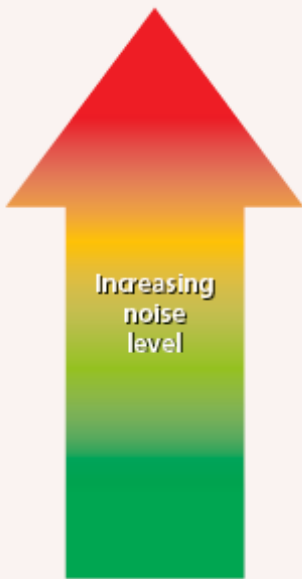
Level 2 Risk Assessment:

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]	$L_{Aeq,sh}$ during 23:00 – 07:00	Individual noise events during 23:00 – 07:00 [Note 4]		
> 50 dB	> 42 dB	Normally exceeds 65 dB $L_{A,Fmax}$	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 $L_{A,Fmax}$ 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



Figure 6 – Site Plans

Appendix D – Environmental Survey

D.1 – Time History Noise Data

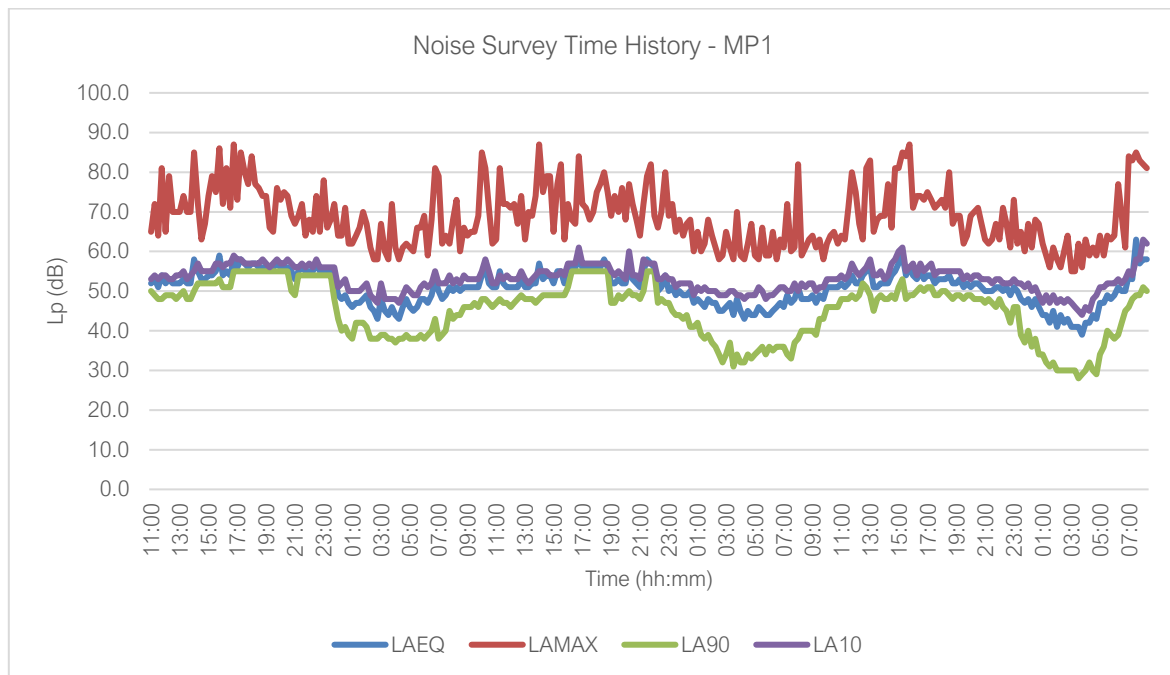


Figure 7 – MP1 Noise Survey Time History

D.2 – Surveying Equipment

Piece of Equipment	Serial No.
CESVA SC250 Class 1 Sound Level Meter	T252860
CESVA CB011 Class 1 Calibrator	T253524

Table 10 – Surveying Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with negligible deviation noted. 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 – Chadderton (Approx. 6.9km N of Site)				
Time Period	Air Temp (°C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
12/05/2023 – 00:00 – 23:59	8.5 – 13.4	0.0	NE	0.0 – 5.2
13/05/2023 – 00:00 – 23:59	6.4 – 20.9	0.0	SE	0.0 – 2.2
14/05/2023 – 00:00 – 23:59	8.1 – 18.2	0.0 – 0.2	WSW	0.0 – 3.9
15/05/2023 – 00:00 – 23:59	6.5 – 14.3	0.0	WNW	0.0 – 3.9

Table 11 – Weather Conditions

Appendix E – Noise Break-in Calculations

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 and BS EN 12354-3.
- The reverberation time is typically 0.5 and 0.3 seconds across the relevant frequency range for a furnished living room and a bedroom, respectively, in the UK. These values are used for living rooms and bedrooms.
- Window areas and room volumes have been taken from the technical drawings provided to NOVA Acoustics. Detailed details can be provided upon request.
- 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 Area Day Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k
Measured Leq,T	59	61	55	55	51	54	53	49
Glazing Noise Ingress	24	36	29	30	20	11	11	5
Ventilation Noise Ingress	17	31	15	16	15	8	11	4
Wall Noise Ingress	6	18	14	11	-1	-3	-9	-13
Roof Noise Ingress								
Room Absorption Correction		2	1	1	0	0	0	-1
Total Noise Ingress	28	42	33	34	25	16	17	9
NR25	30	55	43	35	28	25	21	19
Exceedance of Criteria	-2	-13	-10	-1	-3	-9	-4	-10

Bedrooms Day Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k
Measured Leq,T	59	61	55	55	51	54	53	49
Glazing Noise Ingress	23	35	28	29	19	10	10	4
Ventilation Noise Ingress	20	33	17	18	17	10	13	6
Wall Noise Ingress	6	19	15	12	0	-2	-8	-12
Roof Noise Ingress								
Room Absorption Correction		-1	-1	-1	-2	-2	-2	-3
Total Noise Ingress	26	40	31	31	23	15	16	8
NR25	30	55	43	35	28	25	21	19
Exceedance of Criteria	-4	-15	-12	-4	-5	-10	-5	-11

Bedrooms Night Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k
Measured Leq,T	55	61	53	54	49	51	48	43
Glazing Noise Ingress	22	35	26	28	17	7	5	-2
Ventilation Noise Ingress	17	33	15	17	15	7	8	0
Wall Noise Ingress	5	19	13	11	-2	-5	-13	-18
Roof Noise Ingress								
Room Absorption Correction		-1	-1	-1	-2	-2	-2	-3
Total Noise Ingress	24	40	29	30	21	12	11	2
NR20	25	51	39	30	23	20	16	14
Exceedance of Criteria	-1	-11	-10	0	-2	-8	-5	-12

Bedrooms Night Time Max

Item / Description	dB(A)	63	125	250	500	1k	2k	4k
Corrected Lmax Spectrum	69	74	68	68	64	66	62	56
Glazing Noise Ingress	35	48	41	42	32	22	19	11
Ventilation Noise Ingress	31	46	30	31	30	22	22	13
Wall Noise Ingress	18	31	27	24	12	9	0	-6
Roof Noise Ingress								
Room Absorption Correction		-1	-1	-1	-2	-2	-2	-3
Total Noise Ingress	38	52	43	44	35	26	24	15
NR40	45	67	56	49	43	40	37	34
Exceedance of Criteria	-7	-15	-13	-5	-8	-14	-13	-19

Figure 8 – Noise Break-In Calculation



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