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Noise Assessment

Bartons Road, Havant

Noise Assessment

Project: BARTONS ROAD, HAVANT

Report reference: RP01-24394-R4

Client: STONEBOND PROPERTIES (GUILDFORD) LIMITED
1 BISHOPS WHARF
WALNUT TREE CLOSE, GUILDFORD
SURREY, GU1 4UP

Our details: CASS ALLEN ASSOCIATES LTD
BEDFORD I-LAB
BEDFORD
MK44 3RZ

Document control:

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1. EXECUTIVE SUMMARY

- 1.1 Cass Allen has been instructed by Stonebond Properties (Guildford) Limited to assess noise affecting a proposed new development at Bartons Road, Havant.
- 1.2 The assessment was carried out in accordance with relevant local and national planning guidance.
- 1.3 A noise survey was carried out at the site. Noise levels at the site are dictated by road traffic noise emissions from Bartons Road and the B2149 and mechanical plant noise from the adjacent SSE site.
- 1.4 A 3D noise model of the development was constructed based on the results of the site noise survey. The noise model was used to predict noise levels across the development.
- 1.5 Noise affecting the development has been assessed in accordance with ProPG guidance. The design of the development is considered to be acceptable subject to the adoption of acoustically upgraded glazing and ventilation and acoustic screening around gardens. This can be investigated further at the detailed design stage and may be secured by the imposition of a noise-related planning condition by the Local Planning Authority.
- 1.6 Compliance with noise criteria in Building Regulations Part O has also been assessed. Some bedrooms will need to be designed so that windows can remain closed at night without the rooms overheating. This can be assessed further in due course.
- 1.7 Noise emissions from the SSE site have been assessed. It is envisaged that noise levels from the SSE site can be largely mitigated, subject to acoustically upgraded glazing and ventilation, screening around gardens, and the installation of the 4m acoustic barrier on the eastern boundary of the site (the location is shown in Appendix 6). However, it is recommended that noise emissions from this site are assessed at the detailed design stage, once it has been possible to establish the operating conditions of all mechanical plant items associated with this site. However, no matter how low the noise from the louvre is designed to, it is possible that it may still be occasionally faintly audible, particularly during significant lulls of road traffic.
- 1.8 Noise emissions from the nearby public houses have also been assessed. It has been calculated that noise levels from these sources can be suitably mitigated, subject to the adoption of the glazing and ventilation strategy set out in this report.
- 1.9 Appropriate limits for noise from mechanical plant have been calculated based on measured noise levels at the site and guidance given in BS4142. This will be investigated further at the detailed design stage and may be secured by the imposition of a noise related planning condition if deemed necessary by the Local Planning Authority.
- 1.10 In summary, it is our view that the site is suitable for the development in terms of noise levels and that planning permission may be granted subject to the imposition of suitable planning conditions, if necessary.

2. INTRODUCTION

- 2.1 Cass Allen has been instructed by Stonebond Properties (Guildford) Limited to assess noise affecting a proposed new development at Bartons Road, Havant.
- 2.2 The assessment has been carried out in accordance with relevant local and national planning guidance.
- 2.3 The aims of the assessment were:
- to establish the suitability of existing noise levels at the site for the proposed development
 - where required, identify appropriate measures to optimise the acoustic design of the development and achieve acceptable noise levels in habitable areas
 - to set noise limits for any future mechanical plant that will serve the proposed development
- 2.4 This report contains technical terminology; a glossary of terms can be found at www.cassallen.co.uk/glossary.

3. PROJECT DESCRIPTION

- 3.1 The site is allocated in the adopted Havant Borough Site Allocations Plan (2014) under ref. L145 for 90 dwellings.
- 3.2 The site currently contains an open field and is bordered by Bartons Road to the north, with residential dwellings further to the north. To the east is the SSE site, which comprises offices and areas containing mechanical plant. Further to the east is Havant & Waterlooville Football Club and The Westleigh public house. A car dealership & service centre (known as Solent Used Car & Service Centre) is located directly to the south-west of the site. To the west of the site is the B2149, with residential dwellings further to the west.
- 3.3 The site location is shown in Figure 1 below.

Figure 1 Site Location and Surrounding Area



- 3.4 The proposal is the erection of 90 dwellings with associated landscaping, parking and improved access. A current drawing of the proposed development layout is shown in Appendix 1.

4. PLANNING POLICY

National Policy

- 4.1 Outline guidance for the assessment of noise affecting new developments is given in the National Planning Policy Framework (NPPF) (December 2024). Relevant sections in this case are highlighted below:

187. 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.

198. 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 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.

200. 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.

Noise Policy Statement for England

- 4.2 The Noise Policy Statement for England (NPSE) was published in March 2010 and seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. It also sets out the long term vision of Government noise policy:

to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

- 4.3 The NPSE clarifies that noise should not be considered in isolation of the wider benefits of a scheme or development, and that the intention is to minimise noise and noise effects as far as is reasonably practicable having regard to the underlying principles of sustainable development.

- 4.4 The explanatory note of NPSE defines the terms used in the NPPF:

2.20: 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.

2.21: Extending these concepts for the purpose of this 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.

- 4.5 The NPSE does not define the SOAEL numerically, stating in paragraph 2.22:

It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

Noise Planning Practice Guidance

- 4.6 The Noise Planning Practise Guidance (NPPG), as amended on 22 July 2019, provides further guidance on noise and reiterates the guidance within the NPPF and NPSE. It states 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.

- 4.7 The NPPG provides advice regarding how to determine the impact of noise, including whether or not a significant adverse effect or adverse effect is occurring or likely to occur and whether or not a good standard of amenity can be achieved.
- 4.8 It provides more descriptive detail for the definitions of NOEL, LOAEL and SOAEL than the NPSE, but does not specify numerical values. A summary of the advice given is reproduced in Table 1 below.

Table 1 Observed Effect Levels due to Noise (NPPG)

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Local Policy

- 4.9 Havant Borough Council's Local Plan 2011 provides outline guidance on the control of noise in new residential developments within the borough. Policy CS16 High Quality Design states:

Planning permission will be granted for development that is designed to a high standard, which helps to create places where people want to live, work and relax. All development should demonstrate that its design:

1. *Responds to, draws inspiration from and respects local context and:*

... The development does not cause unacceptable harm to the amenity of neighbours through smell, the loss of privacy, outlook, noise and overlooking.

- 4.10 Policy DM10 Pollution states:

Development that may cause pollution of water, air or soil or pollution through noise... will only be permitted where all the following relevant criteria can be met:

2. *The health and safety of existing and future users of the site, or nearby occupiers and residents is not put at risk*

- 4.11 Furthermore, feedback has been provided by the project Environmental Health Officer to request the assessment is carried out in line with the below:

- *1/3 octave analysis of the SSE louvre noise inside Plot 42 and affected gardens relative to recognised low frequency noise criteria (e.g. DEFRA NANR45 curves or similar); and,*
- *A clear determination of whether SOAEL [as per the NPPG] can be avoided at all plots by implementing mitigation measures, taking account of the plant operating times and low frequency characteristics.*

- 4.12 The DEFRA NANR45 guidance states “[this guidance] is not intended to provide a prescriptive indicator of nuisance since there are other factors that may need to be considered in reaching this decision.” Therefore, in our view, it would not be appropriate to use this guidance to determine criteria for the acceptability of plant noise emissions from the SSE site. This is discussed further in Section 6, which considers the potential impact of this noise source in line with BS4142 and the NPPG.

- 4.13 To address the requirements of the national and local policies, the following key acoustic matters have been assessed:

- noise affecting the habitable areas of the proposed development
- noise emissions from mechanical plant associated with the development at the position of existing sensitive receptors in the area

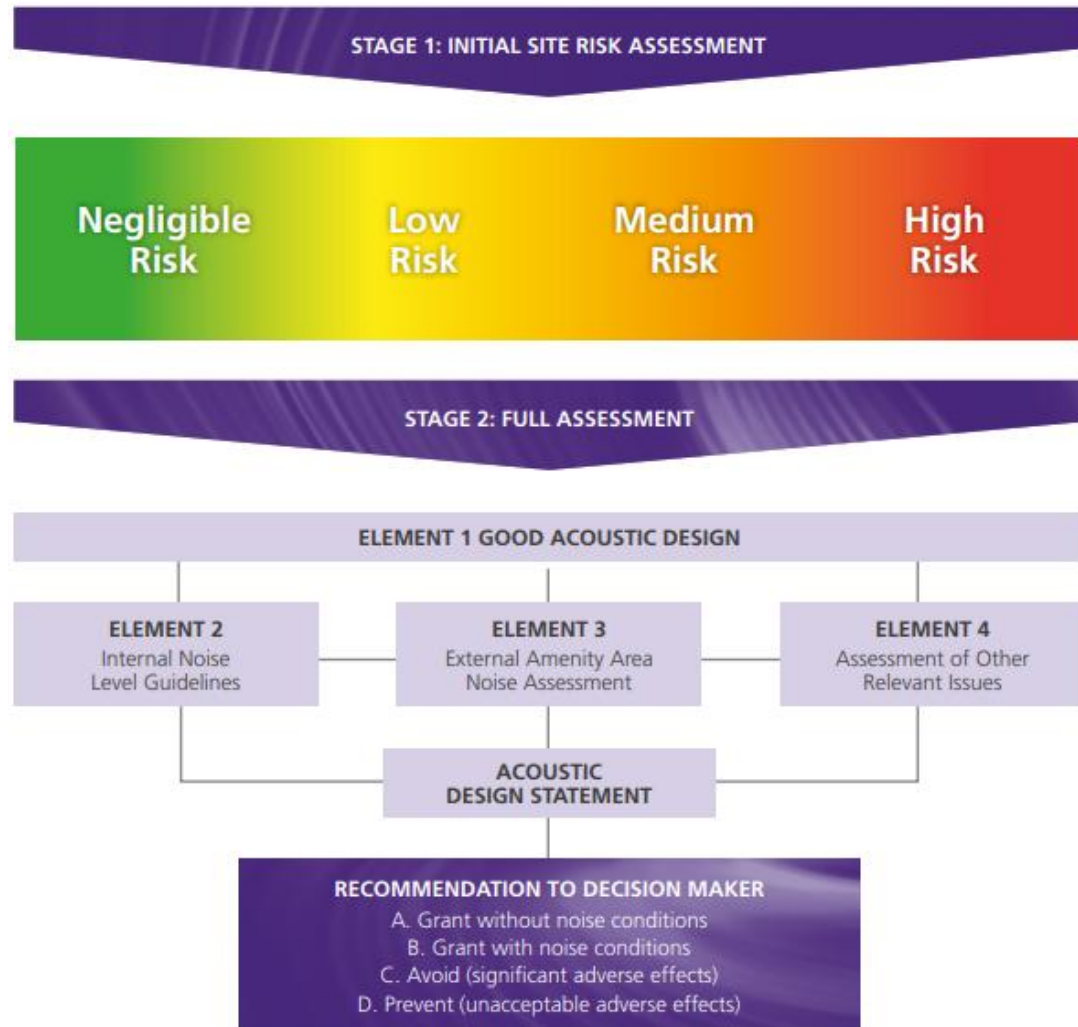
5. NOISE AFFECTING THE DEVELOPMENT

5.1 Specific guidance on the assessment of noise affecting new residential development is given in ProPG: Planning and Noise for New Residential Development, May 2017 (ProPG). The process within the ProPG guidance for the appraisal of noise levels affecting new residential development is considered to be current 'best practice' and has, therefore, been followed for the assessment. The assessment process can be summarised as follows:

- Stage 1 – measure noise levels at the site and carry out an initial noise risk assessment of the proposed development site based on the measured levels.
- Stage 2 – where a higher noise risk is identified, carry out a detailed assessment including the following four considerations:
 - Element 1 – the overall acoustic design and layout of the site
 - Element 2 – internal noise levels in habitable areas
 - Element 3 – noise levels in external amenity areas
 - Element 4 – consideration of other relevant issues
- Based on the results of the Stage 2 assessment, provide a recommendation to the decision maker on whether planning permission can and should be granted.

5.2 The process is shown visually in Figure 2 below.

Figure 2 ProPG Assessment Process



- 5.3 It should be noted that the guidance in ProPG relates primarily to noise from transportation sources, i.e. road traffic, aircraft, rail etc. Any significant noise from other sources (e.g. industrial, commercial or entertainment sources) is outside the scope of the ProPG guidance and, therefore, requires separate consideration. This is discussed further below in relation to noise from nearby commercial premises, mechanical plant, and the football stadium to the east of site.

Stage 1 – Noise survey and initial assessment

- 5.4 A noise survey was carried out at the site from 16 - 23 April 2025 to assess existing noise levels in the area. The full methodology and results of the noise survey are provided in Appendix 2.
- 5.5 Average noise levels (LAeq) across the site were generally dictated by road traffic on The B2149 and Bartons Road. Average noise levels at the south and eastern edges of the site were also affected by mechanical plant noise from the SSE site.

- 5.6 Maximum noise levels (LA_{max}) at the north of the site were largely dictated by car passes along the B2149.
- 5.7 Background noise levels (LA₉₀) across the site were dictated by constant road traffic noise from the B2149.
- 5.8 Areas of the development at the western and northern edges of the site will be subject to the highest noise levels. The noise survey results show that noise levels at facades at these positions are as follows:
- Western edge of the site facing the B2149:
 - Average noise levels during the daytime - 60 dB LA_{eq},0700-2300hrs
 - Average noise levels during the night-time - 53 dB LA_{eq},2300-0700hrs
 - Typical maximum noise levels during the night-time - 70 dB LA_{max}
 - Northern edge of the site facing Bartons road:
 - Average noise levels during the daytime - 64 dB LA_{eq},0700-2300hrs
 - Average noise levels during the night-time - 55 dB LA_{eq},2300-0700hrs
 - Typical maximum noise levels during the night-time - 73 dB LA_{max}
- 5.9 Based on the results of the site noise survey, a 3D computer noise model was developed to predict and assess the noise levels that will exist across the entire development.
- 5.10 The 3D noise model was developed using Cadna/A v2026 environmental noise modelling software. Cadna/A incorporates the calculation methodology outlined in the Department of Transport Welsh Office - Calculation of Road Traffic Noise (CRTN) for the assessment of road traffic noise propagation.
- 5.11 Several iterations of the 3D noise model were developed using the evolving site plan to ensure that noise from the surrounding noise sources (especially the noise from the pub gardens and the SSE site) was mitigated as practicably as possible through the positioning of the residential dwellings and gardens within the constraints of the site.
- 5.12 The layout of the development and surrounding area was input into the model. To calculate the spread of noise levels around the site, daytime and night-time average noise levels were input for the surrounding roads (e.g. the B2149 and Bartons Road) and calibrated to the results of the on-site noise measurements.
- 5.13 The methodology and results of the noise modelling are provided in Appendix 3. It can be seen from the modelling results that road traffic noise levels will be highest on facades of the development facing the B2149 and Bartons Road and facing the SSE office building and the lowest at the centre of the site.

- 5.14 The noise levels can be compared with Figure 3 below to assess the 'noise risk' of the site. Where the noise risk is high, significant acoustic design measures may be required to achieve acceptable noise levels in the development. Where the noise risk is low, acceptable noise levels may be achievable with no specific acoustic design measures.

Figure 3 Noise Risk Assessment (Adaption of Figure 1 from ProPG)



- 5.15 It can be seen from a comparison of the measured noise levels in Paragraph 5.8 above with Figure 3 that the site is 'Medium' risk in relation to daytime noise levels and 'Medium' risk in relation to night-time noise levels. Therefore, ProPG requires that a more detailed 'Stage 2' assessment is carried out.

Stage 2 – Element 1 – Overall acoustic design of the site

- 5.16 The acoustic design of development has been reviewed in relation to the measured noise levels at the site. The layout of the development is considered to represent good acoustic design for the following reasons:
- The layout positions sensitive areas of the residential properties away from the surrounding noise sources, as far as practicable within the project constraints.
 - The use of slightly increased garden fence heights in selected areas, to further reduce noise emissions from the SSE site and Bartons Road. This is discussed further below.
 - Where possible, within the project constraints, houses on the eastern site boundary have been positioned in order to provide acoustic screening to their gardens from noise generated at the SSE site. This is discussed further below.
 - The addition of the acoustic barrier on the eastern boundary of the site. This is discussed further below.
 - The use of acoustically upgraded glazing & ventilation to reduce noise levels inside the habitable rooms of the proposed residential dwellings, where applicable. This is discussed further below.

Stage 2 – Element 2 - Internal noise levels

- 5.17 Appropriate design criteria for acceptable noise levels in acoustically sensitive areas of new developments are given in BS8233:2014 'Guidance on sound insulation and noise reduction for buildings'.

5.18 Relevant BS8233 design criteria are summarised in Table 2 below.

Table 2 BS8233:2014 Internal Noise Criteria

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB LAeq,16hour	-
Dining	Dining room/area	40 dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hour	30 dB LAeq,8hour

- 5.19 Full construction details for the development have not been finalised as the project is at an early design stage. It has, therefore, been assumed that the external walls of the development will be constructed using a standard masonry construction (e.g. 102mm brick, 100mm insulated cavity, 100mm concrete block) or a light-weight construction designed to achieve a similar level of sound insulation (this is technically achievable subject to detailed design).
- 5.20 Background ventilation for the development will be provided by continuous mechanical extract ventilation (MEV) systems with trickle ventilators in the building facade. The ventilation system should be designed to achieve appropriate noise levels within the habitable rooms.
- 5.21 Calculations were carried out using facade modelling software in accordance with the methodology given in BS8233:2014 to calculate the sound insulation performance required of the glazing and ventilation to achieve the nominated internal noise criteria in the 'worst-case' habitable rooms of the development (i.e. the habitable rooms that will be subject to the highest external noise levels). The calculations included a 3 dBA design margin.
- 5.22 If acceptable internal noise levels can be achieved in 'worst case' habitable rooms then it follows that acceptable internal noise levels can be achieved in all other habitable rooms of the development using similar glazing and ventilator types.
- 5.23 The calculations were carried out based on the dimensions/details for facade elements taken from project drawings, as well as the acoustic environment measured during the noise survey and with the assumption that the louvre on the SSE building has a height of 4m (based on observations made on site).
- 5.24 The results of the calculations are shown in Appendix 4 and are summarised in Table 3 below.

Table 3 Acoustic Requirements for ‘Worst Case’ Habitable Rooms

‘Worst Case’ Rooms	Glazing Performance Requirements (inc. Frames)	Ventilator Performance Requirements (in Open Position)
Bedrooms on Bartons Road	33 dB Rw+Ctr	38 dB D _{ne,w} + Ctr
Living rooms on facing B2149		
Bedrooms facing SSE site	37 dB Rw+Ctr	MVHR
Note The requirements given are approximate only and should be confirmed at the detailed design stage when full design details are available.		

- 5.25 The required sound insulation performance values in Table 3 could typically be achieved by the glazing and ventilator types shown in Table 4.

Table 4 Typical Glazing / Ventilator Acoustic Performances

Glazing (in Good Quality Sealed Frames)	Typical Weighted Sound Reduction (Rw + Ctr)
6/16/6.4mm thermal double glazing	33
16.6/16/12.8mm Laminated thermal double glazing	37
Ventilators	Typical Acoustic Performance (D _{new} + Ctr)
Greenwood 5000EAW.AC2 (Vent +2 Acoustic Modules – External & Internal)	38
Note The acoustic performance of the glazing systems (including frames) should always be confirmed with the manufacturer before selection for installation on site.	

- 5.26 It can be seen from the above that compliant internal noise levels will be achievable in the development subject to the specification of suitable glazing and ventilation systems at the detailed design stage. It is, therefore, our view that the proposed development is, in principle, acceptable with regards to the noise levels that will exist within the habitable rooms. Noise from the SSE site is discussed further in Section 6.
- 5.27 It should be noted that it will be possible to use lower acoustic performance glazing and ventilators for habitable rooms on facades that are further from or acoustically screened from the surrounding noise sources. This can be investigated further at the detailed design stage.
- 5.28 The above ProPG assessment for planning purposes is based on internal noise levels with windows closed (assumed to be “normal” circumstances). However, it is anticipated that residents will open their windows at times for thermal comfort (e.g. to prevent overheating in warmer months). Noise levels in the rooms will increase under these circumstances.
- 5.29 The development will be subject to Part O of the Building Regulations (Approved Document O), which came into effect on 15 June 2022. Section 3.2 of Approved Document O (ADO) states:

In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

a. 40dB LAeq,T, averaged over 8 hours (between 11pm and 7am).

b. 55dB LAFmax, more than 10 times a night (between 11pm and 7am).

5.30 It is important to note that the Part O requirements only apply to bedrooms at night. There are no requirements for other habitable rooms (living rooms, dining rooms, etc).

5.31 The noise levels in bedrooms at night with the windows open will vary based on the external night-time noise levels and the size and extent of window opening required to control overheating. The wider the window needs to be open, the lower the sound insulation performance. The following indicative “outside to inside” reduction values have been adopted for the assessment based on current industry guidance¹:

- ~4 dB when the window is fully open
- ~9 dB when the window is open to around ~0.4m²
- 13 dB when the window is partially open to ~0.2m².

5.32 Therefore, it is possible to rely on a larger window opening to control overheating on quieter facades. The relationship between external noise levels and window openings for compliance with Part O is summarised in Table 5.

¹ These values are taken from guidance published in the document “Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O” Version 1.1 November 2024, by the Association of Noise Consultants. The values are based on a floor area of 10m² and a room height of 2.4m.

Table 5 External Part O Noise Criteria and Allowable Window Opening for Overheating

External Noise Levels outside Bedrooms at Night		Allowable night-time window opening to control overheating
Average Noise Levels (LAeq,8hrs)	Maximum Noise Levels (LAmax) – see Note 1	
≤44 dB	≤59 dB	Fully open (to achieve 13% of the floor area which is typically ~1.3m ²). Ventilators fully open.
≤49 dB	≤64 dB	Open (~4% of floor area e.g. ~0.4m ²) – see Note 2. Ventilators fully open.
≤53 dB	≤68 dB	Partially open (~2% of floor area e.g. ~0.2m ²). Ventilators fully open.
≥54 dB	≥69 dB	Windows to be assumed to be fully closed during the night for the purposes of Part O compliance. Ventilators fully open.
Note 1		Not exceeded more than 10 times per night (between 11pm and 7am)
Note 2		An opening of 4% of the floor area would comply with the 'simplified method' for Part O compliance, if targeted, as the site is in a 'medium risk' area.

- 5.33 The criteria in Table 5 above have been applied to the predicted night-time noise levels from the model to show where open windows can be relied upon for the control of overheating and Part O compliance. The results are shown in Appendix 5.
- 5.34 It can be seen from Appendix 5 that windows to bedrooms facing Bartons Road, B2149 and the SSE site will need to be assumed to be closed during the night-time for the purposes of the overheating assessment due to the higher external noise levels. Open windows can be used to help address overheating in all other bedrooms across the rest of the site.
- 5.35 The information in Appendix 5 can be provided to the project Energy Assessor to inform the overheating assessment and demonstrate compliance with Part O.

Stage 2 – Element 3 – Noise levels in external amenity areas

- 5.36 BS8233 states that it is desirable that noise levels in external amenity areas of residential developments do not exceed 50 dB LAeq and that 55 dB LAeq,T should be regarded as an upper guideline value. However, BS8233 recognises that these guideline values will not always be achievable in city centres or urban areas adjoining main roads or other transport sources. In these cases, BS8233 states that the development should be designed to achieve the lowest practicable noise levels in the amenity spaces.
- 5.37 With all garden fences (or brick walls around gardens) assumed to have heights of 1.8 m, the vast majority of gardens are calculated have noise levels that do not exceed the upper guideline value given in BS8233, due to road traffic noise.

- 5.38 As part of the development design, a 4m tall acoustic barrier has been included on the eastern boundary of the site. The location of the barrier is shown in Appendix 6.
- 5.39 With a 2.4 m garden fence installed on the north and eastern boundaries of Plot 1, garden noise levels are calculated to not exceed the BS8233 upper guideline value. The calculations have been carried out with noise levels calculated approximately in the centre of each garden.
- 5.40 Additionally, several gardens located towards the south-east of the site are affected by noise from the SSE site (although the noise levels in these gardens do not exceed the BS8233 upper guideline value). A 2.4 m fence has been included in the development layout, to reduce noise levels from the SSE site, at the position of these gardens. The location of this increased fence height is shown in Appendix 6. Noise from the SSE site affecting the habitable rooms of the proposed development is discussed further below, in Section 6 of this report.
- 5.41 The acoustic barrier and all garden fences should of an imperforate construction, with a minimum surface mass of 10 kg/m². Brick walls may also be used as an alternative to garden fences.
- 5.42 Furthermore, based on the results of the noise survey, noise levels on balconies on the northern and western facades of the proposed apartment block are expected to exceed the BS8233 recommended levels by up to 6 dB, due to road traffic noise. However, whilst this is not ideal, in our view, exceeding the BS8233 recommended levels does not normally mean that the balconies would be unacceptable to future residents. The reasons for this are as follows:
- Most developments in urban areas will be subject to noise levels above the BS8233 recommended levels for balconies²
 - It is common for noise levels on balconies facing main roads to exceed the BS8233 recommended noise levels next to main roads and elsewhere.
 - It is reasonable to assume that residents would prefer the option to have a noisier balcony as opposed to having no balcony at all
 - Planners often consider it to be beneficial to the streetscape to have balconies facing roads as they help marry the development to the surrounding area.
- 5.43 The current design of the development is, therefore, considered to be acceptable in relation to road traffic noise levels in external amenity areas.

Stage 2 – Element 4 – Other relevant issues

- 5.44 In our view, the design and acoustic approach outlined above is in line with both local and national noise policy. It is common for residential properties to be situated near to main roads and this is an acceptable scenario provided that the properties are acoustically upgraded where necessary to achieve acceptable noise levels in habitable areas.

² Table 2 from BS8233 notes that daytime noise levels will typically exceed 50-55 dB LAeq,16hr in areas close to busy main roads. It was also found in the UK National Noise Incidence Study 2000/2001 that 90% of UK homes were exposed to daytime noise levels >50dB LAeq,16hr and 54% of UK homes were exposed to noise >55dB LAeq,16hr. It is reasonable to assume that a high percentage of these were in urban areas.

Noise from Havant and Waterloooville Football Club

- 5.45 Due to the proposed sites proximity to Havant and Waterloooville Football Club, noise associated with football matches and other activities at the football club premises has been assessed.
- 5.46 There is no nationally agreed methodology or numerical criteria for the assessment of noise from football clubs. Furthermore, the methodology used for assessing commercial activities in general (BS4142:2014) specifically precludes its use in situations where speech/crowd noise is expected to be the dominant noise source and use for recreational activities, as is the case here. Instead, planning guidance and policy has been applied based on measured noise data at the site.
- 5.47 The noise survey included noise from a football match taking place between Havant and Waterloooville and Bracknell at the Havant and Waterloooville ground. This match took place on Saturday 19th April.
- 5.48 During louder events of the match (e.g. with three goals to home team – considered typical worst case noise scenario), the only activities that were audible were the referee whistle and occasional shouting from fans (i.e. goal celebrations). These activities were only audible on the eastern boundary of the site. The daytime average noise levels (LAeq) and maximum noise levels (L_{Amax}) remained consistent with the levels measured during other days of the survey period, without a football match taking place.
- 5.49 Furthermore, noise from the football club during the game did not have a material impact on the measured daytime average noise levels (LAeq,0700-2300); i.e. average noise levels at the eastern boundary of the site (Logger Position L4, with reference to Appendix 2) were still dictated by mechanical plant noise from the external mechanical plant associated with the SSE site during the matchday.
- 5.50 For the short periods when football noise would be at its loudest, noise levels would be well below the BS8233 daytime indoor noise criteria. Consequently, in our view the noise generated from the football club and activities associated with the football games does not require further mitigation.
- 5.51 Furthermore, football matches are held relatively infrequently, which would typically be between two to four times a month during the football season, and do not occur during night-time (23:00-07:00 hours).
- 5.52 In light of the above, it is our view that the noise mitigation measures proposed earlier in this report to address road traffic and mechanical plant noise are also sufficient to address noise from Havant and Waterloooville Football Club, and that no additional noise mitigation measures for this source are considered necessary.

Noise from Solent Used Car & Service Centre

- 5.53 As stated in Paragraph 3.1, the Solent Used Car & Service car dealership is located to the south-west of the proposed development.
- 5.54 As part of the noise survey set out in Appendix 2, a noise logger was set up on the south-western boundary of the proposed development, with the aim to measure noise from the car dealership

(Logger Position L3). Analysis of the measured noise levels at this location shows that no significant noise was picked up from this premises during the survey period. It is recommended that noise from this premises is reviewed at the detailed design stage, once it has been possible to liaise with management of this premises. It is recommended that the acoustic criteria set out in Tables 5 & 6 (set out in Section 6 below) are adopted for the purposes of assessing noise from this premises.

Recommendation to decision maker

- 5.55 It is our view that planning permission may be granted in relation to noise affecting habitable areas of the development subject to the imposition of suitable planning conditions to ensure that acceptable noise levels are achieved in the finished development, if necessary.

6. COMMERCIAL NOISE ASSESSMENT

- 6.1 The site has several commercial noise sources nearby. To the east of site is The Westleigh Pub and the SSE site, which contains mechanical plant. Furthermore, to the west of site is a Hungry Horse Pub, known as the Heron. These have been assessed in turn below and suitable mitigation measures have been identified where required.
- 6.2 BS4142:2014+A1:2019 – *Methods for rating and assessing industrial and commercial sound* (hereafter BS4142) can be used to assess the impact of noise from external industrial and/or commercial noise sources on nearby sensitive receptors.
- 6.3 The BS4142 assessment methodology can be summarised as follows:
1. Measure the existing background noise levels (LA90,T dB) at the locations of nearby noise sensitive receptors during the quietest periods when the noise source(s) under investigation will operate
 2. Predict or measure the noise emissions (LAeq,T dB) from the noise source(s) under investigation at the location(s) of the nearby sensitive receptors, and add corrections for any distinguishable acoustic features (e.g. tones, whines, screeches, hisses etc)
 3. Subtract the measured background noise levels (Item 1 above) with the measured or predicted rating noise levels (Item 2 above) at each sensitive receptor. BS4142 states that:
 - a) *Typically, the greater this difference, the greater the magnitude of the impact.*
 - b) *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
 - c) *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
 - d) *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*
- NOTE Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.*

Design Criteria

- 6.4 As stated in Paragraph 5.46, BS4142 specifically precludes its use in situations where speech/crowd noise is expected to be the dominant noise source and use for recreational activities, as is the case here, in relation to noise from music and patrons.

- 6.5 Clause 11 in Section 11 of BS4142 advises the following with regards to the importance of considering the context of a noise when assessing the likely impact of commercial noise:

The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.

- 6.6 In this instance, the site is located in a mixed-use area, where noise would be expected from nearby existing commercial premises. Such activities are typical across industrial estates up and down the country; noise associated with such activities should therefore be perceived in this context.

- 6.7 BS4142 advises that in the situation where a new noise-sensitive receptor is introduced and there is an extant industrial and/or commercial sound:

Other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation

- 6.8 BS4142 goes on to state:

Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.

...3) The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

- i) façade insulation treatment;*
- ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and*
- iii) acoustic screening.”*

- 6.9 Therefore, it is appropriate to include the effect of any noise mitigation measures (such as facade insulation treatment, e.g. upgraded acoustic glazing and ventilation) in the assessment of the commercial noise to evaluate internal and outdoor acoustic conditions.

- 6.10 As such, alternative guidance should also be given weight when assessing the impact of commercial noise on the development. On this basis, it is our view that if noise from nearby commercial uses does not exceed 10 dB below the BS8233 criteria within habitable spaces of the proposed development, there will be a low risk of residents being disturbed by the noise. A 10 dB reduction in the BS8233 internal noise level criteria is a significant reduction and is comparable to a stringent use of the ‘acoustic character corrections’ for commercial noise detailed in BS4142.

- 6.11 The adopted noise limits for public house noise affecting the proposed development are set out in Table 5.

Table 6 Commercial Noise Limits – Public House Noise

Location	Worst Case Internal Noise Level within Development	
	Daytime	Night-time
Worst affected proposed dwelling	25 dB LAeq,T	20 dB LAeq,T

- 6.12 Noise limits have also been adopted for mechanical plant noise affecting the proposed development – this applies to noise from the adjacent SSE site. The internal noise limits are based on the internal noise level criteria given in BS8233, with BS4142 acoustic character corrections also applied.
- 6.13 The external noise limit (applicable to gardens) has been adopted based on the BS4142 assessment methodology set out in Paragraph 6.3. Given that the Havant Borough Council's Local Plan 2011 does not give specific criteria for limits for mechanical plant, noise limits of equal to measured background have been adopted for this assessment. The limit has been selected based on the background noise level (LA90) measurements at Logger Position L4 (as shown in Appendix 2). The adopted noise limits are shown below in Table 7.

Table 7 Internal and Garden Plant Noise Limits (SSE site)

Location	Plant Noise Limits		
	Internal		External
	Daytime	Night-time	Gardens ¹
Worst affected proposed dwelling	35 dB LAr,Tr	30 dB LAr,Tr	46 dB LAr,Tr

Note 1 The adopted noise limit for gardens is applicable to daytime hours only (07:00-23:00), due to gardens typically not being used during night-time hours. This is consistent with the BS8233, which provides guideline values for noise levels in gardens during daytime hours only.

- 6.14 In our view, if noise from nearby commercial premises and mechanical plant noise does not exceed the criteria set out in Table 5 and Table 6 within habitable spaces of the development, there will be a low risk of residents being disturbed by noise.

Assessment

Noise From Surrounding Pubs

- 6.15 During the noise survey, there was no commercial noise observed from either the of the pubs (based on analysis of audio recordings and the measured noise levels); therefore, Cass Allen library data, which has been previously measured at comparable premises, have been used for this assessment.
- 6.16 Both pubs have amplified music played within them (a DJ once a month at the Heron and live music/DJ events are held within The Westleigh). Furthermore, it is understood that The Westleigh is available for private hire). The currently advertised operating hours of each public house are as follows:
- The Westleigh: 11:00 to 23:30 Monday to Sunday;
 - Heron: 09:00 to 23:00 Monday to Sunday.
- 6.17 The location of the public house buildings, windows and any doors for both buildings were included in the 3D noise model to calculate the noise impact of these sources on the proposed development. The various windows and doors at both pubs were put into the model to quantify the noise breakout from possible openings in the facades of each public house. To ensure a conservative assessment, relevant doors and windows for each pub were modelled as being fully open where applicable.
- 6.18 The results of these calculations are set out in Table 7 below.

Table 8 Calculated Internal Noise Levels – Public House

	Daytime	Night-time ¹
Noise Limit (as per Table 5)	25 dB LAeq,T	20 dB LAeq,T
Calculated Internal Noise Level	<20 dB LAeq,T	<20 dB LAeq,T

Note 1 The calculations for the night-time period are based on no live music operating at The Westleigh during the final half-hour of its operating period (23:00-23:30).

- 6.19 It can be seen from Table 8 that the calculated noise levels from the use of the public houses are compliant with the noise limits set out in Table 6. Furthermore, the calculated noise levels given in Table 7 are likely to be lower for the vast majority of the time because, as stated in Paragraph 6.17, the calculations are based on the relevant doors and windows from each public house being open during the modelled scenario.
- 6.20 On this basis, it is our view that public house noise emissions affecting the proposed development are acceptable, subject to the adoption of the glazing and ventilation strategy set out in this report. Noise emissions from the public houses can be investigated further at the detailed design stage, with the view to potentially assess whether glazing and ventilation products with a lower acoustic performance can be adopted in areas of the site less exposed to this noise source.

Noise from SSE site

- 6.21 During the noise survey, significant mechanical plant noise as a low frequency electrical hum (with a peak at 100Hz) was observed across the south-eastern section of the proposed development from a louvre located at ground floor level of the adjacent SSE building.
- 6.22 A series of short term and longer-term measurements took place to measure the noise impact of the louvre, as shown in Appendix 2.
- 6.23 The louvre was included in the 3D noise model along with the latest site layout, to calculate its noise impact on the facades and gardens of the proposed development. The 3D noise model was developed based on the noise environment that was present during the noise survey and the assumption that the louvre on the SSE building has a height of 4m (based on observations made on site).
- 6.24 BS4142 states that context should be considered and corrections should be applied for on-time and character of the noise. Based on the findings of the noise survey, the noise from the louvre appears to operate continuously and, as discussed, has a distinct tone (a low frequency humming). Therefore, a +6dB correction for tonality has been applied to calculated results of the 3D noise model.
- 6.25 Calculations have been carried out to determine the noise levels inside from the habitable rooms of the worst-affected dwelling by noise from the SSE site, which in this case is Plot 42. The calculations were carried out based on the room and window dimensions given in the current project drawings.
- 6.26 The internal noise impact from mechanical plant was calculated to be 12 dBA L_{Ar,Tr} within the worst-affected bedroom in Plot 42. This noise level is compliant with both the daytime (by 23 dB) and night-time criteria (by 18 dB) applicable to noise from the SSE site, as set out in Table 8 above. Without the 6 dB rating penalty for tonality applied, the calculated noise level inside the worst-affected bedroom of Plot 42 is calculated to be 6 dBA.
- 6.27 Daytime average noise levels inside this bedroom are calculated to be 19 dB L_{Aeq,16hrs} and night-time average noise levels inside this bedroom are calculated to be 18 dB L_{Aeq,8hrs}. When comparing the calculated noise from the SSE site inside this bedroom, this illustrates a difference in noise levels of 7 dB in the daytime and 6 dB in the night-time. In our view, differences in noise levels of this magnitude do fall within the classification of a LOEAL or a SOEAL, in relation to the descriptions of the effect levels given by NPPG in Table 1 of this report. Consequently, it is our view that internal noise levels from the proposed development in relation to noise from the SSE site are acceptable, subject to the adoption of the mitigation measures set out in this report.
- 6.28 With the mitigation measures that have been incorporated into the development design, this noise will have been reduced as far as practicable. As discussed above, in our view, the predicted levels of noise from the SSE site would be classified as 'No Observed Adverse Effect' in line with NPPG, this means that the noise may at times be present but not intrusive (see Table 1). SSE noise is below the level of either LOEAL or a SOEAL, which the project EHO expressed should be avoided (as stated in Section 4).

- 6.29 The 3D noise model also predicted the impact of the noise breaking out from the louvre on the proposed gardens in the development. With a standard 1.8-meter fence and the tonality correction discussed above, the worst-case affected garden would experience 46 dB L_{Ar,Tr} of noise from the louvre. In this case, the worst-affected garden is in Plot 52.
- 6.30 The positioning of the proposed residential dwellings as part of the overall development layout has been discussed with the project team to minimise noise levels in the gardens as practicably as possible, within the project constraints. Where it was not possible to reposition all houses in front of their respective gardens (i.e. to provide acoustic screening from the SSE site), a 2.4-meter tall garden fence is included at several locations on the eastern boundary of the development.
- 6.31 With this fencing in place and the installation of the acoustic barrier along the eastern site boundary, noise from the SSE site has been mitigated to be 9 dB lower than the lowest typical background noise level in the worst affected garden (although the noise may still be faintly audible during significant lulls of road traffic). In our view, this level of noise is too low to be classified under LOEAL or a SOEAL, as per the EHO comments provided in Section 4.
- 6.32 Furthermore, the following noise sources were identified at the SSE site:
- An additional louvre, also located in the western facade was of the SSE building, located on the top floor. No noise from this louvre was identified during the survey.
 - Five air handling units located to the north of the main SSE building. Noise was identified from these units (as set out in Appendix 2); however, noise emissions from these units were quieter compared to noise emissions from the ground floor louvre in the main SSE building.
 - A substation was also identified to the north of the main SSE building.
- 6.33 The calculations described in Paragraph 6.23 were based on noise emissions from the ground floor louvre of the main SSE building, as this largely dictated noise emissions from the SSE site during the survey period.

7. PLANT NOISE IMPACT ASSESSMENT

Design criteria – Mechanical plant noise

- 7.1 As stated in Paragraph 6.13, given no specific criteria for mechanical plant noise limits are provided in Havant Borough Council's Local Plan 2011, noise limits of equal to background have been adopted for this assessment and are shown in Table 7 below.
- 7.2 Background noise levels (LA90) at the site were measured as part of the site noise survey outlined in Appendix 2. The measured background noise levels have been used to develop limits for plant noise emissions from the new development at the positions of the surrounding residential properties in accordance with the BS4142 assessment methodology. The limits are shown in Table 8 below.

Table 8 BS4142 Noise Limits - Free-field Levels

Location	Period	
	Daytime/Evening (0700-2300hrs)	Night-time (2300-0700hrs)
Nearest residential properties to north of development	58 dB LAr,Tr	37 dB LAr,Tr
Nearest residential properties to south of development	48 dB LAr,Tr	44 dB LAr,Tr

Note 1 The above limits are 'rated' noise levels. Any mechanical plant noise emissions should have appropriate corrections for the character of the noise applied and still meet these limits.

Proposed mechanical plant design

- 7.3 Detailed design information is not yet available for external mechanical plant for the development, and therefore noise emissions from external mechanical plant cannot be accurately predicted at the positions of nearby residential properties at this stage.
- 7.4 The selection and design of external mechanical plant will be reviewed as project information becomes available to ensure that the project BS4142 noise limits given in Table 7 are achieved.
- 7.5 It is expected that it will be straightforward to achieve the BS4142 noise limits given the distance between the edge of the site and nearby sensitive receptors and the nearby roads screening the noise generated by the development. Compliance with the limits could be secured through the imposition of a suitable planning condition if deemed necessary by the Local Planning Authority.

8. CONCLUSIONS

- 8.1 Cass Allen was instructed by Stonebond Properties (Guildford) Limited to assess noise affecting a proposed new development at Bartons Road, Havant.
- 8.2 The assessment was carried out in accordance with relevant local and national planning guidance.
- 8.3 A noise survey was carried out at the site. Noise levels at the site are dictated by road traffic noise emissions from Bartons Road and the B2149 and mechanical plant noise from the adjacent SSE site.
- 8.4 A 3D noise model of the development was constructed based on the results of the site noise survey. The noise model was used to predict noise levels across the development.
- 8.5 Noise affecting the development has been assessed in accordance with ProPG guidance. The design of the development is considered to be acceptable subject to the adoption of acoustically upgraded glazing and ventilation and acoustic screening around gardens. This can be investigated further at the detailed design stage and may be secured by the imposition of a noise-related planning condition by the Local Planning Authority.
- 8.6 Compliance with noise criteria in Building Regulations Part O has also been assessed. Some bedrooms will need to be designed so that windows can remain closed at night without the rooms overheating. This can be assessed further in due course.
- 8.7 Noise emissions from the SSE site have been assessed. It is envisaged that noise levels from the SSE site can be largely mitigated, subject to acoustically upgraded glazing and ventilation, screening around gardens, and the installation of the 4m acoustic barrier on the eastern boundary of the site (the location is shown in Appendix 6). However, it is recommended that noise emissions from this site are assessed at the detailed design stage, once it has been possible to establish the operating conditions of all mechanical plant items associated with this site. However, no matter how low the noise from the louvre is designed to, it is possible that it may still be occasionally faintly audible, particularly during significant lulls of road traffic.
- 8.8 Noise emissions from the nearby public houses have also been assessed. It has been calculated that noise levels from these sources can be suitably mitigated, subject to the adoption of the glazing and ventilation strategy set out in this report.
- 8.9 Appropriate limits for noise from mechanical plant have been calculated based on measured noise levels at the site and guidance given in BS4142. It is envisaged that it will be straightforward to achieve the plant noise limits. This will be investigated further at the detailed design stage and may be secured by the imposition of a noise related planning condition if deemed necessary by the Local Planning Authority.
- 8.10 In summary, it is our view that the site is suitable for the development in terms of noise levels and that planning permission may be granted subject to the imposition of suitable planning conditions, if necessary.

Appendix 1 Development Layout



Notes:

- Please do not scale from this drawing except for planning purposes.
- Unless otherwise stated all dimensions are in millimetres.
- Please read in conjunction with all relevant architectural and engineering information.
- Contractor to confirm all dimensions, levels, and setting out on site.

Revisions:

Rev:	Date:	Description:
P03	20.08.25	Paving annotation updated
P04	04.12.25	Planner comments updated
P05	05.12.25	Soft landscape layout updated
P06	05.12.25	Play area and planting layouts updated

Charnwood Landscape Design Limited

Quatro House □ Lyon Way □ Frimley Road □ Camberley □ Surrey □ GU16 7 ER
Tel : 01433 631 960 Email : info@cdcl.co.uk

Job	BARTONS ROAD, HAVANT	Scale	1:200 @ A0	Date	JUL 25
Drawing Name	LANDSCAPE SURFACE FINISHES AND DETAIL TAG LOCATION PLAN	Dwg no.	CLDL 2445 (06) 01 01	Rev.	P06
Status	FOR PLANNING	Drawn by.	JS	Checked by.	EL

Appendix 2 Survey Results

Survey Summary:

The survey comprised short-term operator attended noise measurements and longer-term unattended noise monitoring at the site. Noise levels at the site were generally dictated by road traffic on surrounding roads.

Survey Period:

16/04/2025 to 23/04/2025

Survey Objectives:

- To identify noise sources that contribute to ambient noise levels at the site;
- To measure noise levels around the site over a typical day and night-time period.

Equipment Used:

Type	Manufacturer	Model	Serial Number
Sound level meter ¹	NTi Audio	XL2	A2A-15506-E0
Sound level meter ¹	NTi Audio	XL2	A2A-24252-E1
Calibrator	Larson Davis	Type CAL200	15011
Sound level meter ¹ (noise logger)	Rion	NL-32	00482672
Sound level meter ¹ (noise logger)	Rion	NL-32	00251125
Calibrator	Rion	NC-74	34551703

Note 1: All sound level meters were calibrated before and after measurement periods and no significant drift in calibration was found to have occurred. The results of the measurements are therefore considered to be representative.

Weather Conditions:

The observed weather conditions were acceptable for acoustic measurement throughout the attended survey periods (low-medium wind speeds and no rain). Weather records for the area confirmed that weather conditions were also generally acceptable for acoustic measurement during the unattended monitoring. Any periods of unattended monitoring that may have been adversely affected by weather conditions have been excluded from the data analysis.

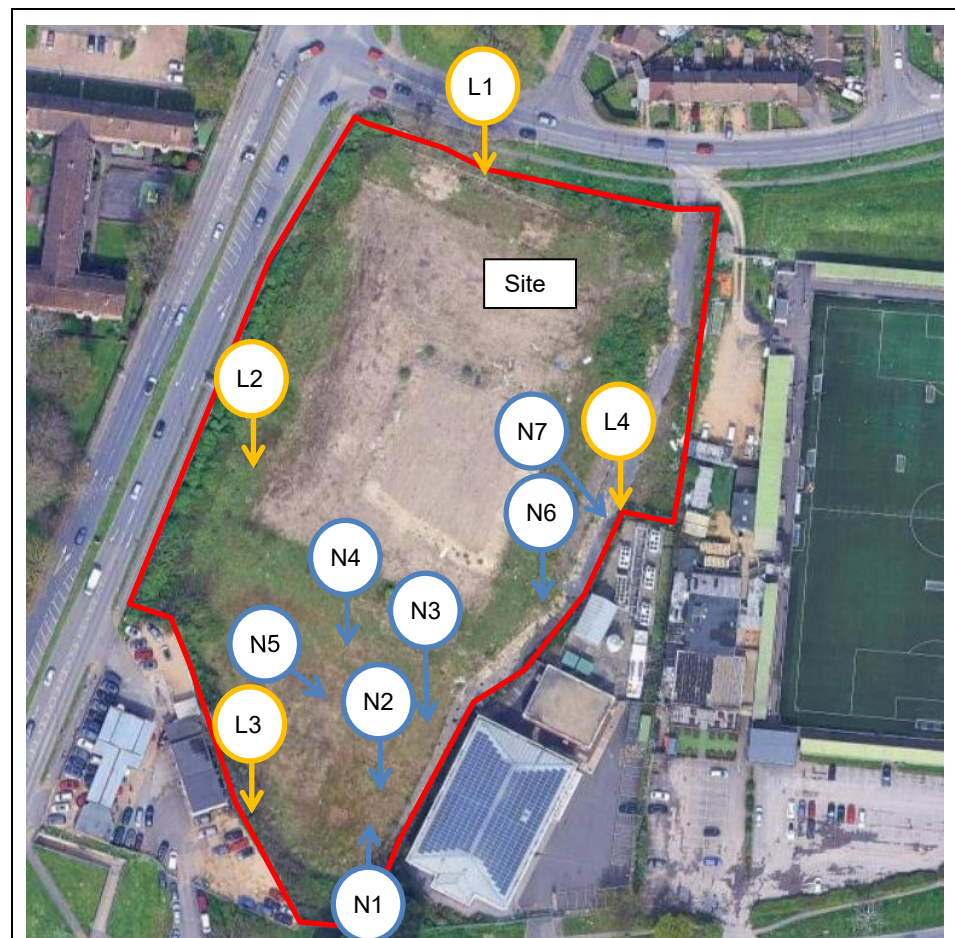
Measurement Positions:

Position (refer plan below)	Description
N1	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to nearby noise sources
N2	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to nearby noise sources
N3	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to nearby noise sources
N4	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to nearby noise sources

Measurement Positions:

Position (refer plan below)	Description
N5	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to nearby noise sources
N6	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to nearby noise sources
N7	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to nearby noise sources
L1	Unattended noise logging position. 3m above ground level. Free-field. Direct line of sight to nearby noise sources
L2	Unattended noise logging position. 3m above ground level. Free-field. Direct line of sight to nearby noise sources
L3	Unattended noise logging position. 3m above ground level. Free-field. Direct line of sight to nearby noise sources
L4	Unattended noise logging position. 3m above ground level. Free-field. Direct line of sight to nearby noise sources

Site Plan showing Measurement Positions:



Attended Noise Monitoring Results:

Date	Position	Time	Meas. Length	LAeq, dB	LAmix, dB	LA90, dB	Observations
16/04/2025	N1	13:32	1 min	54	63	52	Average noise dictated by breakout from louvre on side of SSE building. Maximum noise dictated from distant vehicle passes.
16/04/2025	N2	13:33	1 min	54	59	52	
16/04/2025	N3	13:35	1 min	54	58	51	
16/04/2025	N4	13:41	1 min	51	53	49	
16/04/2025	N5	13:43	1 min	52	56	50	
16/04/2025	N6	13:49	1 min	54	57	53	Noise dictated by breakout from louvre on side of substation. Measured LAmix level caused by a combination of a distant vehicle pass and noise from the substation louvre.
16/04/2025	N7	13:52	1 min	56	63	54	Noise dictated by collective noise from external plant associated with SSE

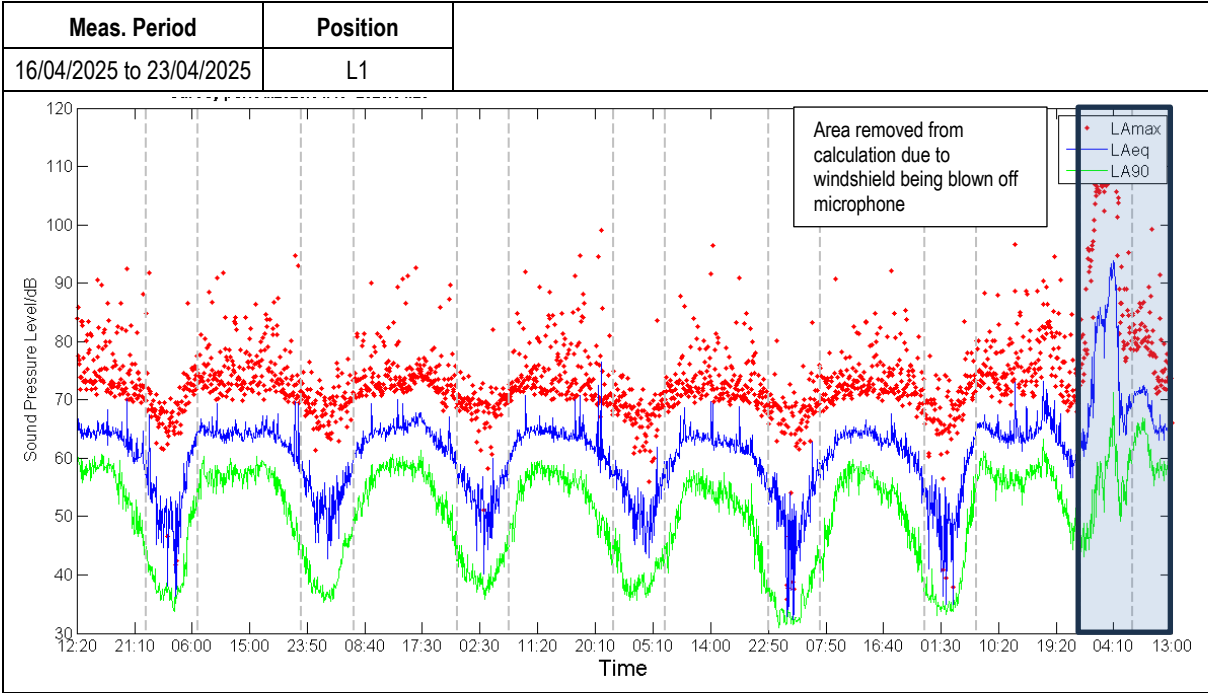
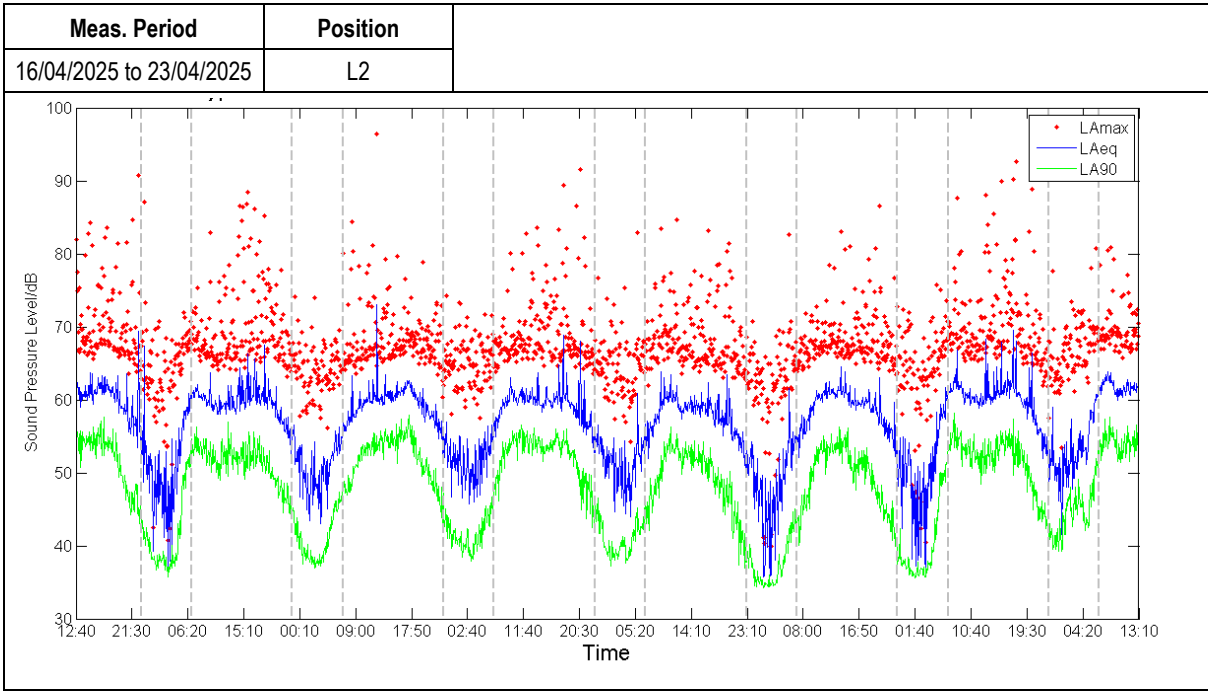
Unattended Noise Monitoring Results:

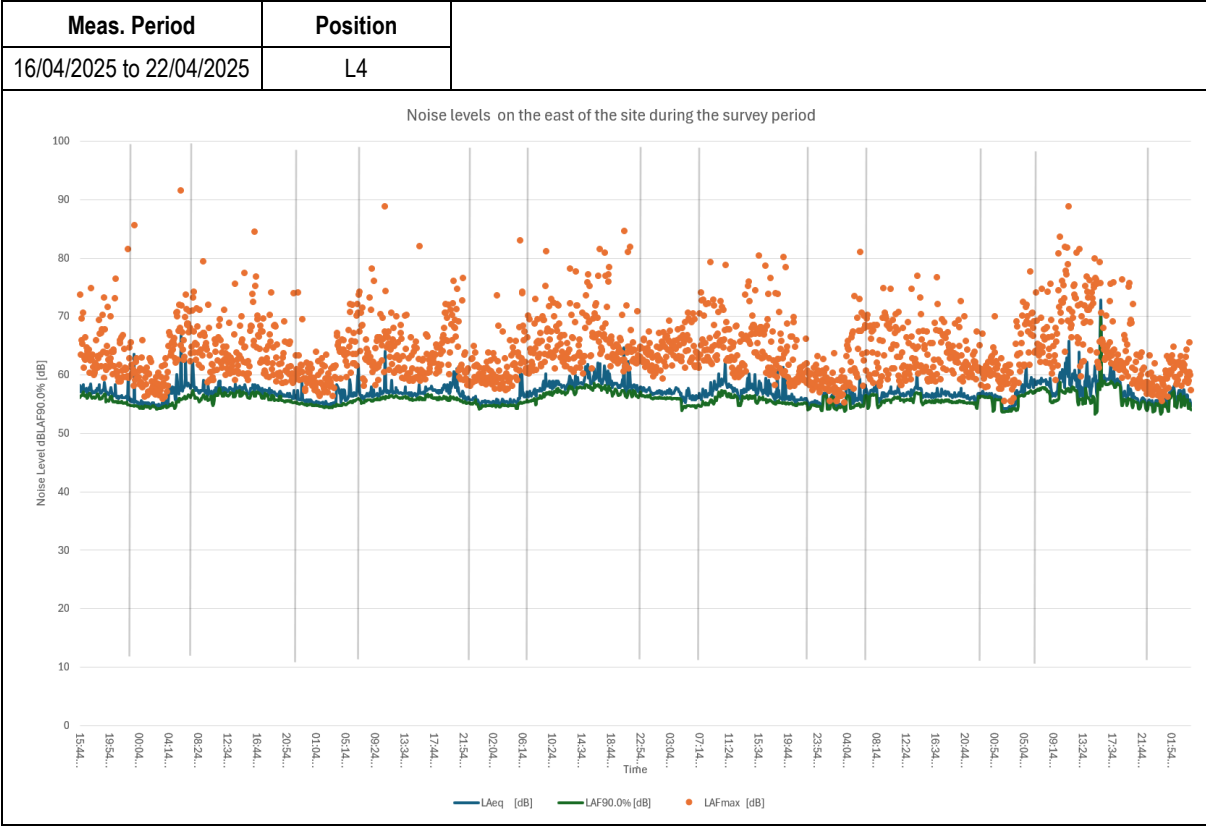
Meas. Period	Position	Daytime (0700-2300hrs)		Night-time (2300-0700hrs)		
		LAeq,16hr, dB	LA90,1hr dB ¹	LAeq,8hr, dB	LA90,5mins, dB ¹	LAmix, dB ²
16/04/2025 to 23/04/2025	L1	64	58	55	37	72-73
16/04/2025 to 23/04/2025	L2	60	54	53	38	68-70
16/04/2025 to 23/04/2025	L3	52	48	49	44	62-64
16/04/2025 to 23/04/2025	L4	58	56	56	55	66-68

Note 1: Typical lowest measured during the period shown.

Note 2: Highest typical maximum noise level during the night-time (not exceeded more than 10-15 times per night).

Unattended Noise Monitoring Results:





Appendix 3 Modelling Results

Modelling Software:

CADNA/A Version 2026

Modelled Scenarios:

Day and night-time average noise levels across the site

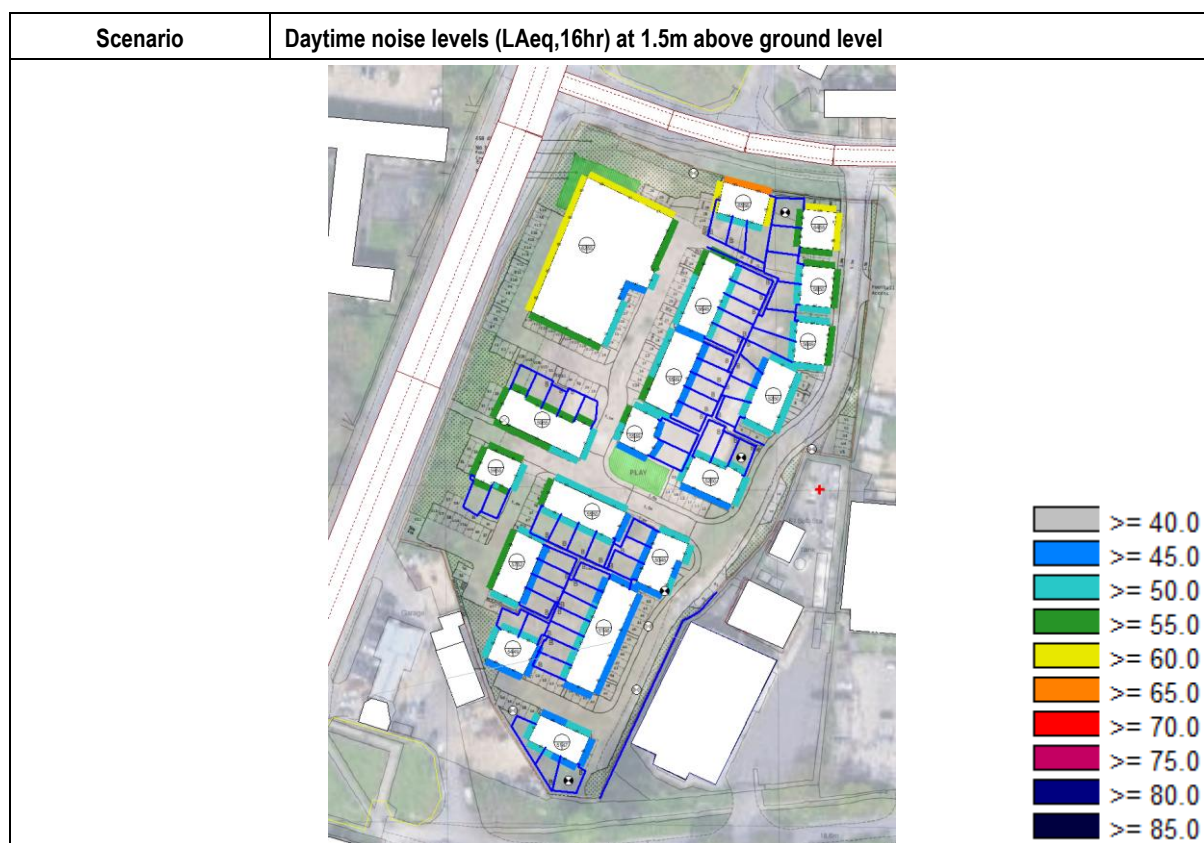
Data inputs:

- Noise survey results
- Topographical data for the site
- Development layout

Calculation Algorithms Used:

- Calculation of Road Traffic Noise 1988 – Department of Transport
- ISO 9613-1:1993 Acoustics-Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere
- ISO 9613-2:1996 Acoustics-Attenuation of sound during propagation outdoors – Part 2: General method of calculation
- ISO 9613-2:2024 Acoustics-Attenuation of sound during propagation outdoors – Part 2: Engineering method for the prediction of sound pressure levels outdoors

Modelling Printout:





Scenario

Daytime commercial noise levels (LAeq,1hr)



Appendix 4 Façade Calculations

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PROJECT:

ROOM:

VARIANT:

NOTES:

Room Dimensions [m] W L H

Room Volume = m³

Partition Area = m²

Ventilation ref area = m²

Free Field SPL K = dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

EXTERNAL SPECTRUM (A weighted)		dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->		-								No data
Road traffic spectrum (according to BS 8233:1999 section 6)		65.0								
			46.8	50.9	54.4	57.8	61.0	58.2	53.0	Reference spectrum

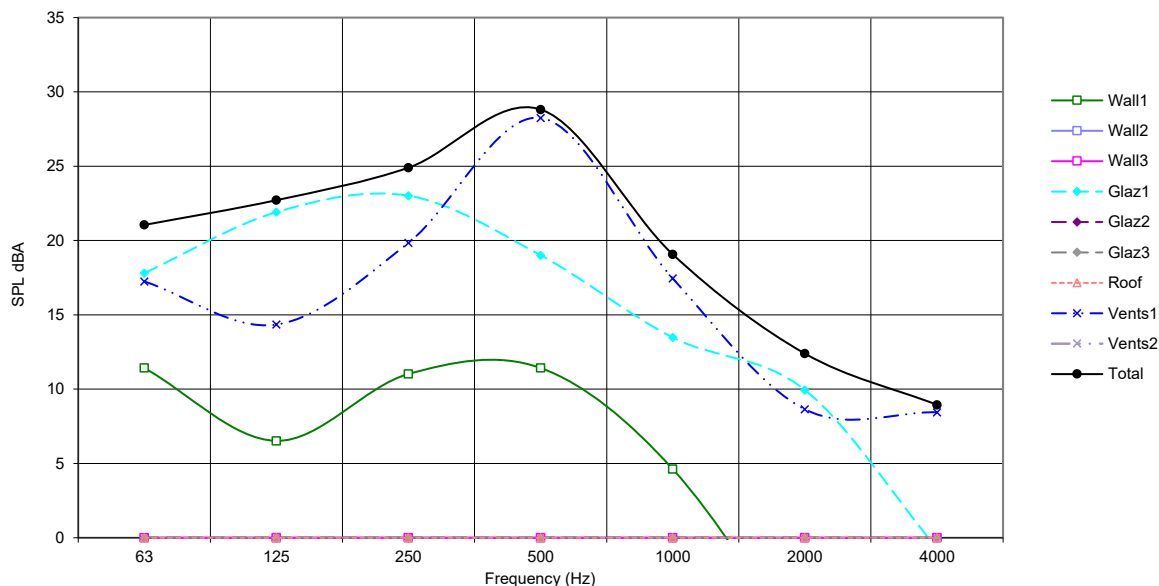
REVERBERATION TIME

DIRECT INPUT ----->								No data
EQUAL RT for all bands ----->	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Default - RT set to 0.5s

Façade Element			Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity /100mm block	▼	5.2	36	45	44	47	57	67	77	3%	54	0	-4
	ATTENUATION	▼												
Wall 2	WALLS	▼		0	0	0	0	0	0	0	0%			
	ATTENUATION	▼												
Wall 3	WALLS	▼		0	0	0	0	0	0	0	0%			
	ATTENUATION	▼												
Glazing 1	33 dB Rw + Ctr - High Acoustic Performance Double Glazing	▼	1.6	24	24	27	34	43	44	49	35%	33 (inc Ctr)	-	-
	ATTENUATION	▼												
Glazing 2	GLAZING	▼		0	0	0	0	0	0	0	0%			
	ATTENUATION	▼												
Glazing 3	GLAZING	▼		0	0	0	0	0	0	0	0%			
	ATTENUATION	▼												
Roof	ROOF / FLOOR	▼		0	0	0	0	0	0	0	0%			
	ATTENUATION	▼												
Resultant composite Façade SRI				30	31	33	40	49	50	55				
Resultant SPL inside room excluding ventilators dB				27.6	19	22	23	20	14	10	-1	39%		

Ventilator Type		Num	D _{n,a} dB to BS EN 20140-10:1992									Dnew	C	Ctr
Ventilation	Greenwood 5000EAW.AC2 (Vent + 2 Acoustic Modules - External & Internal)	1	33	40	38	33	47	53	48	61%	42	-2	-4	
	ATTENUATION													
Ventilation	VENTS		0	0	0	0	0	0	0	0%				
	ATTENUATION													
Resultant SPL inside room through ventilators dB		29.6	17	14	20	28	17	9	8	61%				
Total SPL inside room		31.7	21	23	25	29	19	12	9					

Element contribution to total internal noise level



PROJECT:

ROOM:

VARIANT:

NOTES:

Room Dimensions [m] W L H

Room Volume = m³

Partition Area = m²

Ventilation ref area = m²

Free Field SPL K = dB

SELECT Free Field or Façade SPL for model input >>>

NOTES: **EXTERNAL SPECTRUM (A weighted)**

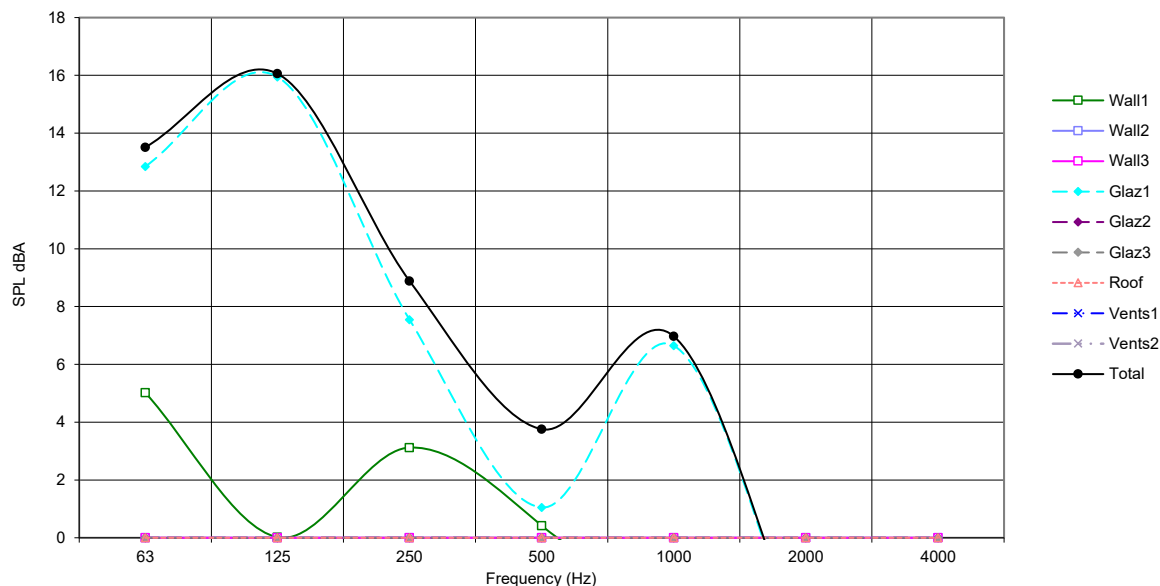
EXTERNAL SPECTRUM (A weighted)		dBA	63	125	250	500	1000	2000	4000
Direct input - Free Field SPL (A weighted octave bands) dB ----->		55.5	40.4	44.4	46.5	46.8	51.9	47.3	40.9
Road traffic spectrum (according to BS 8233:1999 section 6)			34	38	41	41	46	41	35
			40.4	44.4	46.5	46.8	51.9	47.3	40.9
									Direct input

REVERBERATION TIME

DIRECT INPUT ----->	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	No data
EQUAL RT for all bands ----->	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Default - RT set to 0.5s
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity /100mm block	5.2	36	45	44	47	57	67	77	9%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	37 dB Rw+Ctr Test Data	1.6	23	24	34	41	41	47	53	84%	0	0	0
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Resultant composite Façade SRI			29	30	39	45	47	53	59				
Resultant SPL inside room excluding ventilators dB			18.9	14	16	9	4	7	-4	-16	100%		

Ventilator Type		Num	D _{n,e} dB to BS EN 20140-10:1992									Dnew	C	Ctr
Ventilation	MVHR	1	99	99	99	99	99	99	99	1%	0	0	0	
ATTENUATION														
Ventilation	VENTS		0	0	0	0	0	0	0	0%				
ATTENUATION														
Resultant SPL inside room through ventilators dB			-99.0	-55	-51	-49	-49	-44	-48	-55	0%			
Total SPL inside room			18.9	14	16	9	4	7	-4	-16				

Element contribution to total internal noise level

PROJECT:

ROOM:

VARIANT:

NOTES:

Room Dimensions [m] W L H

Room Volume = m³

Partition Area = m²

Ventilation ref area = m²

Free Field SPL K = dB

SELECT Free Field or Façade SPL for model input >>>

NOTES: **EXTERNAL SPECTRUM (A weighted)**

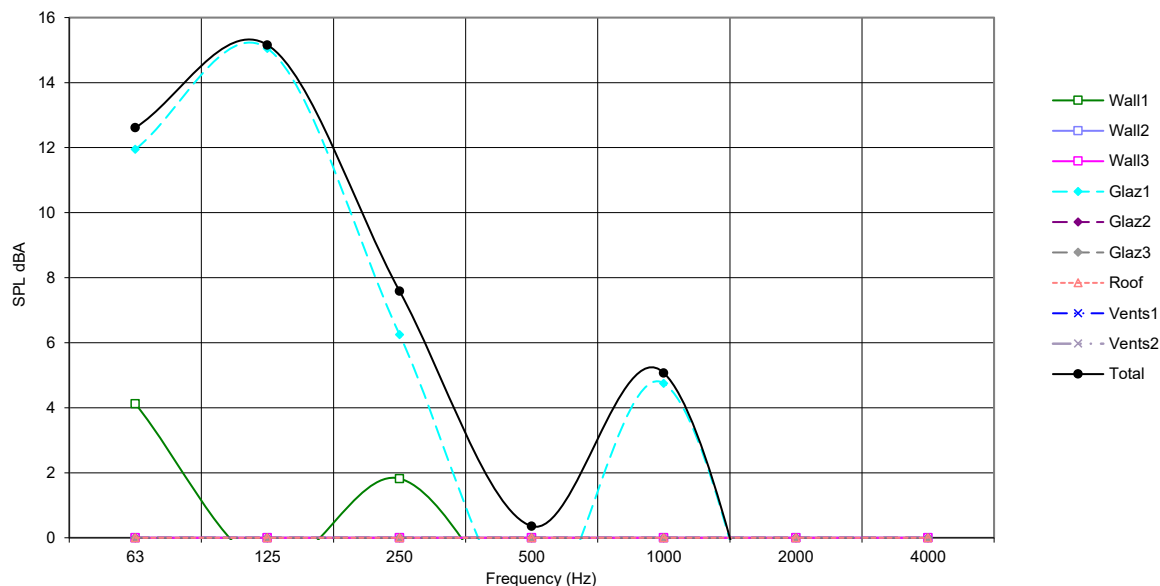
Direct input - Free Field SPL (A weighted octave bands) dB ----->	53.3	39.5	43.5	45.2	43.4	50.0	44.0	35.6
Road traffic spectrum (according to BS 8233:1999 section 6)	34	38	39	37	44	38	30	uncorrected spectrum
	39.5	43.5	45.2	43.4	50.0	44.0	35.6	Direct input

REVERBERATION TIME

DIRECT INPUT ----->	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	No data
EQUAL RT for all bands ----->	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Default - RT set to 0.5s
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	

Façade Element			Area [m2]	SRI dB to BS EN ISO 140-3:1995									Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	▼	5.2	36	45	44	47	57	67	77	2%	54	0	-4	
	ATTENUATION	▼													
Wall 2	WALLS	▼		0	0	0	0	0	0	0	0%				
	ATTENUATION	▼													
Wall 3	WALLS	▼		0	0	0	0	0	0	0	0%				
	ATTENUATION	▼													
Glazing 1	37 dB Rw+Ctr Test Data	▼	1.6	23	24	34	41	41	47	53	89%	0	0	0	
	ATTENUATION	▼													
Glazing 2	GLAZING	▼		0	0	0	0	0	0	0	0%				
	ATTENUATION	▼													
Glazing 3	GLAZING	▼		0	0	0	0	0	0	0	0%				
	ATTENUATION	▼													
Roof	ROOF / FLOOR	▼		0	0	0	0	0	0	0	0%				
	ATTENUATION	▼													
Resultant composite Façade SRI				29	30	39	45	47	53	59					
Resultant SPL inside room excluding ventilators dB				17.9	13	15	8	0	5	-7	-21	100%			

Ventilator Type		Num	D _{n,e} dB to BS EN 20140-10:1992									Dnew	C	Ctr
Ventilation	MVHR	1	99	99	99	99	99	99	99	2%	0	0	0	
	ATTENUATION													
Ventilation	VENTS		0	0	0	0	0	0	0	0%				
	ATTENUATION													
Resultant SPL inside room through ventilators dB			-99.0	-56	-52	-50	-52	-46	-52	-60	0%			
Total SPL inside room			17.9	13	15	8	0	5	-7	-21				

Element contribution to total internal noise level

PROJECT:

ROOM:

VARIANT:

NOTES:

Room Dimensions [m] W L H

Room Volume = m³

Partition Area = m²

Ventilation ref area = m²

Free Field SPL K = dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

dBA	63	125	250	500	1000	2000	4000
Direct input - Free Field SPL (A weighted octave bands) dB ----->	46.7	33.7	38.4	36.7	38.5	43.0	36.5
Road traffic spectrum (according to BS 8233:1999 section 6)	28	32	31	33	37	31	23
	33.7	38.4	36.7	38.5	43.0	36.5	29.3

uncorrected spectrum

Direct input

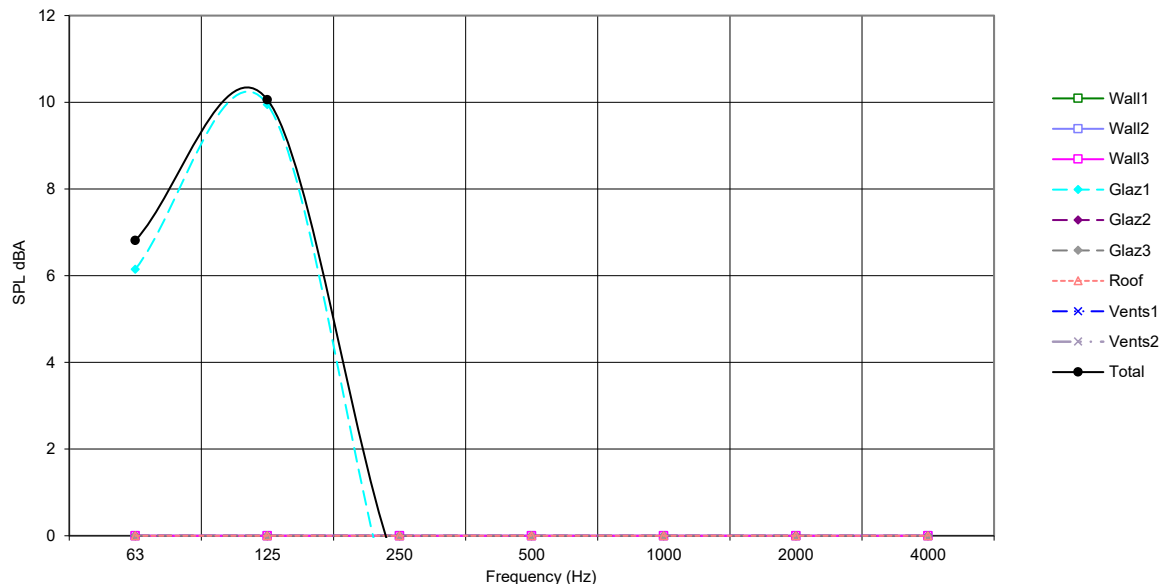
REVERBERATION TIME

DIRECT INPUT ----->	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	No data
EQUAL RT for all bands ----->	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Default - RT set to 0.5s
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr	
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	5.2	36	45	44	47	57	67	77	4%	54	0	-4	
	ATTENUATION													
Wall 2	WALLS		0	0	0	0	0	0	0	0%				
	ATTENUATION													
Wall 3	WALLS		0	0	0	0	0	0	0	0%				
	ATTENUATION													
Glazing 1	37 dB Rw+Ctr Test Data	1.6	23	24	34	41	41	47	53	69%	0	0	0	
	ATTENUATION													
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%				
	ATTENUATION													
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%				
	ATTENUATION													
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%				
	ATTENUATION													
Resultant composite Façade SRI			29	30	39	45	47	53	59					
Resultant SPL inside room excluding ventilators dB			12.2	7	10	-1	-5	-2	-15	-28	100%			

Ventilator Type		Num	D _{n,e} dB to BS EN 20140-10:1992									Dnew	C	Ctr
Ventilation	MVHR	1	99	99	99	99	99	99	99	4%	0	0	0	
	ATTENUATION													
Ventilation	VENTS		0	0	0	0	0	0	0	0%				
	ATTENUATION													
Resultant SPL inside room through ventilators dB			-99.0	-62	-57	-59	-57	-53	-59	-66	0%			
Total SPL inside room			12.2	7	10	-1	-5	-2	-15	-28				

Element contribution to total internal noise level



PROJECT:

ROOM:

VARIANT:

NOTES:

Room Dimensions [m] X X

Room Volume = m³

Partition Area = m²

Ventilation ref area = m²

Free Field SPL K = dB

SELECT Free Field or Façade SPL for model input >>>

EXTERNAL SPECTRUM (A weighted)

Direct input - Free Field SPL (A weighted octave bands) dB ----->	-							No data
Road traffic spectrum (according to BS 8233:1999 section 6)	65.0							
		46.8	50.9	54.4	57.8	61.0	58.2	53.0
								Reference spectrum

REVERBERATION TIME

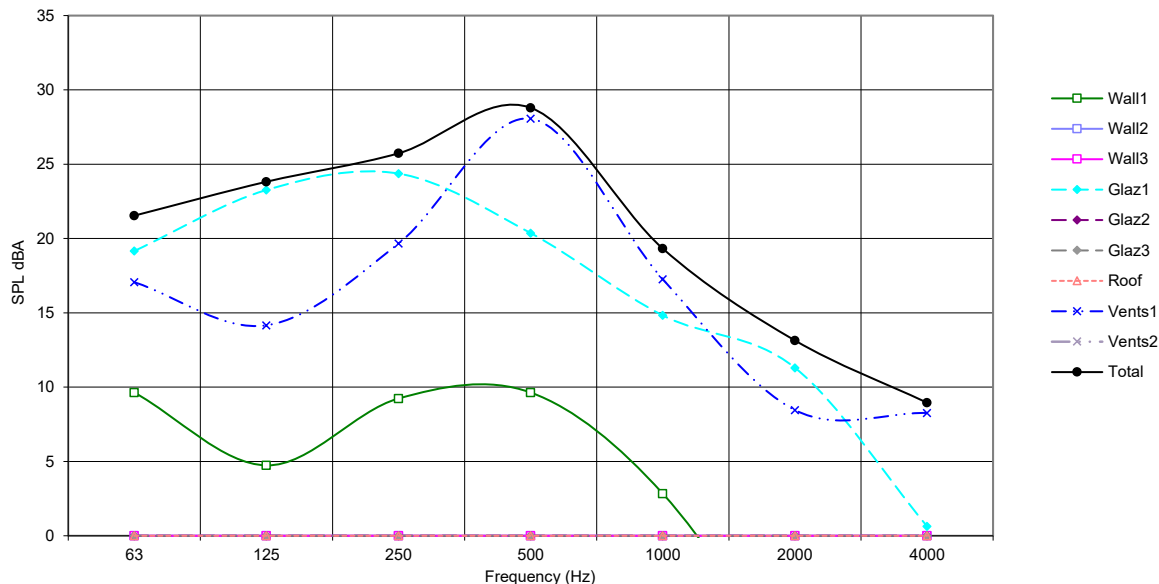
DIRECT INPUT ----->								No data
EQUAL RT for all bands ----->	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Default - RT set to 0.5s

NOTES:

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr			
Wall 1	Typical - 102mm brick/50mm cavity /100mm block	7.2	36	45	44	47	57	67	77	2%	54	0	-4			
	ATTENUATION															
Wall 2	WALLS		0	0	0	0	0	0	0	0%						
	ATTENUATION															
Wall 3	WALLS		0	0	0	0	0	0	0	0%						
	ATTENUATION															
Glazing 1	33 dB Rw + Ctr - High Acoustic Performance Double Glazing	4.4	24	24	27	34	43	44	49	44%	33 (inc Ctr)	-	-			
	ATTENUATION															
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%						
	ATTENUATION															
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%						
	ATTENUATION															
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%						
	ATTENUATION															
Resultant composite Façade SRI			28	28	31	38	47	48	53							
Resultant SPL inside room excluding ventilators dB			28.8	20	23	24	21	15	11	1	46%					

Ventilator Type		Num	D _{n,a} dB to BS EN 20140-10:1992									Dnew	C	Ctr
Ventilation	Greenwood 5000EAW.AC2 (Vent + 2 Acoustic Modules - External & Internal)	2	33	40	38	33	47	53	48	54%	42	-2	-4	
	ATTENUATION													
Ventilation	VENTS	0	0	0	0	0	0	0	0	0%				
	ATTENUATION													
Resultant SPL inside room through ventilators dB		29.4	17	14	20	28	17	8	8	54%				
Total SPL inside room		32.1	22	24	26	29	19	13	9					

Element contribution to total internal noise level



PROJECT:

ROOM: Room Dimensions [m] W L H

VARIANT: Room Volume = m³

NOTES: Partition Area = m²

Free Field SPL K = dB

SELECT Free Field or Façade SPL for model input >>>

EXTERNAL SPECTRUM (A weighted)

Direct input - Free Field SPL (A weighted octave bands) dB ----->	-							No data
Road traffic spectrum (according to BS 8233:1999 section 6)	73.0							
		54.8	58.9	62.4	65.8	69.0	66.2	61.0
								Reference spectrum

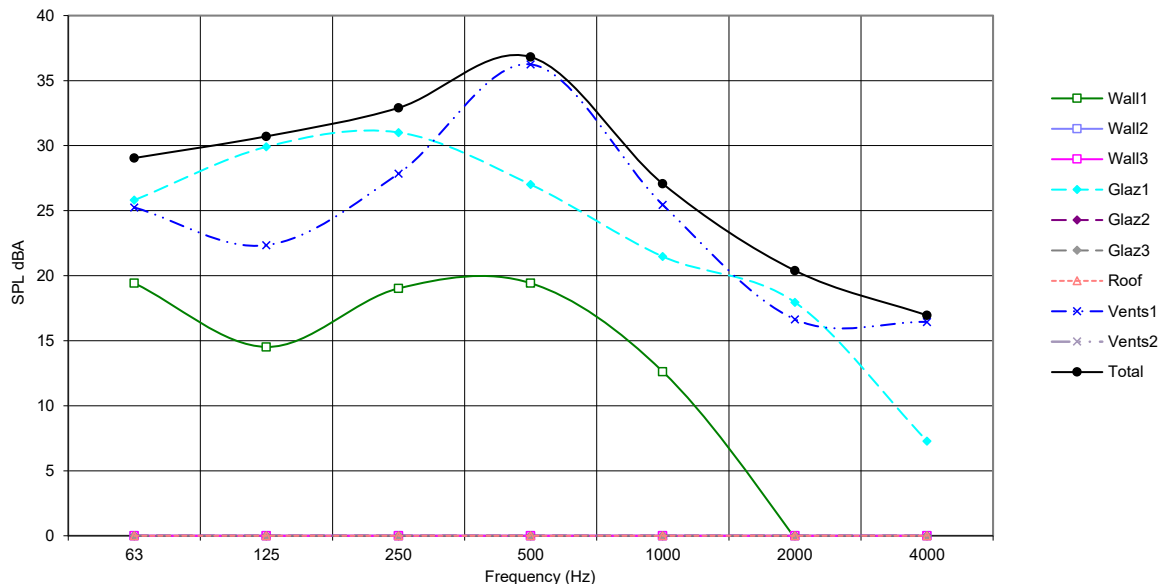
REVERBERATION TIME

DIRECT INPUT ----->								No data
EQUAL RT for all bands ----->	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Default - RT set to 0.5s

Façade Element	Area [m ²]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1 Typical - 102mm brick/50mm cavity/100mm block	5.2	36	45	44	47	57	67	77	3%	54	0	-4
ATTENUATION												
Wall 2 WALLS		0	0	0	0	0	0	0	0%			
ATTENUATION												
Wall 3 WALLS		0	0	0	0	0	0	0	0%			
ATTENUATION												
Glazing 1 33 dB Rw + Ctr - High Acoustic Performance Double Glazing	1.6	24	24	27	34	43	44	49	35%	33 (inc Ctr)	-	-
ATTENUATION												
Glazing 2 GLAZING		0	0	0	0	0	0	0	0%			
ATTENUATION												
Glazing 3 GLAZING		0	0	0	0	0	0	0	0%			
ATTENUATION												
Roof ROOF / FLOOR		0	0	0	0	0	0	0	0%			
ATTENUATION												
Resultant composite Façade SRI		30	31	33	40	49	50	55				
Resultant SPL inside room excluding ventilators dB		35.6	27	30	31	28	22	18	7	39%		

Ventilator Type	Num	D _{n,e} dB to BS EN 20140-10:1992								D _{nw}	C	Ctr
Ventilation Greenwood 5000EAW.AC2 (Vent + 2 Acoustic Modules - External & Internal)	1	33	40	38	33	47	53	48	61%	42	-2	-4
ATTENUATION												
Ventilation VENTS		0	0	0	0	0	0	0	0%			
ATTENUATION												
Resultant SPL inside room through ventilators dB		37.6	25	22	28	36	25	17	16	61%		
Total SPL inside room		39.7	29	31	33	37	27	20	17			

Element contribution to total internal noise level



PROJECT:

ROOM:

VARIANT:

NOTES:

Room Dimensions [m] W L H

Room Volume = m³

Partition Area = m²

Ventilation ref area = m²

Free Field SPL K = dB

SELECT Free Field or Façade SPL for model input >>>

NOTES: _____

EXTERNAL SPECTRUM (A weighted)

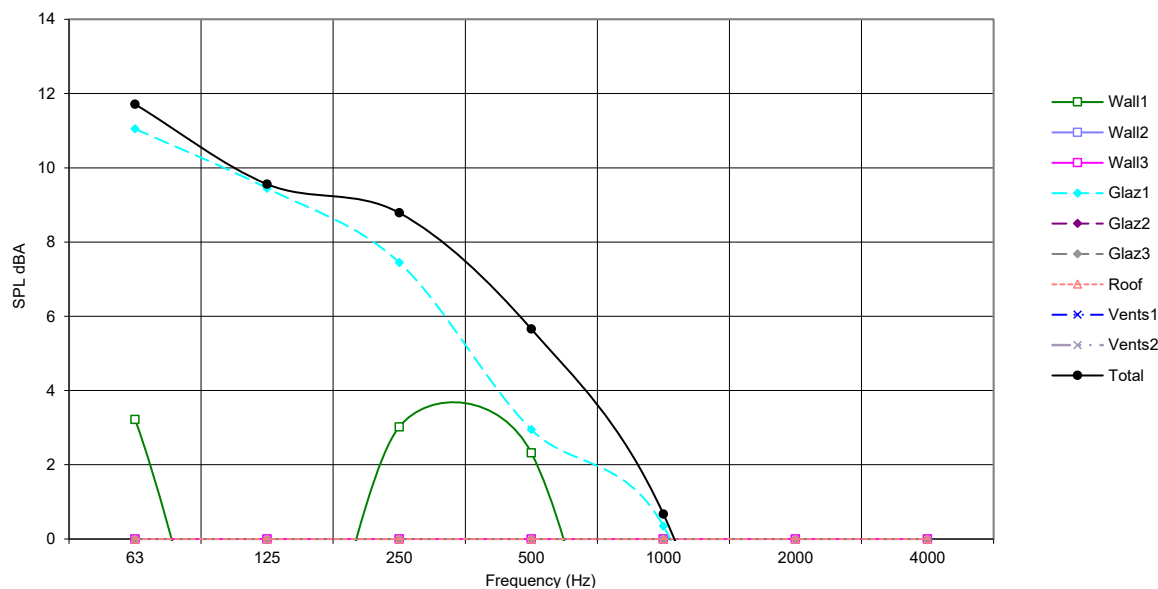
EXTERNAL SPECTRUM (A weighted)		dBA	63	125	250	500	1000	2000	4000
Direct input - Free Field SPL (A weighted octave bands) dB ----->		52.7	38.6	37.9	46.4	48.7	45.6	41.7	36.5
Road traffic spectrum (according to BS 8233:1999 section 6)									
			38.6	37.9	46.4	48.7	45.6	41.7	36.5
									Direct input

REVERBERATION TIME

DIRECT INPUT ----->								No data
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Default - RT set to 0.5s

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr	
Wall 1	Typical - 102mm brick/50mm cavity /100mm block	5.2	36	45	44	47	57	67	77	3%	54	0	-4	
	ATTENUATION													
Wall 2	WALLS		0	0	0	0	0	0	0	0%				
	ATTENUATION													
Wall 3	WALLS		0	0	0	0	0	0	0	0%				
	ATTENUATION													
Glazing 1	37 dB Rw+Ctr Test Data	1.6	23	24	34	41	41	47	53	81%	0	0	0	
	ATTENUATION													
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%				
	ATTENUATION													
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%				
	ATTENUATION													
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%				
	ATTENUATION													
Resultant composite Façade SRI			29	30	39	45	47	53	59					
Resultant SPL inside room excluding ventilators dB			15.6	12	10	9	6	1	-10	-21	100%			

Ventilator Type		Num	D _{n,e} dB to BS EN 20140-10:1992									Dnew	C	Ctr
Ventilation	MVHR	1	99	99	99	99	99	99	99	3%	0	0	0	
	ATTENUATION													
Ventilation	VENTS		0	0	0	0	0	0	0	0%				
	ATTENUATION													
Resultant SPL inside room through ventilators dB			-99.0	-57	-58	-49	-47	-50	-54	-59	0%			
Total SPL inside room			15.6	12	10	9	6	1	-10	-21				

Element contribution to total internal noise level

PROJECT:

ROOM:

VARIANT:

NOTES:

Room Dimensions [m] W L H

Room Volume = m³

Partition Area = m²

Ventilation ref area = m²

Free Field SPL K = dB

SELECT Free Field or Façade SPL for model input >>>

NOTES: _____

EXTERNAL SPECTRUM (A weighted)

EXTERNAL SPECTRUM (A weighted)		dBA	63	125	250	500	1000	2000	4000
Direct input - Free Field SPL (A weighted octave bands) dB ----->		38.1	20.5	18.5	28.9	35.3	31.3	27.5	21.5
Road traffic spectrum (according to BS 8233:1999 section 6)									
			20.5	18.5	28.9	35.3	31.3	27.5	21.5

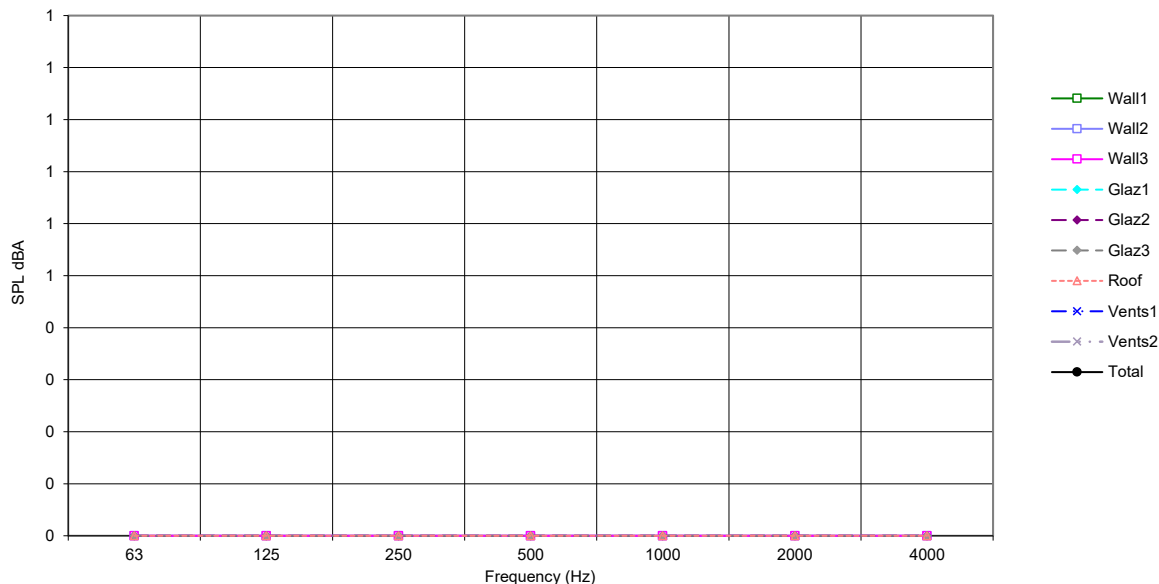
20.5 18.5 28.9 35.3 31.3 27.5 21.5 Direct input

REVERBERATION TIME

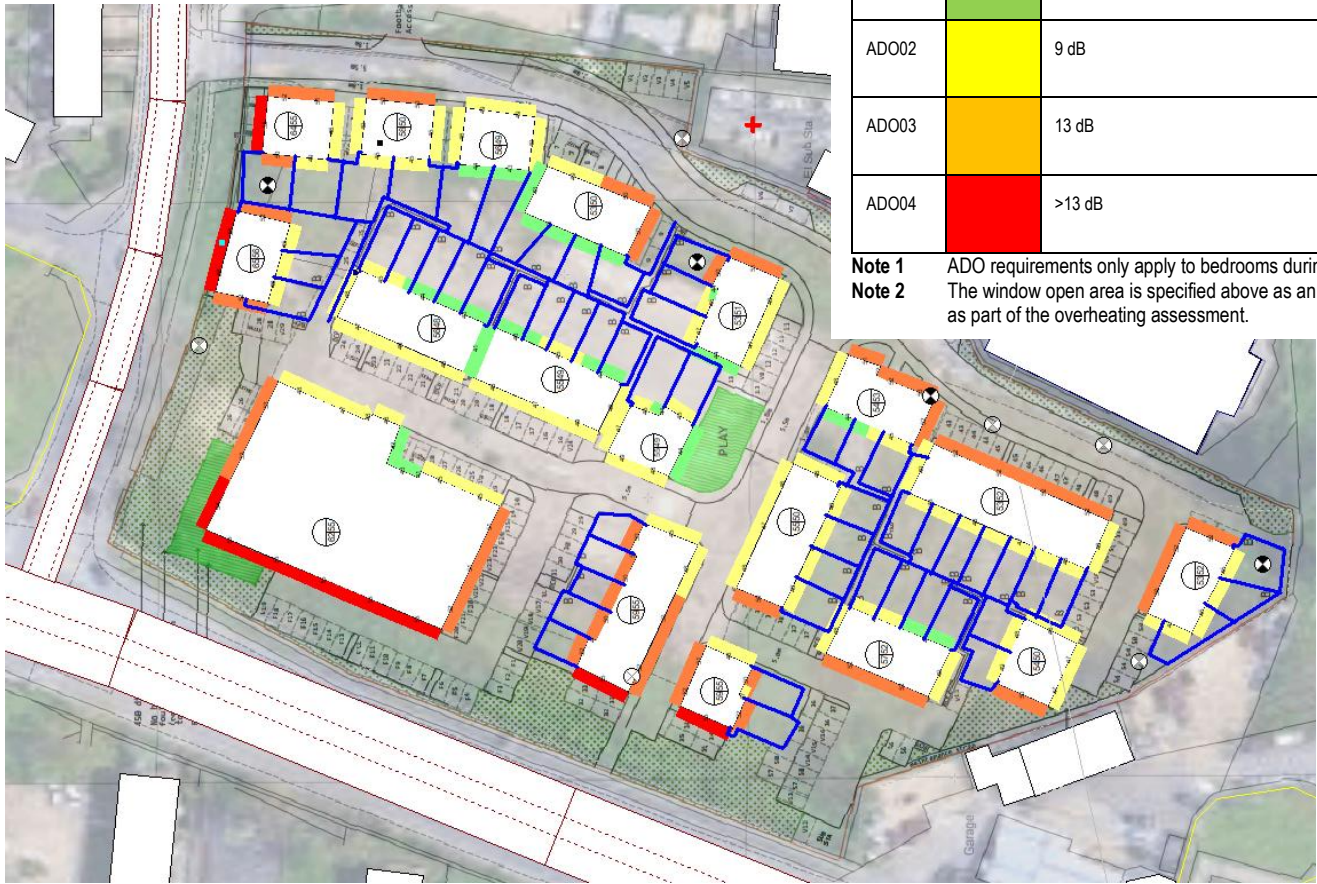
DIRECT INPUT ----->								No data
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Default - RT set to 0.5s

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr			
Wall 1	Typical - 102mm brick/50mm cavity /100mm block	5.2	36	45	44	47	57	67	77	13%	54	0	-4			
	ATTENUATION															
Wall 2	WALLS		0	0	0	0	0	0	0	0%						
	ATTENUATION															
Wall 3	WALLS		0	0	0	0	0	0	0	0%						
	ATTENUATION															
Glazing 1	33 dB Rw + Ctr - High Acoustic Performance Double Glazing	1.6	24	24	27	34	43	44	49	13%	33 (inc Ctr)	-	-			
	ATTENUATION															
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%						
	ATTENUATION															
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%						
	ATTENUATION															
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%						
	ATTENUATION															
Resultant composite Façade SRI			30	31	33	40	49	50	55							
Resultant SPL inside room excluding ventilators dB			1.5	-8	-10	-2	-3	-16	-21	-32	100%					

Ventilator Type		Num	D _{n,e} dB to BS EN 20140-10:1992									Dnew	C	Ctr
Ventilation	MVHR	1	99	99	99	99	99	99	99	12%	0	0	0	
ATTENUATION														
Ventilation	VENTS		0	0	0	0	0	0	0	0%				
ATTENUATION														
Resultant SPL inside room through ventilators dB			-99.0	-75	-77	-67	-60	-64	-68	-74	0%			
Total SPL inside room			1.5	-8	-10	-2	-3	-16	-21	-32				

Element contribution to total internal noise level

Appendix 5 Part O Acoustic Requirements for Bedrooms at Night



Ref.	Colour	Outside-to-inside noise reduction requirement	Part O Requirement for Bedrooms
ADO01	Green	4 dB	Energy assessment (e.g. TM59) to show that bedrooms will not overheat at night with windows fully open (e.g. 13% of floor area, which is typically around 1.3m ²) and ventilators fully open.
ADO02	Yellow	9 dB	Energy assessment (e.g. TM59) to show that bedrooms will not overheat at night with windows open (e.g. 4% of floor area, which is typically around 0.4m ²) and ventilators fully open.
ADO03	Orange	13 dB	Energy assessment (e.g. TM59) to show that bedrooms will not overheat at night with windows partially open (e.g. ~2% of floor area, which is typically around 0.2m ²) and ventilators fully open.
ADO04	Red	>13 dB	Energy assessment (e.g. TM59) to show that bedrooms on these facades will not overheat at night with windows fully closed and ventilators fully open.

Note 1 ADO requirements only apply to bedrooms during night-time hours (23:00-07:00)
Note 2 The window open area is specified above as an actual open area, not 'equivalent open area' and the values may therefore need to be converted as part of the overheating assessment.

Appendix 6 Fence Height markup



Colour Ref	Meaning of colour
Unmarked	Standard height 1.8m fencing can be used
	Fencing of 2.4m height proposed for acoustic screening
	4m high noise barrier proposed for acoustic screening



Architectural & Environmental Consultants

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