Suite 24
Doncaster Business Innovation Centre
Ten Pound Walk
Doncaster
DN4 5HX

Proposed Residential Conversion, St Barnabas Hall, 26 Honeywell Street, Barnsley, S71 1PZ

Noise Impact Assessment

For:
Maw Town Planning Ltd

23rd February 2024

Ref: NIA-11139-24-11532 St Barnabas Hall, Barnsley
Issue: Draft
Author: S. Jefferson BSc (Hons) MIOA

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1 Introduction

1.1 Overview

Environmental Noise Solutions (ENS) has been commissioned by Maw Town Planning Ltd to carry out a noise impact assessment for the proposed residential conversion of St Barnabas Hall, 26 Honeywell Street, Barnsley, S71 1PZ (hereafter referred to as 'the site').

The objectives of the noise impact assessment were to:

- Determine external noise levels at the site
- Assess the potential impact of the external noise climate on the proposed residential development with reference to relevant guidelines
- Provide recommendations for a scheme of sound attenuation works, as necessary, to protect future occupants of the proposed residential development from a loss of amenity due to noise

This report details the methodology and results of the assessment and provides recommendations for the building envelope (fenestration and ventilation). It has been prepared to accompany a planning application to be submitted to the Barnsley Metropolitan Borough Council.

The report has been prepared for Maw Town Planning Ltd for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties referring to the report should consult Maw Town Planning Ltd and ENS as to the extent to which the findings may be appropriate for their use.

A glossary of acoustic terms used in the main body of the text is contained in Appendix 1.

1.2 Site Description and Proposed Development

The site comprises two separate, but connected church buildings located within an urban setting in Barnsley.

The building is bound by Old Mill Lane to the north, existing residential properties to the south and west, with Honeywell Street to the east.

Development proposals are for the vertical division of both church buildings to form 9 no. town houses.

The existing building is Grade II* listed and it is understood that as a consequence, the existing window leads and glazing must be retained.

2 Policy Context and Assessment Guidance

2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF)[1] was updated in December 2023 and sets out the Government's planning policies for England and how these are expected to be applied.

Where issues of noise impact are concerned the NPPF provides brief guidance in paragraph 180 where it states that 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.....noise pollution'.

Paragraph 191 advises that:

'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 impacts 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'

The NPPF also refers to the 2010 DEFRA publication, the Noise Policy Statement for England (NPSE) which reinforces and supplements the NPPF.

2.2 Noise Policy Statement for England

The Noise Policy Statement for England[2] (NPSE) sets out 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. This long-term vision is supported by the following aims:

- 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

[1] National Planning Policy Framework. Ministry of Housing, Communities and Local Government (2023)
[2] Government Department for Environment, Food and Rural Affairs. Noise Policy Statement for England. March 2010.

The NPSE describes the following levels at which noise impacts may be identified:

- NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise
- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected
- SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur

According to the explanatory notes in the statement, where a noise level falls between the lowest observable adverse effect level (LOAEL) and a level which represents a significant observable adverse effect level (SOAEL):

'….all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur.'

2.3 Planning Practice Guidance on Noise

Planning Practice Guidance[3] (PPG) is an online resource which provides additional guidance and elaboration on the NPPF. It advises that the Local Planning Authority should consider the acoustic environment in relation to:

- 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
- Whether or not a good standard of amenity can be achieved

In line with the Explanatory Note of the NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that:

'…the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation'.

The PPG also provides general advice on the typical options available for mitigating noise, suggesting that Local Plans may include noise standards applicable to proposed developments within the Local Authority's administrative boundary, although it states that:

'Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed'.

With regard to the mitigation of extant environmental noise at a proposed residential development, the guidance states that:

'… consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations'.

[3] Planning Practice Guidance on Noise: http://planningguidance.planningportal.gov.uk/blog/guidance/noise/

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation. The following guidance documents provide some meaningful context.

2.4 Assessment Guidance

ProPG Planning and Noise: New Residential Development

ProPG Planning and Noise: New Residential Development (ProPG)[4] was published in 2017 by the Association of Noise Consultants, Institute of Acoustics and the Chartered Institute of Environmental Health.

Stage 2: Element 2 of ProPG sets indoor ambient noise levels for residential dwellings based on the guidance contained in British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (BS 8233), see Table 2.1.

Table 2.1: Indoor Ambient Noise Levels in Dwellings

Activity	Location	Good Indoor Ambient Noise Levels	
Resting	Living Room	35 dB $L_{Aeq\ (0700\text{-}2300)}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq\ (0700\text{-}2300)}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq\ (0700\text{-}2300)}$	30 dB $L_{Aeq\ (2300\text{-}0700)}$ 45 dB $L_{AMax,F\ (2300\text{-}0700)}$

Note 4 to the above table states:

'A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. 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.'

Note 5 to the above table states:

'Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7'.

This is consistent with the guidance contained within the PPG, which states that:

'... consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations'.

[4] 'ProPG Planning and Noise: New Residential Development (ProPG)', 2017. Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH)

On the basis of the above, the following criteria (with windows closed and an alternative means of ventilation provided) are considered appropriate for the proposed development and considered to represent good resting and sleeping conditions:

- ≤ 35 dB $L_{Aeq\ (0700\text{-}2300)}$ in habitable rooms during the daytime
- ≤ 30 dB $L_{Aeq\ (2300\text{-}0700)}$ in bedrooms during the night-time
- 45 dB $L_{Amax,F}$ not regularly exceeded in bedrooms during the night-time

3 Noise Survey

3.1 Overview

In order to establish external noise levels at the site, noise surveys were undertaken during the daytime on Thursday 1st February and the early hours (night-time) of Friday 2nd February 2024.

The adopted noise monitoring positions (shown in Appendix 2) were as follows:

- MP1 was located at the northern elevation at 4 metres above ground level (AGL) overlooking Old Mill Road.
- MP2 was located at the eastern elevation at 4 metres above ground level (AGL) overlooking Honeywell Street.
- MP3 was located at the western elevation at 4 metres above ground level (AGL) overlooking the access road behind Bridge Street.

Noise measurements were undertaken using a Bruel & Kjaer 2250 Type 1 integrating sound level meter, connected to a windshield covered microphone positioned at the locations detailed above.

The measurement system calibration was verified immediately before and after the survey period using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration level was noted.

Measurements consisted of A–weighted broadband parameters including L_{Aeq}, L_{A10} L_{A90}, and $L_{Amax,F}$ together with linear octave band data.

The noted weather conditions during the surveys were dry with wind speeds < 5 m/s. Weather conditions were therefore considered appropriate for noise monitoring.

3.2 Summary

Table 3.1 presents a summary of the noise data for each measurement session, at each measurement position, rounded to the nearest decibel. As measurements were made at 1 metre from the existing building façade, a –3 dB façade enhancement correction has been applied in order to approximate the free field noise levels.

Table 3.1: Summary of Noise Measurement Data

Position	Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	Comment
MP1	01/02/24	1054-1154	66	55	70	Road traffic On Old Mill Road
		1154-1254	66	56	70	
		1254-1354	66	56	70	
MP2	01/02/24	0948-1048	62	54	65	Road traffic on Old Mill Road and Honeywell Street
		1511-1526	61	54	64	
	02/02/24	0456-0700	58	39	62	
MP3	01/02/24	1432-1508	60	51	64	Road traffic on Old Mill Road
Maximum noise levels typically ≤ 76 dB LAmax,F during the night-time (early morning)						

3.3 Analysis

The noise environment at the site was controlled road traffic on Old Mill Lane, with a lesser contribution from vehicles along Honeywell Street.

For the prediction of daytime road traffic noise, the Department of Transport's Memorandum on the Calculation of Road Traffic Noise (CRTN) explains that the following shortened measurement procedure may be used. Measurements of L_{A10} are made over any three consecutive hours between 10:00 and 17:00 hours. Using $L_{A10\,(3\,hour)}$ as the arithmetic mean of the three consecutive values of hourly L_{A10}, the $L_{A10\,(18\,hour)}$ can be calculated from the equation:

$$L_{A10\,(18\,hour)} = L_{A10\,(3\,hour)} - 1\ dB$$

A study prepared by TRL Limited on behalf of the Department for Environment, Food and Rural Affairs (DEFRA) entitled 'Converting the UK Traffic Noise Index $L_{A10\,(18\,hour)}$ to EU Noise Indices for Noise Mapping' presents a methodology for calculating daytime $L_{Aeq\,(0700\text{-}2300)}$ and night-time $L_{Aeq\,(2300\text{-}0700)}$ ambient noise levels based on the $L_{A10\,(18\,hour)}$ noise levels, as follows:

$$L_{Aeq\,(0700\text{-}2300)} = 10 * \log\left([(10^{((0.95 * L_{A10\,(18\,hour)} + 1.44)/10)*12}] + [10^{((0.97 * L_{A10\,(18\,hour)} - 2.87)/10)*4}]\right)$$

$$L_{Aeq\,(2300\text{-}0700)} = 0.90 * L_{A10,\,18\,hour} - 3.77$$

Based on the above formulae, the daytime and night-time ambient noise levels at MP1 are measured / calculated at **67 dB $L_{Aeq\,(0700–2300)}$** and **58 dB $L_{Aeq\,(2300–0700)}$** respectively. Maximum noise levels at MP2 were measured at up to **76 dB $L_{Amax,F}$** during the night-time (early morning) in the vicinity of the proposed bedrooms on the eastern façade overlooking Honeywell Street.

4 Noise Assessment

4.1 Design Noise Levels

Design noise levels at the northern façade (fronting onto Old Mill Road) are as follows:

- **≤ 67 dB $L_{Aeq\ (0700\text{-}2300)}$** during the daytime
- **≤ 58 dB $L_{Aeq\ (2300\text{-}0700)}$** during the night-time

Design noise levels at the eastern façade (fronting onto Honeywell Street) are as follows:

- **≤ 62 dB $L_{Aeq\ (0700\text{-}2300)}$** during the daytime
- **≤ 58 dB $L_{Aeq\ (2300\text{-}0700)}$** during the night-time
- **≤ 76 dB $L_{Amax,F}$** during the night-time

4.2 Scheme of Sound Attenuation

In order to calculate the sound insulation requirements for habitable rooms at the development the Building Research Establishment (BRE) building envelope insulation calculation spreadsheet was used. This spreadsheet is based on the calculation methodology advocated in BS 8233. The spreadsheet allows input of external noise levels, room dimensions and reverberation time together with parameters for the various elements of the building envelope and calculates the internal noise level based on external noise level metric (L_{Aeq} and $L_{Amax,F}$ in this case). See Appendix 3 for BRE calculation sheets.

All habitable rooms should be provided with secondary glazing rated at least **40 dB R_w+C_{tr}**. This would readily be met with a scheme of secondary glazing in conjunction with the existing glazing, consisting of the existing external 6mm pane, 63mm air gap and 4/12/4 internal pane.

With secondary glazing, the windows should be made airtight, with ventilation to the dwellings supplied via mechanical means such that the minimum ventilation rates set out in Approved Document Part F may be achieved when operating under normal conditions.

The following points should be noted:

- The glazing recommendations apply to the window within a sealed unit. It is the responsibility of the window supplier to ensure that the window frame does not compromise the performance of the glazing.

- When selecting a glazing system to satisfy the requirements outlined above, it is important to ensure that the $R_w + C_{tr}$ value is achieved (rather than simply the R_w value). Published R_w values tend to be higher than corresponding $R_w + C_{tr}$ values; therefore, incorrect selection could result in an overestimation of sound reduction performance which in turn could result in higher internal noise levels.

- Internal noise levels due to mechanical ventilation plant should not exceed 26 dB(A) in bedrooms and 30 dB(A) in living rooms

5 Summary and Conclusions

A noise impact assessment has been undertaken for the proposed residential conversion of St Barnabas Hall, 26 Honeywell Street, Barnsley, S71 1PZ.

The noise environment at the site is characterised by local and distant road traffic.

A scheme of sound insulation works has been developed to protect the proposed residential development from the ambient noise climate.

Appendix 1 – Abbreviations and Definitions

Sound Pressure Level (L_p)
The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 µPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$L_p = 20 \log_{10}(p/p_o)$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_o = reference sound pressure (20 µPa).

A-weighting
A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$
The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$
The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$
The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{Amax,F}$
The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

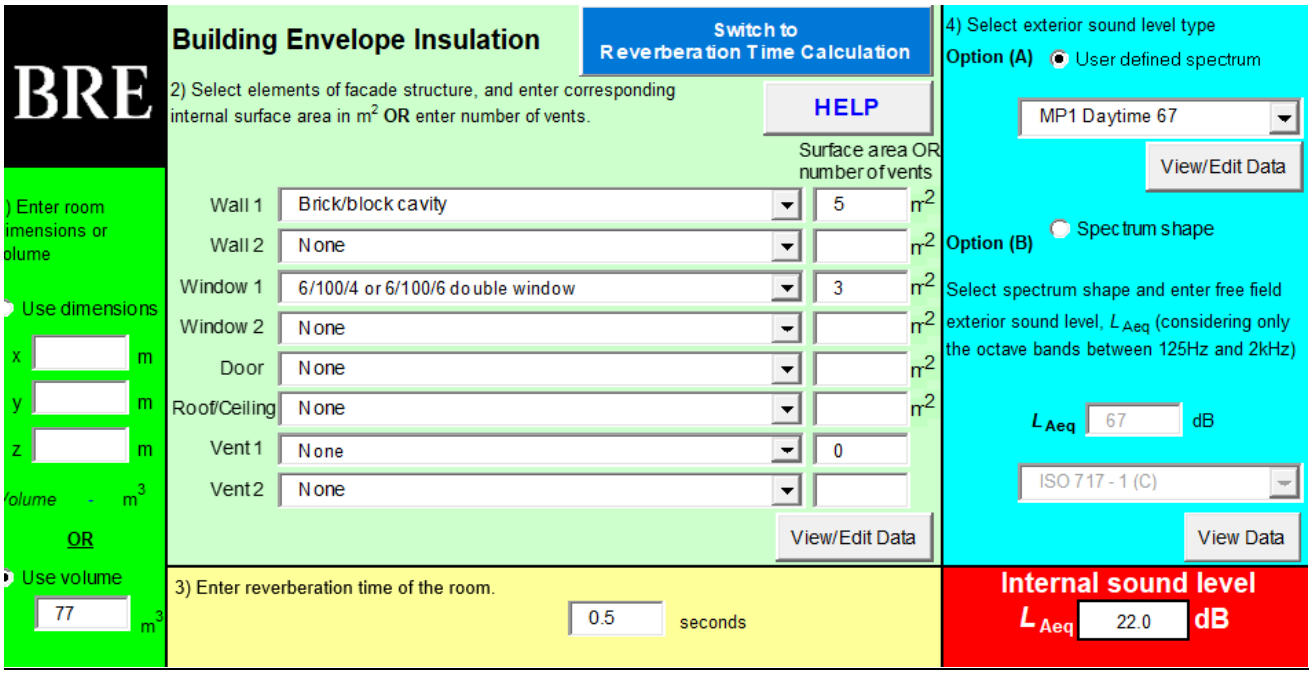
Single Event Level / Sound Exposure Level (SEL or L_{AE})
The energy produced by a discrete noise event averaged over one second, regardless of the event duration. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_W)
Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_W is used to characterise the insulation of a material or product that has been measured in a laboratory).

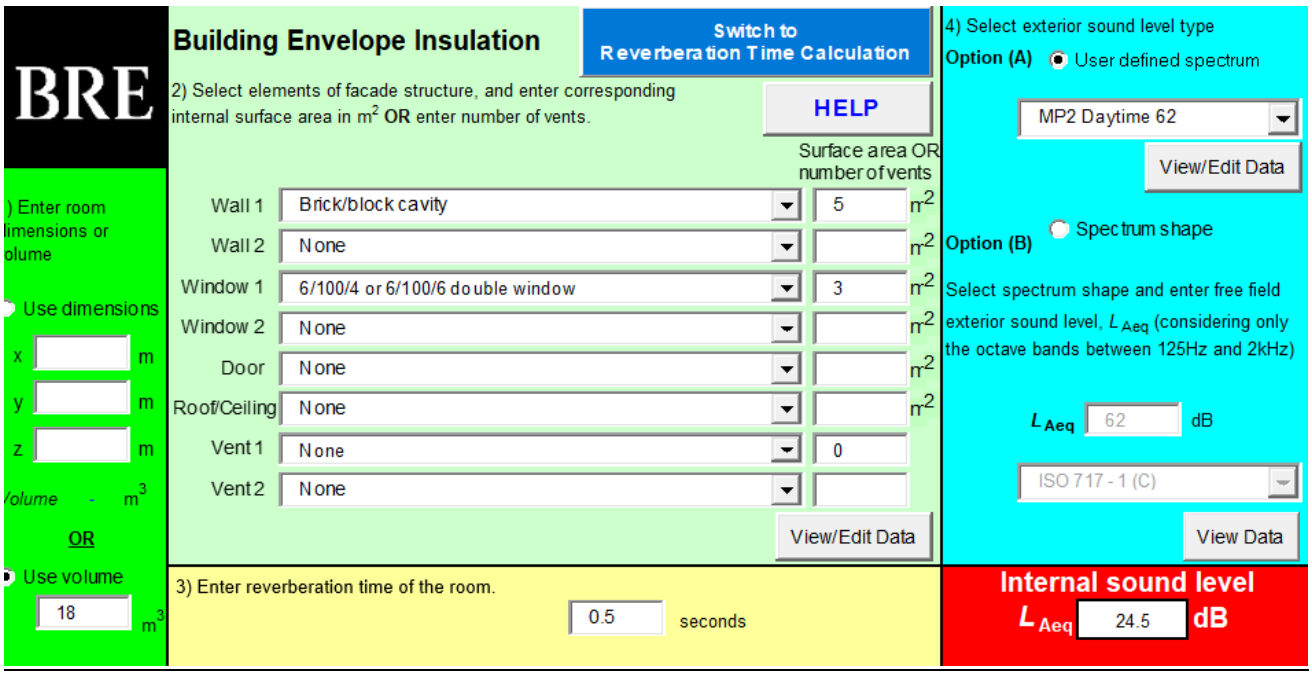
Appendix 2 –Measurement Positions

Appendix 3 – BRE Calculation Sheets

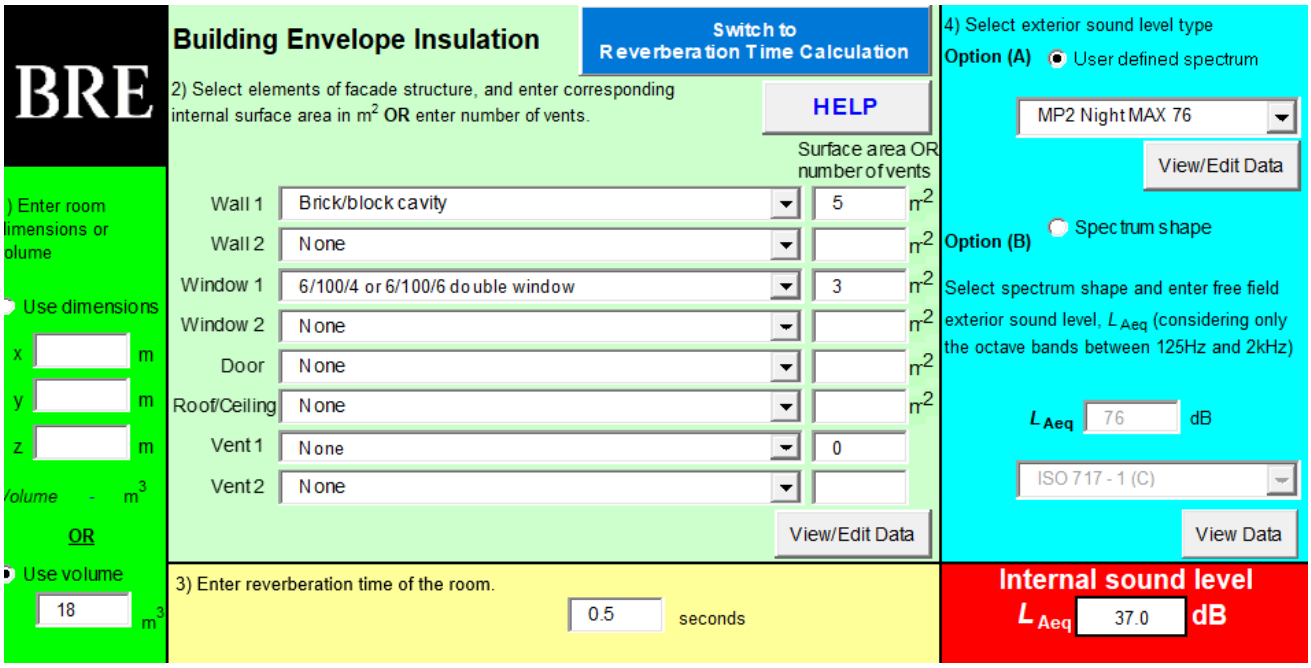
MP1 – Daytime Internal Ambient Noise Level



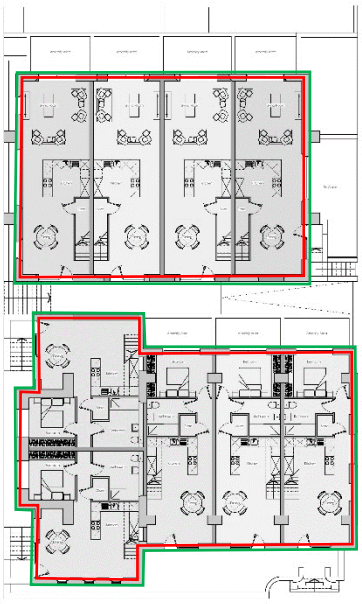
MP2 – Daytime Internal Ambient Noise Level



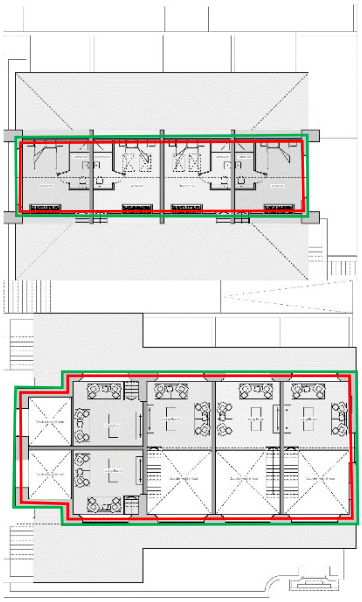
MP2 – Night-time Maximum Internal Ambient Noise Level



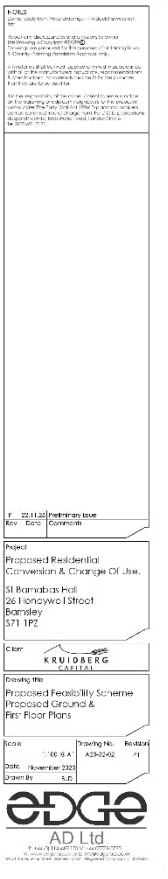
Appendix 4 – Scheme Of Mitigation (All habitable rooms)



Proposed Ground Floor Level (1:100)



Proposed First Floor Level (1:100)



Secondary glazing rated at 40 dB Rw+Ctr
Existing single glazing to be retained