NOISE IMPACT ASSESSMENT

7 The Chauntry, High Street, Haverhill, CB9 8AA

24th February 2024

ISSUE 01

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1.0 INTRODUCTION

DAA Group has been appointed to carry out a Noise Impact Assessment at 7 The Chauntry, High Street, Haverhill, CB9 8AA to support a Planning Application for two residential units to ensure it does not prejudice the amenities of any future occupants in accordance with:

- National Planning Policy Framework 2021 (NPPF)
- National Planning Practice Guidance (NPPG)
- West Suffolk Local Plan.

A scheme of noise mitigation measures in the report provides specification details as appropriate for sound insulation upgrade treatment to the separating walls and separating floors.

The technical content of this assessment has been provided by a Tech member of the Institute of Acoustics.

The Institute of Acoustics is the UK's professional body for those working in acoustics, noise and vibration

2.0 NOISE CRITERIA

2.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The Department for Communities and Local Government introduced the National Planning Policy Framework (NPPF) in March 2012. The latest revision of the NPPF is dated July 2021.

The NPPF sets out the Government's planning policies for England and how these are expected to be applied. It provides a framework where local Councils can produce their own local and neighbourhood plans which reflect the needs of their communities.

In conserving and enhancing the natural environment, the planning system should prevent both new and existing development from contributing to, or being put at, unacceptable risk from environmental factors including noise.

Planning policies and decisions should aim to avoid noise giving rise to significant adverse impacts on health and quality of life as a result of new development. Conditions may be used to mitigate and reduce noise to a minimum so that adverse impacts on health and quality of life are minimised. It must be recognised that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them. Reference is made within NPPF to the Noise Policy Statement for England (NPSE) as published by DEFRA in March 2021.

2.2 NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

The long-term vision of the NPSE is stated within the documents scope, 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'. The policy aims are stated to:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.

The application of NPSE should mean that noise is properly taken into account at the appropriate time (for example in planning applications or appeals) where it must be considered alongside other relevant issues. The guiding principles of Government policy on sustainable development should be used to assist in the implementation of the NPSE.

The NPSE should apply to all types of noise apart from occupational noise in the workplace. The types of noises defined in the NPSE includes:

- Environmental noise from transportation sources;
- Neighbourhood noise which includes noise arising from within the community; industrial premises, trade and business premises, construction sites and noise in the street

The Noise Policy Statement England (NPSE) outlines observed effect levels relating to the above, as follows:

- **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.
- **LOAEL – Lowest Observed Adverse Effect Level**
  - This is the level above which adverse effects on health and quality of life can be detected.
- **SOAEL – Significant Observed Adverse Effect Level**
  - This is the level above which significant adverse effects on health and quality of life occur.

As stated in The Noise Policy Statement England (NPSE), it is not currently possible to have a single objective based measure that defines SOAEL that is applicable to all sources of noise in all situations. Specific noise levels are not stated within the guidance for this reason, and allow flexibility in the policy until further guidance is available.

2.3 ProPG: PLANNING AND NOISE

As outlined above, the National Planning Policy Framework encourages improved standards of design, although it provides no specific noise levels which should be achieved on site for varying standards of acoustic acceptability, or a prescriptive method for the assessment of noise.

ProPG: Planning and Noise was published in May 2017 in order to encourage better acoustic design for new residential schemes in order to protect future residents from the harmful effects of noise. This guidance can be seen as the missing link between the current NPPF and its predecessor, PPG24 (Planning Policy Guidance 24: Planning and Noise), which provided a prescriptive method for assessing sites for residential development, but without the nuance of 'good acoustic design' as outlined in ProPG.

ProPG allows the assessor to take a holistic approach to consider the site's suitability, taking

into consideration numerous design factors which previously may not have been considered alongside the noise level measured on site, for example the orientation of the building in relation to the main source of noise incident upon it.
It should be noted this document is not an official government code of practice, and neither replaces nor provides an authoritative interpretation of the law or government policy, and therefore should be seen as a good practice document only.

2.4 ACOUSTICS VENTILATION AND OVERHEATING

The AVO Guide includes:

* an explanation of ventilation requirements under the building regulations and as described in Approved Document F, along with typical ventilation strategies and associated noise considerations;
* an explanation of the overheating assessment methodology described in CIBSE TM59; potential acoustic criteria and guidance relating to different ventilation and overheating conditions, for both environmental noise ingress and building services noise;
* and a worked example of the application of the AVO Guide including indicative design solutions.

The AVO Guide is intended for the consideration of new residential development that will be exposed predominantly to airborne sound from transport sources, and to sound from mechanical services that are serving the dwellings in question. Although the policy coverage is limited to England, the approach may be applicable in other parts of the UK.

The AVO Guide is intended to contribute to the practice of good acoustic design, as emphasised in the Professional Practice Guidance on Planning and Noise (ProPG).

2.5 BRITISH STANDARD BS 8233:2014

British Standard Code of Practice BS8233:2014 'Sound insulation and noise reduction for buildings' provides recommended guideline value for internal noise levels within dwellings which are similar in scope to guideline values contained within the World Health Organisation Guidelines for Community Noise 1999 (WHO).

Activity	Location	07:00 to23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,\ 16hour}$	
Dining	Dining room/area	40 dB $L_{Aeq,\ 16hour}$	
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,\ 16hour}$	30 dB $L_{Aeq,\ 8hour}$

2.4.1 Indoor ambient noise levels for dwellings

The WHO guideline noise criteria set an internal sleep disturbance noise limit of 45dB LAmax,F which should not be exceeded on a regular basis.

3.0 SITE SURVEY

3.1 SITE DESCRIPTION

The application site is a mid-terrace property located among mixed-use buildings along High Street. The area is a mix of commercial and residential properties, typical of an urban cityscape environment. The dominant noise source is plant noise from adjacent plant.
(See Figure 3.1)

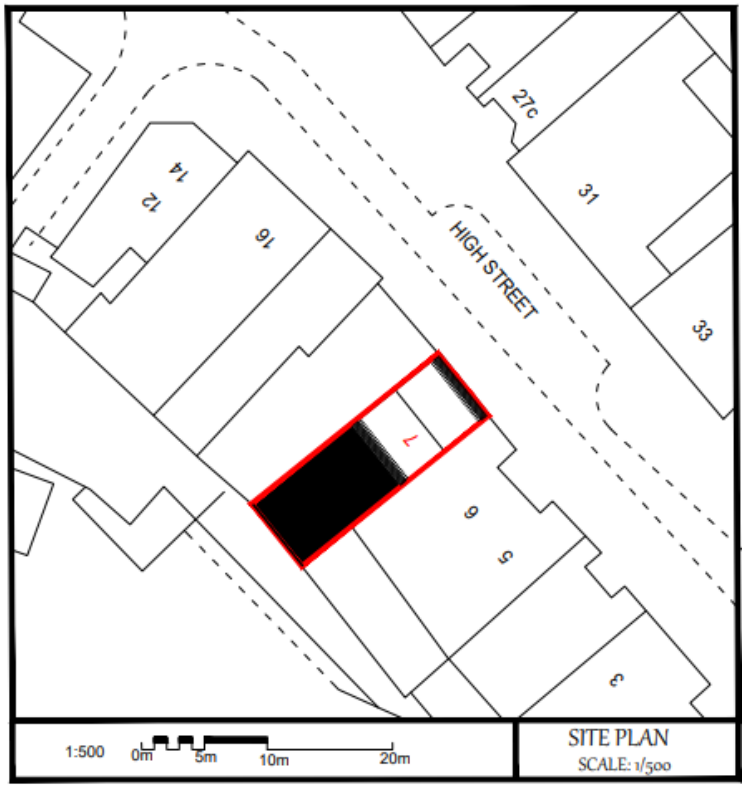


Figure 3.1 – Proposed Site

3.2 ENVIRONMENTAL SITE SURVEY PROCEDURE

In order to characterise the sound profile of the area an environmental sound survey has been carried out from 20/02/2024 to 21/02/2024. The monitoring position was chosen in order to collect representative data for the potential noise break into the habitable rooms.
Noise Measurements were carried out free field. The monitoring location is shown in Figure 3.2.

Figure 3.2 – Measurement Location

3.3 EQUIPMENT

Instrument manufacturer	**Rion**
Model	**NA-28**
Serial Number	**00392485**
Microphone Type	**UC-59**
Serial Number	**14934**
Calibrator	**NC-74**
Serial Number	**34494274**

The calibration of the sound level meter was verified in-situ before any measurements were taken, using the hand held calibrator and reference tone of 114dB at 1kHz. Validation checks at the end of the survey indicated that all instruments had operated within permitted tolerances for drift and measured level.

Copies of Calibration certificates are available upon request.

3.4 METEOROLOGICAL CONDITIONS

As the environmental noise survey was carried out over a long un-manned period no localized records of weather conditions were taken. However, during the set up and collection of the monitoring equipment, the weather conditions have been documented in the following table. All measurements have been compared with met office weather data of the area, specifically the closest weather station, 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 – Wattisham Weather station				
Time Period	**Air Temp (◦C)**	**Rainfall mm/h**	**Prevailing Wind Direction**	**Wind Speed (m/s)**
23/02/2024 – 00:00 – 23:59	0 - 8	0.0	SW	5 - 10
24/02/2024 – 00:00 – 23:59	0 -8	0.0	SE	4-6

Table 3.4 – Weather Summary

4.0 NOISE SURVEY

The following free-field sound levels have been derived for assessment of environmental noise break-in.
A maximum value is provided for each night-time measurement period. Based on the World Health Organisation interpretation that for a noise to be regular it needs to occur several (i.e. more than two) times per hour; the LAmax(f) noise needs to be based upon an average of 10-15 events that are typical in nature. The aim of protecting against maximum noise levels is to ensure protection against typical intermittent noise levels rather than one-off events; whereby an arithmetic average of the 15 typical maximum events across each night period is used to determine values of dB LAmax(f) reported below. Average LAeq levels and Representative LA90 levels have been used for our calculations. These have been summarised in table 4.1 below.

Measurement Data	Free Field Sound Pressure Level dB		
	MP 1		
Time	$L_{Aeq,15}$	$L_{AMAX,15}$	$L_{A90,15}$
07:00 – 23:00	50dB	64dB	45dB
23:00 – 07:00	42dB	56dB	38dB

Table 4.1 - Measurement Levels

Leq, ff noise levels are taken as the continuous equivalent free-field sound pressure level outside the room elements under consideration. These correspond to the highest reliable readings taken for day and night periods.

Location	T	Time	Free-Field Sound Pressure Level Leq, T dB re.20µPa						
			125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	A
MP1	16h	Day	55	49	48	46	41	33	50
	8h	Night	47	41	40	38	33	25	42
		Max	61	55	54	52	47	39	56

Table 4.2 Summary of Highest octave -band sound levels for break in assessment

5.0 PROPOSED RESIDENTIAL UNIT – LAYOUT DESIGN

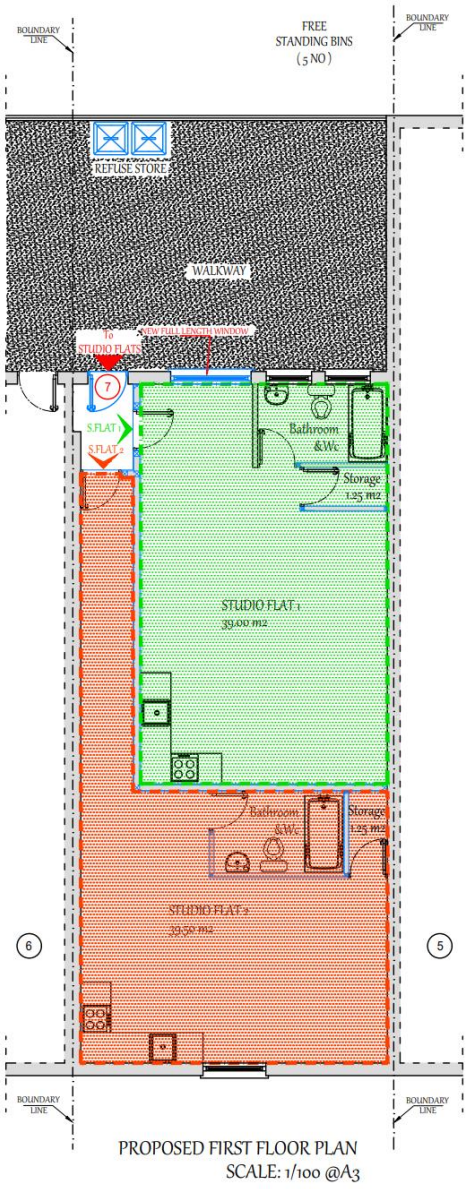


Figure 5.0 - Architectural Drawings of Proposed Layout

5.1 EXTERNAL SOUND LEVELS

5.1.1 Pro PG Acoustic Design Statement

The scope of ProPG is restricted to the consideration of new residential development that will be exposed predominantly to airborne noise from transport sources. New apartments, flats and houses are the most common type of new residential development, however the guidance can also be applied to other types of residential developments such as residential institutions, care homes etc. As such it is directly applicable to this development.

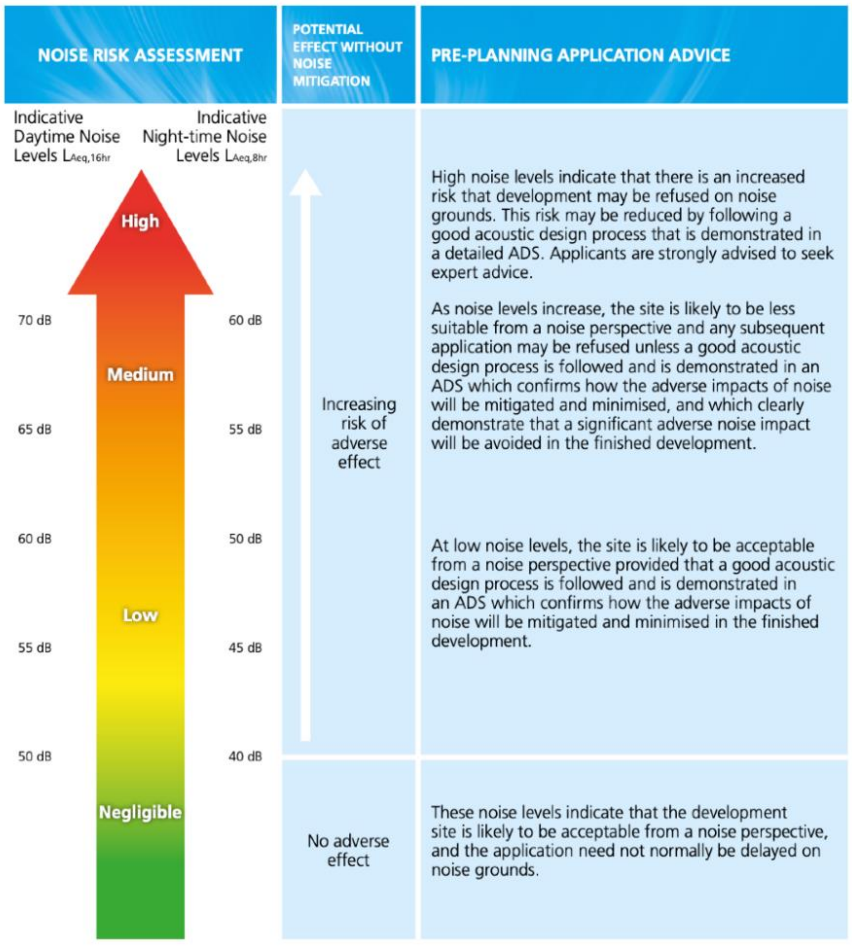


Figure 5.1 - ProPG Noise risk assessment guide

The following table assesses the ProPG noise risk for the measured data. The purpose of this is to provide a view of the noise risk at the site.

MP1	Daytime $L_{Aeq, 16hr}$ 07:00 – 23:00	Night-time $L_{Aeq, 8hr}$ 23:00 – 07:00
Noise Level	50dB	42dB
ProPG Noise Risk	LOW	LOW

Table 5.1.1 : ProPG Stage 1 Assessment table

ProPG states that “Particular care should be taken to ensure that any noise events (as quantified by LAmax,F) have been properly identified and assessed”.

5.1.2 ASSESSMENT OF COMMERCIAL SOURCES

Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it ought to be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to BS4142:2014 can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation." The observed commercial noise sources affecting the assessment areas are as follows:

Figure 5.1.2 – Commercial Noise Sources

	Proposed residential Unit
	Condenser Units - Specsavers

During attendance at the site, the units were not all operating. For a robust assessment we have calculated (from manufacturer sound data) the noise emissions from all units operating at the same time to 1 meter outside the proposed habitable window. We have added 3 dB for sound characteristics.

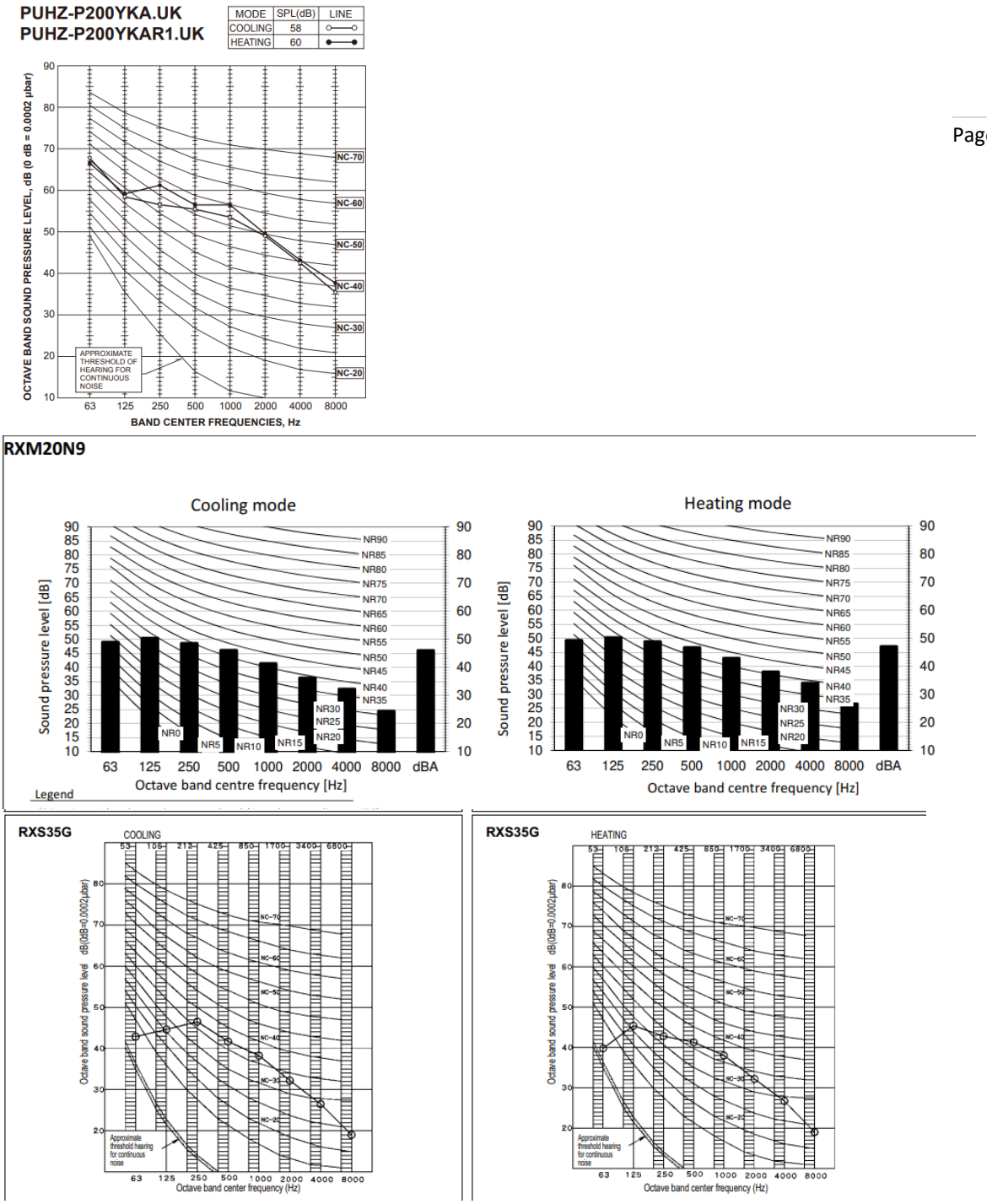


Figure 5.1.3 – Manufacture Noise Data

6.0 BS4142:2014+A1:2019 ASSESSMENT – 1m Outside Nearest residential Window

Character corrections should be added to the 'specific sound level' if it exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. Based on on the proposed window our measurements the plant was not tonal.

- Intermittency – We do not consider plant to have distinguishable intermittency.
- Impulsivity – Plant such as this is not normally impulsive.
- Other Sound Characteristics – we have applied a +3dB correction for other sound.

BS4142:2014 Assessment	
Source Operating Period	Existing Plant Noise 09:00 – 17:30
Reference Time Interval (Tr) Element	15 minutes Level (dB)
Specific Sound Level	55
Representative Background Noise Level (LA90)	45
corrections	3
Rating Level	58
Excess of Rating over Background Sound Level	+13

Detailed calculations can be found in Appendix D.

6.1 DISCUSSIONS AND CONTEXT

BS4142 states: “Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following:
The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

- Façade sound insulation treatment
- Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation
- Acoustic screening.” With regard to ‘good acoustic conditions’

“The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occur. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context. The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.”

With a calculated Rating of +13dB over the background noise, this indicates an adverse impact on future occupants. It is noted that this is worse case scenario and its unlikely that all units will be operating at full capacity at the same time.

To mitigate the noise, we will be using the calculated rating level of 58dB for our break in calculations for daytime and ensure the internal noise level is -10dB below the guidelines.

7.0 EXTERNAL BUILDING FABRIC SPECIFICATION

Sound reduction performance calculations have been undertaken in order to specify the minimum performance required from glazed and non-glazed elements in order to achieve the recommended internal noise levels shown in Table 2.5, taking into account average and maximum noise levels monitored during the environmental noise survey.

In accordance with the assessment guidance in Annex G of BS 8233:2014, the sound insulation performance of the building can be estimated by simple calculation from the free-field noise

564CALCULATION		A	B	(A-B) +5
Location	Period	Highest Free-Field Noise Levels LAeq,T dB	BS8233/WHO Internal Noise Guidance Criteria LAeq, T dB	Typical Insulation Specification dB Rw
MP1	**Day 07:00 – 23:00**	**58**	**35**	**28**
	Night 23:00 – 07:00	**42**	**30**	**17**
		56	**45**	**16**

Table 7.0 - Sound insulation estimate using the simple calculation method of BS8233

Typical sized bedrooms with a high ratio of glazing to masonry have been used for all calculations in order to specify glazing.

As a more robust assessment, LAmax spectrum values of night-time peaks have also been considered and incorporated into the glazing calculation in order to cater for the interior limit of 45 dB LAmax for individual events, as recommended in WHO Guidelines.

7.1 NON-GLAZED ELEMENTS

It is understood that the non glazed element is brickwork cavity walls and would be expected to provide the minimum figures shown above when tested in accordance with BS EN ISO, 140-3:1995.

Element	Octave Band Centre Frequency SRI, dB					
	125	250	500	1K	2K	4K
Non-Glazed Element SRI	41	43	48	50	55	55

Table 7.1 Non-glazed elements sound reduction minimum performance

7.2 SPECIFICATION OF NEW GLAZED UNITS

The minimum sound reduction index (SRI) value required for the glazed elements is shown in Table 7.2.

Glazing Configuration – 10mm/ 20mm cavity/6mm							
Frequency, Hz/dB					Rw	Rw + C	Rw +Ctr
125	250	500	1K	2K	**38**	-2	-4
30	29	33	42	42			

Table 7.2 – Required Glazing Performance – Standard double glazing.

The sound reduction performance stated above must be achieved by the gazing system as a whole in its installed condition. The specification therefore applies to both the glazing element and all seals on any openable part of the system. It should be confirmed with any supplier that the full glazing system supplied complies with the requirements stated in Table 7.2. Glazing data provided by Guardian Glass.

Please note that the above guidance only considers acoustic performance. Other disciplines, which consider thermal, safety, durability etc. should be consulted to ensure suitability.

8.0 INTERNAL NOISE CRITERIA

Location	Monitoring Period	Noise Criteria L_{AMAX}	No. times exceeded L_{AMAX}
(MP1)	07:00 – 23:00	55dB	0
	23:00 – 07:00	45dB	0

Table 8.0 – Noise Criteria L_{AMAX}

Location	Monitoring Period	Noise Criteria L_{Aeq}	Internal Noise Level
(MP1)	07:00 – 23:00	35dB	25dB
	23:00 – 07:00	30dB	10dB

Table 8.1 - Noise Criteria L_{Aeq}

9.0 VENTILATION AND OVERHEATING

Guidance on ventilation and associated acoustic considerations is given in Acoustic Ventilation and Overheating – Residential Design Guide [AVO] issued jointly by the Association of Noise Consultants and the Institute of Acoustics. In this guide, the need for ventilation (as falls under the requirements of Approved Document F [ADF] are covered in three main requirements as follows:

- Whole Dwelling Ventilation - General ventilation – continuous ventilation of rooms or spaces at a relatively low rate

- Extract Ventilation - Removal of air from a space or spaces (typically stale air from bathrooms or kitchens) to outside

- Purge Ventilation - Manually controlled removal of air at a high rate to eliminate fumes and odours, e.g. during painting and decorating or from burnt food. May be provided by natural or mechanical means.

Four main template systems for providing each of the above ADF ventilation requirements are summarised in the AVO guide as shown in Table 9.0.

Ventilation System	Method Of Whole Dwelling Ventilation	Method of Extract Ventilation	Method of purge Ventilation
System 1 (Background Ventilators and intermittent extract Fans	Background ventilators (Trickle Vents)	Intermittent extract fans	Typically provided by opening windows
System 2 (Passive Stack)	Background ventilators (Trickle Vents) & Passive Stack	Continuous via passive stack	Typically provided by opening windows
System 3 (Contunuous Mechanical Extract (MEV)	Continuous mechanical extract (low rate), trickle vents provide fresh air	Continuous mechanical extract (high rate), trickle vents provide fresh air	Typically provided by opening windows
System 4 (Continuously mechanical supply and extract with heat recovery (MVHR)	Continuous mechanical supply and extract (low rate)	Continuous mechanical supply and extract (high rate)	Typically provided by opening windows

Table 9.0 – Summary of ADF Ventilation Requirements

Where possible, natural forms of ventilation are typically preferred. However, in high noise areas, it may be necessary to recommend System 4, in order to minimise penetrations through the external building façade, which weaken the overall sound reduction performance.

The Below Table outlines the appropriate ventilation strategies for this development.

Ventilation Strategy (according to ADF)	LIVING AREA	BEDROOM
System 1: Intermittent Extract Fans System 2: Passive Stack Ventilation	✓	✓
System 3: Continuous Mechanical Extract (MEV)	✓	✓
System 4: Continuous Mechanical Supply & Extract with Heat Recovery (MVHR)	✓	✓

Table 9.0.1 – Ventilation Options

It should be ensured that all mechanical extract ventilation is designed to not exceed the internal noise criteria stated in Table 2.4.1.

To stairwells, no specific acoustic measures would be necessary and standard trickle vents would be appropriate.

In order to comply with Building Regulations (Part F), fresh air ventilation to habitable rooms is required via acoustic trickle ventilators. The acoustic trickle ventilators should comply with the minimum octave band normalised weighted level differences stated in Table 9.0.2.

Frequency, Hz/dB					Dnw,w,+Ctr (Open)
125	250	500	1K	2K	41dB
40	38	40	40	40	

Table 9.0.2 – Required Ventilator performance. We have used Titon V75

OVERHEATING

Overheating Considerations Through the proposed external façade and glazing configurations detailed in Sections 7.1 and 7.2, in combination with the trickle ventilation summarised in Section 9.0, it can be demonstrated that acceptable internal noise levels will be achieved with windows closed and background ventilation provided in accordance with System 1 ventilation.

Purge ventilation can typically be provided through openable windows, as during periods when purge ventilation is required, internal noise levels are less critical. Further consideration has also been given to possible overheating requirements. As the overheating strategy is not currently known, consideration has been given to the worst case scenario of openable windows being used. According to BS 8233: 2014, a typical building facade with a partially open window offers 15 dB attenuation. Based on the measured ambient noise levels shown in Table 4.1, the predicted internal ambient noise levels within habitable rooms with partially open windows used to prevent overheating would be as follows:

- Daytime ambient noise level: LAeq,16hr 43 dB
- Night-time ambient noise level: LAeq,8hr 27 dB

Note: The above levels assume windows would be partially opened to prevent overheating for an entire daytime or night-time period.

Table 3-3 of the AVO Guidelines indicates that a significant effect is likely to occur when internal noise levels exceed LAeq,16hr 50 dB during daytime hours and LAeq,16hr 42 dB during night-time hours. Above these levels, the guidance states that noise is expected to lead to a material change in behaviour.

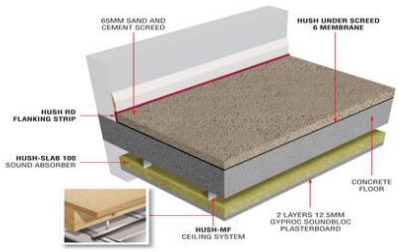
The calculated internal levels do not exceed the AVO threshold, indicating use of openable windows could be an acceptable solution.

10.0 INTERNAL SOUND INSULATION ASSESSMENT

The floor and wall structure may be subject to pre-completion testing in accordance with requirements of The Building Regulations 2010 Approved Document E (2003 Edition & amendments). It should be expected that the proposed dwelling will exceed the minimum performance standards of the Regulations, as stipulated between dwellings in terms of dB DnT,w +Ctr.

10.1 PROPOSED FLOOR SYSTEM

A 150mm (125mm if only pendant lighting is required) suspended ceiling incorporating 100mm mineral wool with a density of 45kg/m3 rigid slab to be installed.

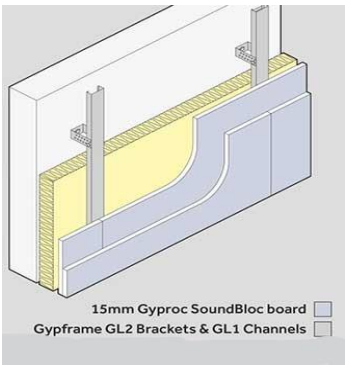


A separation gap with a minimum 3mm must be left between walls and floor and then filled with acoustic sealant to prevent flanking noise.

25mm Resilient bars to be installed and fitted with 2x layer of Soundbloc Plasterboard with staggered joins.

10.2 PARTY WALLS

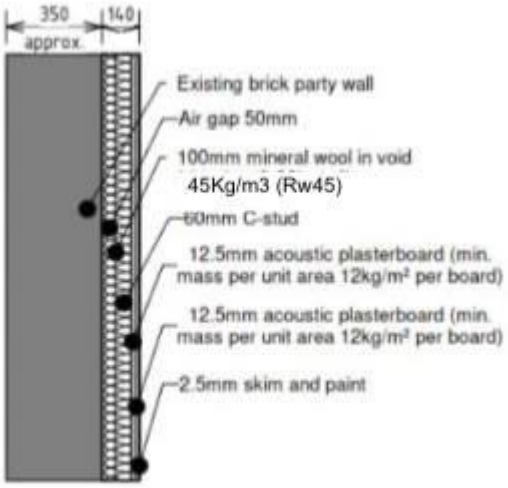
Separating walls are to be built as British Gypsum Quiet Wall, high performance acoustic wall system. Mineral wool infill to be a minimum of 50mm Rw45. (See Detail Below).



Alternatively, 75mm CLS stud wall with a 75mm cavity can be erected and secured via the ceiling joist and floor joist but not the party wall directly. The wall must sit on a 15mm strip of Soundbloc Plasterboard (Blue Board) between floor and ceiling to act as a deflection strip and minimise flanking noise. The cavity must be insulated with Rw45/50mm Mineral wool with 45kg/m3 density and left with a clear 25mm airgap. Fitting of one side of the party wall would be sufficient on solid construction.

10.3 EXISTING PARTY WALLS

The following construction is proposed:



10.4 LIGHTWEIGHT WALL DETAILING

Socket backs in lightweight partitions should be boxed in using two layers of plasterboard of the same mass as the partition wall and should be staggered by at least 300mm. Party walls should 'break' any lightweight flanking constructions to ensure acoustic discontinuity between the leaves of the partition.

10.5 DOWNLIGHTERS

Downlighters should be installed in accordance with the manufacturer's guidelines at a density of no more than 1 light per 2m2 of ceiling and at centres not less than 0.75m. Openings should be no larger than 100mm diameter, or 10mm x 100mm.

10.6 WALL JUNCTIONS

Where party walls meet other constructions, the party wall construction must 'break' the flanking construction, such as the plasterboard lining of external walls. Blockwork for internal leaves of external and flanking walls should have a minimum density of 1850kg/m3 . With these proposed

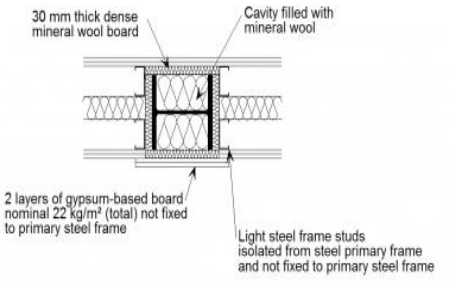
works implemented the flanking construction is expected to achieve the uprated performance requirements. Cavity stops should be used at all junctions between walls and floors in the external cavity.

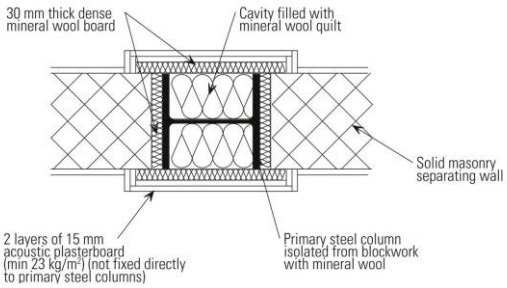
10.7 COMMUNAL AREAS

Soft closers are to be installed to communal and residential main doors to prevent high Reverberation Time (RT60) i.e slamming door.
Acoustic seals and drop seals to be installed to all main residential doors to prevent break in noise.

10.8 STEEL BEAMS & WASTE PIPES

All steel beams and waste pipes should be boxed and infilled with 100mm 60kg/m3 mineral wool and encased with 15mm soundbloc plaster board, where possible a 20-25mm air gap should be incorporated.





11.0 SUMMARY AND CONCLUSIONS

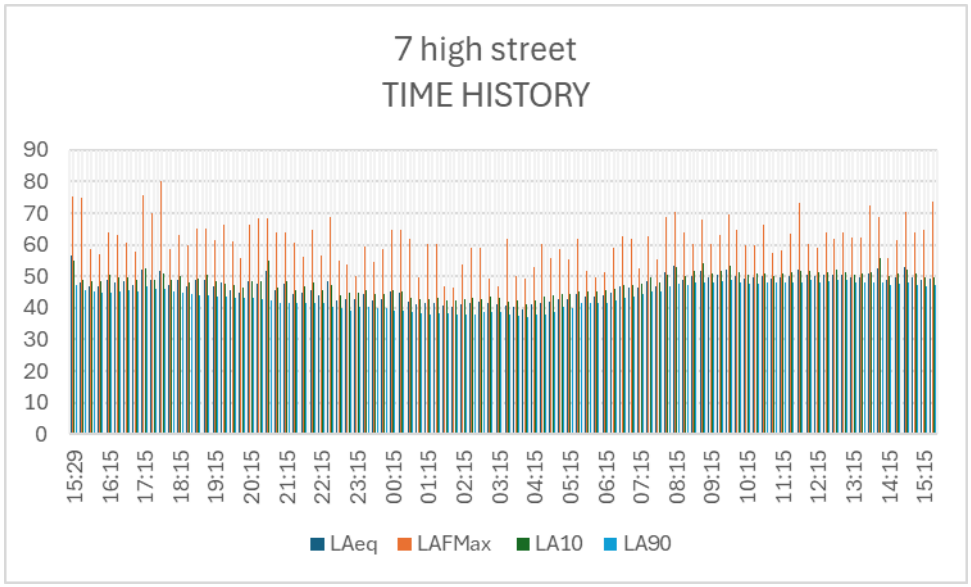
A baseline noise survey has been undertaken by DAA Group to establish the prevailing noise climate in the locality of 7 The Chauntry, High Street, Haverhill, CB9 8AA in support of a Planning Application for a new residential units and to ensure it does not prejudice the amenities of any future occupants.

Using results of the noise survey, the sound insulation performance for the whole building envelope including glazing (windows) is assessed, and a scheme of noise mitigation measures is established and included in the report verified by BS8233:2014 rigorous method building envelope sound insulation calculations.

A scheme of noise mitigation measures in the report provides specification details as appropriate for sound insulation treatment to the separating walls and separating floors.

It is concluded that, the impact of noise will not prejudice the amenities of any future occupants provided the above points are taken into consideration.

APPENDIX A – MEASUREMENTS



APPENDIX B - ACOUSTIC TERMINOLOGY

B.1 WEIGHTED DECIBEL, dB(A)

The unit generally used for measuring environmental, traffic or industrial noise is the A-weighted sound pressure level in decibels, denoted dB(A). The weighting is based on the frequency response of the human ear and has been found to correlate well with human subjective reactions to various sounds. An increase or decrease of approximately 10 dB corresponds to a subjective doubling or halving of the loudness of a noise, and a change of 2 to 3 dB is subjectively barely perceptible.

B.2 EQUIVALENT CONTINUOUS SOUND LEVEL, LAeq

Another index for assessment for overall noise exposure is the equivalent continuous sound level, L_{Aeq}. This is a notional steady level which would, over a given period, deliver the same sound energy as the actual time-varying sound over the same period.

B.3 MAXIMUM NOISE LEVEL, LAmax

The maximum noise level identified during a measurement period. Experimental data has shown that the human ear does not generally register the full loudness of transient sound events of less than 125 ms in duration.

B.4 NOISE RATING, NR

Noise ratings are used as a single figure criterion for specifying services noise in buildings. Each noise rating value has an associated spectrum of defined values in each third or octave frequency band. To determine the noise rating of a room the measured spectrum is compared to a set of noise rating curves. The highest NR curve that crosses any single frequency band of the measurement determines the noise rating for the room. The single figure noise rating is read at the 1 kHz band.

B.5 SOUND LEVEL DIFFERENCE (D)

The sound insulation required between two spaces may be determined by the sound level difference needed between them. A single figure descriptor which characterises a range of frequencies, the weighted sound level difference, D, is sometimes used (BS EN ISO 717-1). This parameter is not adjusted to reference conditions.

The standardized level difference, Dn, T is a measure of the difference in sound level between two rooms, in each frequency band, where the reverberation time in the receiving room has been normalised to 0.5 s. This parameter measures all transmission paths, including flanking paths.

The weighted standardized level difference, DnTw, is a measure of the difference in sound level between two rooms, which characterises a range of frequencies and is normalised to a reference reverberation time

B.6 SOUND REDUCTION INDEX (R)

The sound reduction index (or transmission loss) of a building element is a measure of the loss of sound through the material, i.e. its attenuation properties. It is a property of the component, unlike the sound level difference which is affected by the common area between the rooms and the acoustic of the receiving room. The weighted sound reduction index, Rw, is a single figure description of sound reduction index characterising a range of frequencies, which is defined in BS EN ISO 717-1: 1997. The Rw is calculated from measurements in an acoustic laboratory

B.7 STATISTICAL NOISE LEVELS (L_{A90}, (T) L_{A1}, (T) L_{A10}, (T) etc.)

For levels of noise that vary widely with time, for example road traffic noise, it is necessary to employ an index which allows for this variation. The L_{A10} is the level exceeded for ten per cent of the time under consideration, has historically been
adopted in the UK for the assessment of road traffic noise. The LA90 is the level exceeded for ninety per cent of the time, has been adopted to represent the background noise level. The L_{A1} the level exceeded for one per cent of the time, is representative of the maximum levels recorded during the sample period. A weighted statistical noise levels are denoted LA10, dB LA90, dB. etc. The reference time (T) is normally included, e.g. LA10, (5min), & LA90, (8hr).

B.8 TYPICAL NOISE LEVELS

Typical noise levels are given in the following table.

Noise Level dB(A)	Example
130	Threshold of pain
120	Jet aircraft take-offs at 100 m
110	Chain saw at 1 m
100	Inside disco
90	Heavy lorries at 5 m
80	Kerbside of busy street
70	Loud radio (in typical domestic room)
60	Office or restaurant
50	Domestic fan heaters at 1m
40	Living room
30	Ventilation Noise in Theatre
20	Remote countryside on still night
10	Sound insulated test chamber
0	Threshold of hearing.

APPENDIX C - CALCULATIONS

Calculation Sheet
MP1 - 07:00 - 23:00 to LR

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - MP1 - 07:00 - 23:00										
Noise Levels		**69.0**	**62.0**	**57.0**	**56.0**	**54.0**	**49.0**	**41.0**	**41.0**	**58.4 dBA**
Composite SRI										
Facade Width (m)	2.0									
Facade Height (m)	3.0									
Main Element - External Wall										
SRI		42	41	43	48	50	55	55	56	Rw 51
Window Width (m)	1.5									
Window Height (m)	2.4									
No. of Windows (no)	1.0									
Glazed Element - 38Rw										
SRI		35	30	29	33	42	42	36	38	Rw 39
No. of Vents (no)	2.0									
Vent - Vents										
Dne		40	40	38	40	40	40	40	40	Dnew 41
		-32.6	*-30.2*	*-28.8*	*-31.9*	*-34.3*	*-34.3*	*-33.1*	*-33.7*	
10 log (S/A)										
Internal Receiver - LR										
		-4.1	*-4.1*	*-4.1*	*-4.1*	*-4.1*	*-4.1*	*-4.1*	*-4.1*	
+3										
		3.0	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Internal Receiver Noise										
Internal Receiver Noise - LR										
Reverberant Field, LPrev		**35.3**	**30.7**	**27.0**	**23.0**	**18.6**	**13.6**	**6.8**	**6.2**	**25 dBA**

Calculation Sheet
MP1 23:00 - 07:00 to BR

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - MP1 23:00 - 07:00										
Noise Levels		**47.0**	**47.0**	**41.0**	**40.0**	**38.0**	**33.0**	**25.0**	**25.0**	**42.4 dBA**
Composite SRI										
Facade Width (m)	2.0									
Facade Height (m)	3.0									
Main Element - External Wall										
SRI		42	41	43	48	50	55	55	56	Rw 51
Window Width (m)	1.5									
Window Height (m)	2.4									
No. of Windows (no)	1.0									
Glazed Element - 38Rw										
SRI		35	30	29	33	42	42	36	38	Rw 39
No. of Vents (no)	2.0									
Vent - Vents										
Dne		40	40	38	40	40	40	40	40	Dnew 41
		-32.6	*-30.2*	*-28.8*	*-31.9*	*-34.3*	*-34.3*	*-33.1*	*-33.7*	
10 log (S/A)										
Internal Receiver - BR										
		-2.9	*-2.9*	*-2.9*	*-2.9*	*-2.9*	*-2.9*	*-2.9*	*-2.9*	
+3										
		3.0	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Internal Receiver Noise										
Internal Receiver Noise - BR										
Reverberant Field, LPrev		**14.5**	**17.0**	**12.3**	**8.2**	**3.9**	**-1.1**	**-8.0**	**-8.5**	**10.2 dBA**

Calculation Sheet

MP1 LAMAX to BR

		Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	
Noise Source										
Noise Source - MP1 LAMAX										
Noise Levels		**61.0**	**61.0**	**55.0**	**54.0**	**52.0**	**47.0**	**39.0**	**39.0**	**56.4 dBA**
Composite SRI										
Facade Width (m)	2.0									
Facade Height (m)	3.0									
Main Element - External Wall										
SRI		42	41	43	48	50	55	55	56	Rw 51
Window Width (m)	1.5									
Window Height (m)	2.4									
No. of Windows (no)	1.0									
Glazed Element - 38Rw										
SRI		35	30	29	33	42	42	36	38	Rw 39
No. of Vents (no)	2.0									
Vent - Vents										
Dne		40	40	38	40	40	40	40	40	Dnew 41
		-32.6	*-30.2*	*-28.8*	*-31.9*	*-34.3*	*-34.3*	*-33.1*	*-33.7*	
10 log (S/A)										
Internal Receiver - BR										
		-2.9	*-2.9*	*-2.9*	*-2.9*	*-2.9*	*-2.9*	*-2.9*	*-2.9*	
+3										
		3.0	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Internal Receiver Noise										
Internal Receiver Noise - BR										
Reverberant Field, LPrev		**28.5**	**31.0**	**26.3**	**22.2**	**17.9**	**12.9**	**6.0**	**5.5**	**24.2 dBA**

NOISE EMISSION CALCULATION														
ITEM	**PARAMETER**			**HZ**		**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**	**dBA**
1	**Schedule of Plant**	Qty												
2	**Daikin - RXM20N9**	3	Spl	dB	+	54	55	54	51	48	42	33	30	54
3	Daikin - RXMS35G	1	Spl	dB	+	40	45	44	42	38	32	27	19	48
	Mitsubishi - PUHZ-P200YKA	1	Spl	dB	+	66	59	61	56	56	50	43	38	60
4														
5														
6	Revised Spl:	1	Spl	dB	+	66	61	62	57	58	51	44	39	61
7														
8														
9														
10														
11	Distance to nearest receptor Metres:	2		dB	-	**-6**	**-6**	**-6**	**-6**	**-6**	**-6**	**-6**	**-6**	**-6**
12	$SPL=L1-20\log_{10}(r2/r1)$	1												
13														
14	Natural Barrier		ð	dB	-	0	0	0	0	0	0	0	0	0
15														
16	Spl at receptor			dB	+	60	55	56	51	52	45	38	33	55
17														
18														
19														
20	noise correction	0		dB	+	3	3	3	3	3	3	3	3	3
21														
22														
23	Specific noise level at receptor			dB	+	63	58	59	54	55	48	41	36	58
24	(1m outside noise sensitive window)													
25	**Lowest Background Noise Levels:(L_{A90})**													
26	**Day Time (07:00-23:00)**													**45**
27	**Difference:** (Assessment level)			dB	-									**13**
28														

GUARDIAN GLASS

Acoustic Performance

Glazing Configuration

10mm Float Glass
20mm Cavity
6mm Float Glass

Sound Reduction Indices

Frequency, Hz / dB						Rw	C	Ctr	OITC	STC
125	250	500	1000	2000	4000	38	-2	-4	32	37
30	29	33	42	42	36					

Disclaimer: The acoustic performance data provided in the reports is based on a test protocol or an estimation and may be used if user actual glazing is identical to input data described herein. Acoustic performance data herein is only applicable for glazing dimensions 1,23 m x 1,48 m (as per testing standard). Estimation of acoustic performance is based on component-similarity assumptions which are derived from measured data and interpolation to expand the database of values from test protocols. Due to inherent variations in acoustic performance when testing in accordance with EN ISO 10140-3/EN ISO 10140-2, some variation in the calculated performance can also be expected. As such, the weighted performance, Rw, and adaptation terms, C and Ctr, should typically be considered to be accurate within ±2 dB. However, wider deviations can occur. Actual performance may vary according to the glazing dimensions, frame system, noise sources and many other parameters. The acoustic performance data herein should not be used as a substitute for tests of actual glazing. For more information, please consult Assumptions and Terminology section in Guardian Acoustic Assistant. By accessing this calculator, you agree not to alter or modify the generated report data and information, by any means. Any manual alteration will be your own responsibility and will annul all the content of the report.

Wednesday, March 6, 2024 | Acoustic database 20210629 | Protocol №: 16/12500-1320-S assumption, ,