Noise Impact Assessment

Site Address: 3-7 Mill Street East, Dewsbury, Kirklees, WF12 9AQ

Client Name: Rose Consulting

Project Reference: NP-013941

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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 3-7 Mill Street East, Dewsbury, Kirklees, WF12 9AQ ('the site'). The site is subject to road noise from Mill Street East and commercial/light industrial noise from the surrounding premises.

The applicant has submitted planning application, ref. 2025/62/96083/E – '*Change of use from storage (B8) to children's home (C2)'* ('the Application') to the Local Planning Authority ('LPA'), Kirklees Council. This report has been prepared to accompany the application.

A noise survey has been undertaken to establish the prevailing sound levels at the proposed development. 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:

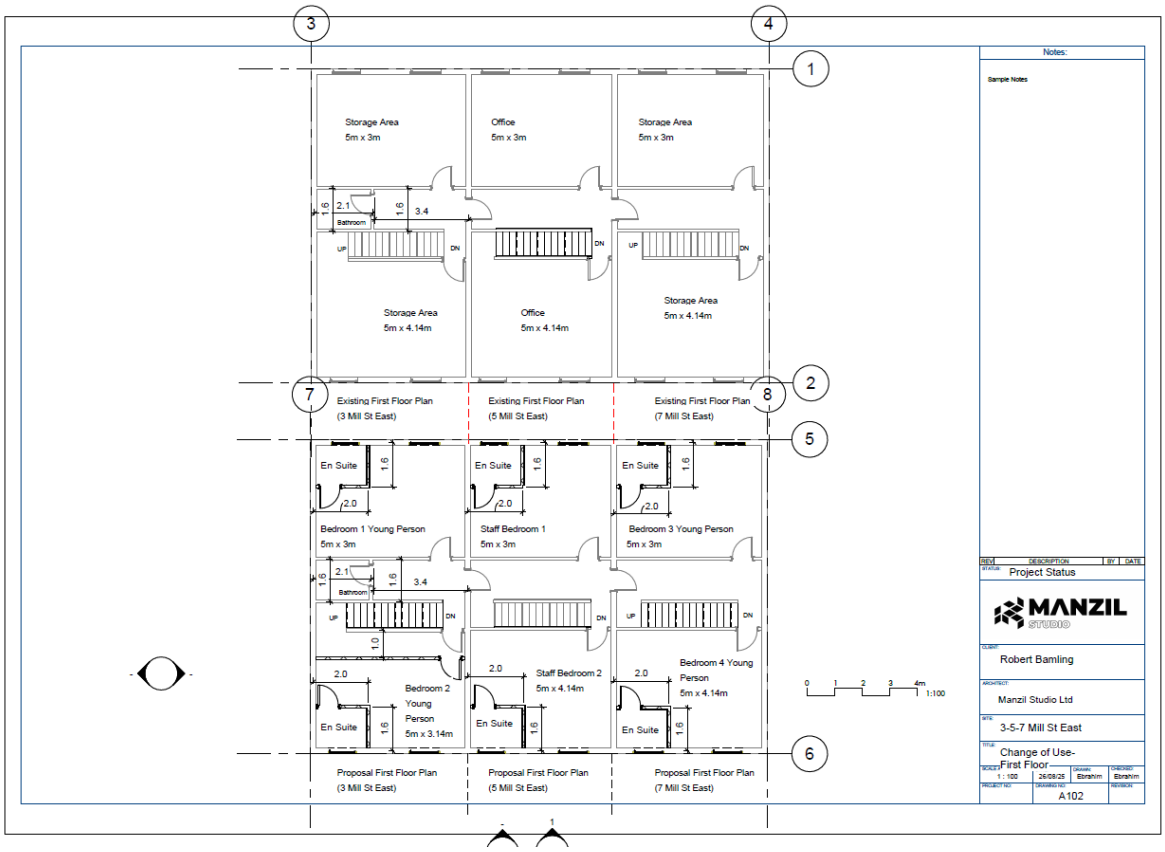
- The LPA's comments regarding the application
- National Planning Policy Framework (NPPF, 2024)
- Noise Policy Statement for England (NPSE, 2010)
- British Standard BS8233:2014 – 'Guidance on sound insulation and noise reduction for buildings'
- British Standard BS4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound'
- Approved Document F: Volume 1 Dwellings (2021)
- Acoustics Ventilation Overheating: Residential Design Guide 2020' (AVO Guide)

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

1.2 Proposal Brief

The proposal is for the change of use of the building from storage (B8) to a children's home for up to four children, with a manager/deputy and up to two carers staying overnight on a rota basis (C2). The proposed first-floor layout of the development is shown below. Additional plans can be found in Appendix C.

NOVA Acoustics has been informed that there will not be any items of externally fixed mechanical plant at the development.



Drawing Ref. 2025-93083__20Grouped_20Plans_20and_20Elevations_1113304 from 'MANZIL Studio'

Figure 1 – Proposed Development

1.3 Local Planning Authority & Background

The following comments have been made by the LPA regarding the development:

"With regards to (b), the site is immediately adjoining on all sides (north, south, east and west) by commercial and light industrial premises which are actively in use. These operations have the potential to generate noise, dust, vibration and general activity associated with industrial and commercial processes, including vehicular movements and servicing. The introduction of a sensitive use such as a children's home in this location would not be compatible with the established character and function of the area.

Further, the insertion of such a use in this location would introduce future occupiers who are likely to be adversely affected by the impacts of nearby commercial operations, resulting in pressure for those businesses to curtail or modify their activities. This would in turn prejudice their ability to operate effectively and would undermine the continued employment function of the wider Priority Employment Area."

This assessment has been undertaken in response to the comments to determine whether appropriate acoustic conditions can be achieved within the proposed development building whilst ensuring that the operations of the surrounding commercial and industrial premises are not unduly constrained.

The internal noise environment is assessed using guidance provided in BS8233:2014. The assessment therefore considers the level of sound insulation required by the building envelope in order to achieve suitable internal living conditions.

In addition, noise emissions arising from surrounding commercial and industrial activities, including plant and vehicle servicing operations, is assessed in accordance with BS4142:2014+A1:2019. This standard provides a methodology for determining the potential for adverse impact from industrial and commercial sound on nearby noise sensitive receptors.

Furthermore, the Agent of Change principle is also considered, as recommended within national planning policy. In this context, the proposed development sound insulation scheme must be designed to ensure that future occupants are protected from existing noise sources, whilst avoiding placing unreasonable restrictions on the established operations of surrounding commercial and industrial premises.

Accordingly, this assessment considers both the suitability of the internal acoustic environment for future occupants and the compatibility of the proposed development within the existing industrial character of the surrounding area.

2. Environmental Noise Survey

2.1 Measurement Methodology

An attended and unattended environmental noise survey was undertaken at the site to determine the existing noise climate affecting the proposed development. The measurement dates and particulars are outlined in the following table.

As the monitoring at MP1 and MP2 was undertaken under façade conditions, the results have been corrected to convert them to a free-field level.

A 130mm diameter windshield was fitted to each microphone. The equipment was field calibrated before and after the survey with negligible levels of drift noted.

Location	Survey Dates	Measurement Particulars
MP1 (Long-term)	25-27/02/2026	Equipment protruding from a first-floor window at a distance of 1m from the building façade on Mill Street E.
MP2 (Long-term)		Equipment protruding from a first-floor window at a distance of 1m from the building façade on the rear elevation.
MP3 (Short-term)	25/02/26, 15:50 – 16:25 & 27/02/26, 10:00 – 11:00	Equipment mounted on a tripod at 1.5m from the ground in free-field conditions.

Table 1 – Measurement Methodology

The site surroundings and measurement locations are highlighted in the following figure.

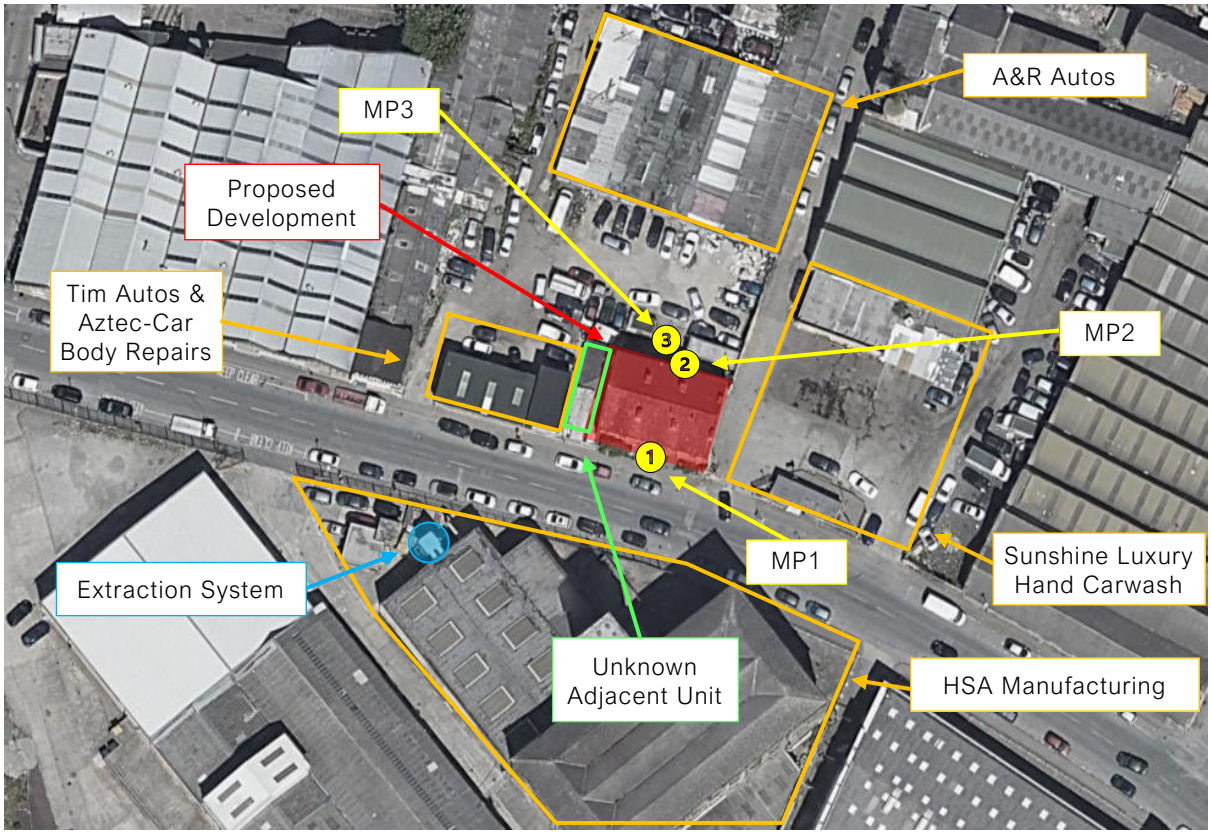


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Figure 2 – Measurement Locations and Site Surroundings

2.2 Context & Subjective Impression

The site is located on Mill Street East in Dewsbury, within a predominantly commercial/light industrial area. Surrounding land uses include garages and workshops located immediately to the rear of the site, a car wash facility to the east, and a number of industrial units along Mill Street East. The surrounding environment contains a range of activities capable of generating noise, including vehicle movements, servicing operations and fixed plant associated with nearby commercial premises.

The details and operational times of commercial premises within proximity to the proposed development are shown in the table below. Any premises not listed is regarded as being low risk in terms of noise impact.

Name	Description	Opening Hours
Tim Autos	A mechanic at Unit 1, Armoforn Yard.	10:00 – 18:00 hours, Monday to Saturday.
Aztec-Car Body Repairs	A car body shop at Unit 6, Armoforn Yard.	09:00 – 18:00 hours, Monday to Saturday.
A&R Autos	A car garage at Armoforn Yard.	Unknown at this stage.
Sunshine Luxury Hand Carwash	A car wash at Mill St E.	09:00 – 19:00 hours, Monday to Saturday 09:30 – 20:00 hours, Sunday.
HSA Manufacturing	A specialist shopfitting manufacturer at Units 11, 13 and 14 Victoria Mills.	Unknown at this stage.

Table 2 – Surrounding Commercial Premises

During the site visit, the prevailing acoustic environment was dominated by road traffic noise from Mill Street East, which was clearly audible throughout the survey period and formed the primary background noise source. In addition to road traffic, a tonal mechanical noise associated with a large extraction system located at the HSA Manufacturing premises across Mill Street East was clearly perceptible at the front of the site.

During the short-term attended measurements undertaken at the rear of the site, the dominant noise source continued to be road traffic from Mill Street East, with intermittent noise emissions associated with nearby commercial activities also audible at times. Noise associated with the adjacent car wash facility was also intermittently audible at the rear of the site, primarily from the operation of jet wash equipment and associated plant. Activity from the garage units was generally limited during the survey period; however, occasional noise emissions were observed, including vehicle movements, engine idling noise and the use of mechanical tools. These activities produced intermittent and occasionally impulsive noise events, such as those associated with compressed air equipment, etc.

2.3 Environmental Noise Survey Results – Ambient and Maximum Noise Levels

A summary of the ambient sound levels measured during the attended and unattended noise surveys is presented in the table below. The maximum sound levels ($L_{AFmax,2min}$) exceeded fewer than 10 times during the night-time periods measured are also shown. The time history results can be found in Appendix D.

Location	Measurement Period ('T')	Octave Frequency Band (Hz, dB)							Overall (dBA)
		63	125	250	500	1k	2k	4k	
MP1	Average $L_{eq,16hr}$ (Day)	66	60	60	59	58	55	49	62
	Highest $L_{eq,1hr}$ (Day)	69	63	65	64	63	59	52	67
	Average $L_{eq,8hr}$ (Night)	59	52	52	51	52	48	41	55
	Highest $L_{eq,1hr}$ (Night)	64	56	56	56	57	54	48	61
	Typical $L_{AFmax,2min}$ (Night)	78	74	79	75	73	72	64	78
MP2	Average $L_{eq,16hr}$ (Day)	56	49	49	48	48	47	47	54
	Highest $L_{eq,1hr}$ (Day)	56	53	56	56	54	51	51	59
	Average $L_{eq,8hr}$ (Night)	49	44	41	38	37	32	28	41
	Highest $L_{eq,1hr}$ (Night)	53	48	45	42	41	39	32	46
	Typical $L_{AFmax,2min}$ (Night)	63	61	54	55	55	48	39	59
MP3	Average $L_{eq,40min}$ (Day)	55	48	51	50	44	43	43	52
	Average $L_{eq,1hr}$ (Day)	56	51	51	50	46	43	41	52

Table 3 – Sound Level Results Summary

As shown in the table above, the highest daytime $L_{Aeq,1h}$ measured at MP2 (rear of the site) was 61dB. During the attended spot measurements undertaken at MP3, also located at the rear of the site, the L_{Aeq} measured over the 1-hour measurement period was 52dB, during which typical operational activities from the surrounding commercial premises were observed.

Therefore, using the highest daytime $L_{Aeq,1h}$ of 61dB for the break-in assessment represents a robust and conservative approach, as this value is approximately 9dB higher than the levels measured during the attended survey under representative operational conditions.

2.4 Environmental Noise Survey Results – Background Noise Levels

A summary of the typical background sound levels measured during the noise survey is shown in the table below. The levels have been derived via statistical analysis of the measured $L_{A90,15min}$ data and were chosen depending on the ranges and distributions of measurement results. Full noise survey time histories and histograms can be found in Appendix D.

Location	Period	Typical Background Sound Level ($L_{A90,T}$, dB)
MP1	Day: 07:00 – 23:00	42
	Night: 23:00 – 07:00	37
MP2	Day: 07:00 – 23:00	42
	Night: 23:00 – 07:00	38

Table 4 – Background Sound Level Results Summary

3. BS4142 Noise Impact Assessment

3.1 Noise Sources & Subjective Impression

To the front of the proposed development is a large extraction system associated with HSA Manufacturing. As can be seen in the time history below, the noise emissions from the extraction system are continuous from 07:00 to 17:30 approximately.

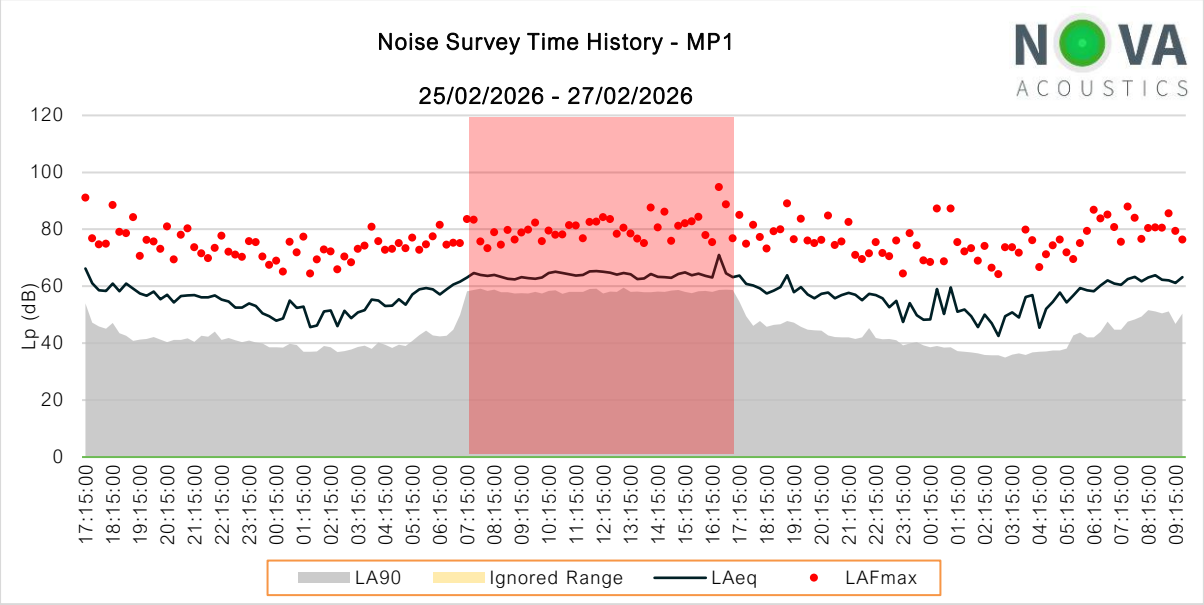


Figure 3 – Noise Survey Time History – MP1

To the rear of the proposed development, there are a number of commercial garage units which contribute to the noise environment. As can be seen in the time history below, the noise profile does not exhibit a clear 'diurnal' pattern associated with a single dominant source. However, during the daytime period, when the surrounding commercial premises are typically operational, a number of peaks in the measured sound levels can be observed. These peaks are consistent with the subjective observations made during the site visit, where intermittent and occasionally impulsive noise emissions were noted from the surrounding commercial units. These peaks in noise emissions are thought to be associated with activities such as the use of tools and general workshop operations.

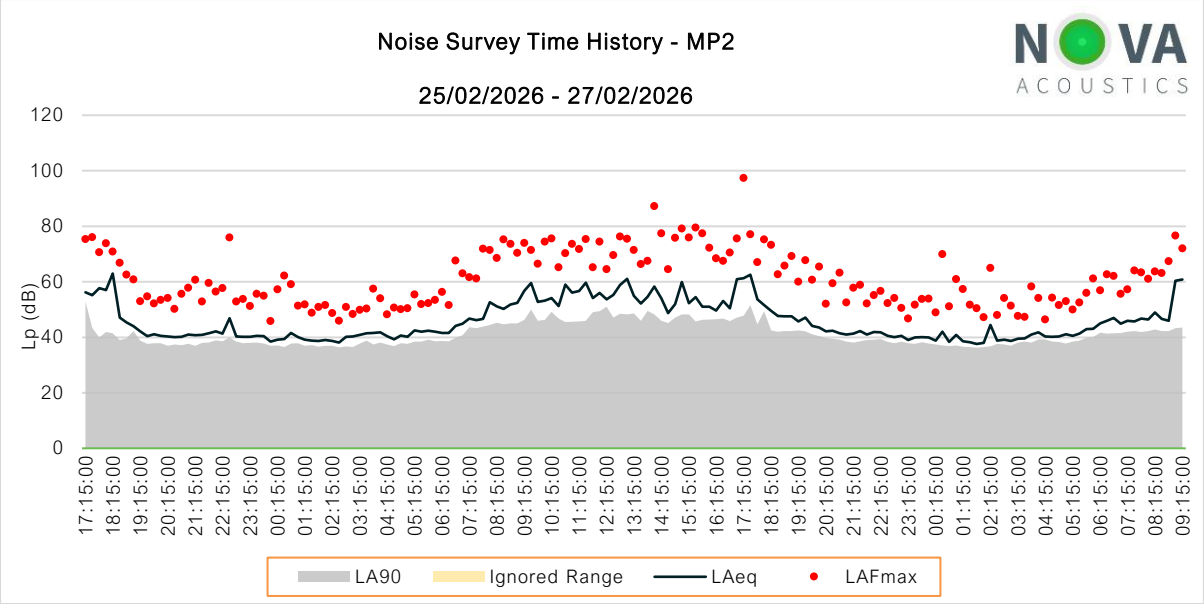


Figure 4 – Noise Survey Time History – MP2

To ensure the residential amenity of the future occupants is fully protected, the noise emissions from the surrounding commercial/light industrial premises are assessed in accordance with BS4142:2014+A1:2019 in the following sections. The location of the plant equipment under assessment is shown in Figure 2.

3.2 Background Sound Level Analysis

The background sound level used as the basis of the BS4142 assessment has been derived from the periods immediately before and after the operational hours of the extraction system (MP1) and the opening hours of the car garages and carwash to the east and rear (MP2).

Given the ranges and distributions of the $L_{A90,15min}$ measurements, 42dB and 48dB are considered to be representative background sound levels for MP1 during periods when the fixed plant is in operation. At MP2, the measured background sound levels were lower, with values ranging between 38dB and 44dB, reflecting the more intermittent nature of commercial activity at the rear of the site.

3.3 Specific Sound Levels

Presented in the table overleaf are the highest $L_{Aeq,1h}$ ambient sound levels measured during the operational hours of the extraction system, together with the highest $L_{Aeq,1h}$ levels measured during the operational periods of the car garages and car wash located to the rear of the site. As can be seen in Figures 3 and 4, the ambient sound levels during these periods were clearly dominated by the noise emissions from the sources under assessment. The measured levels are therefore significantly above the residual background sound levels, and consequently no correction for residual noise has been applied.

Description	1/1 Octave Frequency Band (Hz, $L_{eq,T}$ dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
MP1 - HSA Extraction System (26/02/26 – 16:15 to 17:15)	69	63	65	64	63	59	52	69	67
MP2 – Car Garages and Carwash (26/02/26 – 17:15 to 18:15)	56	53	56	56	54	51	51	59	60

Table 5 – Specific Sound Level of Associated Commercial Units

3.4 BS4142 Noise Impact Assessment

The BS4142 noise impact assessments are presented in the tables below.

Description	1/1 Octave Frequency Band (Hz, $L_{eq,T}$, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
HSA Extraction System (26/02/26 – 16:15 to 17:15)	69	63	65	64	63	59	52	69	67
BS4142 Acoustic Feature Correction	A +2 dB penalty is applied to account for a perceptible low-frequency hum that was present during the site visits.								+2
Rating Sound Level ($L_{Ar,Tr}$)	Specific sound level plus rating penalties.								69
Background Sound Level	MP1 $L_{A90,15min}$ representative of 'worst-case' morning period.								42
Exceedance	Exceedance of rating level above background.								+27
BS4142 Assessment Outcome	'Significant Adverse Impact, dependent on context'.								
NPPF & NPSE Outcome	'Significant Observed Adverse Effect Level' ('SOAEL').								
Mitigation measures are required to reduce noise impact within the development.									

Table 6 – BS4142 Noise Impact Assessment – Front Façade (MP1)

Description	1/1 Octave Frequency Band (Hz, $L_{eq,T}$, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
MP2 – Car Garages and Carwash (26/02/26 – 17:15 to 18:15)	56	53	56	56	54	51	51	59	60
BS4142 Acoustic Feature Correction	A +6 dB penalty has been applied for clearly perceptible impulsivity that was present during the site visits.								+6
Rating Sound Level ($L_{Ar,Tr}$)	Specific sound level plus rating penalties.								66
Background Sound Level	MP2 $L_{A90,15min}$ representative of 'worst-case' morning period.								38
Exceedance	Exceedance of rating level above background.								+28
BS4142 Assessment Outcome	'Significant Adverse Impact, dependent on context'.								
NPPF & NPSE Outcome	'Significant Observed Adverse Effect Level' ('SOAEL').								
Mitigation measures are required to reduce noise impact within the development.									

Table 7 – BS4142 Noise Impact Assessment – Rear Façade (MP2)

As can be seen from the assessments above, it is likely that noise emissions from the surrounding commercial and light industrial premises (namely the large extraction system associated with HSA Manufacturing to the front of the site, together with intermittent and impulsive noise generated by tools and operational activities from the garages and car wash located to the rear and east) would result in a 'significant adverse impact' (dependent on context), at the proposed development.

As such, it is recommended that appropriate mitigation measures are implemented to reduce the potential noise impact for future occupants.

4. Agent of Change Principle

Considering that commercial noise is clearly dominant at the site, the 'Agent of Change' principle must be considered in order to reduce the likelihood of complaints from future residents and avoid placing undue restrictions on the nearby businesses.

Regarding this, the following is stated in paragraph 200 of the NPPF:

"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."

The 'ProPG Planning and Noise' (May 2017) guidance, 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 by promoting good health and wellbeing through the effective management of noise. It 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 are considered to be relevant to this development:

1. Reduction of noise at the source

The most effective method of controlling noise impact is typically the reduction of noise emissions at the source. In this case, the dominant external noise sources are associated with surrounding commercial and light industrial premises. Whilst these sources are not directly controlled by the applicant, the potential for noise reduction may exist through liaison with the business operators. Possible mitigation measures that could be explored include:

- Enclosing the extraction fan associated with the HSA Manufacturing premises.
- Installing an acoustic silencer on the exhaust ductwork serving the extraction system.
- Operational controls within the surrounding garage units, such as undertaking noisy activities with roller shutter doors closed.

Should the client reach an agreement with the relevant businesses, further investigations should be undertaken by a qualified acoustician to determine the feasibility and potential effectiveness of these measures.

It is however understood that as these businesses are not in the direct control of the applicant, reduction of noise at source may not be feasible.

2. Reorientation of the development and acoustic shielding

Both the front and rear façades of the site are exposed to noise from surrounding commercial activities, and these emissions occur predominantly during the daytime operational period. As such, relocating habitable rooms within the building footprint or reorientating the development would not provide a meaningful reduction in noise exposure.

Accordingly, this mitigation option is not expected to provide a significant benefit.

3. Enhanced façade sound insulation treatment

To ensure the possibility of adverse impact across both facades is reduced as much as is practicable, it is recommended that an enhanced façade sound insultation treatment is implemented.

For the front façade, the sound insulation scheme is based on the highest $L_{Aeq,1h}$ measured during both the daytime and night-time periods, which represents the most onerous external noise conditions associated with both road traffic and the extraction system serving the HSA Manufacturing premises located across Mill Street East.

For the rear façade, the sound insulation is similarly based on the highest $L_{Aeq,1h}$ measurements, however in addition to this, given the intermittent and occasionally impulsive character of noise emissions associated with activities from the surrounding garages and car wash facilities, a +6dB character correction is applied to the daytime level for the purposes of the façade break-in assessment.

Further to the above, to avoid disturbance due to low-frequency noise emissions, the Moorhouse Curve is applied for the 63Hz and 125Hz octave bands.

It is thought that the internal noise level criteria can be achieved with windows closed; however, there are likely to be significant exceedances if future occupants open their windows for ventilation purposes. Given this, it is recommended that secondary mechanical ventilation systems are installed that allow for appropriate internal conditions to be achieved without the need for opening windows. The acceptability of this strategy will have to be agreed with the LPA as there will still be an inherent risk in developing residential accommodation in this location.

The ventilation systems must be compliant with the requirements of Approved Document F and should be capable of providing the following:

- Background ventilation
- Purge ventilation
- Overheating mitigation

5. Noise Break-in Assessment and Sound Insulation Scheme

5.1 Internal Noise Level Criteria

The design criteria shown in the following tables are used in the assessment:

Location	Day & Night
All Rooms	63Hz limit of 47dB 125Hz limit of 41dB

Table 8 – Low Frequency Acoustic Design Criteria (Moorhouse)

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}*

Notes:
[1] *The maximum criteria have been taken from the World Health Organisation (WHO) Guidelines for Community Noise.*
[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".*
[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".*
[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.*
[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 9 – Internal Acoustic Design Criteria

As stated in Section 4, to protect future occupants from fluctuations in commercial noise, the highest $L_{eq,1h}$ measurements are used for the noise break-in calculations. This is thought to be in line with Note 4 shown in the table above.

In addition, a +6dB rating penalty is applied to the highest $L_{Aeq,1h}$ measured at MP2 during the daytime to account for 'clearly perceptible' impulsivity.

5.2 Determined External Noise Levels

The external free-field noise levels incident on the façades of the proposed development building are presented in the figure and table below.

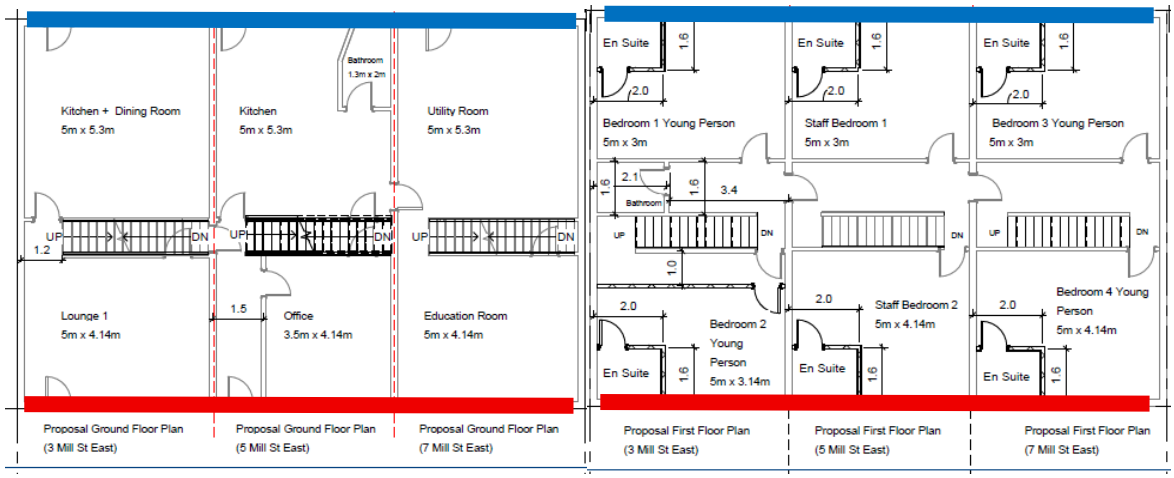


Figure 5 – Determined External Free-field Noise Levels

Elevation	Daytime Noise Levels (dB) (07:00 – 23:00)	Night-time Noise Levels (dB) (23:00 – 07:00)	
	Ambient ($L_{Aeq,1hr}$)	Ambient ($L_{Aeq,1hr}$)	Maximum (L_{AFmax})
Front	67	61	78
Rear	65 [1]	46	59

Notes:
[1] *A +6dB rating penalty has been applied to account for 'clearly perceptible' impulsivity.*

Table 10 – Determined External Free-field Noise Levels

5.3 Glazing Specification

Glazing and background ventilation specifications that achieve the relevant internal noise criteria are shown in the table below. Detailed noise ingress calculations can be found in Appendix E.

Description	Octave Frequency Band (Hz, dB)							Overall (dB)
	63	125	250	500	1k	2k	4k	
Front Façade – Living Rooms								
6mm Glass / 6-16mm Air Cavity / 4mm Glass	20	21	20	26	38	37	39	32 R_w (-4 C_{tr})
Front Façade - Bedrooms								
6mm Optiphon Glass / 16mm Argon / 6.8mm Optiphon Glass	21	21	28	37	48	48	54	40 R_w (-6 C_{tr})
Rear Façade								
6mm Glass / 6-16mm Air Cavity / 4mm Glass	20	21	20	26	38	37	39	32 R_w (-4 C_{tr})

Table 11 – Glazing Specification

Note: *Any other window 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.*

5.4 Whole Dwelling (Background) Ventilation Specification

As detailed in Section 4, an alternative mechanical ventilation system will be required for all habitable rooms along both the front and rear façades.

It recommended that an MHVR or PIV whole house ventilation system is installed. An example of this would be the Envirovent 'Atmos Wall' system, however, any other system capable of meeting the requirements the requirements of ADF for whole dwelling ventilation can be installed.

5.5 Structural Building Envelope Elements

In order to not downgrade the performance of the façade, the remaining elements of the external envelope, e.g., the roof and external wall should be designed to achieve 10dB above the glazing sound insulation performances presented above.

In relation to the external walls, this would be readily achievable with a standard double brick wall comprised of a minimum of 200mm brickwork. With regard to the roof, a standard roof construction, together with the loft void being used as a storage space, is expected to provide sufficient sound reduction to achieve the required internal noise criteria.

6. Overheating Mitigation

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.

As stated in Section 4, to avoid adverse impacts that could occur if future occupants were to open windows to mitigate overheating, a secondary ventilation system will need to be installed for all habitable rooms.

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. Regardless of the ventilation strategy, it must be ensured that all designs are compliant with the requirements of Approved Document F.

Further advice can be provided by NOVA Acoustics if required.

7. Internal Mechanical Plant Design

7.1 Mechanical Ventilation Regenerated Noise Considerations

Please note that where a mechanical ventilation system is to be installed, it must be ensured that regenerated noise within the apartments is appropriately controlled.

Desirable internal ambient noise levels that should be met during periods where these systems are in use are defined in ADF and AVO. These figures are presented below.

Ventilation Condition	Desirable Internal Ambient Noise Levels for Mechanical Services (dB $L_{Aeq,T}$)		
	Bedrooms	Living / Dining Rooms	Bathroom / WC / Kitchen
ADF – Whole Dwelling (Background) Ventilation	≤ 26 or 30 [1]	≤ 30	--
ADF – Extract Ventilation	≤ 26 or 30 [1]	≤ 35	≤ 45
ADF – Purge Ventilation	-- [2]		
AVO – Overheating Provision	≤ 30 [3]	≤ 35	--

Notes:
[1] *AVO states that a figure of 26dB(A) may be more appropriate 'to prevent an adverse reaction from most occupants while falling asleep'.*
[2] *AVO states that 'no desirable noise levels are currently proposed based on the lack of evidence of acceptable noise levels when providing purge ventilation for the purpose of rapidly diluting indoor pollutants.*
[3] *Section 1.10.10 of CIBSE Guide A 2015 states that a range of +/- 5 dB may be acceptable depending on the situation.*

Table 12 – Internal Noise Level Design Criteria

Based on the above, the mechanical ventilation system should be designed to no greater than 30dB $L_{Aeq,T}$ (NR25) in bedrooms at night and 35dB $L_{Aeq,T}$ (NR30) in living rooms during the daytime. However, should there be any terminal units located in rooms, a 5dB relaxation may be acceptable as the occupant will have control over these units and the noise would be broadband and steady state (which is considered less acoustically characterful).

In line attenuators may be required to the room supply and extract branches of the system. This will require final confirmation. In addition, the heat recovery units should only be fixed to the soffit of the slab.

Based on the above and as a general design guide, the following maximum duct velocities for conventional low velocity systems should not be exceeded. The below information has been taken from Table 2.16 of CIBSE Guide B2 'Ventilation and ductwork: 2016'.

Noise Level (dBA)	Duct Velocity (m/s)		
	Main Duct	Branch Duct	Final Runout
30 (NR25)	3.0	2.5	<2.0
35 (NR30)	5.0	4.5	2.5
45 (NR40)	7.5	6.0	3.5

Table 13 – Indicative Maximum Duct Velocities

8. Noise Breakthrough Assessment and Sound Insulation Scheme

8.1 Noise Breakthrough Criteria

The proposed development structurally adjoins a commercial/light industrial premise via partition walls to the west. It is stated in BS8233 that the internal noise thresholds include 'overall noise' which is the sum of structure borne and airborne noise sources. As such, noise breaking through from the structurally adjoining businesses is considered to ensure the cumulative noise does not exceed the required criteria. Guidance on sound insulation between adjoining domestic and non-domestic properties is discussed in section 0.8 of the Building Regulations, Approved Document E (ADE):

"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.

8.2 Assumed Internal Ambient Noise Levels

At the time of preparing this assessment, the exact operational use of the adjoining commercial unit is not confirmed. However, based on the surrounding land uses in the area, which predominantly comprise of vehicle repair workshops, MOT centres and general car garage operations, it is considered reasonable to assume that the neighbouring premises could operate under a similar use.

On this basis, the octave band internal sound pressure levels for a typical MOT unit are shown in the table below. The noise profile has been taken from measurements of a vehicle MOT site carried out by NOVA Acoustics previously (report ref. NP-010165).

Description	1/1 Octave Frequency Band (Hz, L_{eq}, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Internal Garage During MOT Services	63	65	66	70	66	68	68	61	74

Table 14 – Predicted Internal Sound Ambient Noise Levels of MOT Garage

8.3 Sound Insulation Design Criteria

The minimum required sound reduction for the partition wall between the business and the proposed development is shown in the table below. This is based on not achieving an internal noise level which is 5dB below the internal noise threshold defined in BS8233:2014.

This approach is considered appropriate in this case given that only the ground floor section of the building adjoins the neighbouring commercial premises, with the adjoining internal spaces proposed to comprise a lounge and kitchen/dining area.

Description	1/1 Octave Frequency Band (Hz, dB)						
	63	125	250	500	1k	2k	4k
Total Internal Noise Level in MOT Garage (L_P)	63	65	66	70	66	68	68
Noise Threshold: NR25 Curve + Moorhouse (L_p)	47	41	35	28	25	21	19
Minimum Sound Reduction Required ($D_{n,T}$)	16	24	31	42	41	47	49

Table 15 – Minimum Required Airborne Sound Insulation

8.4 Sound Insulation Design Criteria

An example wall construction that can achieve the required sound insulation standard is outlined below. The airborne sound reduction provided by the proposed partition has been modelled in INSUL 10.0 software.

- Existing 200mm brick (min. density of 1600kg/m^3)
- MuteClip^{TM} and Furring Channel system affixed directly to the brickwork (in accordance with the manufacturers guidelines) with 25mm mineral wool insulation within the cavity (min. density of 10kg/m^3)
- 2 No. 15mm SoundBloc plasterboards (with overlapping joints and sealed with flexible mastic at the perimeter)

It should be noted that this is an indicative specification that can achieve the required acoustic performance considering 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.

9. Fixed Plant Noise Limit Levels

At this stage, no external plant equipment has been formally proposed as part of the development. However, as discussed in Section 4, the mitigation strategy for the development is likely to require secondary mechanical ventilation in order to allow windows to remain closed whilst achieving the required internal acoustic conditions. The installation of such systems may require the provision of fixed external plant equipment.

Consequently, plant noise limit levels have been defined to ensure that plant noise emissions do not result in adverse noise impacts at the nearest noise-sensitive receptors (NSRs).

The limit levels are inclusive of any rating penalties that should be applied to account for audible characteristics of the noise which could be deemed to cause increased annoyance, such as intermittency, impulsivity, or tonality. The limit levels have been calculated for the daytime and night-time periods, depending on when the plant will be operational.

The calculated plant noise limit levels are shown in the table below.

Description	Daytime Period (dBA)		Night-time Period (dBA)	
	MP1	MP2	MP1	MP2
Background Sound Level ($L_{90,15min}$)	42	42	37	38
Cumulative Plant Noise Limit Level at NSR ($L_{r,Tr}$)	37	37	32	33
BS4142 Assessment Outcome	'Low Impact'			
NPSE & NPPF Assessment Outcome	'No Observed Adverse Effect Level' ('NOAEL')			

Table 16 – BS4142 External Plant Noise Limit Levels

As can be seen, provided the plant limit levels are adhered to, all noise emissions from the external plant units would not exceed the existing background sound levels. When assessed in accordance with BS4142 this indicates 'low impact', and when assessed with the NPPF and NPSE this is classed as 'No Observed Adverse Effect Level' ('NOAEL'). When/if the plant units are specified, the noise emissions should be calculated by an appropriately qualified person to ensure that the limit levels are achieved.

10. 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 can be achieved.

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

1. The good acoustic design principles and noise management measures outlined in **section 4** should be implemented as part of the development.
2. The proposed glazing and background ventilation systems, or suitable alternatives, should be installed as shown in **section 5**.
3. The overheating mitigation strategy provided in **section 6** should be implemented.
4. General design advice and criteria are provided for any mechanical ventilation systems in **section 7.**
5. The separating wall between the structurally adjoining commercial property and the proposed development should be designed to achieve the required sound insulation specified in **section 8**. Further design assistance can be provided by NOVA Acoustics Ltd if required.
6. If external plant systems are specified for the development, the noise limit levels defined in **section 9** should not be exceeded. Further calculations and assessment may be required to ensure the plant noise limit levels can be achieved. Please contact NOVA Acoustics for assistance, if required.

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 $p0$ is the reference sound pressure (20 µPa)
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 $p0$ is the reference sound pressure (20 µPa)
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), updated 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.

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 17 – 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 – 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 13dB. 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.

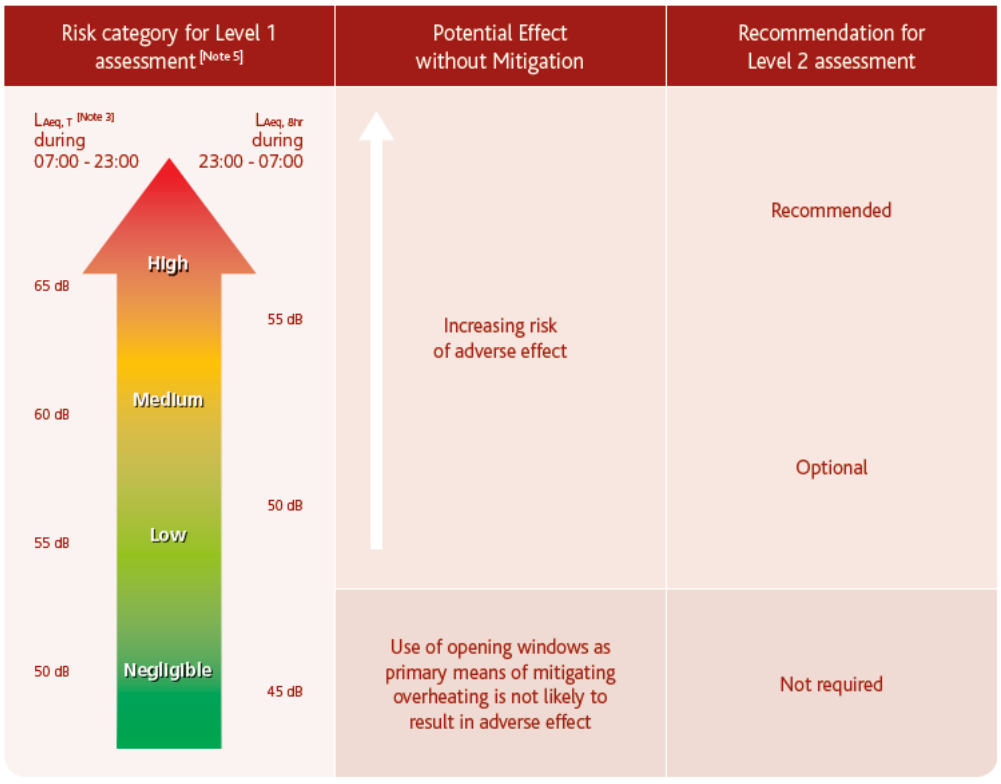


Table 3-2 of AVO Guide (2020)

Figure 6 – 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.

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 18 – 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.

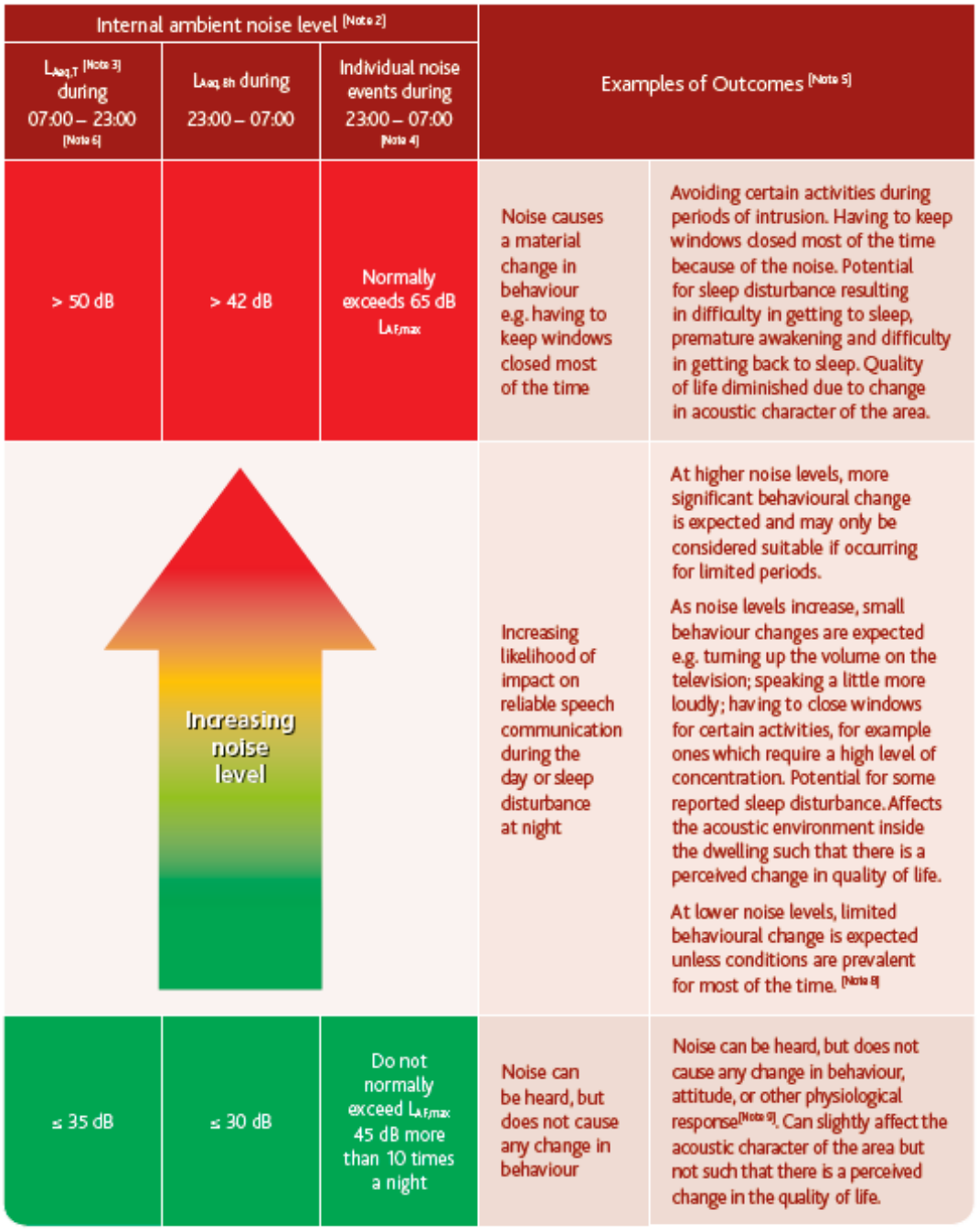


Table 3-3 of AVO Guide (2020)

Figure 7 – AVO Guide Level 2 Internal Ambient Noise Levels

B.5 – BS4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound'

Overview

BS4142 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ 'specific sound level', immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{Ar,Tr}$ 'rating sound level'. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

Rating Penalty

Section 9 of BS4142 describes how the rating sound level should be derived from the specific sound level, by deriving a rating penalty.

BS4142 states:

"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level. This can be approached in three ways:

a) subjective method;
b) objective method for tonality;
c) reference method."

Due to the nature of the development the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142, which states:

"Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed. Correct the specific sound level if a tone, impulse or other characteristics occurs, or is expected to be present, for new or modified sound sources."

BS4142 defines four characteristics that should be considered when deriving a rating penalty, namely; tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

a) Tonality

A rating penalty of +2dB is applicable for a tone which is "just perceptible", +4dB where a tone is "clearly perceptible", and +6dB where a tone is "highly perceptible".

b) Impulsivity

A rating penalty of +3dB is applicable for impulsivity which is "just perceptible", +6dB where it is "clearly perceptible", and +9dB where it is "highly perceptible".

c) Other Sound Characteristics

BS4142 states that where *"the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distance against the residual acoustic environment, a penalty of +3dB can be applied."*

d) Intermittency

BS4142 states that when the *"specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time … if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3dB can be applied."*

Background Sound Level

The background sound level is the underlying level of sound over a period, T, and is indicative of the relative quietness at a given location. It does not reflect the occurrence of transient and/or higher sound level events and is generally governed by continuous or semi-continuous sounds.

To ensure the background sound level values used within the assessment are reliable and suitably represent both the particular circumstance and periods of interest, efforts have been made to quantify a 'typical' background sound level for a given period. The purpose has not been to simply select the lowest measured value. Diurnal patterns have also been considered as they can have a major influence on background sound levels, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes.

Since the intention is to determine a background sound level in the absence of the specific sound that is under consideration, it is necessary to understand that the background sound level can in some circumstances legitimately include industrial and/or commercial sounds that are present as separate to the specific sound.

Assessment of Impact

BS4142 states: *"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs"*. An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

- *"Typically, the greater this difference, the greater the magnitude of the impact."*
- *"A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."*
- *"A difference of around +5dB 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."*

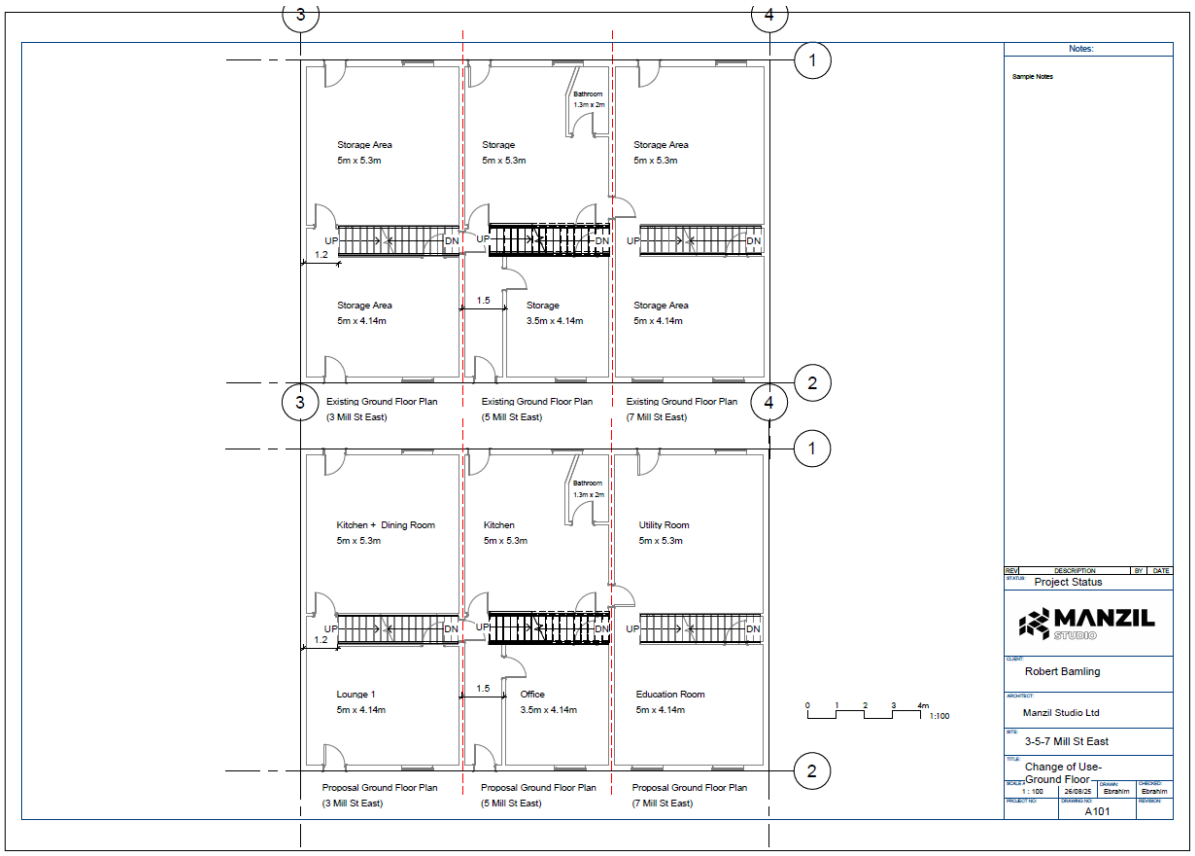
Interpreting the guidance given in BS4142, with consideration of the guidance given in the NPSE and NPPG Noise, an estimation of the impact of the rating sound is summarised in the following text:

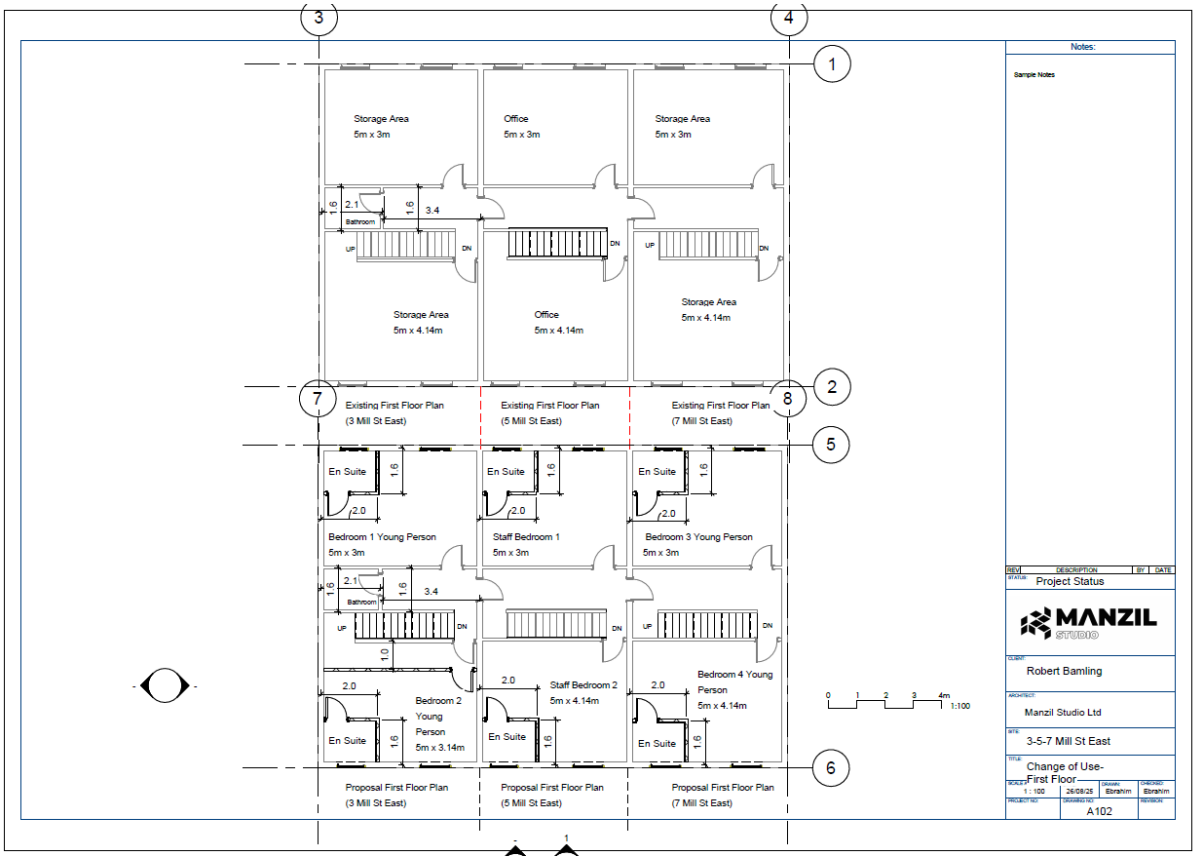
- A rating sound level that is +10dB above the background sound level is likely to be an indication of a 'Significant Observed Adverse Effect Level';

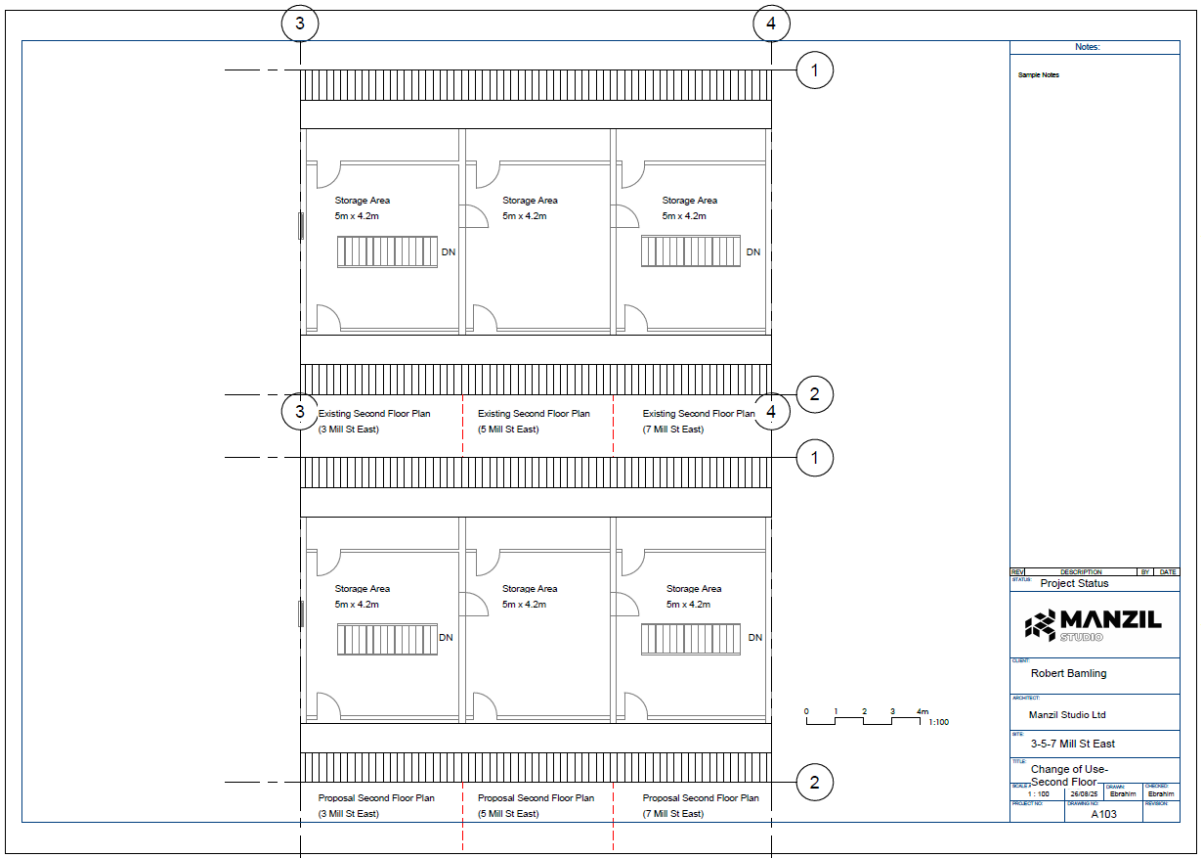
- A rating sound level that is +5dB above the background sound level is likely to be an indication of a 'Lowest Observed Adverse Effect Level';
- The lower the rating sound level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating sound level does not exceed the background sound level, this is an indication of the specific sound source having a low impact and would therefore classify as 'No Observed Adverse Effect Level';
- At levels significantly below the measured background sound level (i.e. greater than 10dB), this is an indication of a 'No Adverse Effect Level'.

During the daytime, the assessment is carried out over a reference time period of 1-hour. The periods associated with day or night, for the purposes of the Standard, are 07.00 to 23.00 and 23.00 to 07.00, respectively.

Appendix C – Site & Location Plans




Storage Area
5m x 3m
Office
5m x 3m
Storage Area
5m x 3m
Bathroom
Storage Area
5m x 4.14m
Office
5m x 4.14m
Storage Area
5m x 4.14m
Existing First Floor Plan
(3 Mill St East)
Existing First Floor Plan
(5 Mill St East)
Existing First Floor Plan
(7 Mill St East)
En Suite
Bedroom 1 Young Person
5m x 3m
Staff Bedroom 1
5m x 3m
Bedroom 3 Young Person
5m x 3m
Bedroom 2
Young
Person
5m x 3.14m
Staff Bedroom 2
5m x 4.14m
Bedroom 4 Young
Person
5m x 4.14m
Proposal First Floor Plan
(3 Mill St East)
Proposal First Floor Plan
(5 Mill St East)
Proposal First Floor Plan
(7 Mill St East)
Notes:
Sample Notes
Project Status
MANZIL
STUDIO
Robert Bamling
Manzil Studio Ltd
3-5-7 Mill St East
Change of Use-
First Floor
1 : 100
26/08/25
Ebrahim
A102


Storage Area
5m x 4.2m
Storage Area
5m x 4.2m
Storage Area
5m x 4.2m
Existing Second Floor Plan
(3 Mill St East)
Existing Second Floor Plan
(5 Mill St East)
Existing Second Floor Plan
(7 Mill St East)
Proposal Second Floor Plan
(3 Mill St East)
Proposal Second Floor Plan
(5 Mill St East)
Proposal Second Floor Plan
(7 Mill St East)
Notes:
Sample Notes
Project Status
MANZIL
STUDIO
Robert Bamling
Manzil Studio Ltd
3-5-7 Mill St East
Change of Use-
Second Floor
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26/08/25
Ebrahim
A103

Appendix D – Environmental Survey

D.1 – Time History Noise Data

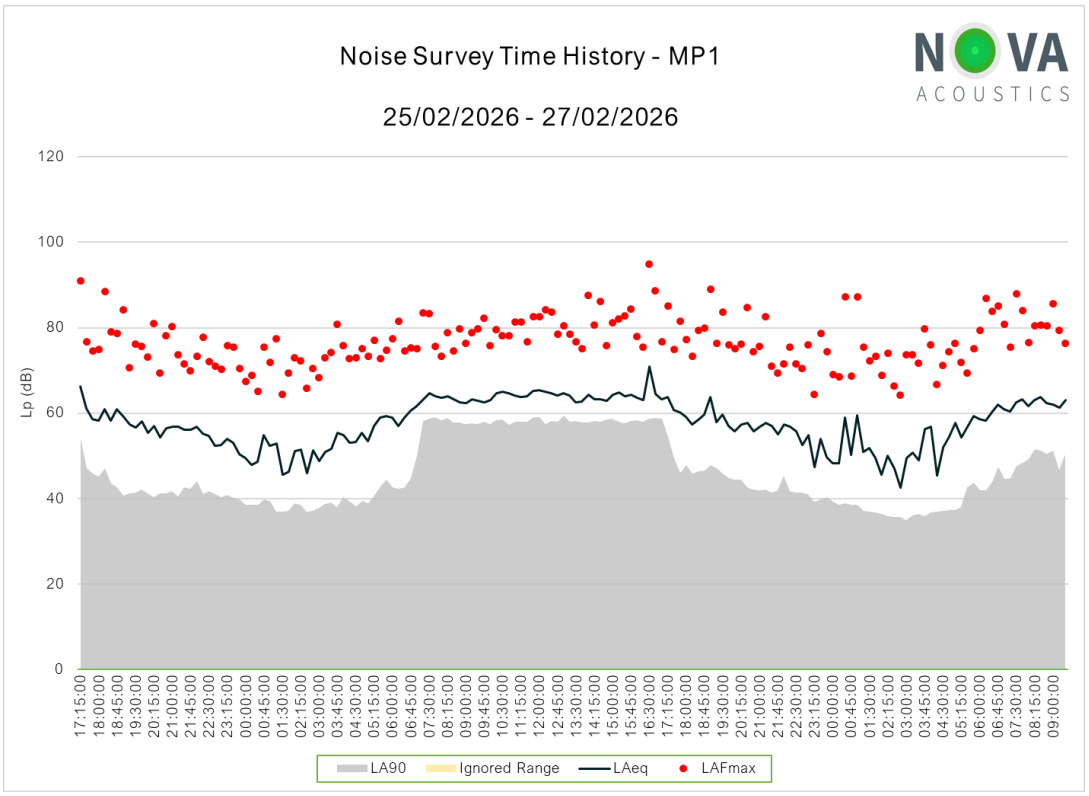

Figure 8 – MP1 Noise Survey Time History

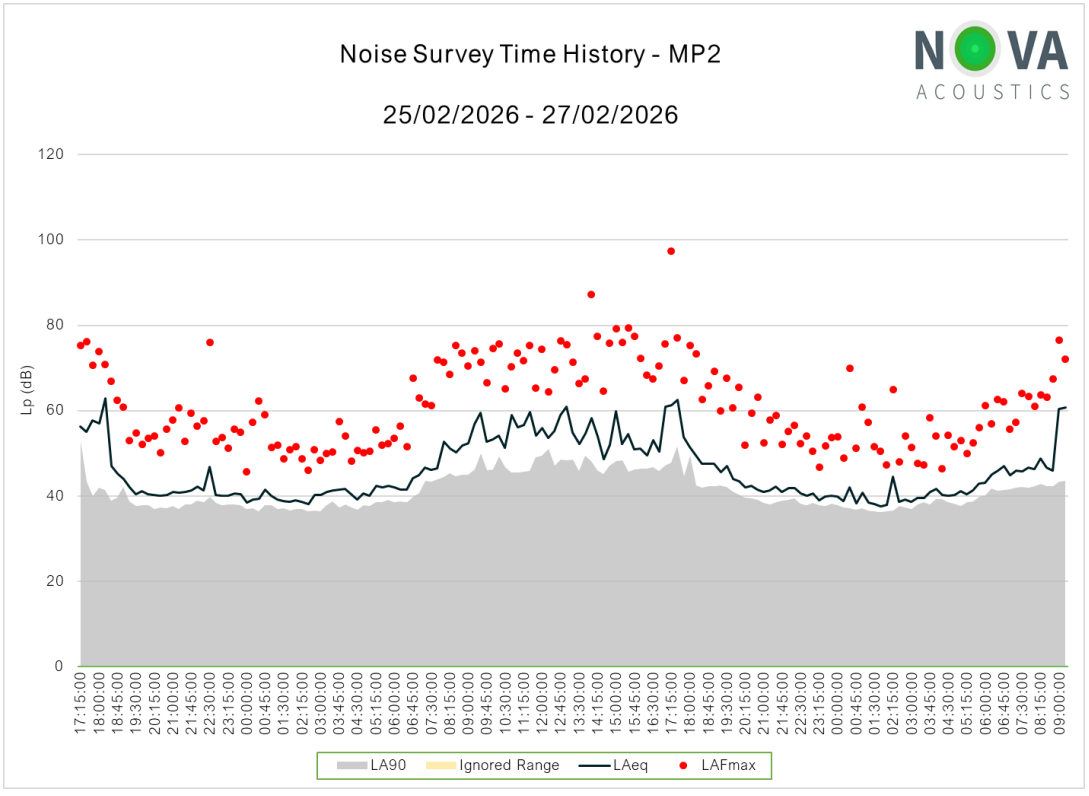

Figure 9 – MP2 Noise Survey Time History

D.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
Svantek SV971A Class 1 Sound Level Meter	141425	≤0.2
Svantek SV971A Class 1 Sound Level Meter	162046	≤0.2
Svantek SV33B Class 1 Calibrator	125695	--

Table 19 – Surveying Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with a negligible deviation. 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 – Ecowitt, Liversedge Weather Station (Approx. 5.7km NW of Site)				
Time Period	Air Temp (°C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s) [1]
25/05/26: 00:00 – 23:59	4.8 – 14.2	0.0	ESE	0.0 – 6.1
26/05/26: 00:00 – 23:59	9.8 – 11.4	0.0 – 1.2	ENE	0.9 – 7.9
27/05/26: 00:00 – 23:59	6.3 – 10.9	0.0 – 0.6	ESE	0.0 – 5.5

Notes:
[1] *Detailed assessment has shown that high wind speeds have not affected the measured noise levels*

Table 20 – Survey 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 BS8233:2014 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 1.6m^2 and room volumes of 33m^3 are used in the calculations for bedrooms as a worst-case scenario. For living rooms, the calculations are based on a window area of 1.6m^2 and room volume of 52m^3 as a worst-case scenario.
- The acoustic performance of the façade elements are taken from the relevant manufacturers technical information or the sound reduction has been predicted using INSUL 10.0.
- For background trickle ventilation a total Equivalent Area of 5000mm^2 per habitable room has been used in the calculations, which equates to 2no. trickle vents (2500mm^2 each).

Living Room (Front Façade)

Description	Height (m)	Width (m)	Length (m)	Volume (m3)	Area (m2)
Room	2.5	5	4.14	51.8	87.1
Single Aspect Façade	--	--	--	--	12.5
Glazing	1.6	--	1.0	--	1.6
Wall Element	--	--	--	--	10.9
Area of Roof / Ceiling	--	--	--	--	0.0
No. of Ventilators	2				
Room in Roof?	No				

Bedroom (Front Façade)

Description	Height (m)	Width (m)	Length (m)	Volume (m3)	Area (m2)
Room	2.5	3.0	4.4	33.1	63.5
Single Aspect Façade	--	--	--	--	7.5
Glazing	1.6	--	1.0	--	1.6
Wall Element	--	--	--	--	5.9
Area of Roof / Ceiling	--	--	--	--	0.0
No. of Ventilators	2				
Room in Roof?	No				

Living Room (Rear Façade)

Description	Height (m)	Width (m)	Length (m)	Volume (m3)	Area (m2)
Room	2.5	5	5.3	66.3	104.5
Single Aspect Façade	--	--	--	--	12.5
Glazing	1.6	--	1.0	--	1.6
Wall Element	--	--	--	--	10.9
Area of Roof / Ceiling	--	--	--	--	0.0
No. of Ventilators	2				
Room in Roof?	No				

Bedroom (Rear Façade)

Description	Height (m)	Width (m)	Length (m)	Volume (m3)	Area (m2)
Room	2.5	3.0	3.0	22.5	48.0
Single Aspect Façade	--	--	--	--	7.5
Glazing	1.6	--	1.0	--	1.6
Wall Element	--	--	--	--	5.9
Area of Roof / Ceiling	--	--	--	--	0.0
No. of Ventilators	2				
Room in Roof?	No				

Living Room (Front Façade) Day Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k
Measured Leq,T	67	69	63	65	64	63	59	52
Glazing Noise Ingress	30	40	33	36	29	16	13	4
Ventilation Noise Ingress								
Wall Noise Ingress	17	27	23	22	13	7	-2	-9
Roof Noise Ingress								
Room Absorption Correction		0	0	-1	-1	-1	-2	-3
Total Noise Ingress	**33**	**43**	**36**	**38**	**31**	**18**	**15**	**5**
NR30 & Moorhouse	35	47	41	39	33	30	26	24
Exceedance of Criteria	-2	-4	-5	-1	-2	-12	-11	-19

Bedroom (Front Façade) Day Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k
Measured Leq,T	67	69	63	65	64	63	59	52
Glazing Noise Ingress	25	41	35	30	20	8	4	-9
Ventilation Noise Ingress								
Wall Noise Ingress	16	27	23	22	13	7	-2	-9
Roof Noise Ingress								
Room Absorption Correction		0	-1	-1	-1	-1	-2	-3
Total Noise Ingress	**28**	**44**	**38**	**33**	**23**	**12**	**6**	**-6**
NR30 & Moorhouse	35	47	41	39	33	30	26	24
Exceedance of Criteria	-7	-3	-3	-6	-10	-18	-20	-30

Bedroom (Front Façade) Night Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k
Measured Leq,T	61	64	56	56	56	57	54	48
Glazing Noise Ingress	18	36	28	21	12	2	-1	-13
Ventilation Noise Ingress								
Wall Noise Ingress	9	22	16	13	5	1	-7	-13
Roof Noise Ingress								
Room Absorption Correction		0	-1	-1	-1	-1	-2	-3
Total Noise Ingress	**20**	**39**	**31**	**24**	**15**	**6**	**1**	**-10**
NR25	30	55	43	35	28	25	21	19
Exceedance of Criteria	-10	-16	-12	-11	-13	-19	-20	-29

Bedroom (Front Façade) Night Time Max

Item / Description	dB(A)	63	125	250	500	1k	2k	4k
Measured Lmax	79	78	74	79	75	73	72	64
Glazing Noise Ingress	38	50	46	44	31	18	17	3
Ventilation Noise Ingress								
Wall Noise Ingress	29	36	34	36	24	17	11	3
Roof Noise Ingress								
Room Absorption Correction		0	-1	-1	-1	-1	-2	-3
Total Noise Ingress	**40**	**53**	**49**	**47**	**34**	**22**	**19**	**6**
NR40	45	67	56	49	43	40	37	34
Exceedance of Criteria	-5	-14	-7	-2	-9	-18	-18	-28

Living Room (Rear Façade) Day Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k
Corrected Leq,T Spectrum	65	62	59	62	62	60	57	57
Glazing Noise Ingress	28	33	29	33	27	13	11	9
Ventilation Noise Ingress								
Wall Noise Ingress	14	20	19	19	11	4	-4	-4
Roof Noise Ingress								
Room Absorption Correction		-1	-2	-2	-2	-2	-3	-4
Total Noise Ingress	**29**	**35**	**31**	**34**	**28**	**14**	**11**	**8**
NR30 & Moorhouse	35	47	41	39	33	30	26	24
Exceedance of Criteria	-6	-12	-10	-5	-5	-16	-15	-16

Bedroom (Rear Façade) Day Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k
Corrected Leq,T Spectrum	65	62	59	62	62	60	57	57
Glazing Noise Ingress	30	35	31	35	29	15	13	11
Ventilation Noise Ingress								
Wall Noise Ingress	14	20	19	19	11	4	-4	-4
Roof Noise Ingress								
Room Absorption Correction		1	1	1	0	0	0	-1
Total Noise Ingress	**33**	**40**	**36**	**39**	**33**	**19**	**16**	**13**
NR30 & Moorhouse	35	47	41	39	33	30	26	24
Exceedance of Criteria	-2	-7	-5	0	0	-11	-10	-11

Bedroom (Rear Façade) Night Time Leq

Item / Description	dB(A)	63	125	250	500	1k	2k	4k
Measured Leq,T	46	53	48	45	42	41	39	32
Glazing Noise Ingress	13	26	20	18	9	-4	-5	-14
Ventilation Noise Ingress								
Wall Noise Ingress	-3	11	8	2	-9	-15	-22	-29
Roof Noise Ingress								
Room Absorption Correction		1	1	1	0	0	0	-1
Total Noise Ingress	**16**	**31**	**25**	**22**	**13**	**0**	**-2**	**-12**
NR25	30	55	43	35	28	25	21	19
Exceedance of Criteria	-14	-24	-18	-13	-15	-25	-23	-31

Bedroom (Rear Façade) Night Time Max

Item / Description	dB(A)	63	125	250	500	1k	2k	4k
Measured Lmax	58	63	61	54	55	55	48	39
Glazing Noise Ingress	24	36	33	27	22	10	4	-7
Ventilation Noise Ingress								
Wall Noise Ingress	9	21	21	11	4	-1	-13	-22
Roof Noise Ingress								
Room Absorption Correction		1	1	1	0	0	0	-1
Total Noise Ingress	**27**	**41**	**38**	**31**	**26**	**14**	**7**	**-5**
NR40	45	67	56	49	43	40	37	34
Exceedance of Criteria	-18	-26	-18	-18	-17	-26	-30	-39


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