Lordship Lane, London

Noise impact assessment

10643.1

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ANC ACOUSTICS & NOISE CONSULTANTS

Institute of Acoustics sponsoring organisation

Lordship Lane, London

Noise impact assessment

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1 Summary

1.1 This report has been prepared in support of a planning application for a mixed-use development situated in the heart of Wood Green, along Lordship Lane.

1.2 Noise levels affecting the proposed development from road traffic and other sources associated with the adjacent bus depot have been measured during the day and night, and the façade noise impact calculated.

1.3 Noise propagation across the site is calculated in environmental noise modelling software, CadnaA.

1.4 The existing noise risk at the site is assessed in accordance with current planning policy, relevant standards and noise practice guidance.

1.5 The façade sound insulation design is considered with windows closed to reduce the calculated noise impact to below the lowest adverse effect level. Alternative provision should be made for whole dwelling ventilation according to the Building Regulations, Approved Document F (AD-F).

1.6 The acoustic performance requirements for glazing and ventilators are summarised in Table 1. Based on these ventilator acoustic constraints, potential AD-F ventilation strategies are suggested. The sound insulation treatments required for each façade are shown in Appendix B.

Requirement (Refer to Appendix B)	Glazing performance	Trickle ventilator performance	Potential AD-F whole dwelling ventilation strategy
1	≥ 27 dB $R_w + C_{tr}$	≥ 31 dB $D_{ne,w} + C_{tr}$	Continuous mechanical extract ventilation; or Mechanical ventilation with heat recovery (trickle ventilators not required)
2	≥ 31 dB $R_w + C_{tr}$	≥ 36 dB $D_{ne,w} + C_{tr}$	
3	≥ 34 dB $R_w + C_{tr}$	≥ 42 dB $D_{ne,w} + C_{tr}$	

Table 1: Summary of minimum façade sound insulation treatment

1.7 If the ventilation strategy ends up without trickle ventilators, the glazing performance could be reduced, but for this assessment we have assumed that trickle vents could be required.

1.8 Based on the details outlined in this report, the noise risks identified are mitigated and minimised, and the site is considered suitable for residential development.

1.9 **Plant noise limits**

1.10 At this stage in the development, exact mechanical plant specifications are unavailable; plant noise limits for the cumulative impact of all proposed plant at the nearest noise sensitive location are proposed to reduce the risk of an adverse impact.

1.11 Background sound levels have been determined at two positions considered representative of the identified noise-sensitive receptors.

1.12 A BS 4142 rated noise impact of no greater than the background sound level at the nearest residential noise sensitive receptor is proposed for the cumulative impact of all fixed mechanical plant.

1.13 Proposed plant noise limits are shown in Table 2.

Location (Residential NSR at 1m outside of noise sensitive residential facades)	Period	Rated noise impact, $L_{Ar,Tr}$	Comments
P2	Daytime *(07:00 – 23:00)*	≤ 49 dB	BS 4142 rating of no greater than the background sound level.
	Night-time *(23:00 – 07:00)*	≤ 44 dB	

Table 2: Proposed upper noise limits for fixed mechanical plant

1.14 Should all fixed mechanical plant run continuously throughout a 24 hour day, the suggested upper limits during the night-time assessment period should be the limit for design.

1.15 Considering the context of the existing acoustic environment and proposed plant noise limits, a BS 4142 assessment would indicate the likelihood of a low impact should the calculated upper limits be adhered to. This impact is considered to be at worst a LOAEL in alignment with the NPSE aims.

2 Introduction

2.1 The proposed mixed-use development consists of a purposed build student accommodation, private residential development and a commercial offer activating Lordship Lane.

2.2 The proposed site is located in the heart of Wood Green, along Lordship Lane; the site location is shown in Figure 1.

2.3 Apex Acoustics has been commissioned to undertake a noise survey and assessment of the potential noise impact on the proposed development site in support of a planning application.

2.4 The purpose of this report is to identify the noise impacts at the site, propose appropriate acoustic design parameters and demonstrate the way internal noise levels may be achieved in practice.

2.5 Noise levels affecting the proposed development from road traffic and other sources have been measured during the day and night, and the façade noise impact calculated.

2.6 Noise propagation across the site is calculated in environmental noise modelling software, CadnaA.

2.7 The primary noise sources considered in this assessment are:

- Road traffic noise on Lordship Lane, situated to the north of the site; and
- Road traffic noise on Redvers Road, situated to the west of the site

2.8 The scope of our appointment includes:

- Measure the existing noise environment over a 4-day period including the weekend at two locations;
- Noise modelling based on the proposed layouts to determine noise levels impacting across the site;
- Calculate the highest façade noise impact affecting the proposed development;
- If required, provide a detailed scheme for the mitigation of noise to reduce the risk of adverse effect, in accordance with local and national policy requirements.

2.9 Internal noise transmission and the sound insulation requirements of the Building Regulations are not considered in this report.

Figure 1: Site location outlined in red

3 Planning policy & guidance

3.1 **National Planning Policy Framework (NPPF,2021)**

3.2 The National Planning Policy Framework (NPPF), sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally-prepared plans for housing and other development can be produced. In respect of noise, Paragraph 174, 185 and 187 of the NPPF states the following:

3.3 Paragraph 174:

"e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability…"

3.4 Paragraph 185:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life [See Explanatory Note to the Noise Policy Statement for England];

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;

3.5 Paragraph 187:

"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. "

3.6 **Noise Policy Statement for England (NPSE)**

3.7 The Noise Policy Statement for England, states three policy aims as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life."*

3.8 The NPSE defines adverse noise impact as follows:

No Observed Effect Level (NOEL)

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.

Lowest Observed Adverse Effect Level (LOAEL)

This is the level above which adverse effects on health and quality of life can be detected.

Significant Observed Adverse Effect Level (SOAEL)

This is the level above which significant adverse effects on health and quality of life occur

3.9 The first two aims of the NPSE require that no significant adverse impact should occur and that, where a noise level which falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

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

3.10 **Planning Practice Guidance for Noise (PPG-Noise,2104)**

3.11 Planning Practice Guidance for Noise advises on how planning can manage potential noise impacts in a new development.

3.12 It explains how to recognise when noise could be a concern and describes how effects levels could be derived. These are summarised in Table 3.

Perception	Examples of Outcomes	Increasing Effect Level	Action
Noticeable 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 - LOAEL			
Noticeable 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. 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 - SOAEL			
Noticeable 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. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid

Table 3: Description of likely responses at effects levels

3.13 **Applicable Guidance**

3.14 **Professional Practice Guidance (ProPG, 2017) on Planning & Noise – New Residential Development**

3.15 Professional Practice Guidance: Planning & Noise - New Residential Development (ProPG, 2017) is a joint publication by the Chartered Institute of Environmental Health (CIEH), the Association of Noise Consultants (ANC) and the Institute of Acoustics (IoA).

3.16 The primary goal of ProPG is "to assist the delivery of sustainable development by promoting good health and wellbeing through the effective management of noise".

3.17 The guidance has been produced to assist practitioners in matters relating to noise and new residential development. It focusses on existing transportation noise sources and has been developed to consider the Government's overarching noise policy, planning policy and policy guidance. It has also been developed to take into account other authoritative sources of guidance such as British Standard BS 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'.

3.18 In the case of sites exposed to industrial and/or commercial noise, ProPG states that if the industrial and/or commercial noise is present but not dominant, then its contribution may be included in the noise level used to establish the degree of risk.

3.19 **British Standard BS 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'**

3.20 BS 8233:2014 provides guidance for the control of noise in and around buildings. It is applicable to the design of new buildings, or refurbished buildings undergoing a change of use.

3.21 BS 8233:2014 provides noise guidance for buildings of different uses, however in respect to dwellings and habitable residential spaces, Table 4 of BS 8233:2014 provides guideline values that it is desirable not to exceed during daytime and night-time periods. These guideline values are reproduced in Table 4**.**

Situation	Upper limits / dB	
	$L_{Aeq,T}$	L_{AFmax}
Living rooms and Bedrooms, daytime	35	-
Bedrooms, night-time	30	45

Table 4: Proposed internal noise level requirements

3.22 BS 8233 does not provide specific guidance on noise levels for regular individual noise events, such as passing trains, which can cause sleep disturbance. Guidance on suitable noise levels for individual events is provided in ProPG, which states:

In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as source, number, distribution, predictability and regularity of noise events'.

3.23 On this basis, it is considered appropriate to adopt the 10th highest $L_{Amax,F}$ noise event occurring in the night-time period for the purposes of the assessment.

4 Noise sources and measurements

4.1 The noise level across the site have been determined using noise measurements undertaken by Apex Acoustics between Thursday 23rd to Monday 27th February 2023. Short-term measurements at positions 3, 4 and 5 were also carried out on Monday 27th February 2023.

4.2 The noise monitoring locations are shown in Figure 2.

Figure 2: Noise monitoring locations

4.3 The equipment used is listed in Table 5.

Equipment	Model	Serial no.
Sound Level Meter	XL2	A2A-11062-E0
Calibrator	Larson Davis CAL 200	13403
Sound Level Meter	XL2	A2A-11084-E0
Calibrator	Larson Davis CAL 200	10665
Sound Level Meter	XL2	A2A-20287-E0
Calibrator	Larson Davis CAL 200	19379

Table 5: Equipment used

4.4 All meters and calibrators have current calibration certificates traceable to national standards.

4.5 Measurements at positions 1 and 2 were made with the microphone located at 3.5 m above the ground. Short-term measurements at positions 3, 4 and 5 were measured with the microphone located at 1.5m above the ground. All positions were located away from other reflecting surfaces, such that the measurements are considered to be free-field.

4.6 Whilst setting up the equipment, the temperature was recorded as 4 °C; the wind speed measured was up to 3.0 m/s and there was 50% cloud cover, but no precipitation.

4.7 The most significant and dominant noise source affecting the proposed development was from road traffic.

4.8 Other noise sources included pedestrians and birdsong during the early mornings.

4.9 The measured levels are summarised in Table 6.

Position	Start Time (hh:mm)	Duration (hh:mm)	$L_{Aeq,T}$ / dB	10th $L_{Amax,F}$ dB	Typical $L_{A90,\ 15min}$ dB
1 (Facing Lordship Lane)	Thursday 23rd February 18:41	04:18	69	-	56
	Thursday 23rd February 23:00	08:00	66	84	43
	Friday 24th February 07:00	16:00	69	-	57
	Friday 24th February 23:00	08:00	67	84	44
	Saturday 25th February 07:00	16:00	68	-	56
	Saturday 25th February 23:00	08:00	66	83	45
	Sunday 26th February 07:00	16:00	69	-	56
	Sunday 26th February 23:00	08:00	66	84	43
	Monday 27th February 07:00	06:05	68	-	-
2 (Redvers Road)	Thursday 23rd February 18:20	04:40	57	-	49
	Thursday 23rd February 23:00	08:00	52	72	44
	Friday 24th February 07:00	16:00	58	-	50
	Friday 24th February 23:00	08:00	54	76	44
	Saturday 25th February 07:00	16:00	57	-	50
	Saturday 25th February 23:00	08:00	53	74	46
	Sunday 26th February 07:00	16:00	57	-	49
	Sunday 26th February 23:00	08:00	56	73	45
	Monday 27th February 07:00	05:40	57	-	-

3	Monday 27th February 15:02	00:15	49	-	-
4	Monday 27th February 13:18	00:15	57	-	-
5	Monday 27th February 15:42	00:15	66	-	-

Table 6: Measured noise levels at measurement positions 1-2

4.10 The worst case measured free-field daytime and night-time noise levels used in the calculations are shown in Table 7.

Position	Parameter	dB(A)	Octave band centre frequency, Hz					
			125	250	500	1k	2k	4k
1	Daytime, $L_{Aeq, 16 hr}$	**69**	51	56	60	65	64	59
	Night-time, $L_{Aeq, 8 hr}$	**67**	46	51	56	64	63	56
	Night-time, $L_{AF,max}$	**84**	-	-	-	-	-	-
2	Daytime, $L_{Aeq, 16 hr}$	**58**	42	46	50	53	52	46
	Night-time, $L_{Aeq, 8 hr}$	**56**	40	44	49	51	50	45
	Night-time, $L_{AF,max}$	**76**	-	-	-	-	-	-

Table 7: Measured free-field noise levels used in the calculations

4.11 **Background sound levels, $L_{A90, T}$**

4.12 The background sound level, $L_{A90, 15min}$ is calculated from the $L_{Aeq\ 15min}$.

4.13 Statistical analysis is undertaken of the results of all the $L_{A90, 15min}$ data following the guidance of BS 4142, to determine a background sound level considered to be representative of the assessment period. Results of the analysis are shown in Appendix A.

4.14 Based on the statistical analysis results, the background sound level considered representative of the daytime and night-time assessment periods are shown in Table 8.

Position	Parameter	$L_{A90, 15min}$
1	Daytime, $L_{Aeq, 16 hr}$	56
	Night-time, $L_{Aeq, 8 hr}$	43
2	Daytime, $L_{Aeq, 16 hr}$	49
	Night-time, $L_{Aeq, 8 hr}$	44

Table 8: Background sound levels representative of the assessment periods

4.15 The representative background sound levels of Position 2 have been selected for use in the noise assessment. Given that the representative background sound levels of Position 1 are higher than those in Position 2, it is therefore considered robust.

5 Noise impact on the site

5.1 Noise transmission and propagation is modelled using proprietary software, Cadna/A, Reference 10. This models noise propagation outdoors according to ISO 9613, Reference 11.

5.2 The modelling parameters used, source of data and details are described in Table 9.

Parameter	Source	Details
Model dimensions	Google Earth	British Transverse Mercator coordinates
Site location and layout	Architects drawings	Architects drawings, Reference 12
Topography –within site	Site observations and Google Street view	Modelled with no changes in topography
Topography –Outside of site	Site observations and Google Street view	Modelled with no changes in topography
Building heights – proposed buildings	Drawings	Architects drawings
Building heights – outside of site	Site observations and Google Street view	3 m per storey + 2 m roof (residential properties)
Receptor positions	Site observations and Google Street view	On the façade closest to the source at a height of 1.5 m, 4 m and 6.5 m to represent ground, first and second floor window heights respectively
Building and barrier absorption coefficient	ISO 9613-2	0.21 to represent a reflection loss of 1 dB
G, Ground factor	ISO 9613-2	Hard ground, G = 0; Porous ground, G = 1 (locally on model)
Max. order of reflections	Apex Acoustics	Three

Table 9: Modelling parameters and assumptions

5.3 Measured daytime and night-time noise levels have been used to ascribe sound power levels to the surrounding roads, and the noise impact at the proposed building façades has been calculated.

5.4 Measured maximum noise levels due to vehicle passes have been used to attribute sound power levels to a point source. The position of the point source has been shifted along the road to calculate the potential worst-case noise impact at each building façade.

5.5 The calculated noise contours results for the daytime $L_{Aeq,\ 16\ hr}$, night-time $L_{Aeq,8\ hr}$ and L_{AFmax} are shown in Figure 3, Figure 4 and Figure 5 respectively.

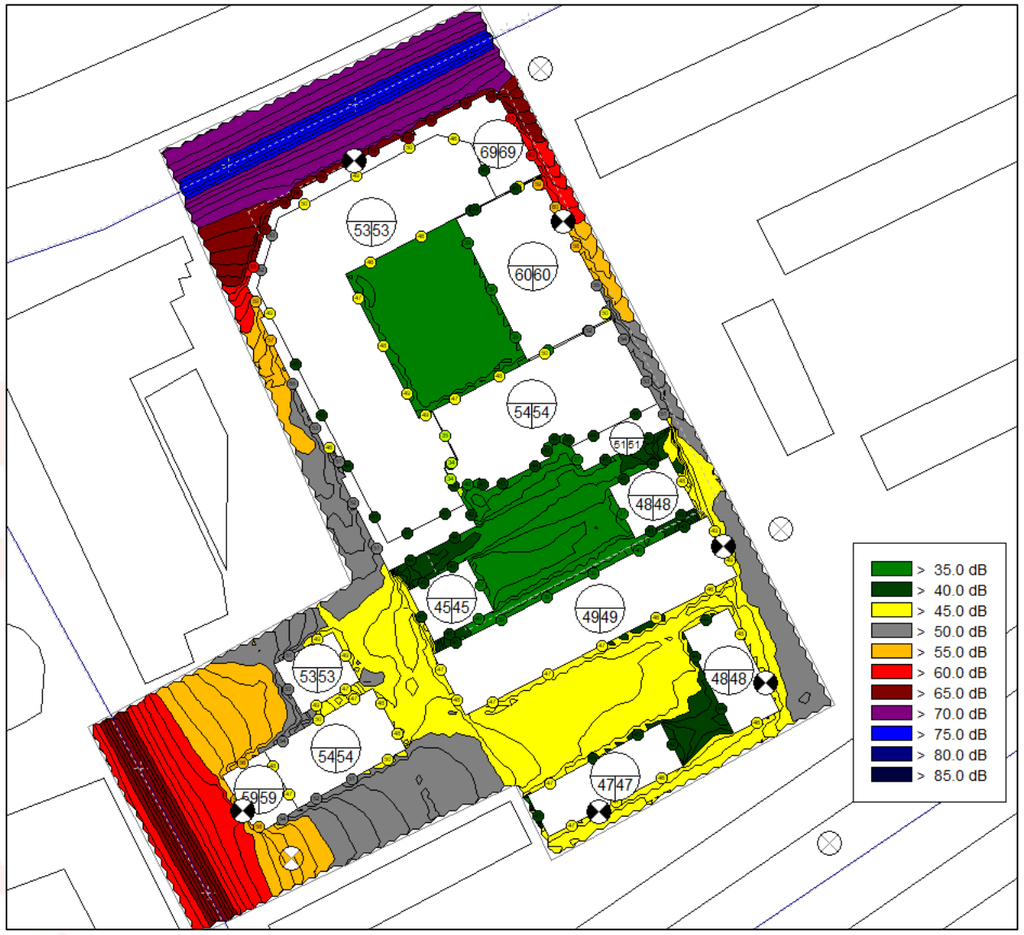


Figure 3: Daytime $L_{Aeq,\ 16\ hr}$ sound contours at 1.5 m above ground

Figure 4: Night-time $L_{Aeq,\,8\,hr}$ sound contours at 1.5 m above ground

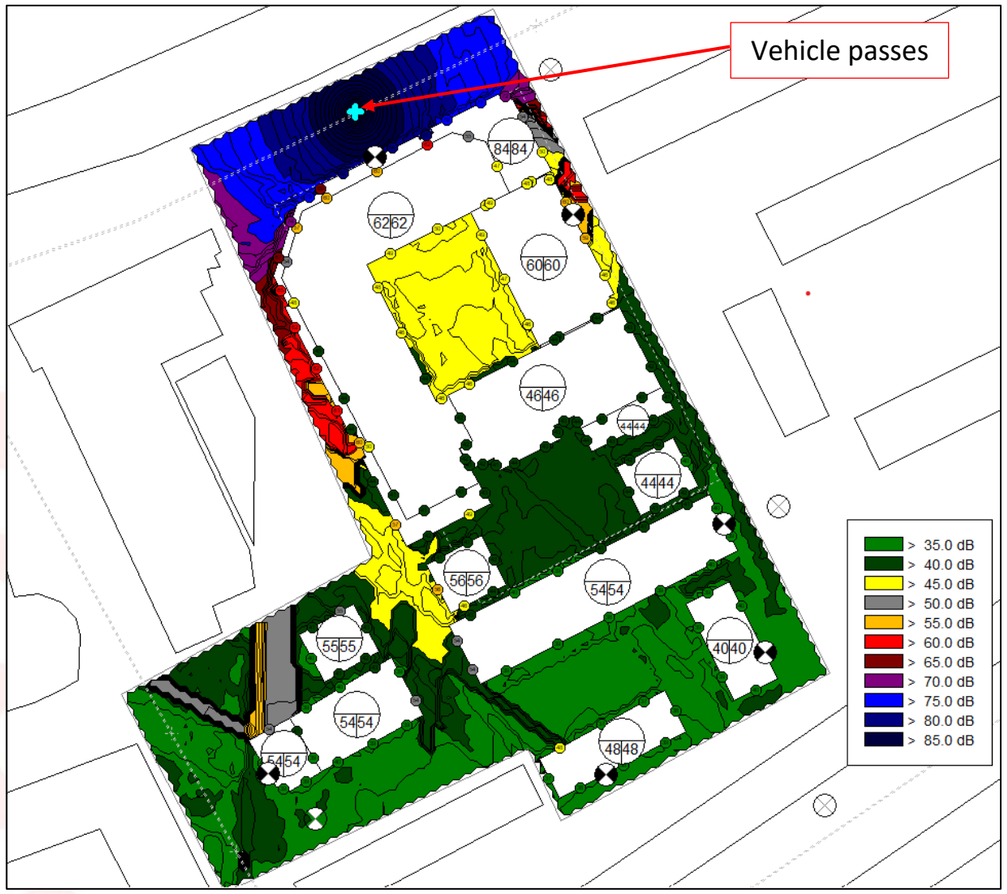


Figure 5: Night-time L_{AFmax} sound contours at 1.5 m above ground due to vehicle passes

6 Achieving internal noise levels

6.1 **Façade sound insulation calculations**

6.2 Free-field noise levels at the windows of the most exposed rooms which are used in the façade sound insulation calculations are shown in Table 10.

6.3 Octave band $L_{Aeq,T}$ noise levels in the 125 Hz to 2 kHz calculation range indicated in BS 8233 have been adjusted to match the single figure calculated A-weighted noise level.

Façade affected	Parameter	dB(A)	Octave band centre frequency, Hz A-weighted free-field noise level, dB				
			125	250	500	1k	2k
North (GF – 4F) (Facing Lordship Lane)	$L_{Aeq,16\ hr}$	**69**	51	55	59	65	64
	$L_{Aeq,8\ hr}$	**67**	49	53	57	63	62
	L_{AFmax}	**84**	-	-	-	-	-
North (5F – 7F) (Facing Lordship Lane)	$L_{Aeq,16\ hr}$	**63**	45	49	53	59	58
	$L_{Aeq,8\ hr}$	**61**	43	47	51	57	56
	L_{AFmax}	**75**	-	-	-	-	-
West (Block B) (Facing Redvers Road)	$L_{Aeq,16\ hr}$	**59**	43	47	51	54	53
	$L_{Aeq,8\ hr}$	**57**	41	45	49	52	51
	L_{AFmax}	**78**	-	-	-	-	-

Table 10: A-weighted external free-field noise levels used to calculate façade sound insulation

6.4 The calculation method for façade sound insulation is in accordance with BS 8233 and the principles of BS EN 12354-3, Reference 14.

6.5 From ISO 16283, Reference 16, the reverberation time is typically 0.5 seconds across the relevant frequency range for a furnished living room. This value is used for both living rooms and bedrooms.

6.6 The minimum glazing and ventilator performances presented in the summary table are calculated to be required to reduce noise levels to below the LOAEL for internal noise levels in those rooms most exposed to external noise ingress.

6.7 Noise levels in less exposed but similarly protected rooms will be lower and therefore also comply with the internal noise level targets.

6.8 The most exposed rooms are those with the largest ratio of window area to room volume, as well as those closest and most exposed to the noise sources.

6.9 Example glazing units that achieve the performance standards shown in Table 1 are identified in Table 11.

Requirement	Glazing performance	Example products (others also feasible)
1	≥ 27 dB $R_w + C_{tr}$	Guardian Glass 4/12/4
2	≥ 31 dB $R_w + C_{tr}$	Guardian Glass 4/16/10
3	≥ 34 dB $R_w + C_{tr}$	Guardian Glass 4/16/8.8

Table 11: Example glazing units

6.10 Since construction details are currently unavailable for the proposed development, for the purposes of calculations bedrooms are assumed to have a window area of 1 m^2 and a volume of 25 m^3, and living rooms are assumed to have a window area of 2 m^2 and a volume of 40 m^3.

6.11 Living rooms are not considered in this assessment as the acoustic performance of the kitchen/living areas of a student accommodation is considered less important. In addition, if the internal level of the bedrooms meets the criteria, the criteria of the kitchen/living areas would also be met.

6.12 The sound reduction of the masonry portion of the facade is much higher than that of the glazing and ventilation provision. Therefore, noise penetration through the masonry is disregarded as relatively insignificant.

6.13 Calculated internal noise levels on the basis of the identified minimum performance requirements are presented in Table 12.

Facades	Room affected	Calculated internal level		
		Daytime dB $L_{Aeq,\ 16\ hr}$	Night-time dB $L_{Aeq,\ 8\ hr}$	Night-time dB $L_{Amax,\ F}$
North (GF – 4F) (Facing Lordship Lane)	Bedroom	31	29	45
North (5F – 7F) (Facing Lordship Lane)	Bedroom	31	29	42
West (Block B) (Facing Redvers Road)	Bedroom	28	26	45

Table 12: Summary of calculated worst-case internal noise levels

6.14 Based on the proposed façade sound insulation provision and the level and frequency of the measured maximum noise event, 45 dB $L_{Amax,\ F}$ is unlikely to be exceeded more than 10 times per night, and is therefore below the LOAEL described in paragraph 3.12.

6.15 **Noise and Approved Document F ventilation conditions**

6.16 The proposed development will be required to meet Part F of the Building Regulations with regard to the whole dwelling ventilation condition, as described in Approved Document F (AD-F), Reference 12.

6.17 The maximum number of trickle ventilators and the required minimum acoustic performance that are calculated to achieve the indoor noise targets are summarised in Table 1.

6.18 Based on the acoustic constraints for trickle ventilators identified to area of site, a natural ventilation strategy as described by AD-F (background ventilators and intermittent extract ventilation) would not typically be feasible. Therefore, either a continuous mechanical extract or mechanical ventilation with heat recovery (MVHR) ventilation system as described by AD-F would be required. Should a MVHR system be implemented, trickle ventilators are not required.

6.19 If the ventilation strategy ends up without trickle ventilators, the glazing performance could be reduced, but for this assessment we have assumed that trickle vents could be required.

6.20 Where a continuous mechanical extract ventilation system is proposed, trickle ventilators are required to habitable rooms, as described by AD-F. Trickle ventilators are required to provide a minimum equivalent ventilation area of 4000 mm^2 for each habitable room, and the total number of ventilators in the dwelling should be at least the same as the number of bedrooms plus two ventilators (i.e. a one bedroom dwelling should have three background ventilators, a two-bedroom dwelling should have four ventilators, etc). Calculations of noise ingress are undertaken on this basis.

6.21 Example ventilators that achieve the performance standards are identified in Table 13.

Requirement	Trickle ventilator performance	Example products (others also feasible)
1	≥ 31 dB $D_{ne,w} + C_{tr}$	Greenwood 6000 S
2	≥ 36 dB $D_{ne,w} + C_{tr}$	Greenwood 2000 L
3	≥ 42 dB $D_{ne,w} + C_{tr}$	Greenwood EHA 574

Table 13: Example trickle ventilators.

6.22 On the basis of the AD-F strategies, the façade sound insulation with the provision for whole dwelling ventilation may be assessed with windows closed.

6.23 Purge ventilation conditions as described by AD-F is manually controlled ventilation of rooms or spaces at a relatively high rate to rapidly dilute pollutants and/or disperse water vapour. Purge ventilation may be provided by natural means (e.g. an openable window) or mechanical means (e.g. a fan).

6.24 For AD-F purge ventilation conditions, ProPG states:

"It should also be noted that the internal level guidelines are generally not applicable under "purge ventilation" conditions as defined by Building Regulations Approved Document F, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food)."

6.25 Considering this guidance, opening windows is considered acceptable for these occasional events without giving risk to potential adverse effect on occupants.

6.26 **Noise and Approved Document O (AD-O) – Overheating**

6.27 Approved Document O relates to the overheating of new dwellings and when undertaking an assessment of the overheating risks the likelihood that open windows can be used for controlling thermal comfort must be considered.

6.28 The aim of AD-O is to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures. As described by the Approved Document, in the Secretary of State's view, compliance with requirement O1 can be demonstrated by using one of the following methods.

a. The simplified method for limiting solar gains and providing a means of removing excess heat, as set out in Section 1 of AD-O.

b. The dynamic thermal modelling method, as set out in Section 2 of AD-O.

6.29 The dynamic thermal modelling method may be required where the requirements of the simplified method are not achieved, or where other factors such as noise restrict the use of the simplified method.

6.30 AD According to AD-O:

"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)."

6.31 The sound contour results for the $L_{Aeq,8hr}$ noise metrics which is considered the worst case are shown in Figure 6.

6.32 The '**green**' contour indicates where the internal noise limits can be met with open windows following the simplified method, and '**red**' where the limits cannot be met with open windows according to the noise limits described in paragraph 6.30.

6.33 The rooms which face into the site do not preclude the use of the simplified method strategy for reducing overheating risk, and open windows are acceptable for removal of excess heat.

6.34 For the façade which face onto Lordship Lane, Redvers Road and Vincent Road (except for rooms on the 8th Floor of Block A), these plots do not comply with the noise limits of the simplified method and any overheating assessments will need to assume these windows remain closed for the bedrooms at night when undertaking the dynamic thermal modelling. The windows can be openable, but the AD-O regulations require noise limits at night to be met in bedrooms when windows are open, or they need to be assumed as closed. They can be open during the daytime within the bedrooms and living rooms.

6.35 In some cases, smaller window open areas are sufficient to mitigate overheating risk. The amount of window open areas can be calculated and will be reviewed at a later stage.

6.36 The facades exposed to the higher noise levels are likely to need an alternative to opening windows for ventilation to control overheating which could include:

- Using the extract fan to provide increased air changes, with façade vents
- Use an MVHR system which provides sufficient air changes to control overheating

6.37 Solutions for controlling overheating will be developed with the Mechanical Engineers and provision for the proposed options have been included within the current design.

Figure 6: 'Green' contour indicates where the internal noise limits can be met with open windows, and 'red' where the limits cannot be met with open windows

7 Proposed plant noise limits

7.1 At this stage in the development, exact mechanical plant specifications are unavailable; plant noise limits for the cumulative impact of all proposed plant at the nearest noise sensitive location are proposed to reduce the risk of an adverse impact.

7.2 Background sound levels have been determined at three positions considered representative of the identified noise-sensitive receptors.

7.3 A BS 4142 rated noise impact of no greater than the background sound level at the nearest residential noise sensitive receptor is proposed for the cumulative impact of all fixed mechanical plant.

7.4 Proposed plant noise limits are shown in Table 14.

Location (Residential NSR at 1m outside of noise sensitive residential facades)	Period	Rated noise impact, $L_{Ar,Tr}$	Comments
P2	Daytime *(07:00 – 23:00)*	≤ 49 dB	BS 4142 rating of no greater than the background sound level.
	Night-time *(23:00 – 07:00)*	≤ 44 dB	

Table 14: Proposed upper noise limits for fixed mechanical plant

7.5 Should all fixed mechanical plant run continuously throughout a 24 hour day, the suggested upper limits during the night-time assessment period should be the limit for design.

7.6 As fixed plant is specified and details become available, the impact will be assessed following the methodologies defined in BS 4142; calculation of fixed plant noise propagation will be undertaken in accordance with BS EN ISO 9613-2.

7.7 Where the calculated fixed plant noise impact exceeds the noise limits, mitigation measures will be developed and determined with the Mechanical Services Engineer which will be capable of mitigating the plant noise impact to achieve the criteria.

7.8 Considering the context of the existing acoustic environment and proposed plant noise limits, a BS 4142 assessment would indicate the likelihood of a low impact should the calculated upper limits be adhered to. This impact is considered to be at worst a LOAEL in alignment with the NPSE aims.

8 Conclusion

8.1 The existing noise impact across the proposed development site has been assessed in support of a Planning Application.

8.2 The assessment has considered the noise impact from the nearby roads.

8.3 The potential implications for the design of the façade sound insulation under whole dwelling conditions as described by AD-F is discussed, and the glazing and ventilator acoustic performance requirements to achieve the indoor noise level targets are identified in Table 1.

8.4 Based on the existing noise risks and details outlined in this report, the site is considered suitable for residential development.

8.5 At this stage in the development, exact mechanical plant specifications are unavailable; plant noise limits for the cumulative impact of all proposed plant at the nearest noise sensitive location is proposed to reduce the risk of an adverse impact.

8.6 A noise survey has been carried out at site and analysis of representative background noise levels carried out for daytime and night-time periods based on guidance included within BS 4142.

8.7 A BS 4142 rated noise impact of no greater than the background sound level at the nearest residential noise sensitive receptor has been adopted for the cumulative impact of all fixed mechanical plant; noise limits are proposed in Table 2.

8.8 Considering the context of the existing acoustic environment and proposed plant noise limits, a BS 4142 assessment would indicate the likelihood of a low impact should the calculated upper limits be adhered to. This impact is considered to be at worst a LOAEL in alignment with the NPSE aims.

9 References

1 National Planning Policy Framework, Department for Communities and Local Government, July 2021.

2 Noise Policy Statement for England, Department for Environment, Food and Rural Affairs, March 2010.

3 Planning Practice Guidance – Noise: http://planningguidance.planningportal.gov.uk/blog/guidance/noise/noise-guidance/

4 Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH), "ProPG: Planning & Noise - New Residential Development," May 2017.

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

6 Guidelines for Community Noise, Edited by Birgitta Bergland, Thomas Lindvall, Dietrich H Schwela, World Health Organisation, 1999.

7 AECOM Environment on behalf of DEFRA, NANR316 Possible options for the identification of SOAEL and LOAEL in support of the NPSE, December 2015.

8 BS 7445:2003, Description and measurement of environmental noise. Guide to quantities and procedures.

9 BS 4142: 2014, Method for rating and assessing industrial and commercial sound.

10 Cadna/A environmental noise modelling software, version 2020, Datakustik GmbH.

11 ISO 9613: Acoustics - Attenuation of sound during propagation outdoors.

12 Pre-application document, Corstorphine & Wright, Doc no. no. 21820, Lordship Lane, Wood Green Site Analysis, September 2022.

13 Approved Document F 2021 Edition, The Building Regulations 2000.

14 BS EN 12354-3:2000, Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound.

15 Practical Acoustic Design – the Apex Method, Proceedings of the Institute of Acoustics Vol 36 Pt 3 2014. Full paper and Poster presentation at Institute of Acoustics Conference 2014, available to download from www.apexacoustics.co.uk

16 BS EN ISO 16283-1:2014 Acoustics – Field measurement of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation.

Appendix A Background sound levels

A.1 Analysis to determine the typical background sound level representative of the daytime and night-time period is undertaken following the guidance of BS 4142, with results shown in Figure 7 - Figure 10.

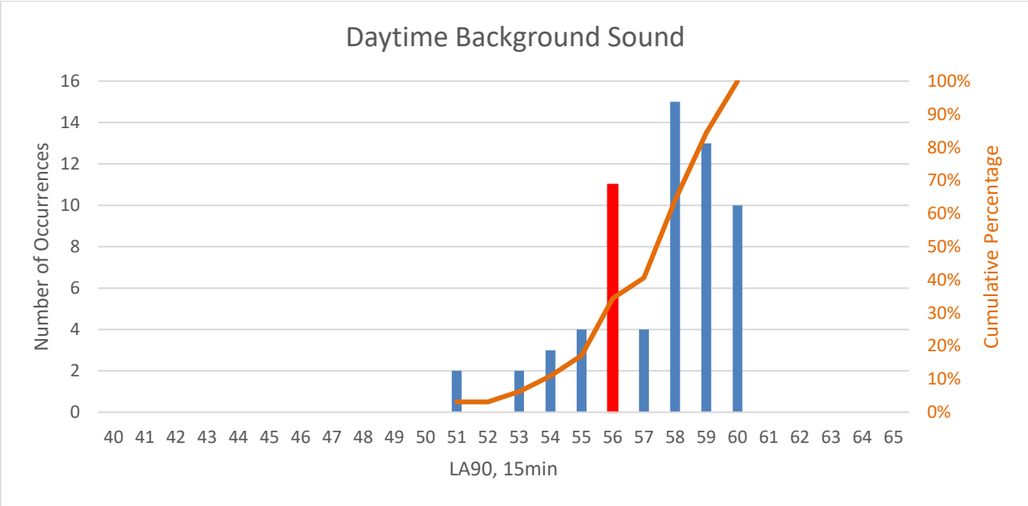


Figure 7: Analysis of daytime background levels, $L_{A90,\ 15\text{-}min}$ at Position 1

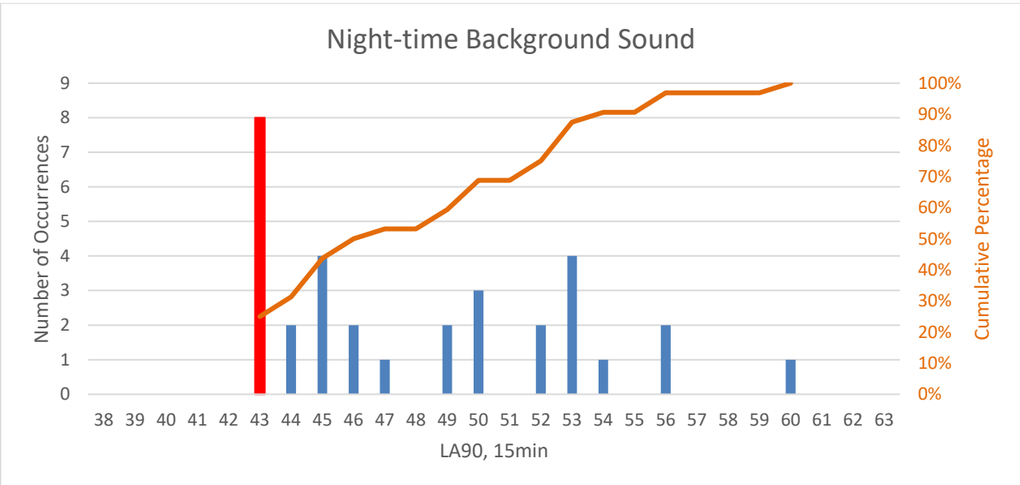


Figure 8: Analysis of night-time background levels, $L_{A90,\ 15\text{-}min}$ at Position 1

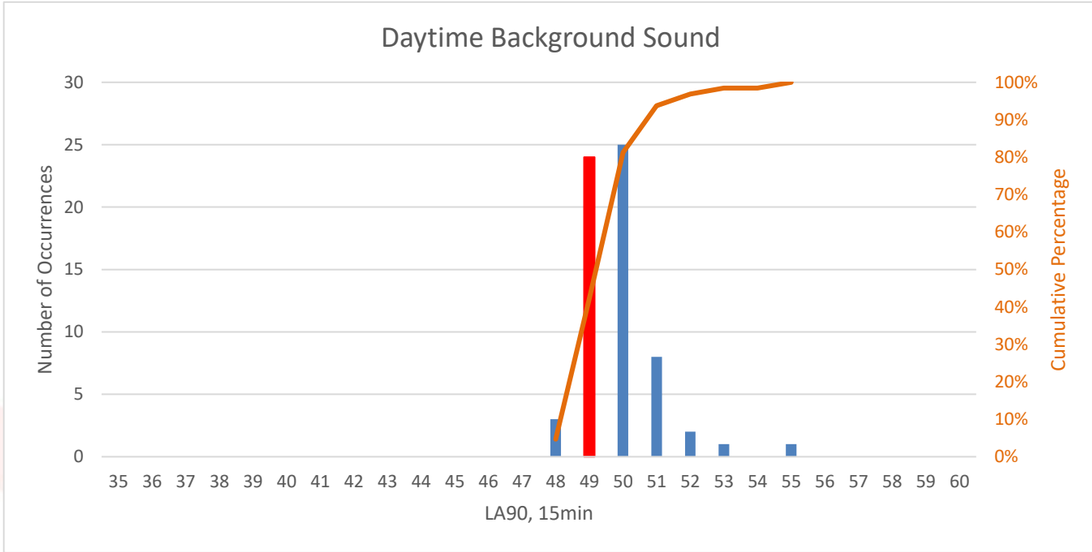


Figure 9: Analysis of daytime background levels, $L_{A90,\ 15\text{-}min}$ at Position 2

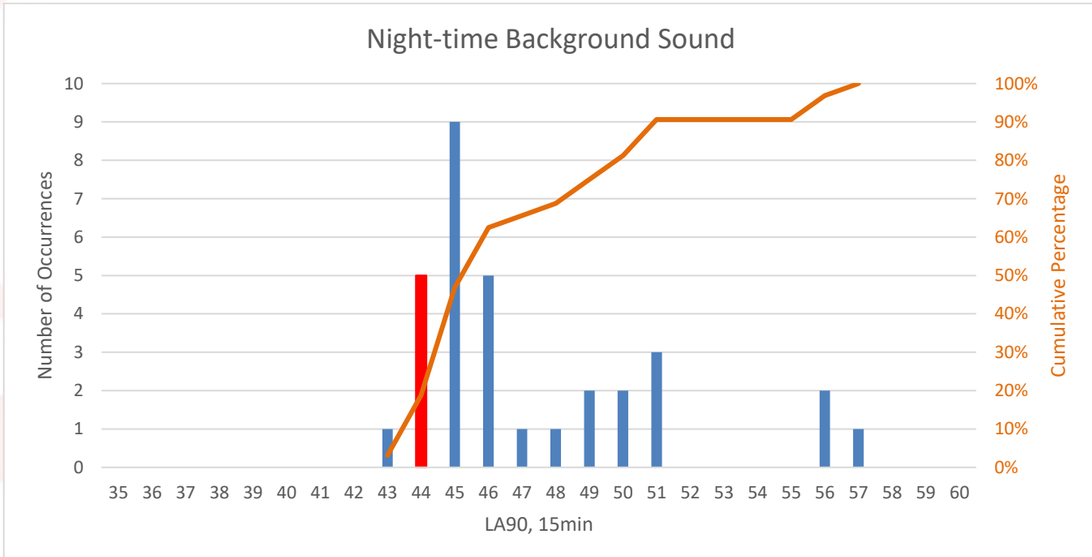
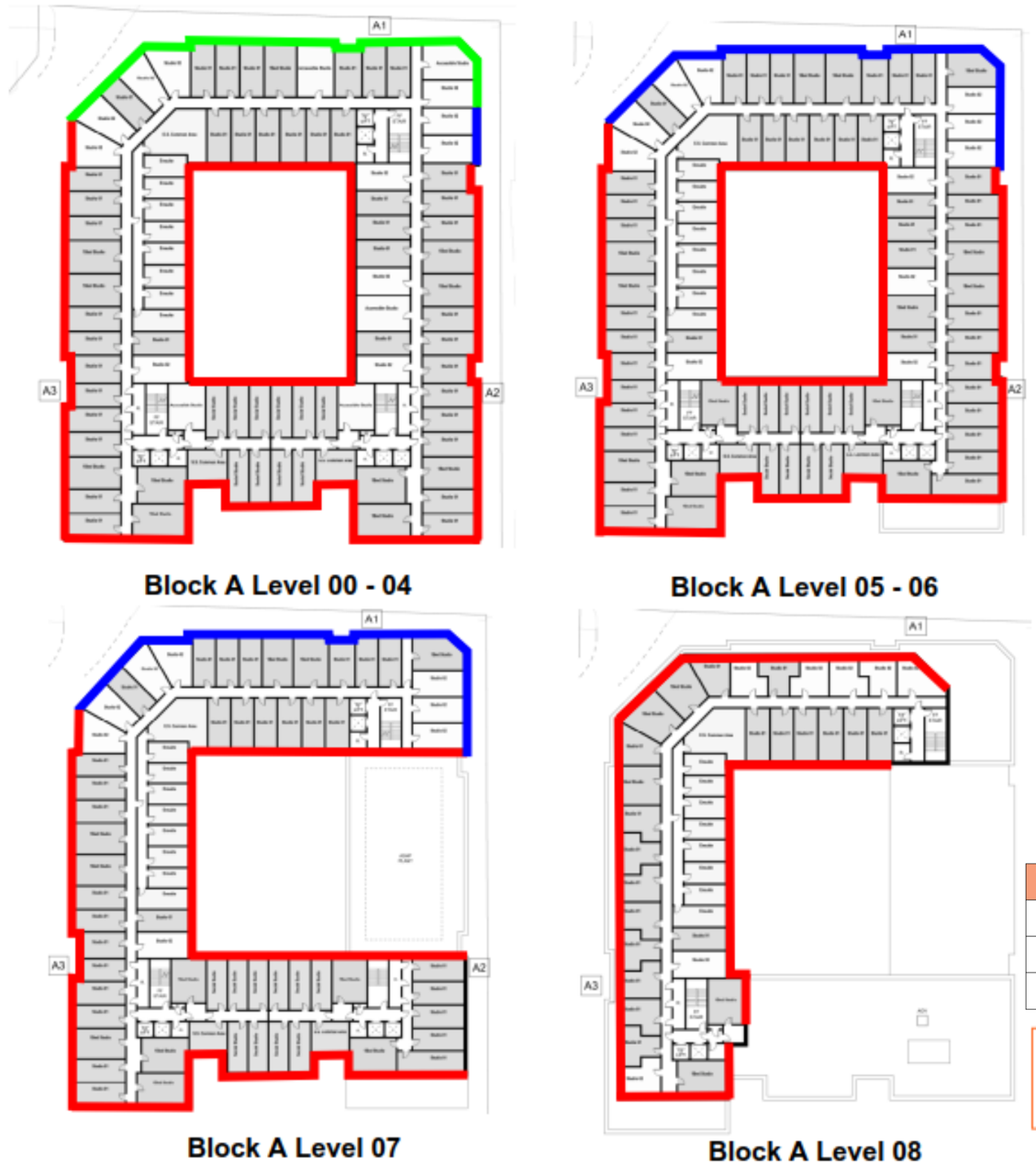


Figure 10: Analysis of night-time background levels, $L_{A90,\ 15\text{-}min}$ at Position 2

Appendix B Façade insulation mark-ups

Block A



Requirement (Refer to Appendix B)	Glazing performance	Trickle ventilator performance	Potential AD-F whole dwelling ventilation strategy
1	≥ 27 dB R_w + C_{tr}	≥ 31 dB $D_{nea,w}$ + C_{tr}	Continuous mechanical extract ventilation; or Mechanical ventilation with heat recovery (trickle ventilators not required)
2	≥ 31 dB R_w + C_{tr}	≥ 36 dB $D_{nea,w}$ + C_{tr}	
3	≥ 34 dB R_w + C_{tr}	≥ 42 dB $D_{nea,w}$ + C_{tr}	

Glazing Acoustic Performance Requirements
- Requirement 1
- Requirement 2
- Requirement 3

Figure 11: Glazing acoustic performance requirements – Block A

Block B

Block B Level 00 - 02

Block B Level 03 - 04

Block B Level 05

Requirement (Refer to Appendix B)	Glazing performance	Trickle ventilator performance	Potential AD-F whole dwelling ventilation strategy
1	≥ 27 dB $R_w + C_{tr}$	≥ 31 dB $D_{nT,w} + C_{tr}$	Continuous mechanical extract ventilation; or Mechanical ventilation with heat recovery (trickle ventilators not required)
2	≥ 31 dB $R_w + C_{tr}$	≥ 36 dB $D_{nT,w} + C_{tr}$	
3	≥ 34 dB $R_w + C_{tr}$	≥ 42 dB $D_{nT,w} + C_{tr}$	

Glazing Acoustic Performance Requirements
- Requirement 1
- Requirement 2
- Requirement 3

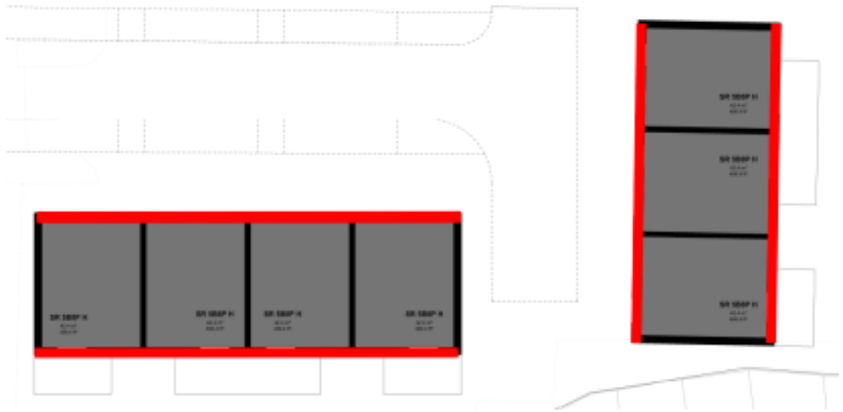
Figure 12: Glazing acoustic performance requirements – Block B

Block C

Block C Level 00 - 02

Block C Level 03 - 05

Block D



Block D Level 00 - 02

Requirement (Refer to Appendix B)	Glazing performance	Trickle ventilator performance	Potential AD-F whole dwelling ventilation strategy
1	≥ 27 dB $R_w + C_{tr}$	≥ 31 dB $D_{nea,w} + C_{tr}$	Continuous mechanical extract ventilation; or Mechanical ventilation with heat recovery (trickle ventilators not required)
2	≥ 31 dB $R_w + C_{tr}$	≥ 36 dB $D_{nea,w} + C_{tr}$	
3	≥ 34 dB $R_w + C_{tr}$	≥ 42 dB $D_{nea,w} + C_{tr}$	

Glazing Acoustic Performance Requirements
- Requirement 1
- Requirement 2
- Requirement 3

Figure 13: Glazing acoustic performance requirements – Block C & D