Our ref: NIA/9568/21/9607/v1/Acorn Way

12th February 2021

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Dear Sir

NOISE IMPACT ASSESSMENT FOR A PROPOSED RESIDENTIAL DEVELOPMENT LAND TO THE SOUTH OF ACORN WAY, GRIMETHORPE, BARNSLEY

1.00 INTRODUCTION

1.01 Environmental Noise Solutions Limited (ENS) has been commissioned by JRB Designs Ltd. to carry out a noise impact assessment for a proposed residential development at land to the south of Acorn Way, Grimethorpe, Barnsley (hereafter referred to as the application site).

1.02 The objectives of the noise impact assessment were to:

- Determine external noise levels at the application site
- Assess the potential impact of the external noise climate on the proposed 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 dwellings from a loss of amenity due to noise

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

1.04 This report has been prepared for JRB Designs Ltd. for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult the aforementioned parties and ENS as to the extent to which the findings may be appropriate for their use.

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

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2.00 APPLICATION SITE SETTING AND PROPOSED RESIDENTIAL DEVELOPMENT

2.01 The application site is located in a mixed-use setting within the village of Grimethorpe. Roughly rectangular in shape, the application site is bound by (see Appendix 2 for a site layout):

- Acorn Way to the north
- Oakroyd Crescent to the east
- Allotments to the south
- An unnamed access road to the west, with commercial premises beyond

2.02 The existing commercial premises to the west of the application site are Countrywide Healthcare (a healthcare supplier) and the Acorn Phase II Business Centre (light industrial units). The main gate at the Acorn Phase II Business Centre was noted to be closed at night, and it was confirmed with Countrywide Healthcare that there is no night time working. The Countrywide Healthcare service yard is circa 100 metres from the application site and is largely screened by the unit, and there is no dedicated service yard at the Acorn Phase II Business Centre.

2.03 In addition, there is a small domestic substation within the application site.

2.04 The noise environment at the application site is characterised by local road traffic on Acorn Way, with an underlying contribution from distant road traffic on the surrounding road network.

2.05 Development proposals are to construct 14 no. dwellings with associated access roads and landscaping.

3.00 BASELINE NOISE SURVEY

3.01 In order to establish external noise levels at the application site, a baseline noise survey was undertaken on Thursday 4th February through to Friday 5th February 2021.

3.02 The following noise monitoring positions were adopted (the approximate locations of the noise monitoring positions are shown in Appendix 2 for reference):

- MP1 was located at the north-eastern corner of the application site at a height of 4.5 metres above ground level (AGL)

- MP1A was located at the north-eastern corner of the application site at a height of 1.5 metres AGL (to assess attenuation due to height)

- MP2 was located at the western boundary of the application site at a height of 4.5 metres AGL

3.03 Noise measurements were made in a free field environment using two Bruel & Kjaer 2250 Type 1 integrating sound level meters. A windshield was fitted for all measurements. The calibration of each measurement system was verified immediately before and after the survey using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration level was noted. Weather conditions throughout the survey were appropriate for monitoring.

3.04 Measurements consisted of A–weighted broadband parameters, together with linear octave band L_{eq} levels. Table 3.1 presents a summary of the measurement data for each measurement session, at each measurement position, rounded to the nearest decibel.

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Table 3.1 – Summary of Noise Measurement Data

Position	Date	Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	Comment
MP1	04/02/21	1028–1128	58	45	61	Dominated by road traffic on Acorn Way Up to 68 dB L_{AFMax} during the night time
MP1	04/02/21	1128–1228	58	46	62	
MP1	04/02/21	1228–1328	58	48	61	
MP1	04/02/21	2326–0000	48	31	51	
MP1	05/02/21	0000–0038	46	32	46	
Daytime noise level 58 dB $L_{Aeq\ (0700\text{-}2300)}$ based on CRTN methodology Night time noise level circa 50 dB $L_{Aeq\ (2300\text{-}0700)}$ based on TRL methodology Maximum noise levels up to 68 dB L_{AFMax} during the night time						
MP1A	04/02/21	1329–1344	52	42	56	Dominated by road traffic on Acorn Way
Daytime noise level circa 52 dB $L_{Aeq\ T}$ Comparison of MP1 (4.0mAGL) and MP1A (1.5mAGL) indicates circa 6 dB difference due to height						
MP2	04/02/21	1030–1130	54	45	57	Dominated by road traffic on Acorn Way (no noise audible from neighbouring commercial units)
MP2	04/02/21	1130–1230	54	45	58	
MP2	04/02/21	1230–1330	54	46	58	
MP2	04/02/21	2333–0000	43	35	44	Traffic on Acorn Way, distant road traffic, distant anonymous plant faintly audible during lulls in traffic
MP2	05/02/21	0000–0036	43	35	44	
Daytime and night time noise levels circa 54 dB $L_{Aeq\ (0700\text{-}2300)}$ and 43 dB $L_{Aeq\ (2300\text{-}0700)}$ respectively						

3.05 The noise environment at the application site was dominated by road traffic on Acorn Way and (to a lesser extent) distant road traffic on the surrounding road network.

3.06 For the prediction of 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:

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

3.07 PPG24 further states that for road traffic noise:

(ii) $L_{Aeq\ (0700–2300)} \approx L_{A10\ (0600–0000)} - 2$ dB

3.08 Substituting (ii) into (i) gives the following approximation:

(iii) $L_{Aeq\ (0700–2300)} \approx L_{A10\ (3\ hour)} - 3$ dB

3.09 Based on the above formula, the daytime ambient noise level at MP1 is measured / calculated at **58 dB $L_{Aeq\ (0700–2300)}$.**

3.10 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 night time road traffic noise levels based on daytime road traffic noise level based on the following formula:

(iv) $L_{Aeq\ (2300–0700)} \approx 0.90 * L_{A10\ (18\ hour)} - 3.77$ (for non-motorways)

3.11 Based on the above formula, the night time ambient noise level at MP1 is measured / calculated at **50 dB $L_{Aeq\ (2300–0700)}$.**

3.12 Ground level at the site is circa 2 metres below the level of the road surface on Acorn Way. As a consequence, the noise levels at MP1A (1.5 metres AGL) were circa 6 dB lower than those at MP1 (4.5 metres AGL). This equates to a daytime ambient noise level of **52 dB $L_{Aeq\ (0700–2300)}$** at 1.5 metres AGL, which is considered representative of gardens at the application site.

3.13 During November 2020, the UK Government announced measures to stem the coronavirus pandemic, including restrictions on non-essential travel.

3.14 Data produced by the Department for Transport (DFT)[1] shows that overall traffic volumes on the day of the survey were circa 65 % of typical flows. Using the methodology in the CRTN, a 35 % reduction in traffic volumes equates to a 2 dB reduction in noise levels – this correction has been robustly applied to the measured noise levels across the application site to account for a potential increase in noise levels once traffic flows are back to 'normal'.

3.15 Although the neighbouring commercial units were observed to be operating during the course of the survey, no significant noise was noted. Further to this, as there are existing residential dwellings set back a comparable distance from the neighbouring units, it is not considered that there will be any additional constraints on the units as a result of the development.

3.16 For reference, the small substation within the application site was subjectively inaudible, even in close proximity during the early hours of the morning.

4.00 NATIONAL PLANNING POLICY FRAMEWORK AND OTHER RELEVANT GUIDANCE

National Planning Policy Framework

4.01 The National Planning Policy Framework (NPPF) was updated in 2019 and sets out the Government's planning policies for England and how these are expected to be applied.

4.02 Where issues of noise impact are concerned the NPPF provides brief guidance in paragraph 170 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'.

4.03 Paragraph 180 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…..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'.

4.04 With regard to extant community noise sources and the potential to affect proposed new developments, Paragraph 182 states that:

'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.'

1 https://www.gov.uk/government/statistics/transport-use-during-the-coronavirus-covid-19-pandemic

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

Noise Policy Statement for England

4.06 The Noise Policy Statement for England (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.

4.07 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.

Planning Practice Guidance – Noise

4.08 Planning Practice Guidance (PPG) is an online resource (as updated 2019) 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.

4.09 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'.

4.10 The PPG also provides general advice on the typical options available for mitigating noise. It goes on to suggest 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'.

ProPG Planning and Noise: New Residential Development

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

4.12 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 below).

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Table 4.1 – Indoor Ambient Noise Levels in Dwellings

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

4.13 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.'

4.14 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'.

4.15 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'.

4.16 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 residential development and considered to represent good resting and sleeping conditions:

- ≤ 35 dB $L_{Aeq\ (0700-2300)}$ during the daytime.
- ≤ 30 dB $L_{Aeq\ (2300-0700)}$ and 45 dB L_{AFMax} not regularly exceeded during the night time.

4.17 With respect to external amenity, ProPG reflects the advice contained in BS 8233, as follows:

'For traditional external areas that are used for amenity space, such as gardens and patios, 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. However, it is also recognized that these 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.'

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5.00 SOUND ATTENUATION SCHEME PROPOSALS

5.01 Including an adjustment for reduced traffic flows (see Paragraph 3.14), the noise levels throughout the application site are as follows:

- **≤ 60 dB $L_{Aeq\ (0700\text{-}2300)}$** during the daytime
- **≤ 52 dB $L_{Aeq\ (2300\text{-}0700)}$** during the night time
- **≤ 68 dB L_{AFMax}** during the night time
- **≤ 54 dB $L_{Aeq\ (0700\text{-}2300)}$** during the daytime in gardens

5.02 In order to calculate the sound insulation requirements for habitable rooms 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 in terms of the external noise level metric (L_{Aeq} and L_{AFMax} in this case).

5.03 In order to achieve the internal noise level criteria described in Paragraph 4.16, habitable rooms at the application site should be fitted with standard glazing rated at least **28 dB R_w+C**, in conjunction with trickle vents rated at least **32 dB $D_{n,e,w}$+C** per 5000 mm^2 EA (vent open), such as the Greenwood 5000EA, or equivalent. Appendix 3 contains selected BRE Calculation Spreadsheets.

5.04 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.

5.05 Daytime ambient noise levels in gardens at the northern boundary of the application site (MP1A) have been measured/calculated at **54 dB $L_{Aeq\ (0700\text{-}2300)}$**.

5.06 Site layout plans indicate that the gardens will be screened from Acorn Way by 2-metre-high solid timber fences.

5.07 With the additional screening attenuation afforded by the proposed timber fence, daytime noise levels in gardens of plots fronting towards Acorn Way will be reduced to < 50 dB $L_{Aeq\ (0700\text{-}2300)}$.

5.08 With respect to Paragraph 182 of the NPPF, it is noted that there are existing residential dwellings set back a comparable distance from the neighbouring commercial units, and therefore it is not considered that the development will impose any additional constraints on the units. Proposals are therefore in keeping with the aims of the NPPF, namely to avoid placing unreasonable restrictions on existing businesses as a result of the proposed development.

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6.00 CONCLUSIONS

6.01 A noise impact assessment has been undertaken for proposed residential development at land to the south of Acorn Way, Grimethorpe, Barnsley.

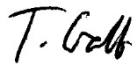
6.02 The noise environment at the application site is characterised by local road traffic on Acorn Way, distant road traffic on the surrounding road network.

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

6.04 The development will not impose any additional constraints on the neighbouring commercial units. Proposals are therefore in keeping with the aims of the NPPF, namely to avoid placing unreasonable restrictions on existing businesses as a result of the proposed development.

I trust that the above is sufficient for your needs, however, should you have any queries please do not hesitate to contact me.

Yours sincerely



Thomas Crabb
MIOA, Diploma in Acoustics and Noise Control
For Environmental Noise Solutions Limited

Appendix 1
Glossary of Acoustic Terms

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:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 µPa).

A-weighting Network

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.

$L_{AF\ max}$

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.

Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, no matter how long the event actually took. This allows for comparison between different noise events which occur over different lengths of time.

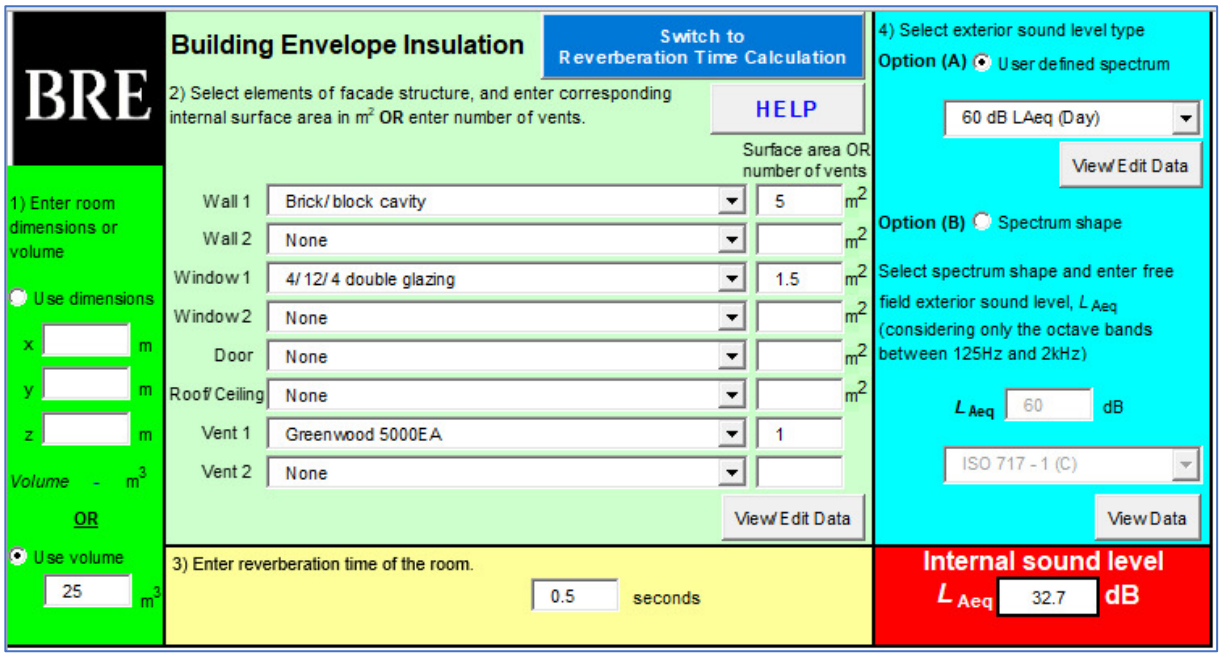
Weighted Sound Reduction Index (R_W)

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).

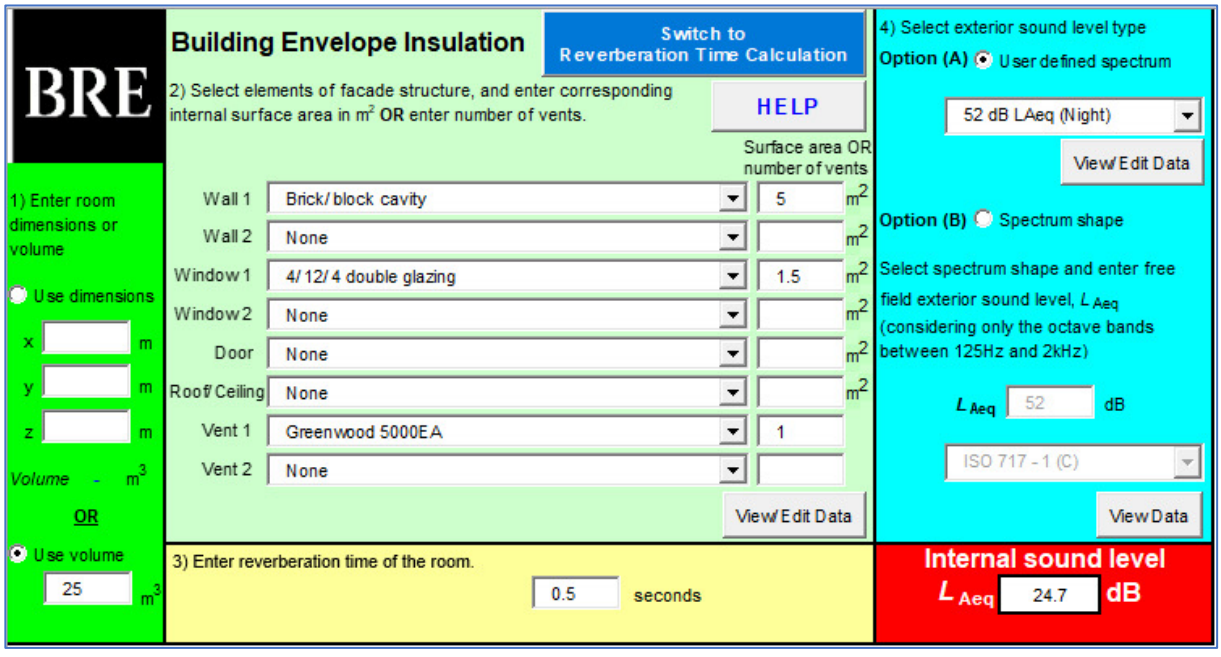
Appendix 2 – Site Layout Plan and Approximate Noise Monitoring Positions

Appendix 3
BRE Calculation Spreadsheets

Daytime Ambient Noise Level



Night Time Ambient Noise Level



Appendix 3
BRE Calculation Spreadsheets

Night Time Maximum Noise Level