

NOISE IMPACT ASSESSMENT

BS 8233:2014

Residential Development – Impact from
Commercial Noise



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REPORT DETAILS

Report Title	Residential Development – Impact from Commercial Noise
Site Address	46 Castle Street, Hinckley, LE10 1DB
Project No.	NALPRO051123.01
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QUALITY ASSURANCE

Issue No.	Status	Issue Date	Comments	Author	Approved
1	Final	06/02/24			
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Assessment Summary

Noise Assessments Ltd was commissioned with the first-floor development by converting upstairs into 3 one-bedroom flats at 46 Castle Street, Hinckley, LE10 1DB (herein referred to as the site), to assess the impact of a proposed change of use from commercial (Use Class E) into residential (C3) - apartments.

Planning permission is being sort from Hinckley and Bosworth Borough Council (HBBC) and following consultations; a noise assessment has been requested to demonstrate current noise from the surrounding commercial sites and the commercial shop on the ground floor does not impact future residents in the new dwellings on the first floor.

Commercial Noise from the Front of the Site

Castle Street is a busy pedestrian high street for shops and cafes.

There are no external plant or extraction systems identified which could cause an issue.

The results demonstrate that, with windows open, internal LAeq and LMax noise levels during the day and night-time within habitable rooms on the first floor at the front of the development are expected to exceed the recommended target levels from time to time, and openable windows cannot therefore be relied upon for background ventilation for an extended period. However, windows can be relied upon for purge ventilation, as required.

Double glazed windows should be installed at the front elevation with 10mm outer pane, 12mm cavity, and 6mm inner pane. This achieves above the minimum 32dB Rw+Ctr rating. Assuming the use of 32 dB Dne,w+Ctr trickle ventilation (Trimvent Select Xtra S13) for background ventilation, daytime environmental noise would be reduced from 52 dB LAeq,16hr to interior levels of 20 dB LAeq,16hr within habitable rooms. The assumed standard of construction would place the internal levels in habitable rooms below 35 dB, therefore within the desirable category.

Assuming the use of 32 dB Dne,w+Ctr trickle ventilation (Trimvent Select Xtra S13), night-time environmental noise in bedrooms would be reduced from 45 dB LAeq,8hr to interior levels 13 dB LAeq,8hr with maximum individual noise events reduced from 72.0 dB LAFmax to 36 dB LAFmax, therefore within the desirable category.

Commercial Noise at the Rear of the Site

The potential for noise impact arising from the nearby commercial sites, however during the monitoring periods, no specific noise (humming, banging etc) was identified. The main noise is from the car park, with engine and door slamming.

Based on the general car park noise in the area, the results demonstrate that, with windows open, internal LAeq and LMax noise levels during the day and night-time within habitable rooms on the ground to second floors at the rear of the development are expected to exceed the recommended target levels from time to time, and openable windows cannot therefore be relied upon for

background ventilation for an extended period. However, windows can be relied upon for purge ventilation, as required.

Double glazed windows should be installed to the rear elevation with 10mm outer pane, 12mm cavity, and 6mm inner pane. This achieves above the minimum 32dB Rw+Ctr rating. Assuming the use of 32 dB Dne,w+Ctr trickle ventilation (Trimvent Select Xtra S13) for background ventilation, daytime environmental noise would be reduced from 56 dB LAeq,16hr to interior levels of 24 dB LAeq,16hr within habitable rooms. The assumed standard of construction would place the internal levels in habitable rooms below 35 dB, therefore within the desirable category.

Assuming the use of 32 dB Dne,w+Ctr trickle ventilation (Trimvent Select Xtra S13), night-time environmental noise in bedrooms would be reduced from 43 dB LAeq,8hr to interior levels 11 dB LAeq,8hr with maximum individual noise events reduced from 70.0 dB LAFmax to 38 dB LAFmax, therefore within the desirable category.

No external amenity spaces are proposed for the development.

Internal Noise Break-in from Ground Floor Shop

A noise assessment is required to assess the likely noise impact from noise generated from the ground floor shop.

The primary noise source within the ground floor shop is people chatting. The noise level was recorded within the shop as 64 dBA.

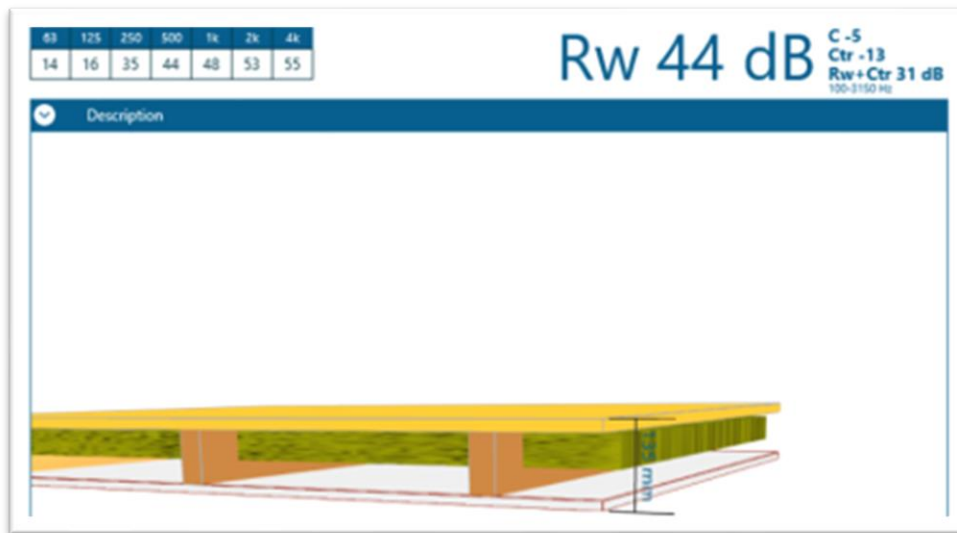
There are proposed bedrooms/lounge above the ground floor shop therefore the sound breaking structure between the floor is assessed.

First floor specifications have been modelled in InsulTM (Marshall Day Acoustics).

Building Insulation

The current floor is floorboards wooden joist and plasterboard.

An improved floor has been determined as shown below.



20mm Particleboard flooring on 300mm timber joists with 2 layers of 16mm Fire rated plasterboard hung on a Gyproc Duraline 15mm underneath, with fibreglass blanket in the joist cavity.

Floor

The initial model by improving the ground floor / first floor partition showed a performance of 44 Rw, this will be adequate in attenuating internal noise transfer to within the target criteria:

Activity	Location	07:00 – 23:00	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 $L_{Aeq,8hour}$

This arrangement is predicted to provide an airborne sound insulation performance in the region of 44 dB Rw, and within the BS8233 criteria including an error margin of +/- 3dB for RW values.

In Summary

A noise intrusion assessment has demonstrated that, via the adoption of the proposed glazing and ventilation strategy internal noise levels within proposed habitable rooms at the front and rear of the site are consistent with the guide values outlined in BS 8233 and by the WHO. Products with higher acoustic performance specifications may be utilised if desired.

The assessment includes a means of ventilation to provide occupants with the ability to maintain adequate background ventilation rates for heating and cooling without having to rely entirely on openable windows.

1. Proposal

- 1.1 Noise Assessments Ltd was commissioned with the first-floor development by converting upstairs first floor into 3 one-bedroom flats at 46 Castle Street, Hinckley, LE10 1DB (herein referred to as the site), to assess the impact of a proposed change of use from commercial (Use Class E) into residential (C3) - apartments.
- 1.2 Planning permission is being sort from Hinckley and Bosworth Borough Council (HBBC) and following consultations; a noise assessment has been requested to demonstrate current noise from the surrounding commercial sites and the commercial shop on the ground floor does not impact future residents in the new dwellings on the first floor.

Existing Context

- 1.3 The site is in a commercial area, with residential apartments located nearby, with a car park at the rear of the site and busy pedestrian high street for shops and cafes.

2. Noise Policy and Guidance

Noise Policy Statement for England (NPSE)

- 2.1 The NPSE sets out the Government's policy on noise and includes the long term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.
- 2.2 This long term vision is supported by the following aims:
- 2.3 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; and
 - where possible, contribute to the improvement of health and quality of life.
- 2.4 There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:
 - 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.
- 2.5 Extending these concepts further, NPSE leads to the concept of a significant observed adverse effect level:

- SOAEL (Significant Observed Adverse Effect Level) – this is the level above which significant adverse effects on health and quality of life occur.

2.6 NPSE acknowledges that it is not possible to have a single objective noise-based measure that defines NOEL, LOAEL and SOAEL that is applicable to all sources of noise in all situations. It is therefore suggested that more specific advice from other applicable noise standards and guidance could be employed to determine suitable noise level criteria within the overall principles of the NPSE.

National Planning Policy Framework (NPPF)

2.7 The revised NPPF was updated on 20 July 2021 and sets out the government’s planning policies for England and how these are expected to be applied. This document replaces the first NPPF published in March 2012 and includes minor clarifications to the revised version published in July 2018 and June 2019.

2.8 Where issues of noise impact are concerned the NPPF provides brief guidance in Chapter 15 ‘*Conserving and enhancing the natural environment*’ as follows:

Paragraph 170:

Planning policies and decisions should contribute to and enhance the natural and local environment by 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.

Paragraph 180:

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:

- mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- 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
- limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

Paragraph 182:

Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). 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.

Planning Practice Guidance (PPG)

- 2.9 PPG is written in support of the NPPF and provides an increased level of specific planning guidance.
- 2.10 It suggests that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It is also suggested that noise should not be considered in isolation and separately from issues such as the economic, social and other environmental dimensions of proposed development.
- 2.11 Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:
- whether or not a significant adverse effect is occurring or likely to occur;
 - whether or not an adverse effect is occurring or likely to occur; and
 - whether or not a good standard of amenity can be achieved.

Technical GuidanceProPG: Planning and Noise

- 2.12 Professional Practice Guidance on Planning and Noise for new residential development (ProPG) was published May 2017 by the Chartered Institute of Environmental Health (CIEH), the Association of Noise Consultants (ANC) and the Institute of Acoustics (IOA). The guidance has been produced to provide practitioners with guidance on the management of noise within the planning system in England.
- 2.13 The guidance focuses on proposed new residential development and existing transport noise sources and reflects the Government's overarching Noise Policy Statement for England (NPSE, the National Planning Policy Framework (NPPF) and Planning Practice Guidance (including PPGN), as well as other authoritative sources of guidance.

2.14 The guidance provides advice for Local Planning Authorities (LPAs) and developers, and their respective professional advisers which complements Government planning and noise policy and guidance and, in particular, aims to:

- Advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
- Encourage the process of good acoustic design in and around new residential developments;
- Outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- Improve understanding of how to determine the extent of potential noise impact and effect; and
- Assist the delivery of sustainable development.

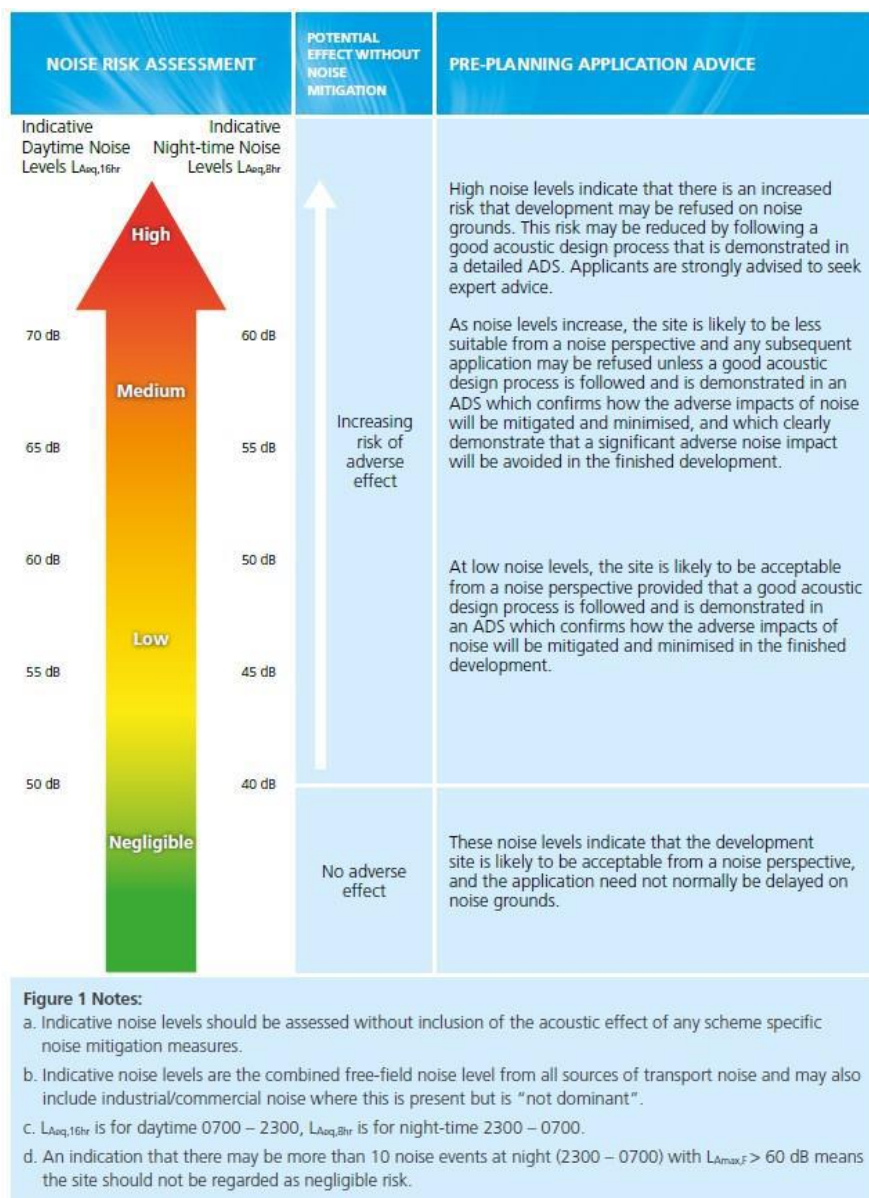
2.15 ProPG provides guidance for the producing an initial site noise risk assessment, pre-mitigation, based on the prevailing daytime and night-time noise levels across the site, from which the site (or areas thereof) can be zoned. The Figure below shows the noise risk assessment criteria taken from Figure 1 of the ProPG.

2.16 ProPG recommends internal and external sound levels in line with those described in BS 8233 and WHO Guidelines.

BS 8233:2014 Guidance on sound insulation and noise reduction for buildings

2.17 This British Standard was published in February 2014 and supersedes BS 8233:1999, which is withdrawn.

2.18 This Standard provides guidance for the control of noise in and around buildings and is applicable to the design of new buildings, or refurbished buildings undergoing a change of use, but does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building.



2.19 For dwellings, the main considerations are:

- for bedrooms, the acoustic effect on sleep; and
- for other rooms, the acoustic effect on resting, listening and communicating.

2.20 It is desirable that the internal ambient noise level does not exceed the following guideline values.

Activity	Location	07:00 – 23:00	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 $L_{Aeq,8hour}$
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- 2.21 For traditional external areas that are used for amenity space, such as gardens, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments.
- 2.22 However, it is also recognized that these external noise guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.
- 2.23 When determining the sound insulation of a building envelope, the requirements should be determined on the basis of the assessment of:
- the level and characteristics of the noise outside the building
 - the design noise levels in the rooms and other spaces of the building
- 2.24 Initial estimates may be obtained using calculations based on single-figure data, however, for detailed noise intrusion calculations to be undertaken, knowledge or assumptions of the following are required.
- Frequency characteristics of the noise source(s).
 - Frequency characteristics of the sound reducing elements.
 - Surface area of the common construction separating the two areas.
 - Reverberation time of the receiving space.

World Health Organisation (WHO)

- 2.25 The World Health Organisation 'Guidelines for Community Noise' 1999 aims to provide environmental health authorities and professionals with guidance on the adverse health effects of community noise on people.
- 2.26 This document presents a summary of research and opinions on the impacts of noise and recommends guideline values for avoidance of particular effects e.g. annoyance and sleep disturbance. It is the primary reference point for other guidance value based documents, such as BS 8233.
- 2.27 The following guideline values have been derived according to specific environments. The values relevant to residential development are shown in the table below.

Specific Environment	Critical Health Effect(s)	L _{Aeq} (dB)	Time base (hrs)	L _{Amax,f} (dB)
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	
Inside bedrooms	Sleep disturbance, night-time	30	8	45

2.28 The above values are consistent with those recommended within BS 8233, however unlike BS 8233:2014, the WHO guidelines present a specific guide value for L_{Amax} levels affecting bedrooms. The research suggests that sleep disturbance effects have been observed at individual L_{Amax} exposures of 45 dB or less. Consequently, it is important to limit the number of individual noise events with a L_{Amax} exceeding 45 dB.

AVO: Acoustics, Ventilation and Overheating Residential Design Guide

2.29 The AVO guide recommends an approach to acoustic assessments for residential development that takes into consideration the interdependence of provisions for acoustics, ventilation and overheating. The application of the AVO Guide is intended to demonstrate good acoustic design in accordance with ProPG. A two-stage assessment approach is advised as:

- Stage 1: Site Risk Assessment
- Stage 2: Detailed Assessment of Adverse Effect

2.30 The guide provides a means of assessment to satisfy the need to consider acoustics, ventilation and overheating at the planning stage. It also assists in educating clients, environmental health officers, planning officers and other stakeholders of the interdependence of design for acoustics, ventilation and overheating.

BS4142:2014– Method for Rating & Assessing Industrial and Commercial Sound

2.31 BS4142:2014 – Methods for rating and assessing industrial and commercial sound' is a recognised standard for assessing the noise impact of fixed plant machinery via relation of noise emissions to current background noise levels.

3. Subjective Impressions

3.1 The noise climate in and around the site is dominated by people chatting and car door slam and vehicle noise. The site forms part of a mainly commercial area.

4. Measurement Location

- 4.1 Noise monitoring equipment for measuring sound levels was set up to capture daytime and night-time noise on 5th to 6th January 2024. The location of the measurement position is shown in Figure 1.
- 4.2 The data collected during this period has been used to characterise the existing acoustic environment at the proposed development site.
- 4.3 Measurement and site location are shown in figure 1 below:

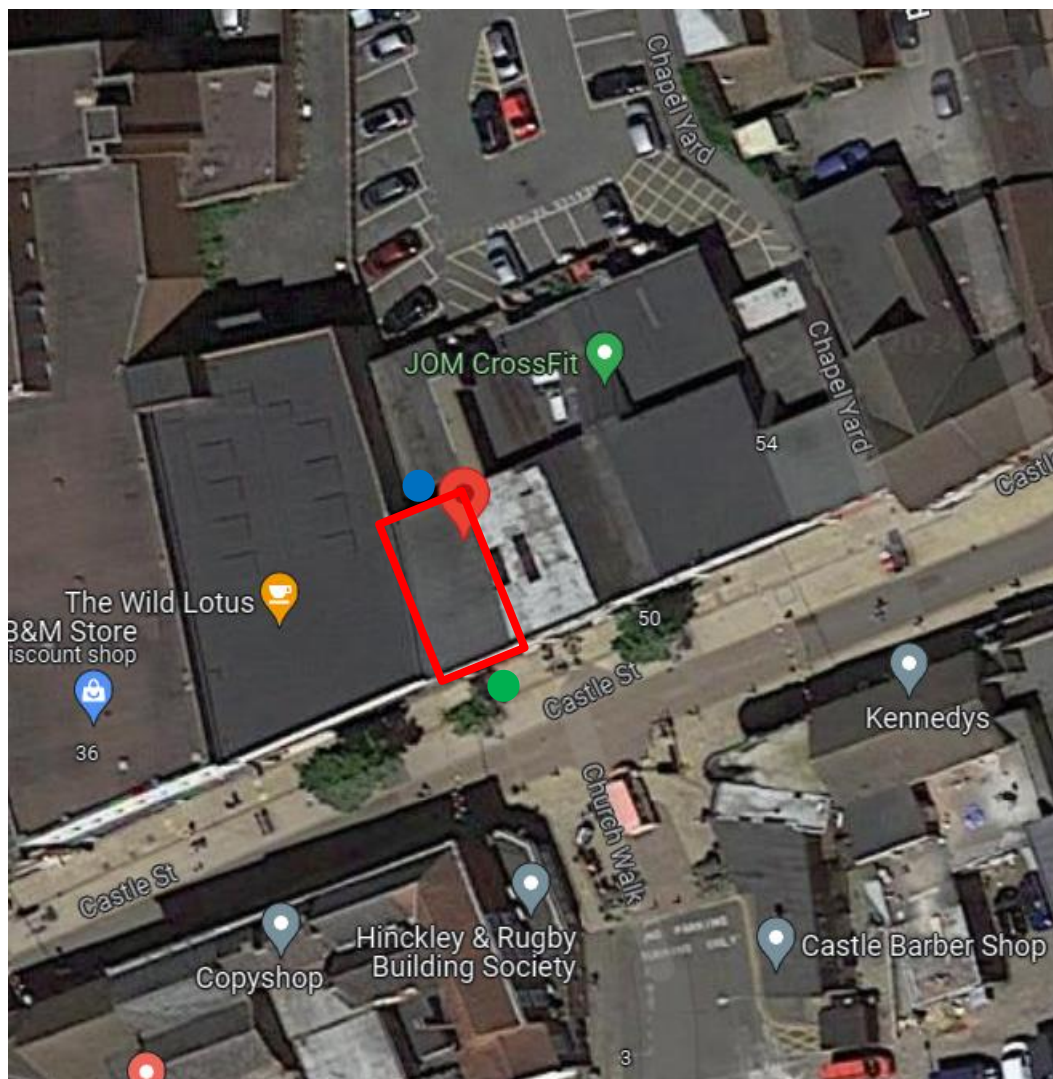


Figure 1: Site & Measurement Location

- Measurement location M1 ● Measurement location M2
- Site location

5. Measurement Procedure

- 5.1 Noise levels were measured from the 5th to 6th January 2024. Full measurement times and durations can be found in **Appendix A**.

6. Measurement Equipment

- 6.1 Measurements were undertaken using a calibrated, Pulsar N45 class 1 sound level meters. Full equipment details can be found in **Appendix B**.
- 6.2 Measurements at the monitoring locations were 'free field' (no vertical reflective surfaces within 3.5 metres of the microphone) and at a height of between 1.2 – 1.5 metres above ground level. During all measurements the microphone was protected with an outdoor windshield.
- 6.3 The calibration level of the meters was checked before and after the survey with a sound calibrator with no variation in the levels observed.
- 6.4 The sound level meter was set to measure various noise parameters including LAeq and LMax values using a 'fast' time weighting.
- 6.5 Full calibration details can be found in **Appendix C**.

7. Weather Conditions

- 7.1 Weather conditions were deemed acceptable for noise measurement. Full meteorological conditions are detailed in **Appendix D**.

BS4142:2014 Assessment from the Front of the Site

8. Noise Survey

- 8.1 A noise survey at monitoring location M1 was conducted on 5th to 6th January 2024.
- 8.2 There are no external plant or extraction systems identified which could cause an issue.
- 8.3 A noise survey was conducted at monitoring location M1 on the 5th to 6th January 2024 to understand the potential noise impact from commercial activity at the front of the site. For the purposes of the assessment the loudest 16hr day and 8hr night were selected and are tabulated below.

Measurement Summary				
Measurement	Date	Period	LAeq (dB)	LAfmax (dB)
M1	05/01/24	Day (16hr)	52	N/A
	06/01/24	Night (8hr)	45	72

- 8.4 The potential for noise impact arising from the nearby commercial sites, however during the monitoring periods, no specific noise (humming, banging etc) was identified.

9. Noise level Calculations

- 9.1 Noise intrusion levels with windows open have been determined assuming that the insulation provided by a window, partially open for ventilation, is 15 dB as suggested by BS 8233 and WHO.

Parameter	Measured External Free-Field Noise Level at 2nd Floor facade	2nd Floor Internal Noise Level with Windows Open	2nd Floor Internal Noise Level with Windows Closed and Vents Open	ProPG Guidance	BS 8233 Classification
Living Space					
Daytime L _{Aeq,16hr} (dB)	52	38	20	Low Risk of Adverse Effects	Desirable (≤35)
Bedrooms					
Daytime L _{Aeq,16hr} (dB)	52	38	20	Low Risk of Adverse Effects	Desirable (≤35)
Bedrooms					
Night-time L _{Aeq,8hr} (dB)	45	30	13	Low Risk of Adverse Effects	Desirable (≤30)
Night-time L _{Amax(f)} (dB)	72	57	36	Low Risk of Adverse Effects	Desirable (≤45)

Internal Noise Levels in Habitable Rooms

- 9.2 Based on the general commercial noise in the area, the results demonstrate that, with windows open, internal LAeq and LMax noise levels during the day and night-time within habitable rooms on the first floor at the front of the development are expected to exceed the recommended target levels from time to time, and openable windows cannot therefore be relied upon for background ventilation for an extended period. However, windows can be relied upon for purge ventilation, as required.
- 9.3 Double glazed windows should be installed at the front elevation with 10mm outer pane, 12mm cavity, and 6mm inner pane. This achieves above the minimum 32dB Rw+Ctr rating. Assuming the use of 32 dB Dne,w+Ctr trickle ventilation (Trimvent Select Xtra S13) for background ventilation, daytime environmental noise would be reduced from 52 dB LAeq,16hr to interior levels of 20 dB LAeq,16hr within habitable rooms. The assumed standard of construction would place the internal levels in habitable rooms below 35 dB, therefore within the desirable category.
- 9.4 Assuming the use of 32 dB Dne,w+Ctr trickle ventilation (Trimvent Select Xtra S13), night-time environmental noise in bedrooms would be reduced from 45 dB LAeq,8hr to interior levels 13 dB LAeq,8hr with maximum individual noise events reduced from 72.0 dB LAFmax to 36 dB LAFmax, therefore within the desirable category.
- 9.5 The potential for adverse impact arising from the nearby commercial sites (humming, banging etc), however during the monitoring periods, no specific noise was identified.

AVO – Stage 1 Overheating Risk Assessment

- 9.6 In January 2020 the Acoustics Ventilation and Overheating: Residential Design Guide (AVO) was published by the Association of Noise Consultants. Therefore, the risk of overheating within proposed dwellings can be considered in line with the AVO guide.
- 9.7 In accordance with AVO, the noise levels across the proposed development site as described in the table above have been compared to the Level 1 risk assessment shown in Table 3.2 of AVO, to establish the potential risk of an overheating condition.
- 9.8 The table above indicates that site will be subject to a 'Medium' risk of an overheating condition during the daytime during periods of high volumes of traffic. Therefore, mitigation is considered necessary and discussed below.

Assessment of Daytime Noise Levels in Living Rooms and Bedrooms

- 9.9 The results demonstrate that, with windows open, internal LAeq and LMax noise levels during the day and night-time within habitable rooms at the front of the development on the first floor are expected to exceed the recommended target levels and openable windows from time to time cannot therefore be relied upon for ventilation for an extended period.

- 9.10 The assessment suggests that an alternative means of ventilation is required to provide occupants with the ability to maintain adequate background ventilation rates without having to rely entirely on openable windows. Care should be taken not to confuse a reliance on closed windows to achieve the noise level criteria with the need to have sealed glazing units. Windows may remain openable for rapid or purge ventilation, or at the occupant's choice.
- 9.11 In situations where there is a reliance on closed windows to meet the guide value, there needs to be an appropriate alternative means of ventilation that does not compromise the façade insulation or the resulting internal noise level. Typically trickle ventilators can be used and sound attenuating types are available.
- 9.12 The following is a list of manufacturers and suppliers of acoustic ventilation products.

Rytens

<http://rts.vents.co.uk/blog/products/background-ventilators/>

Titon

<https://www.titon.com/uk/products/ventilation-systems/window-vents/>

R.W.Simon Ltd

<https://www.rwsimon.co.uk/products/window-ventilation/>

Greenwood

<https://www.greenwood.co.uk/window-vents>

Noise Levels in External Amenity Areas

- 9.13 No external amenity areas are provided with this development.

BS4142:2014 Assessment from the Rear of the Site

10. Noise Survey

- 10.1 A noise survey was conducted at monitoring location M2 on the 5th to 6th January 2024 to understand the potential noise impact from commercial activity/car park noise at the rear of the site. For the purposes of the assessment the loudest 16hr day and 8hr night were selected and are tabulated below.

Measurement Summary				
Measurement	Date	Period	LAeq (dB)	LAfmax (dB)
M2	05/01/24	Day (16hr)	56	N/A
	06/01/24	Night (8hr)	43	70

10.2 The potential for noise impact arising from the nearby commercial sites, however during the monitoring periods, no specific noise (humming, banging etc) was identified.

11. Noise level Calculations

11.1 Noise intrusion levels with windows open have been determined assuming that the insulation provided by a window, partially open for ventilation, is 15 dB as suggested by BS 8233 and WHO.

Parameter	Measured External Free-Field Noise Level at 2nd Floor facade	2nd Floor Internal Noise Level with Windows Open	2nd Floor Internal Noise Level with Windows Closed and Vents Open	ProPG Guidance	BS 8233 Classification
Living Space					
Daytime L _{Aeq,16hr} (dB)	56	41	24	Low Risk of Adverse Effects	Desirable (≤35)
Bedrooms					
Daytime L _{Aeq,16hr} (dB)	56	41	24	Low Risk of Adverse Effects	Desirable (≤35)
Bedrooms					
Night-time L _{Aeq,8hr} (dB)	43	28	11	Low Risk of Adverse Effects	Desirable (≤30)
Night-time L _{Amax(f)} (dB)	70	55	38	Low Risk of Adverse Effects	Desirable (≤45)

Internal Noise Levels in Habitable Rooms

- 11.2 Based on the general commercial noise in the area, the results demonstrate that, with windows open, internal LAeq and LMax noise levels during the day and night-time within habitable rooms on the first floor at the rear of the development are expected to exceed the recommended target levels from time to time, and openable windows cannot therefore be relied upon for background ventilation for an extended period. However, windows can be relied upon for purge ventilation, as required.
- 11.3 Double glazed windows should be installed to the rear elevation with 10mm outer pane, 12mm cavity, and 6mm inner pane. This achieves above the minimum 32dB Rw+Ctr rating. Assuming the use of 32 dB Dne,w+Ctr trickle ventilation (Trimvent Select Xtra S13) for background ventilation, daytime environmental noise would be reduced from 56 dB LAeq,16hr to interior levels of 24 dB LAeq,16hr within habitable rooms. The assumed standard of construction would place the internal levels in habitable rooms below 35 dB, therefore within the desirable category.
- 11.4 Assuming the use of 32 dB Dne,w+Ctr trickle ventilation (Trimvent Select Xtra S13), night-time environmental noise in bedrooms would be reduced from 43 dB LAeq,8hr to interior levels 11 dB LAeq,8hr with maximum individual noise events reduced from 70.0 dB LAFmax to 38 dB LAFmax, therefore within the desirable category.
- 11.5 The potential for adverse impact arising from the nearby commercial sites (humming, banging et), however during the monitoring periods, no specific noise was identified.

AVO – Stage 1 Overheating Risk Assessment

- 11.6 In January 2020 the Acoustics Ventilation and Overheating: Residential Design Guide (AVO) was published by the Association of Noise Consultants. Therefore, the risk of overheating within proposed dwellings can be considered in line with the AVO guide.
- 11.7 In accordance with AVO, the noise levels across the proposed development site as described in the table above have been compared to the Level 1 risk assessment shown in Table 3.2 of AVO, to establish the potential risk of an overheating condition.
- 11.8 The table above indicates that site will be subject to a 'Medium' risk of an overheating condition during the daytime during periods of high volumes of traffic. Therefore, mitigation is considered necessary and discussed below.

Assessment of Daytime Noise Levels in Living Rooms and Bedrooms

- 11.9 The results demonstrate that, with windows open, internal LAeq and LMax noise levels during the day and night-time within habitable rooms at the rear of the development on the first floor are expected to exceed the recommended target levels and openable windows from time to time cannot therefore be relied upon for ventilation for an extended period.

11.10 The assessment suggests that an alternative means of ventilation is required to provide occupants with the ability to maintain adequate background ventilation rates without having to rely entirely on openable windows. Care should be taken not to confuse a reliance on closed windows to achieve the noise level criteria with the need to have sealed glazing units. Windows may remain openable for rapid or purge ventilation, or at the occupant's choice.

11.11 In situations where there is a reliance on closed windows to meet the guide value, there needs to be an appropriate alternative means of ventilation that does not compromise the façade insulation or the resulting internal noise level. Typically trickle ventilators can be used and sound attenuating types are available.

11.12 The following is a list of manufacturers and suppliers of acoustic ventilation products.

Rytens

<http://rts.vents.co.uk/blog/products/background-ventilators/>

Titon

<https://www.titon.com/uk/products/ventilation-systems/window-vents/>

R.W.Simon Ltd

<https://www.rwsimon.co.uk/products/window-ventilation/>

Greenwood

<https://www.greenwood.co.uk/window-vents>

Noise Levels in External Amenity Areas

11.13 No external amenity areas are provided with this development.

12. Internal Noise Break-in from Ground Floor Shop

12.1 A noise assessment is required to assess the likely noise impact from noise generated from the ground floor shop.

12.2 The primary noise source within the ground floor shop is people chatting. The noise level was recorded within the shop as 64 dBA.

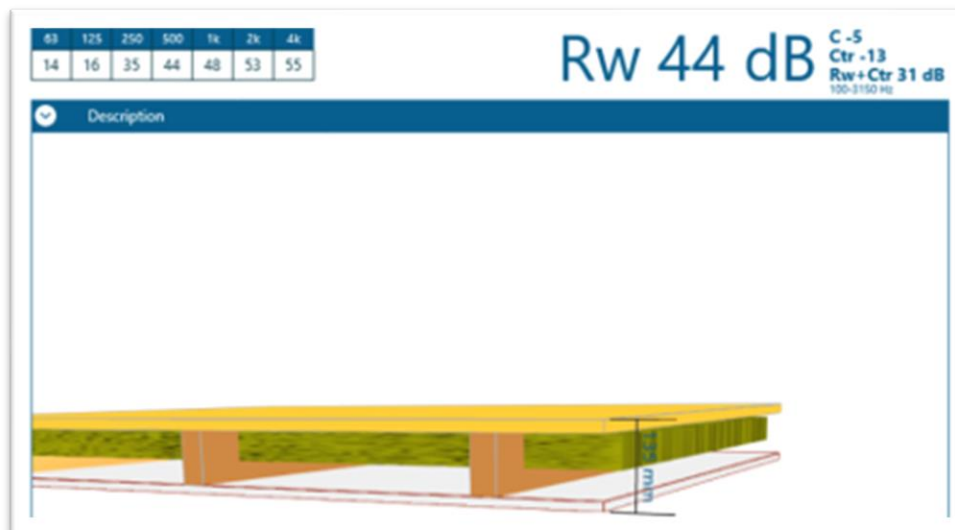
12.3 There are proposed bedrooms/lounge above the ground floor shop therefore the sound breaking structure between the floor is assessed.

12.4 First floor specifications have been modelled in InsuTM (Marshall Day Acoustics).

Building Insulation

12.5 The current floor is floorboards wooden joist and plasterboard.

12.6 An improved floor has been determined as shown below.



12.7 20mm Particleboard flooring on 300mm timber joists with 2 layers of 16mm Fire rated plasterboard hung on a Gyproc Duraline 15mm underneath, with fibreglass blanket in the joist cavity.

Floor

12.8 The initial model by improving the ground floor / first floor partition showed a performance of 44 Rw, this will be adequate in attenuating internal noise transfer to within the target criteria:

Activity	Location	07:00 – 23:00	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 $L_{Aeq,8hour}$

12.9 This arrangement is predicted to provide an airborne sound insulation performance in the region of 44 dB Rw, and within the BS8233 criteria including an error margin of +/- 3dB for RW values.

13. Summary

13.1 Noise Assessments Ltd Noise Assessments Ltd was commissioned with the first-floor development by converting upstairs into 3 one-bedroom flats at 46 Castle Street, Hinckley, LE10 1DB (herein referred to as the site), to assess the impact of a proposed change of use from commercial (Use Class E) into residential (C3) - apartments.

13.2 Planning permission is being sort from Hinckley and Bosworth Borough Council (HBBC) and following consultations; a noise assessment has been requested to demonstrate current noise from the surrounding commercial sites and the commercial shop on the ground floor does not impact future residents in the new dwellings on the first floor.

Commercial Noise from the Front of the Site

13.3 Castle Street is a busy pedestrian high street for shops and cafes.

13.4 There are no external plant or extraction systems identified which could cause an issue.

13.5 The results demonstrate that, with windows open, internal LAeq and LMax noise levels during the day and night-time within habitable rooms on the first floor at the front of the development are expected to exceed the recommended target levels from time to time, and openable windows cannot therefore be relied upon for background ventilation for an extended period. However, windows can be relied upon for purge ventilation, as required.

13.6 Double glazed windows should be installed at the front elevation with 10mm outer pane, 12mm cavity, and 6mm inner pane. The achieves above the minimum 32dB Rw+Ctr rating. Assuming the use of 32 dB Dne,w+Ctr trickle ventilation (Trimvent Select Xtra S13) for background ventiation, daytime environmental noise would be reduced from 52 dB LAeq,16hr to interior levels of 20 dB LAeq,16hr within habitable rooms. The assumed standard of construction would place the internal levels in habitable rooms below 35 dB, therefore within the desirable category.

13.7 Assuming the use of 32 dB Dne,w+Ctr trickle ventilation (Trimvent Select Xtra S13), night-time environmental noise in bedrooms would be reduced from 45 dB LAeq,8hr to interior levels 13 dB LAeq,8hr with maximum individual noise events reduced from 72.0 dB LAFmax to 36 dB LAFmax, therefore within the desirable category.

Commercial Noise at the Rear of the Site

13.8 The potential for noise impact arising from the nearby commercial sites, however during the monitoring periods, no specific noise (humming, banging etc) was identified. The main noise is from the car park, with engine and door slamming.

13.9 Based on the general car park noise in the area, the results demonstrate that, with windows open, internal LAeq and LMax noise levels during the day and night-time within habitable rooms on the ground to second floors at the rear of the development are expected to exceed the recommended target levels from time to time, and openable windows cannot therefore be

relied upon for background ventilation for an extended period. However, windows can be relied upon for purge ventilation, as required.

13.10 Double glazed windows should be installed to the rear elevation with 10mm outer pane, 12mm cavity, and 6mm inner pane. This achieves above the minimum 32dB Rw+Ctr rating. Assuming the use of 32 dB Dne,w+Ctr trickle ventilation (Trimvent Select Xtra S13) for background ventilation, daytime environmental noise would be reduced from 56 dB LAeq,16hr to interior levels of 24 dB LAeq,16hr within habitable rooms. The assumed standard of construction would place the internal levels in habitable rooms below 35 dB, therefore within the desirable category.

13.11 Assuming the use of 32 dB Dne,w+Ctr trickle ventilation (Trimvent Select Xtra S13), night-time environmental noise in bedrooms would be reduced from 43 dB LAeq,8hr to interior levels 11 dB LAeq,8hr with maximum individual noise events reduced from 70.0 dB LAFmax to 38 dB LAFmax, therefore within the desirable category.

13.12 No external amenity spaces are proposed for the development.

Internal Noise Break-in from Ground Floor Shop

13.13 A noise assessment is required to assess the likely noise impact from noise generated from the ground floor shop.

13.14 The primary noise source within the ground floor shop is people chatting. The noise level was recorded within the shop as 64 dBA.

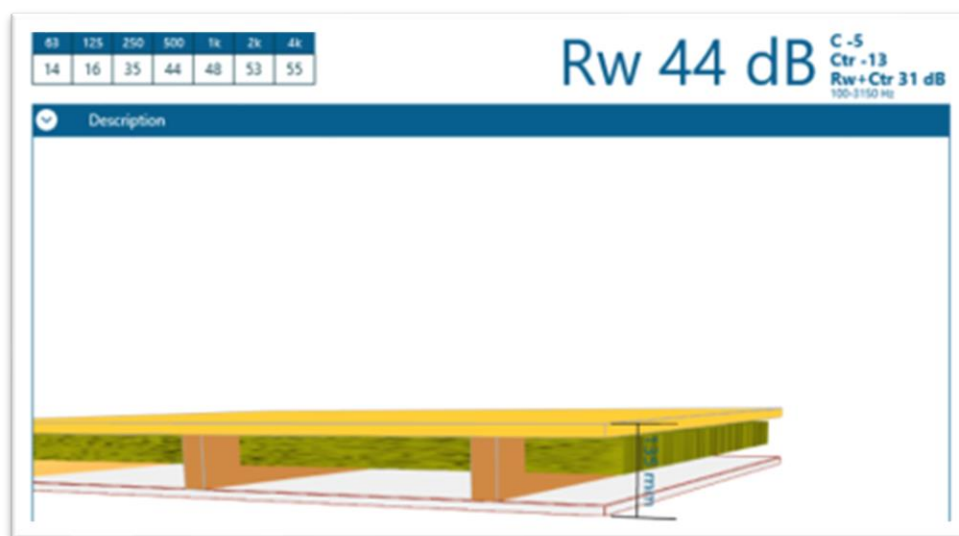
13.15 There are proposed bedrooms/lounge above the ground floor shop therefore the sound breaking structure between the floor is assessed.

13.16 First floor specifications have been modelled in InsulTM (Marshall Day Acoustics).

Building Insulation

13.17 The current floor is floorboards wooden joist and plasterboard.

13.18 An improved floor has been determined as shown below.



13.19 20mm Particleboard flooring on 300mm timber joists with 2 layers of 16mm Fire rated plasterboard hung on a Gyproc Duraline 15mm underneath, with fibreglass blanket in the joist cavity.

Floor

13.20 The initial model by improving the ground floor / first floor partition showed a performance of 44 Rw, this will be adequate in attenuating internal noise transfer to within the target criteria:

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

13.21 This arrangement is predicted to provide an airborne sound insulation performance in the region of 44 dB Rw, and within the BS8233 criteria including an error margin of +/- 3dB for RW values.

In Summary

13.22 A noise intrusion assessment has demonstrated that, via the adoption of the proposed glazing and ventilation strategy internal noise levels within proposed habitable rooms at the front and rear of the site are consistent with the guide values outlined in BS 8233 and by the WHO. Products with higher acoustic performance specifications may be utilised if desired.

13.23 The assessment includes a means of ventilation to provide occupants with the ability to maintain adequate background ventilation rates for heating and cooling without having to rely entirely on openable windows.

Appendices

APPENDIX A - Measurement Details

Measurement	Start Date	Start Time	End Date	End Time
M1/M2	05/01/24	09:30	06/01/24	10:30

APPENDIX B - Equipment Details

Equipment	Make	Model	Class	Serial Number
Sound Meter	Pulsar	N45	1	1365
Calibrator	Pulsar	PM1	1	011121C

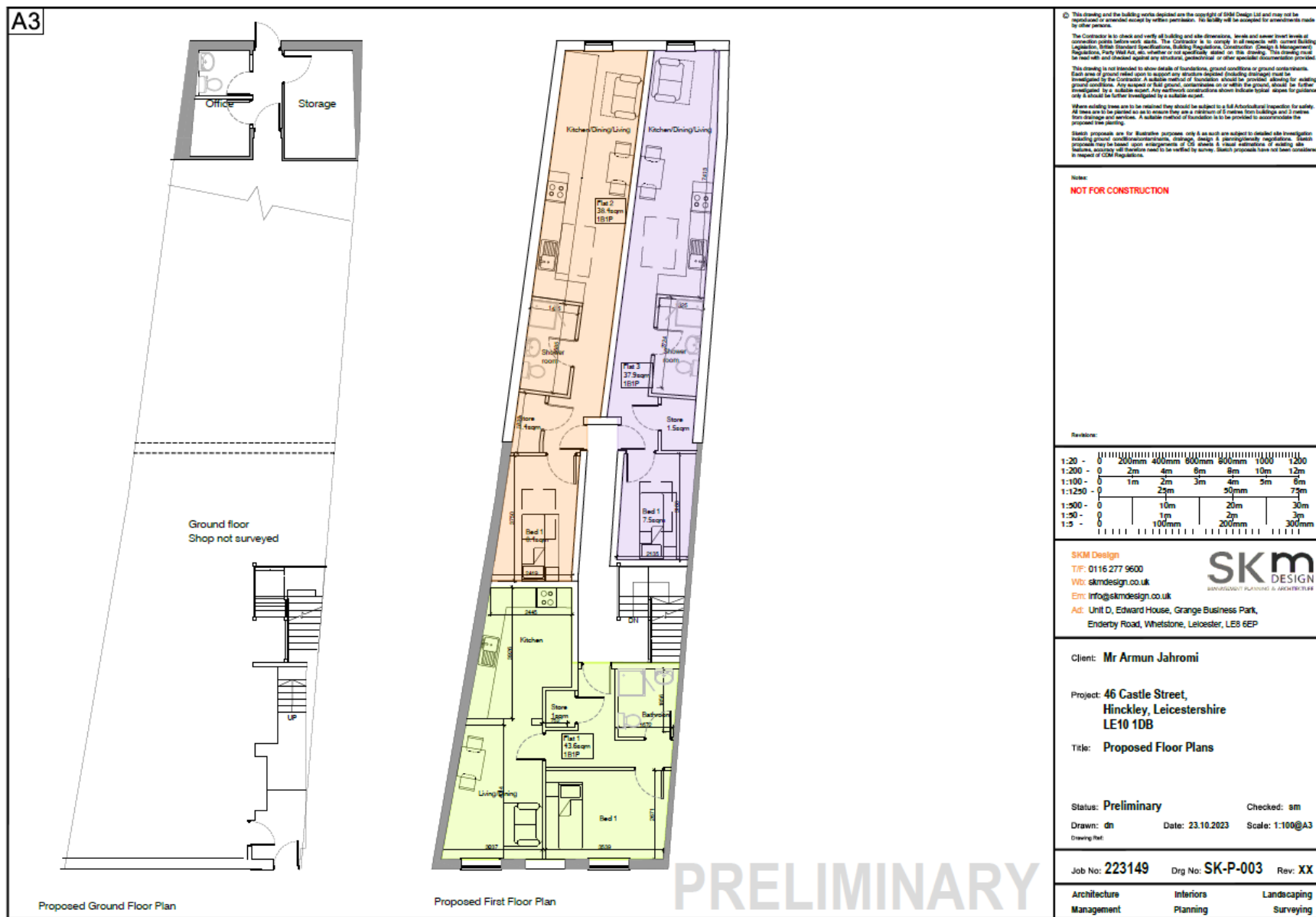
APPENDIX C - Calibration Details

Measurement	Calibrator Ref Level (dB)	Level Before (dB)	Deviation Before (dB)	Level After (dB)	Deviation After (dB)
M1/M2	94.0	94.0	0	94.0	0

APPENDIX D - Meteorology Details

Date	Temp C	Wind Speed m/s*	Wind Direction	Humidity %	Precipitation mm	Cloud Cover (Oktas)
05/01/24	8	2.3	SW	81	0.1	2/8
06/01/24	6	2.5	SW	82	0.0	3/8

APPENDIX E – Layout Drawings



A3



1) Proposed Front Elevation



2) Proposed Rear Elevation

PRELIMINARY

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The Contractor is to check and verify all building and site dimensions, levels and sewer invert levels at construction points before work starts. The Contractor is to comply in all respects with current Building Regulations, British Standard Specifications, Building Regulations, Construction (Design & Management) Regulations, Party Wall Act, etc, whether or not specifically stated on this drawing. This drawing must be read with and checked against any structural, geotechnical or other specialist documentation provided.

This drawing is not intended to show details of foundations, ground conditions or ground contours. Each area of ground related work to support any structure (including drainage) must be investigated by the Contractor. A suitable method of foundation should be provided, allowing for existing ground conditions. Any excavated or built ground, contemporary to or within the ground, should be further investigated by a suitable expert. Any softness conditions shown indicate typical areas for particular only & should be further investigated by a suitable expert.

Where existing trees are to be retained they should be subject to a full Arboricultural Inspection for safety. All trees are to be planted so as to ensure they are a minimum of 5 metres from buildings and 3 metres from drainage and services. A suitable method of foundation is to be provided to accommodate the proposed tree planting.

Sketch proposals are for illustrative purposes only & as such are subject to detailed site investigation including ground conditions, contours, drainage, design & appropriate regulations. Class proposals may be based upon enlargements of CD sheets & visual estimations of existing site features, existing and therefore need to be verified by survey. Sketch proposals have not been considered in respect of CDM Regulations.

Notes:

NOT FOR CONSTRUCTION

Revisions:

1:20	-	0	200mm	400mm	600mm	800mm	1000	1200
1:200	-	0	2m	4m	6m	8m	10m	12m
1:100	-	0	1m	2m	3m	4m	5m	6m
1:1250	-	0	25m	50m	75m			
1:500	-	0	10m	20m	30m			
1:50	-	0	1m	2m	3m			
1:5	-	0	100mm	200mm	300mm			

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SKM
DESIGN
SURVEILLANT PLANNING & ARCHITECTURE
Client: **Mr Armun Jahromi**
 Project: **46 Castle Street,
Hinckley, Leicestershire
LE10 1DB**

 Title: **Proposed Front and Rear
Elevations**
Status: **Preliminary**Checked: **sm**Drawn: **dn**Date: **23.10.2023**Scale: **1:200@A3**

Drawing Ref:

Job No: **223149**Drg No: **SK-E-002**Rev: **XX**
 Architecture
Management

 Interiors
Planning

 Landscaping
Surveying

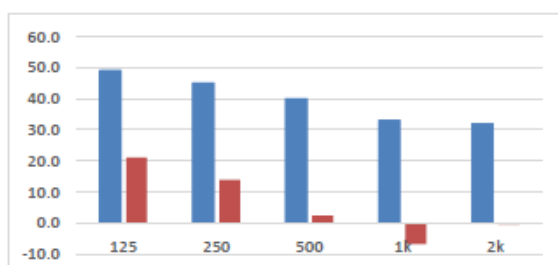
APPENDIX F – BS8233 Rigorous Design Calculation example

BS8233:2014 Specification Calculation Summary

Bedroom - night time

Room Properties		Sound Insulation Properties					
Room Width (m)	3.0	Freq. Hz	125	250	500	1k	2k
Room Depth (m)	4.0	Wall, dB R_{w+Ctr}	41	45	45	54	58
Room Height (m)	2.4	Roof, dB R_{w+Ctr}	41	45	45	54	58
Glazed Area (m ²)	1.8	Glazing, dB R_{w+Ctr}	26	27	34	40	38
Is dwelling within roof?	☒	Vents, dB $D_{f,R,w+Ctr}$	34	38	43	42	34

Noise Levels, dB



External Level	42 dB LAeq
Internal Level	9 dB LAeq
Insertion Loss	33 dB LAeq

Sound Insulation Requirement

Minimum Sound Insulation Requirement			Suitable Systems
Glazing	32	dB R_{w+Ctr}	Double Glazing 10/12/6mm
Ventilation	40	dB $D_{f,R,w+Ctr}$	Acoustically treated trickle vent Titan Xtra Sound Attenuator V75+C50

Technical Calculations

Frequency, Hz	125	250	500	1k	2k
Term 1	0.000553	0.00022	7E-05	8.8E-05	0.00055
Term 2	0.000628	0.0005	1E-04	2.5E-05	4E-05
Term 3	5.96E-05	2.4E-05	2.4E-05	3E-06	1.2E-06
Term 4	0	0	0	0	0
Internal, dB L_{eq}	21.1	13.8	2.4	-6.8	-0.5
Internal, dB LAeq	5.0	5.2	-0.8	-6.8	0.7

Façade Components

Roof	Not Within Roof Space
Glazing	Double Glazing
Vents	Acoustically treated trickle vent

Calculations conducted in accordance with BS8233:2014 rigorous calculation method

$$L_{eq} = 10 \log_{10} \left(\sum_{i=1}^n \left(A_i \cdot 10^{\frac{-D_{i,eq}}{10}} + S_i \cdot 10^{\frac{-R_{i,eq}}{10}} + S_i \cdot 10^{\frac{-R_{i,eq}}{10}} \right) \right) + 10 \log_{10} (S)$$

Suitable systems given as reference only. Other products that achieve the required sound insulation values are available.

APPENDIX G Terminology and Definitions

Noise

Sound only becomes noise (often defined as 'unwanted sound' or sound that is considered undesirable or disruptive) when it causes or contributes to some harmful or otherwise unwanted effect, like annoyance or sleep disturbance.

Acoustic Environment

Sound from all sound sources as modified by the environment.

Equivalent continuous A-weighted sound pressure level $L_{Aeq,T}$

Value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval T, has the same mean square sound pressure as a sound under consideration whose level varies with time.

A-weighting

The human ear is most sensitive to frequencies in the range 1 kHz to 5 kHz. On each side of this range the sensitivity falls off. A-weighting is used in sound level meters to replicate this sensitivity and respond in the same way as the human ear.

Octave Band

Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit.

Maximum Sound Pressure Level $L_{Amax,T}$

Highest value of the A-weighted sound pressure level with a specified time weighting that occurs during a given event or measuring period.

The $L_{A10,T}$ Sound Level

The A-weighted sound pressure that is exceeded for 10% of a given time interval, T. It is often used to evaluate road traffic noise.

The $L_{A90,T}$ Sound Level

The A-weighted sound pressure that is exceeded for 90% of a given time interval, T, measured using time weighting F. It is often referred to as the background noise level and which might in part be an indication of relative quietness at a given location

Free-field Level

The sound pressure level away from reflecting surfaces.

NOTE Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the

measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Façade Level

The sound pressure level 1 m in front of the façade.

NOTE Facade level measurements of LpA are typically 1 dB to 2 dB higher than corresponding free-field measurements because of the reflection from the facade.

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.

ABOUT US

HERE TO HELP

We undertake various noise assessments and noise survey for a wide range of clients to meet their noise requirements and obligations, including for Planning Applications, new developments, building extensions, change of use, small businesses, restaurants, shops and much more.

QUALIFIED AND EXPERIENCED

Over 15 years UK and international acoustic engineering experience of undertaking Noise Monitoring, acoustic solutions, noise survey and Reporting.

Members of the Institute of Acoustics. Undertaken projects in Manchester, North West and across the UK.

GET THE PROJECT DONE

We offer competitive, cost effective acoustic solutions, delivering a noise survey report which complies with Local Planning Authority requirements and sound insulation or health and safety obligations.

We can also undertake Noise Modelling if required.