PLANNING NOISE ASSESSMENT

LAND AT EVENDONS LANE

PROPCO (WOKINGHAM) LTD

JULY 2025

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REVISION HISTORY

Version	Comments	Changes made by	Approved by
P01	First Issued Version	JE	CB
P02	Second Issued Version	JE	CB

CONTENTS

1 INTRODUCTION

Anderson Acoustics Ltd was commissioned by Propco (Wokingham) Ltd, to undertake a noise assessment for the erection of a 64 bed care home (Use Class C2) with site access, parking, hard and soft landscaping and other associated works following demolition of existing commercial buildings. Wokingham Borough Council (WBC) has granted planning permission for the proposed development (ref. 231351) subject to a planning condition relating to noise. Planning Condition 30 is presented below;

30. Noise Impact Assessment - Prior to commencement of development, an in depth noise impact assessment should be carried out by an appropriately qualified consultant, this should be submitted to the local authority for approval. This can inform the design to achieve best practice and will need to address noise impact in terms of:

- *Existing noise sources and how they may affect the amenity of the occupiers of the site once construction is complete, this is to take into consideration the character of the site and the nearby roads etc, and the impact on the amenity of nearby noise sensitive receptors as a result of the new development, both internal and external spaces, taking into consideration any mechanical noise arising from the use of the proposed development including, but not limited to, kitchen extractor fans.*

- *The impact on nearby noise sensitive receptors during the construction phase, to include vehicle movement and plant and machinery being used, as well as construction noise and any mitigation measures.*

- *Details of good design to protect occupiers of the proposed development from noise from existing noise sources, glazing and ventilation of the proposed properties will need to be designed to meet acceptable internal and external noise levels. This report should identify a clear scheme of recommended works, or such other steps as may be necessary to minimize the effects of noise on nearby receptors and on future occupants of the development.*

- *The approved scheme shall be implemented prior to the occupation of the development and permanently retained thereafter.*

Reason: To protect the occupants of nearby residential properties and future occupiers of the proposed development from noise. Relevant policies: Core Strategy policies CP1 and CP3 and Managing Development Delivery Local Plan policy CC06.

Appropriate façade elements (glazing and ventilators) have been detailed to ensure that suitable internal noise levels can be achieved across the development.

3D noise modelling has been undertaken to demonstrate that external noise levels across the development fall below the BS 8233 guideline criteria. Therefore, no further recommendations have been made.

Plant noise limits have been established to support the selection of suitable external plant and mitigation measures.

An outline Construction Noise Risk Assessment has also been undertaken to ensure that the noise impact during the construction phase are suitably controlled.

Providing the recommendations made within this report are included as part of the design and construction, the planning condition may be discharged.

2 SITE DESCRIPTION

The Evendons Centre is currently located at the development site, which comprises of an assortment of small commercial units, and a large area of hardstanding for parking. The site sits between new and existing residential settlement areas, including a built up area to the east along Evendons Lane/Blagrove Lane, and the newer development Redlands Place to the south-west. An aerial view of the current site is shown in Figure 2-1.

Figure 2-1: Existing site – nearest residential premise and noise monitoring position (Anderson Acoustics survey)

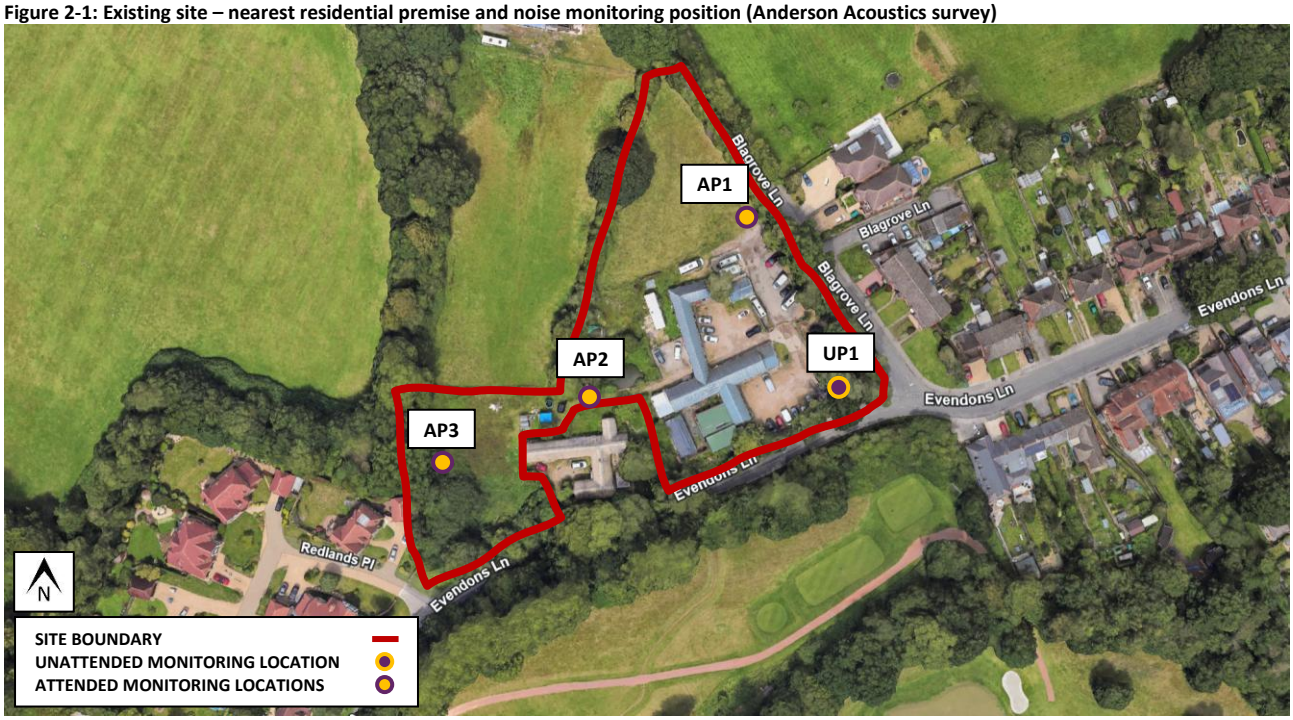


Figure 2-2: Proposed site plan

3 BASELINE NOISE SURVEY

3.1 METHODOLOGY

The prevailing noise conditions at the development have been determined by detailed continuous unattended environmental noise surveys from 28th February to 4th March 2025. Additional attended monitoring was also undertaken on 14th March 2025 from 15:00-15:30 hours at the locations indicated in Figure 2-1.

The dominant noise sources noted during the attended monitoring were bird song, light wind, with occasional aircraft noise and traffic noise from local roads.

Unattended measurements were taken approximately 2.0 m above local ground level and under free field conditions. The height was selected to ensure that the existing boundary fence did not impact measurement. The monitoring position is detailed in Figure 2-1.

Consecutive 15-minute measurements of $L_{Aeq,T}$, L_{Amax} and $L_{A90,T}$ noise indices were obtained using the 'Fast' time weighting.

3.2 INSTRUMENTATION

The equipment used during the survey is shown below in Table 3-1. All equipment was calibrated before and after the survey and no significant drift in calibration was observed.

All noise measurements were undertaken by a consultant certified as competent in environmental monitoring. All acoustic measurement equipment used during the noise survey conformed to Type 1 specification of BS 61672 [1]. A full inventory of this equipment is shown below. All equipment's calibration certificates are available on request.

Table 3-1: Survey Equipment Details

Description	Equipment	Serial no.	Calibration Expiry	Calibration Certification No.
Sound Level Meter	Rion NL-52 Sound Level Meter	732147	26/01/2026	TCRT24/1062
	Preamplifier NH-25	32175		
	Microphone UC-59	05339		
Calibrator	Rion NC-74 Calibrator	34304643	16/07/2025	TCRT241543

3.3 WEATHER CONDITIONS

Weather conditions during the survey period have been obtained from an internet source www.wunderground.com (weather station Wokingham, ID IWOKIN112), which indicates light wind throughout the survey period. Conditions are also noted to be dry throughout the survey period. Weather conditions are not considered to have impacted measurements.

3.4 UNATTENDED MONITORING

The table below presents noise levels measured on site. For the purpose of this assessment, the most commonly occurring $L_{A90,\ 15min}$ was considered representative of the existing background sound level as shown in Figure 3-1.

[1] BS EN 61672-1:2013 Electroacoustics. Sound level meters

2 minute samples have been used to determine the 11th highest for $L_{AFmax,T}$.

Table 3-2: Unattended survey measurement results

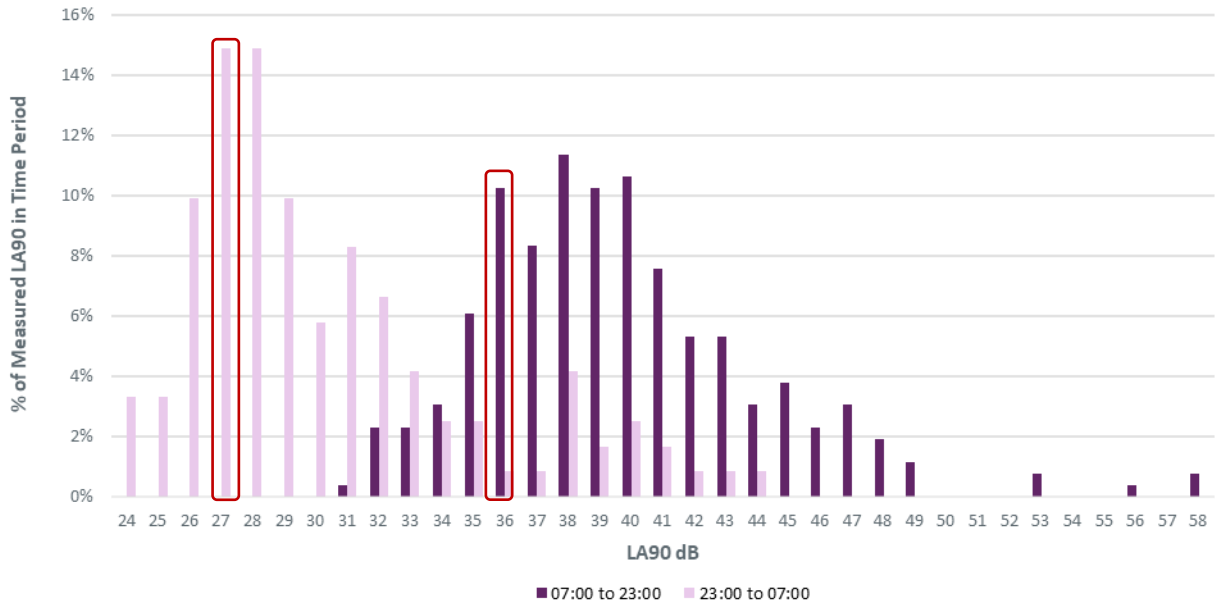
Date	Assessment Period, T	Ambient Sound Level, $L_{Aeq,\ T}$ (dB)	Background Sound Level, $L_{A90,\ 15min}$ (dB)	L_{AFMax} 11th Highest
Friday 28th February 2025	Day time (12:15-23:00)	58	39	75
	Night-time (23:00-07:00)	48	27	
Saturday 1st March 2025	Day time (07:00-23:00)	58	38	73
	Night-time (23:00-07:00)	46	29	
Sunday 2nd March 2025	Day time (07:00-23:00)	57	36	73
	Night-time (23:00-07:00)	45	32	
Monday 3rd March 2025	Day time (07:00-23:00)	61	40	74
	Night-time (23:00-07:00)	46	28	
Tuesday 4th March 2025	Day time (07:00-23:00)	62	47	-
Overall Summary	**Day time (07:00-23:00)**	**59**	**36**	**73**
	Night-time (23:00-07:00)	**45**	**27**	

Table 3-3 presents the octave band data measured at the unattended monitoring position. A typical spectrum has been established for the L_{AFmax} metric.

Table 3-3: Spectral values for period averaged $L_{Aeq,T}$ and $L_{AFmax,T}$ metrics

Period	Metric	dBA	Octave Band Frequency, dB					
			125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
Daytime (07:00 to 23:00)	$L_{Aeq,16hrs}$	59	57	55	54	56	52	47
Night-time (07:00 to 23:00)	$L_{Aeq,8hrs}$	46	44	43	41	43	38	32
	L_{AFmax}	73	69	68	69	71	66	63

Figure 3-1: Background sound levels histogram (unattended monitoring)



3.5 ATTENDED MONITORING

Attended monitoring was completed to further understand the existing acoustic environment across the development site and to help inform the development of a 3D noise model. Monitoring was completed on 14th March 2025 from 12:00-13:00, the results of which can be seen in below in Table 3-4.

Attended position 1 (AP1) was located at the far corner of the unmade car park, with AP2 and AP3 next to the small pond and the western property boundary respectively.

Table 3-4: Attended monitoring results

Monitoring Position	Assessment Period	Ambient Sound Level, $L_{Aeq,T}$ (dB)	Background Sound Level, L_{A90} (dB)
AP1	12:05-12:20	53	34
AP2	12:23-12:39	47	30
AP3	12:35-12:50	50	33

4 PREDICTION MODELLING

4.1 PREDICTED AMBIENT NOISE LEVELS

DataKustik's CadnaA 3D noise modelling software has been used to determine the free field noise levels around the site and at noise sensitive receptors, calibrated to the measured survey data from Anderson Acoustics.

Predictions have been carried out in accordance with the ISO 9613-2 [2] methodologies, which allow consideration of the effects of the acoustic screening provided by the existing buildings surrounding the application site, the topographical conditions throughout the area, ground absorption, atmospheric absorption, acoustic reflections and acoustic screening, as well as applying a light downwind propagation correction to represent a worst-case. Predicted levels have been assessed against the design targets indicated.

3D modelling details are as follows:

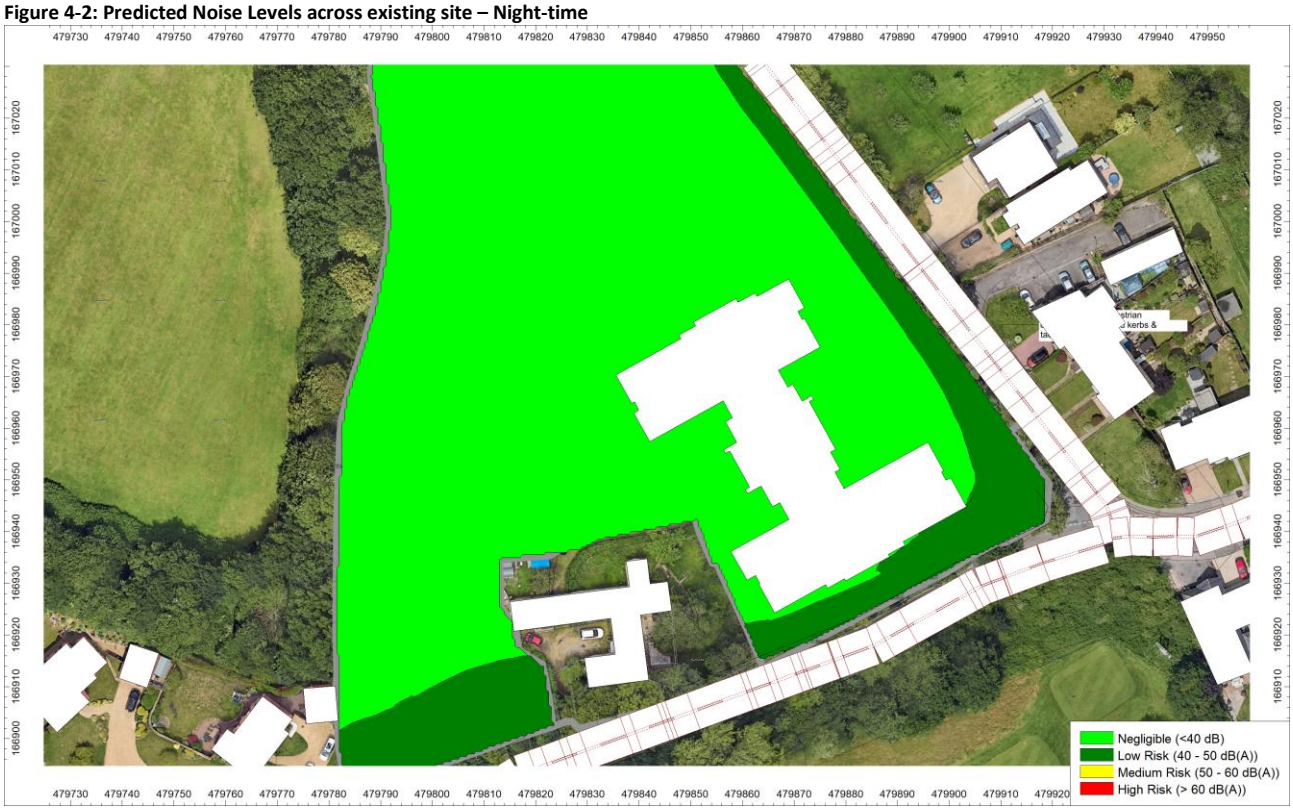
- Receivers have been set at a height of 1.5 m above local ground level. For multistorey buildings, receivers are set at a height of 1.5 m above ground level, then 3.0 m for each additional storey
- Ground modelled as soft due to the extensive green spaces surrounding the development (i.e. G = 0.5).
- 2 orders of reflection

The predicted ambient noise levels for the proposed site are shown in Figure 4-1 and Figure 4-2. Noise contours are associated with the ProPG Risk Thresholds at 1.5 m above ground floor level.

[2] ISO 9613-2:2024 Acoustics — Attenuation of sound during propagation outdoors

Figure 4-1: Predicted noise levels across proposed site – Daytime

Figure 4-2: Predicted Noise Levels across existing site – Night-time



5 BUILDING ENVELOPE DESIGN AND VENTILATION STRATEGY

Assessment guidance is summarised in Appendix B. These should be read in conjunction with the government's overarching planning principles with respect to noise including: Noise Policy Statement for England [3] ; National Planning Practice Framework [4] and Planning Practice Guidance – Noise [5].

5.1 ADOPTED CRITERIA

The ProPG Guide has been considered in this assessment, in line with national planning guidance to determine suitable noise criteria for the development. For transportation sources, it is considered that the BS 8233 and WHO levels should apply, in line with the ProPG L_{AFmax} approach.

Where building services plant installations are proposed, the noise impact from these should be assessed using the guidance methodology presented in BS 4142.

See Appendix B for further detail regarding the assessment criteria.

5.2 PRO-PG STAGE 1: ASSESSMENT

An initial site noise risk assessment has been undertaken in line with the proposed criteria detailed in Appendix B. This is determined by the measured free-field sound levels from the survey and predictions from the 3D environmental noise model.

Table 5-1: ProPG Stage 1 initial site noise risk assessment

Façade Side	ProPG Noise Risk Category	
	Daytime	Night-time
North	Negligible	Negligible
East	Negligible/Low	Negligible
South	Low	Negligible/Low
West	Negligible	Negligible

The above table shows that the $L_{Aeq,T}$ noise levels measured across the site fall into the *"Negligible"* and *"Low"* risk categories.

According to the ProPG, "*at low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development*", therefore, it should be demonstrated that a *"good acoustic design process"* has been adopted and that *"the adverse noise risk can be mitigated and minimised"*.

[3] Department for Environment, Food and Rural Affairs - Noise Policy Statement for England

[4] Ministry of Housing, Communities & Local Government - National Planning Policy Framework

[5] Ministry of Housing, Communities & Local Government - Planning Practice Guidance - Noise

6 PRO-PG STAGE 2: FULL ASSESSMENT

6.1 STAGE 2: ELEMENT 1 – GOOD ACOUSTIC DESIGN PROCESS

As presented in the ProPG, Section 5 of BS 8233 contains guidance on the sequence of stages to be followed in the planning and early acoustic design of a new development. Section 5.4 of BS 8233 outlines a general approach to determining appropriate noise control measures.

Given the site falls into the Low-risk category, further measures to reduce noise levels beyond appropriate façade treatment are not considered to be necessary.

6.2 ELEMENT 2: INTERNAL NOISE LEVEL GUIDELINES

An assessment of internal noise levels has been based on a set of nominal sound reduction performances relative to varying glazing and ventilation elements.

6.2.1 DRAWINGS

Given the proposed development is in the early stages of development, a single layout option alongside assumptions has been used to undertake this assessment. The site layout has been taken from the initial site layout plan provided by the client.

Construction methods and outline elevations have been taken from the Design & Access Statement for the scheme provided by Boutique Care Homes. The following GA Plans have been used within calculations.

Table 6-1: Drawings Used

Description	Drawing Number	Date
Proposed Site Plan	B01-11 10 F	22.05.25
Proposed Ground Floor	B01-11 01 G	28.04.25
Proposed First Floor	B01-11 02 G	28.04.25
Proposed Second Floor	B01-11 03 F	28.04.25
Proposed Roof Plan	B01-11 04 C	28.04.25
Proposed Elevations – Sheet 1	B01-11 05 B	28.04.25
Proposed Elevations – Sheet 2	B01-11 06 B	28.04.25

6.2.2 ROOM REVERBERATION

In order to calculate the internal ambient noise levels within habitable rooms, our analysis has assumed typical reverberation times in furnished bedrooms and living rooms, which have been based on a flat reverberation time of 0.5 seconds across the frequency spectrum between 125 Hz and 4kHz.

6.2.3 NON-GLAZED EXTERNAL AREAS

It is understood that external walls will be a masonry construction. It has also been assumed that the roof will be a standard tiled/slated roof construction. The below sound reduction performance has been assumed for the external wall/roof systems.

Table 6-2: Assumed sound reduction index (dB) of the external wall construction

Reference	Example	R_w / $R_w + C_{tr}$
W1	Masonry Walls	52/48
R1	Tiled/slated roof with plasterboard ceiling	40/37

In order to achieve the internal noise guidelines as set out in Section B.5, it is necessary to estimate internal noise levels with windows closed using glazing and ventilation products.

An assessment of the external building fabric elements has been undertaken based on the unattended spectral data of $L_{Aeq,T}$ and L_{AFmax} levels measured during daytime and night-time periods. Guidance is given in the following sections regarding suitable glazing, ventilation and external wall configurations to achieve the required internal ambient noise levels within the proposed dwellings. Calculations have been undertaken following the general method set out in BS EN 12354-3 [6].

6.2.4 VENTILATION

It is understood that ventilation to bedrooms is proposed via natural means with inline extract to ensuites. An assessment has been undertaken to determine the minimum performance requirements of ventilators to control external noise ingress.

To achieve the recommended internal ambient noise levels, a typical trickle vent is expected to provide sufficient sound insulation from external sources. The location of ventilator types is detailed within Figure 6-1 and Table 6-5.

Table 6-3: Example ventilation configurations

Ventilator Reference	Configuration Example	$D_{n,e,w}$ / $D_{n,e,w} + C_{tr}$
V1	Standard Trickle Vent	31/27
V2	Acoustic Trickle Vent	38/36

Windows should be openable for purge or rapid ventilation, as requested by ADF. Internal noise level guidelines are generally not applicable under these exceptional events, which should only occur occasionally (i.e. to remove odour from painting, cooking etc.). For unit ventilators, the measurements to determine their sound reduction performance based on BS EN ISO 10140-2 [7] and should be rated in accordance with BS EN ISO 717-1 [8].

6.2.5 GLAZING

Calculations have been undertaken in accordance with BS 12354-3 to determine the required worst-case acoustic performances for the glazed elements of the façade, in order to provide appropriate internal noise levels in habitable rooms, during both daytime and night-time periods. The resulting worst-case performance requirements are presented in Table 6-4. The location of glazing types is detailed within Figure 6-1 and Table 6-5.

[6] The British Standards Institution - Building acoustics - Estimation of acoustic performance of buildings from the performance of elements

[7] ISO 10140-2:2021 Acoustics — Laboratory measurement of sound insulation of building elements

[8] ISO 717-1:2020 Acoustics — Rating of sound insulation in buildings and of building elements

Table 6-4: Example glazing configurations

Glazing Reference	Glazing Configuration Example	R_w / $R_w + C_{tr}$
G1	Double glazing e.g. 4 mm glass / 12 mm cavity / 4 mm glass	31/27
G2	Double glazing e.g. 10 mm glass / 12 mm cavity / 6 mm glass	37/33

The sound insulation requirements of the glazing are applicable to the window system as a whole, including frames, mullions, and panels. They are based on BS EN ISO 10140-2 and rated in accordance with BS EN ISO 717-1.

All glazing systems should be capable of meeting the performance specifications detailed above, with test certificates being made available in support. Glazing proposals which only reflect the guidance constructions indicated in this report will not be sufficient evidence that a glazing system will achieve the required performance specification.

6.3 GLAZING AND VENTILATOR CONFIGURATIONS

Glazing and Ventilator Configurations necessary to achieve appropriate internal noise levels are presented in Figure 6-1 and Table 6-5, below.

Figure 6-1: Glazing and Ventilator Locations

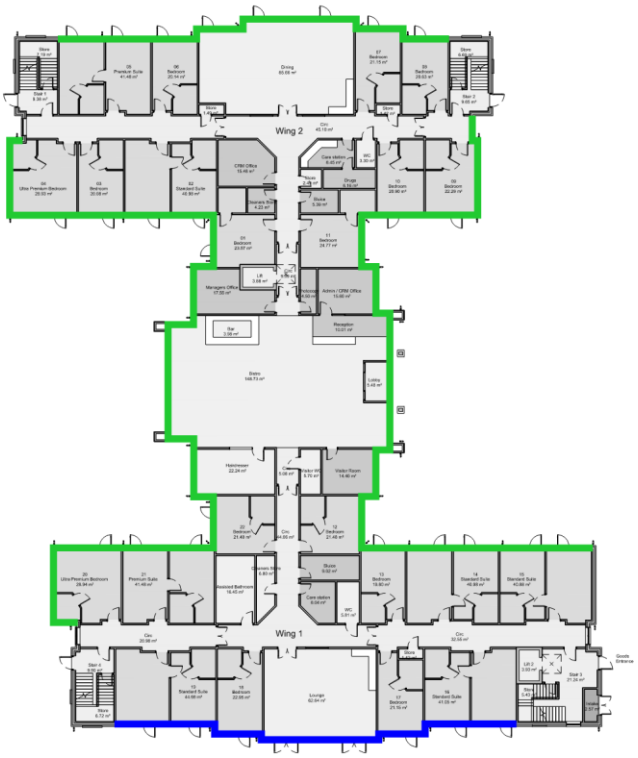


Table 6-5: Proposed Glazing and Ventilation Combinations

Reference	Room Type	Glazing & Ventilator Selections
Green	Living Room	G1 + V1
	Bedroom	G1 + V1
Blue	Living Room	G2 + V2
	Bedroom	G2 + V2

6.4 ELEMENT 3 – EXTERNAL AMENITY AREA NOISE ASSESSMENT

BS 8233 states that "*it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments*".

Figure 6-2 presents the predicted daytime ambient noise levels across the site at ground floor level. Predictions demonstrate that the majority of the site will experience ambient noise levels below the lower guideline level of 50 dB $L_{Aeq,16hrs}$, with some areas nearer to the adjacent roads experiencing ambient noise levels that exceed the upper guideline level of 55 dB $L_{Aeq,16hrs}$.

Further mitigation measures are not considered necessary.

Figure 6-2: Predicted Noise Levels in Ground Floor External Amenity Areas

6.5 ELEMENT 4 – ASSESSMENT OF OTHER RELEVANT ISSUES – OVERHEATING

6.5.1 OVERHEATING: APPROVED DOCUMENT O

Approved Document O (AD-O) of the Building Regulations came into effect in June 2022, which states the following with regard to its application:

"This approved document takes effect on 15 June 2022 for use in England. It does not apply to work subject to a building notice, full plans application or initial notice submitted before that date, provided the work for each building is started before 15 June 2023. Full detail of the transitional arrangements can be found in Circular Letter 01/2021 published on gov.uk."

AD-O specifically states that noise during the night-time period (23:00 to 07:00) must be considered as part of the overheating strategy.

Sections 3.2 and 3.3 of the document state:

"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 $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).

b. 55dB L_{AFmax}, more than 10 times a night (between 11pm and 7am)."

To summarise the above, the AD-O noise requirements state that if the above limits are exceeded when windows are open in bedrooms, an alternative overheating mitigation strategy should be used. AD-O does not provide any guidance on noise conditions in living rooms (either day or night) or bedrooms during the day. Although this is not specified within the planning condition, compliance with ADO is necessary to comply with the building regulations and should therefore be considered as part of the design.

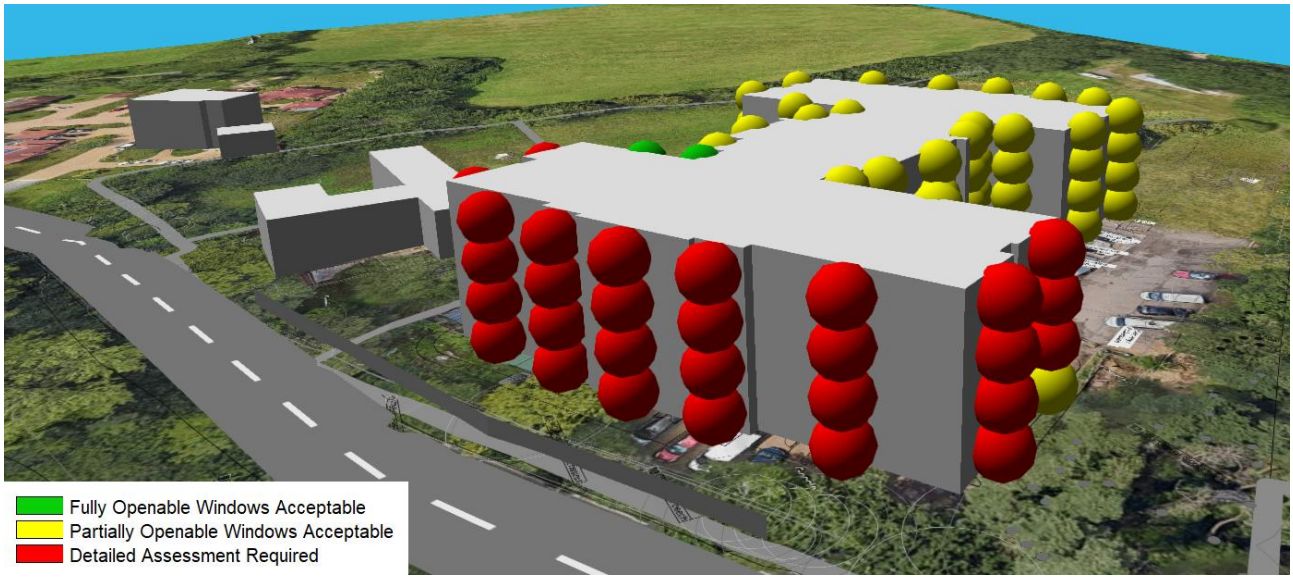
The below figures demonstrate the predicted external sound levels at 1 m from facades across the development. Figure 6-3 demonstrates that the ADO night-time criterion of 40 dB $L_{Aeq,T}$ can be achieved across the development site by using fully openable windows for most of the development with partially open windows being acceptable for south facing rooms.

Figure 6-3: $L_{Aeq,8hrs}$ Approved Document O Outline Assessment

Figure 6-4 demonstrates that the night-time criterion b of ADO (55 dB L_{AFmax}) can be achieved with partially openable providing 10 dB sound reduction across the northern aspect of the development. Partially openable windows providing approximately 0.7 m^2 equivalent open area will typically provide 10 dB sound reduction.

A detailed overheating assessment is recommended for south facing rooms to ensure that appropriate overheating mitigation can be provided during the detailed design stages. Openable or partially openable windows are predicted not to be suitable due to the increased noise levels within rooms on the southern façade.

Figure 6-4: L_{AFmax} Approved Document O Outline Assessment



7 PLANT NOISE LIMITS

At this stage of the design, items of plant not have not yet been selected. As such noise limits have been set at the nearest residential receptors based on the survey results.

In the absence of clear guidance set out by the local authority, it is proposed that a plant noise assessment will be undertaken in-accordance with BS 4142:2014+A1:2019 and that the plant noise rating level at the worst-affected noise sensitive receptor will be assessed against the existing background sound levels, $L_{A90,T}$.

7.1.1 BS 4142 AND PPG-NOISE

A summary of the BS4142:2014 assessment method is included in Appendix B. Within it, it describes the likely level of adverse impact in relation to the comparative difference between the background sound level and the rating level predicted at the noise sensitive receptor. These relate to the descriptions within assessment method described in PPG – Noise, the following values can be applied to LOEAL & SOAEL;

Table 7-1: BS4142:2014 and PPG-N

Difference between the Rating Level ($L_{Ar,Tr}$) to the Background Sound Level ($L_{A90,15min}$)	BS4141 Description	PPG – Noise
+10 dB	Significant adverse impact	SOAEL
0 dB	Does not exceed background is an indication of low impact	LOAEL

The results from the unattended monitoring, as set out in Table 3-2, are considered to be representative of the existing background sound levels at the facades of the nearest residential receptors.

It is not known when plant is expected to be operational, as such daytime and night-time levels have been presented below.

The target rating levels for fixed plant installations are presented in Table 7-2, where these should be designed to not exceed the existing background sound level, which would be an indication of low impact.

Table 7-2: Target noise rating levels for fixed plant noise

Period	Modal background Sound Level, $L_{A90,15min}$	Target Rating Level, $L_{Ar,Tr}$
Day time (07:00-23:00)	36 dB	≤ 36 dB
Night-time (23:00-07:00)	27 dB	≤ 30 dB [a]

Notes
[a] An operational noise limit below 30 dB L_{Aeq} was considered low according to the outdated BS4142:1997 standard, "Rating industrial noise affecting mixed residential and industrial areas." Although this standard has been superseded by the 2014 and 2019 versions, it is still cited in several Local Authority policy documents, particularly in cases where background or rating noise levels are very low. According to the scope of the superseded standard, the method described was not suitable when background and rating noise levels were below 30 dB. Therefore, it is considered reasonable to set plant noise emission criteria to generally not exceed 30 dB at the nearest residential window.

The assessment has been made over a 1-hour period during the daytime (07-23) and a 15-minute during the night-time (23-07), in keeping with the assessment period specified for daytime-based assessments within BS 4142. Suitable mitigation options should be developed at the next design stage.

Should the plant contain acoustically distinguishable features such as intermittency, tones or impulsiveness, appropriate penalties (as defined in BS 4142) should be applied to determine the maximum acceptable sound pressure level at the façade of the NSRs.

7.2 NOISE SENSITIVE RECEPTORS

Nearby noise sensitive receptors are made up of existing residential properties.

Results from the unattended and attended surveys demonstrate that the background sound level does vary significantly across the development site. Therefore, the typical background sound level established at the unattended monitoring position during the daytime and night-time periods has been used to determine appropriate outline plant noise limits at all of the noise sensitive receptors surrounding the development site.

7.3 CAREHOME RECEPTORS

The impact of external plant noise should also be considered at the new habitable spaces. Therefore, a suitable external noise limits should be established to maintain acceptable internal ambient noise levels within these spaces.

At this stage it is not known whether openable windows will be required to mitigate overheating during the summer periods. Where openable windows are required to mitigate overheating an assumed 10 dB attenuation for a partially open window will be applied. Where openable windows are not required to mitigate overheating the external noise limit will be dependent on the performance of the glazing system. Increased levels of external plant noise may be tolerated where building façade elements are specified to provide higher levels of sound insulation. The following plant noise limits should be considered.

Table 7-3: Proposed plant noise limit depending on openable window requirements

Condition	Plant Noise Limit at 1 m from nearest care home window
Openable windows are required to mitigate overheating	40 dB $L_{Ar,Tr}$
Openable windows are not required to mitigate overheating	55 dB $L_{Ar,Tr}$

8 CONSTRUCTION NOISE RISK ASSESSMENT

This assessment outlines the construction noise impacts and effects for the proposed development, following the methodology of the CIEH London Good Practice Guide: Noise & Vibration Control for Demolition and Construction. Though the guidance is produced for London, it is considered applicable elsewhere and is often used to identify construction noise risks at the design stage, when detailed construction information is not available. The construction methodology and phasing is not available at this stage so this assessment procedure has been used and the highest risks considered.

During the design phase the constructability of any proposals is considered, among other things, the practicality of employing measures that can be incorporated to minimise noise levels and vibrations. The risk assessment process defines the mitigation measures considered for the proposed development, to avoid significant effects during construction from construction activities, plant and vehicle movements.

The first step in the construction noise risk assessment approach is to consider the site location and ambient noise levels. Table 3-2 shows the daytime ambient sound level to be 59 dB $L_{Aeq,16hrs}$, so the site is considered to have a *"Medium ambient noise level"* as it is within the range 55 – 65 dB $L_{Aeq,10hrs}$. There are noise sensitive land uses within 25m of the proposed development site.

The works are to take place in "normal working hours":

- Mondays to Fridays - 08:00 – 18:00;
- Saturdays – 08:00 – 13:00;

- Sundays and Public\Bank Holidays – No works permitted.

Table 8-1 shows the risk assessment Part A details, Table 8-2 shows the Part B details, and Table 8-3 shows the summary of the risk assessment.

Table 8-1 Construction Noise Risk Assessment A

Locality / Site information	Low	Medium	High
Programme Duration	<6 months	6 months to 12 months	**> 12 months**
Proximity of nearest sensitive receptors	>50m from the boundary	Between 25m and 50m	**<25m**
Day-time Ambient Noise Level	High ambient noise level	**Medium ambient noise level**	Low ambient noise level
Working hours	**Normal working hours only**	Some extended evening or weekend working	Some night-time working
SUBTOTAL A	**1**	**1**	**2**

Table 8-2 Construction Noise Risk Assessment B

Works Information	Low	Medium	High
Location of Works			
Majority within existing complete building envelope			
Majority of works external			✓
External demolition			
Limited to 2 weeks			
External demolition between 2 weeks and 3 months		✓	
External demolition greater than 3 months			
Ground Works			
Limited to non-percussive methods (i.e. hand tools / small excavator / small backhoe)			
Percussive methods less than 3 months		✓	
Percussive methods greater than 3 months			
Piling			
Limited to 1 week			
Bored piling only. No impact or vibratory piling		✓	
Impact or vibratory piling			
Vibration generating activities			
Limited to less than one month			
Between one week and three months		✓	
Greater than three months			
Street Management			
Required for less than one week or not at all			
Required for between a week and a month		✓	
Required for more than a month			
SUBTOTAL B Add up the number of ticks in each column	0	5	1

Table 8-3 Risk Assessment Summary

	Low	Medium	High
Risk Assessment A – Locality / Site Information	1	1	2
Risk Assessment B - Works information For the highest number of ticks in SUBTOTAL B add one tick to the equivalent risk column	0	6	1
Total	**1**	**7** [a]	**3**

Notes
[a] Medium Risk

The site is therefore classified as Medium Risk, and the mitigation measures for a Medium Risk site apply. These mitigation measures are shown in Table 8-4.

Table 8-4 Mitigation Measures

Key	**H = Highly Recommended**	**D = Desirable**	**N = Not applicable**
General Considerations			
General considerations are measures which apply to all sites, to be considered when planning the site, prior to commencement of works or those which are not identified by the other categories.			
Mitigation for all Risk Sites			
Designated site-based staff shall have the authority to take the steps necessary on behalf of the contractor(s) to ensure noise and vibration is adequately controlled and managed, according to the circumstances associated with each worksite.			
At the commencement of their appointment on a project (or prior to start of works on site), all site staff are to be briefed on their responsibilities to the application of BPM to minimise construction noise and vibration and the content of any planning consents, codes of construction or other legal agreements. The performance of the training should then be regularly reviewed and repeated throughout the construction programme as appropriate.			
Site hoarding to be built and maintained to maximise the reduction in noise levels to sensitive buildings and land uses.			
Display contact details of contractor and responsible site manager as well as working hours and other site information on the hoarding.			
Locate the site access away from noise sensitive receptors.			
Keep internal haul routes well maintained and avoid steep gradients.			
Limit material and plant loading and unloading to normal working hours.			
Reduce loading / unloading heights for muck away and material movement to mitigate impact noise.			
Handle all material in a manner that minimises noise.			
Join the Considerate Constructors Scheme for the site (see Appendix 6 for further information).			
Consult the respective Borough's Code of Construction Practice / Technical Guidance.			

Mitigation Measures to be Considered	Low Risk	Medium Risk	High Risk
Submit a Section 61 consent application to the local authority (see Appendix 2)	N	**D**	H
Adhere to 'quiet hours' as agreed and/or adopted by the local authority.	D	**D**	H
Maximise the screening effect of buildings and temporary stockpiles through programming / phasing of works.	N	**D**	H
Use rubber linings in chutes, dumpers and hoppers to reduce impact noise.	D	**H**	H
Minimise opening and closing of site access gates through good coordination of deliveries and vehicle movements.	D	**H**	H
See Vehicle Activity for additional good practice with regards to the transportation of material.	D	**H**	H
Plant			
Construction plant and equipment, in one form or another, will be used on a construction site throughout the duration of a project. They are a source of noise and vibration and can disturb local residents and users of other receptors and form the basis of a large proportion of complaints received by a local authority.			
It is important that the appropriate plant and equipment for the task is selected and the correct procedures are followed to ensure the plant is used at its most effective and efficient.			
Mitigation for All Risk Sites			
Ensure that each item of plant and equipment complies with the noise limits quoted in the relevant European Commission Directive 2000/14/EC, United Kingdom Statutory Instrument (SI) 2001/1701.			
Fit all plant and equipment with appropriate mufflers or silencers of the type recommended by the manufacturer.			
Follow manufacturer's guidance and measures to operate plant and equipment and use it in a manner which minimises noise.			
Use all plant and equipment only for tasks for which it has been designed for.			
Shut down all plant and equipment in intermittent use in the intervening periods between works or throttle it down to a minimum.			
Mitigation Measures to be Considered	**Low Risk**	**Medium Risk**	**High Risk**
If possible power all plant and equipment by mains electricity or other quieter technology rather than locally powered sources such as generators.	D	**H**	H
Maximise screening from existing features / structures, or employ the use of full or partial enclosures for fixed plant. The enclosures should be well maintained. Fixed plant can include generators, compressors, pumps, batching plant and ventilation plant.	D	**H**	H
Locate and orientate fixed or semi-static plant away from noise sensitive receptors.	D	**H**	H
Consider additional measures to control noise for any plant required to operate on a 24 hour basis; for example, dewatering pumps or generators used to power site security.	D	**H**	H
Vibratory compaction equipment shall be used in a mode which minimises the incident vibration at nearby residential and other sensitive properties. Consideration should be given to engaging concentric weights only when running at speed to avoid run up, run down resonances, the use of smaller equipment, or turning off the mechanical vibration on vibratory rollers and undertaking more passes for areas where there is a particular risk that disruption may occur at neighbouring properties.	D	**H**	H

Vehicle Activity
Material deliveries and removals are major noise sources that can have an impact on receptors both close to and at a distance away from a construction site.
Measures to minimise this impact should be considered as early as possible in the planning stage of a project, so site layout and logistical plans can be developed accordingly. Measures are especially necessary for sites close to schools or where a number of construction sites are operating within close proximity to each other.
Mitigation for all Risk Sites
Ensure all vehicle movements occur within normal hours or at agreed times, taking into account the primary function of sensitive receptors in the vicinity (i.e. avoiding school drop-off/pick-up periods).
Maximise the reuse of any waste arising on site to minimise vehicle movements.
Plan deliveries and vehicle movements so that vehicles are not waiting or queuing on the public highway. If waiting or queuing is unavoidable then engines should be turned off.
Minimise opening and closing of site access through good coordination of deliveries and vehicle movements.

Mitigation Measures to be Considered	Low Risk	Medium Risk	High Risk
Plan site layout to ensure that reversing is kept to a practicable minimum, and where practicable eliminated altogether.	D	**D**	H
Where reversing is required, use broadband reverse sirens / alarms or, where it is safe to do so, disengage all sirens and alarms and use banks-men.	D	**D**	H
Produce a robust Construction Traffic Management Plan which may also be required by the Local Planning Authority to plan, manage and minimise vehicle movements. Avoid unnecessary impact on sensitive receptors, traffic diversions via other sensitive areas or bottlenecks (see TfL guidance).	D	**H**	H
Consider potential accumulation of traffic from other local construction sites and plan delivery routes and times to avoid congestion.	D	**H**	H
Rubber/ Neoprene (or similar non- metal lining material) matting to line the inside of material transportation vehicles so as to avoid the 'first drop' high noise levels.	N	**D**	H
Where site space is limited and volume of vehicles attending site is high, seek vehicle holding bay(s) to use with 'Just in time' delivery management systems.	N	**D**	H
Space planning for stockpiling of material (over weekends and, evening and nights) within the site to allow removal during normal working hours only.	N	**D**	H
Consider alternative means of transport, e.g. river and rail.	N	**D**	H

Demolition Phase
Demolition has the potential to cause the most disruption to a neighbouring receptor. Modern non-percussive demolition techniques need to be considered wherever practicable to limit its noise and vibration impact. Where these methods are not possible, due to site or other constraints, then measures to minimise the amount and intensity of percussive breaking on site should be given priority.
Percussive demolition methods have been used for years to dismantle buildings and break up the resulting concrete and brickwork. These methods can be particularly intrusive and can have a major impact on the local environment with only limited noise mitigation measures available.
Mitigation for all Risk Sites
Employ the use of acoustic screening; this can include planning the demolition sequence to utilise screening afforded by buildings to be demolished.

Mitigation Measures to be Considered	Low Risk	Medium Risk	High Risk
If working out of hours on safety grounds, limit high noise/vibration demolition activities to normal hours wherever practicable.	D	**D**	H
Avoid demolition activities outside of normal working hours through the use of temporary measures, such as safety / protection fences, to enable works to be conducted during normal working hours.	D	**D**	H
Utilise low impact demolition methods such as non – percussive plant wherever practicable.	N	**H**	H
Use rotary drills and "bursters" activated by hydraulic or electrical power, or chemically based expansion compounds, to facilitate fragmentation and excavation of hard material.	N	**D**	H
Avoid the transfer of noise and vibration from demolition activities to adjoining occupied buildings through cutting any vibration transmission path or by structural separation of buildings.	N	**D**	H
Rather than breaking in-situ, consider the removal of larger sections by lifting them out and breaking them down either in an area away from sensitive receptors or off-site.	N	**D**	H
Ground Works and Piling Phase			
There are many non-percussive methods available on the market for breaking-out and piling that make percussive methods obsolete in many cases and these should take priority when works are in the planning stage.			
Percussive piling methods can create both intrusive noise and vibration at local receptors and can continue for a long period of time, depending on the size of the new development. Where percussive methods are used measures within the Good Practice Table will help mitigate noise and vibration impacts.			
Mitigation for all risk sites			
Avoid percussive piling wherever possible.			
Mitigation Measures to be considered	**Low Risk**	**Medium Risk**	**High Risk**
If working outside of normal hours on safety grounds, limit major excavation works to normal working hours.	D	**D**	H
Adopt the following hierarchy of groundwork / piling methods, in order of preference to minimise the impact of piling, if ground conditions, design and safety allows: · Pressed-in methods, e.g. Hydraulic jacking · Auger / bored piling · Diaphragm Walling · Vibratory piling or vibro-replacement · Driven piling or dynamic consolidation	D	**H**	H
Consider the location and layout of the piling plant for efficient operation and potential noise control of generators and any electric or hydraulic motors used by plant.	D	**H**	H
Where impact piling is the only option, utilise a non-metallic dolly between the hammer and driving helmet, or enclose the hammer and helmet within an acoustic shroud.	D	**H**	H
Consider concrete pour sizes and pump locations. Plan the start of concrete pours as early as possible within normal working hours to avoid overruns.	D	**H**	H
Where obstructions are encountered stop works and review approach; adopt work methods that minimise noise and vibration.	D	**H**	H
When using an auger (for bored piling), rather than dislodging material from the auger by rotating the drill back and forth quickly, use alternate methods where safe to do so. For example, some piling rigs are equipped with metal brush to remove spoil as the auger is taken out of ground.	D	**D**	D

Prepare pile caps using methods / procedures which minimise the use of breakers, e.g. using hydraulic splitters to crack the top of the pile.	D	**H**	H

Construction Phase
During the construction phase many of the problems can be minimised or even removed by careful planning and organisation of the site.
As the height of the building structure increases receptors further away from the site can potentially become more exposed to noise due to removal of shielding effects of neighbouring buildings.
Each site and building method will offer its own opportunities to reduce its impact on local receptors.

Mitigation for all Risk Sites
When working within a building ensure all openings (e.g. windows and doors) are closed or sealed up.
Plan the site layout to maximise screening from existing features / structures.

Mitigation Measures to be Considered	**Low Risk**	**Medium Risk**	**High Risk**
Use prefabricated building structures or elements to minimise noise on site.	N	**D**	H
Where on-site fabrication is unavoidable, all high noise level works should be carried out within normal hours.	N	**D**	H
Consider concrete pour sizes and plan the start of concrete pours as early as possible within normal working hours to avoid overruns.	D	**H**	H
Where practicable consider using an on- site, noise attenuated, concrete batching plant to minimise overruns and disturbance from queuing delivery wagons from off-site and remote facilities.	N	**D**	H
Obtain and agree a protocol with concrete suppliers and sub-contractor with measures to ensure that as far as practicable overruns on concrete pours do not occur.	D	**H**	H

Monitoring
Monitoring may include either physical measurement or observational on-site monitoring. Noise and vibration monitoring is the most obvious way of demonstrating to a local authority that you are complying with the noise and vibration levels presented within any agreements and works are being carried out in accordance with the British Standard BS5228.
Any monitoring regime should be agreed with the local authority prior to being implemented to avoid unnecessary costs. Any personnel undertaking noise and vibration monitoring shall be able to demonstrate their competency for the task. Any monitoring undertaken should be readily available for the local authority to review upon request.

Mitigation for all Risk Sites
Establish pre-existing levels of ambient noise.
Carry out attended noise monitoring at the start of any new phase of works, to check source sound emission data from plant on-site and following any complaints.
Carry out regular on site observation monitoring and checks/ audits to ensure that BPM is being employed at all times. Such checks should include: · Hours of working · Presence of mitigation measures, equipment (engine doors closed, airlines not leaking, etc.) and screening (location and condition of local screening, etc.) · Number and type of plant · Construction method, and · Where applicable, any specific Section 61 consent conditions.
The site reviews should be logged and any remedial actions recorded.

Mitigation Measures to be Considered	Low Risk	Medium Risk	High Risk
Monitor noise continuously during demolition, piling, excavation and sub- and superstructure works at agreed locations and report to the local authority at agreed intervals.	N	**D**	H
Monitor vibration continuously during demolition, piling, excavation and sub-structure works at agreed locations and report to the local authority at agreed intervals.	N	**D**	H
Appraise and review working methods, procedures and logistics on a regular basis to ensure continuous development of BPM.	N	**D**	H
Establish level trigger alerts in agreement with the local authority and guided by BS5228. Monitor noise and vibration to trigger text alerts; where levels exceed the triggers then inform the local authority, review work practices and agree additional mitigation measures with the local authority.	N	**D**	H
Use monitoring equipment with web access capabilities to view and inspect real time measurement and/or audio data.	N	**D**	H
Communication and Liaison			
It is important that good relations are built with people living and working within the vicinity of the work site.			
The developer or contractor should communicate with neighbours on all planned works, especially for periods outside of normal working hours, where agreed. Methods of communication, as a minimum would involve letter drops prior to and during works. Other forms of communication could include newsletters, meetings which residents or community groups can attend, notice boards, websites or social media, depending on the size of the project.			
All correspondence to be sent to residents or other neighbouring receptors should be forwarded to the local authority prior to its distribution, ideally for comment. The local authority can also provide guidance on the area to be included within the letter drops.			
Mitigation for all Risk Sites			
Develop a Community Liaison Plan. Develop a Complaint Procedure with timescales for responses and a nominated liaison person to engage with residents and to handle complaints. These should be agreed with the local authority.			
Display contact details for the site manager and liaison officer prominently on the site hoarding.			
Brief all site staff regarding the complaints procedure and mitigation requirements and their responsibilities to register and escalate complaints received.			
Mitigation Measures to be Considered	**Low Risk**	**Medium Risk**	**High Risk**
Send regular updates at appropriate intervals to all identified affected neighbours via newsletter and posting information on the site hoarding. Also make information available via email when requested.	N	**D**	H
Develop and maintain a website to provide information about the project and to receive feedback.	N	**D**	H
Arrange regular community liaison meetings at appropriate intervals including prior to commencement of project. Respond to issues raised and report back to attendees.	N	**D**	H
Arrange meetings and communicate on a regular basis with neighbouring construction sites to ensure activities are coordinated to minimise any potential cumulative issues.	N	**D**	H
Advise neighbours about reasons for and duration of any permitted works outside of normal working hours.	D	**H**	H
Arrange meetings and communicate on a regular basis with the local authority to monitor the progress of the works and to consider any concerns or complaints raised by the local community.	N	**D**	H

The construction noise criteria are established based on the guidelines in the London Good Practice Guide and BS5228-1:2009+A1:2014, which emphasises maintaining acceptable noise levels at sensitive receptor locations, such as residential properties, schools, and hospitals. The guide suggests that construction noise levels should not exceed 75 dB L_{Aeq} for periods of up to 10 hours per working shift.

With the noise and vibration mitigation measures in place construction noise form activities and vehicle movements are considered to be not significant. A planning condition can be imposed to ensure the mitigation measures are to the satisfaction of the council or a s.61 application and consent can be used to secure them. Construction vibration is considered to have limited impact given the distance to receptors from the working areas and the nature of the works.

9 SUMMARY

Anderson Acoustics Ltd was commissioned by Propco (Wokingham) Ltd, to undertake a noise assessment to support the discharge of Planning Condition 30 as detailed by Wokingham Borough Council (WBC) for the erection of a 64 bed care home (Use Class C2) with site access, parking, hard and soft landscaping and other associated works following demolition of existing commercial buildings. Planning permission for the proposed development has been granted (ref. 231351).

Observations during the site visit indicated that noise sources included bird song, light wind, with occasional aircraft noise and traffic noise from local roads.

As no specific assessment criteria has been referenced within the planning condition the assessment has been undertaken following the guidance in the Professional Planning Guidance on Planning & Noise: New Residential Development (the ProPG), whilst cognisant of the relevant national policies.

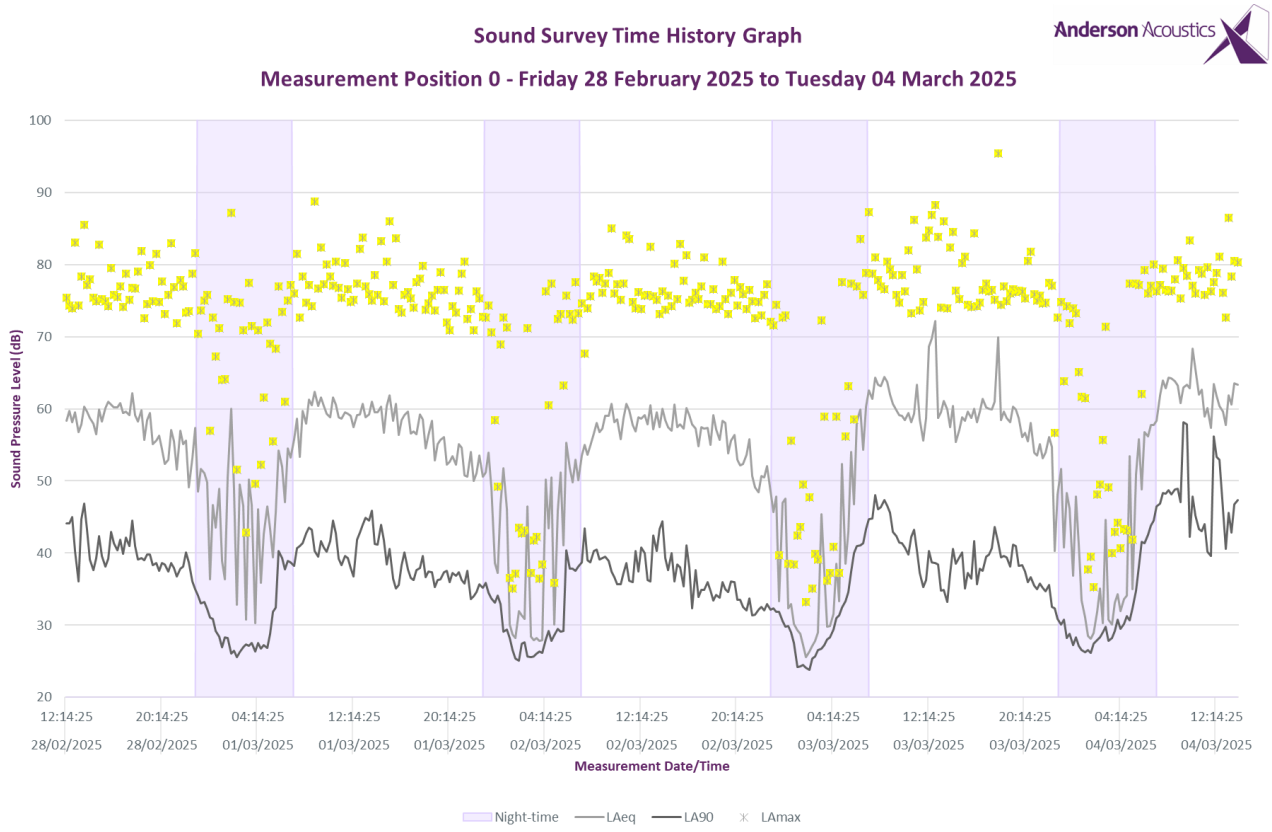
To demonstrate compliance with the planning condition:

- The minimum sound reduction for glazing and ventilation methods has been established across the development to achieve the guideline BS 8233 internal noise levels, as detailed in Section 6.2.
- With respect to mitigating internal noise levels during the overheating condition, the initial assessment shows that openable windows are expected to be acceptable for all rooms towards the north, east and west of the development, however, a detailed overheating assessment is recommended for south facing rooms to ensure that openable windows are not relied upon to mitigate the overheating condition.
- Measurements across the site indicate that no further mitigation measures are necessary to reduce external noise levels to improve noise levels in external amenity areas.
- As plant selections have not been completed, outline plant noise limits have been proposed to ensure that the impact of future fixed plant does not adversely impact the nearest noise sensitive receptors. A detailed assessment should be undertaken once the final selections are known.
- Outline construction noise limits have been set to ensure that the noise impact during the construction phase are suitably controlled.

With the above in mind, providing the above is incorporated in the design of the development, our recommendation to the decision maker would be to discharge the planning condition. It is noted that a detailed assessment should be undertaken once final selections have been made to demonstrate that recommendations made within this report have been incorporated into the design.

APPENDIX A

SURVEY RESULTS



APPENDIX B

ACOUSTIC REQUIREMENTS

B.1 NOISE POLICY STATEMENT FOR ENGLAND (NPSE, 2010)

The NPSE is the Government's overarching statement on noise policy for England, and applies to all forms of noise other than occupational noise, setting out the long-term vision of Government noise policy, which is 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.

Which is supported by the following noise policy aims:

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

a) Avoid significant adverse impacts on health and quality of life;

b) Mitigate and minimise adverse impacts on health and quality of life; and

c) Where possible, contribute to the improvement of health and quality of life.

When discussing the meaning of significant adverse and adverse within an Explanatory Note, the NPSE states:

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.

To which the NPSE added the following related concept:

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

The Explanatory Note continues:

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.

The NPSE concludes by explaining in a little more detail how the LOAEL and SOAEL relate to the three aims listed above. Logically, it starts with the aim of avoiding significant adverse effects on health and quality of life, then addresses the situation where the noise impact falls between the LOAEL and the SOAEL, when *"all reasonable steps*

should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development." The final aim envisages proactive management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development.

B.2 NATIONAL PLANNING POLICY FRAMEWORK (NPPF, 2024)

First published in 2012, and most recently updated in December 2024, the NPPF sets out the Government's planning policies for England, and how these are expected to be applied. Noise is referenced within the NPPF as follows. These are effectively the NPPF's policies on noise.

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

> 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. Development should, wherever possible, help to improve local environmental conditions such as ai and water quality, taking into account relevant information such as river basin management plans…

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 new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life[69]
>
> 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…
>
> Reference number 69 of the above quotation points to the Explanatory Note to the NPSE (see above).

The following policy is also relevant to noise.

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.

201. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.

As mentioned above, the Government has published accompanying web-based planning guidance for a number of categories, including noise (see below).

B.3 NPPF PLANNING PRACTICE GUIDANCE, NOISE (PPG-N, 2019)

Following initial release in 2014, the planning practice guidance now forms part of the NPPF, referred to as relevant planning practice guidance, which includes guidance on the category of Noise. The guidance is often referred to as PPG-Noise, PPG-N or PPG(N).

In keeping with the NPSE and NPPF, no values (in dB) are presented; however, plenty of guidance is provided as to the issues to consider in assessing noise and determining suitable thresholds.

A noise exposure hierarchy table is provided, which summarises the noise exposure hierarchy based on the likely average response of those affected, and is reproduced below. It includes examples of outcomes relevant to the NOEL, LOAEL and SOAEL effect thresholds described in the NPSE. These outcomes are in descriptive form; there is no numerical definition of the NOEL, LOAEL and SOAEL.

Table B-1: Noise exposure hierarchy table (as per PPG-N)

Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a 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, attitude or other physiological response, 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 small actual or 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, attitude or other physiological response, 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, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

B.4 PROPG: PLANNING & NOISE

The Professional Practice Guidance on Planning & Noise for New Residential Development was produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England.

The ProPG acknowledges and reflects the Government's overarching Noise Policy Statement for England (NPSE), the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance on Noise, as well as other authoritative sources of guidance.

The two sequential stages of the overall approach are:

- Stage 1 – an initial noise risk assessment of the proposed development site
- Stage 2 – a systematic consideration of four key elements

Where sites are deemed to be "negligible" risk under Stage 1, there would not normally be a need for a Stage 2 assessment.

The four key elements to be undertaken in parallel during Stage 2 of the recommended approach are:

- Element 1 – demonstrating a "Good Acoustic Design Process"
- Element 2 – observing internal "Noise Level Guidelines"
- Element 3 – undertaking an "External Amenity Area Noise Assessment"
- Element 4 – consideration of "Other Relevant Issues"

ProPG recommends that the details of the assessment(s) are presented in an Acoustic Design Statement (ADS). An ADS should not be necessary for a site assessed as negligible risk.

B.4.1 STAGE 1: INITIAL SITE NOISE RISK ASSESSMENT

The noise risk assessment is intended to provide an indication of the likely risk of adverse effects from noise without any measures in place. It may be based on measurement or prediction (or a combination) as appropriate and should aim to describe noise levels over a "typical worst case" 24-hour day either now or in the foreseeable future.

The noise risk assessment categories are presented in Figure 1 of the ProPG, which is reproduced in Appendix B. It illustrates how an initial noise risk assessment is linked with an increasing risk of adverse effect from noise, and how this in turn is broadly associated with indicative noise levels derived from current guidance and experience.

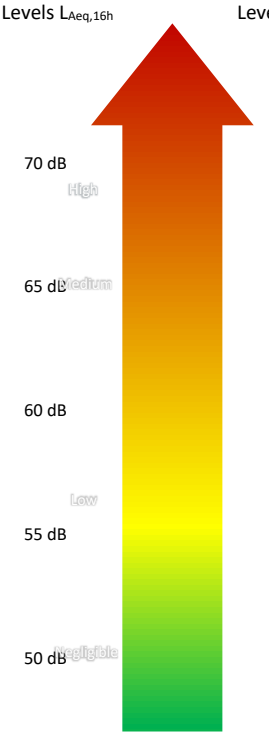
The indicative noise levels are intended to provide a sense of the noise challenge at a potential residential development site. Whilst it is noted that they "…should be interpreted flexibly having regard to the locality, the project and the wider context…", there is considered to be no need to amend them for the purposes of this assessment.

In the final column, the initial noise risk assessment is aligned with pre-planning application guidance that highlights the increasing importance of good acoustic design as the noise risk increases.

ProPG states that "It is important that the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker". Though, presumably, this would be acceptable for sites/noise levels deemed negligible risk (when a Stage 2 assessment or ADS would not normally be required).

It is noted that the categories (negligible, low, medium and high) do not necessarily correspond with a given threshold. This is perhaps understandable since these may vary in practice due to various acoustic and non-acoustic factors (which may vary from site to site); however, it is not helpful when it comes to consistently determining the degree of risk.

Table B-2: Stage 1 initial site noise risk assessment (as per ProPG Figure 1)

Noise risk assessment		Potential effect without noise mitigation	Pre-planning application advice
Indicative Daytime Noise Levels $L_{Aeq,16h}$	Indicative Night-time Noise Levels $L_{Aeq,8h}$		
	60 dB 55 dB 50 dB 45 dB 40 dB	Increasing risk of adverse effect	High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice. As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development. At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.
		No adverse effect	These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.

Notes:

a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
b. Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".
c. $L_{Aeq,16h}$ is for daytime 0700 – 2300, $L_{Aeq,8h}$ is for night-time 2300 – 0700.
d. An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,F}$ > 60 dB means the site should not be regarded as negligible risk.

To determine thresholds for this purpose, it is logical in the first instance to take from the table above that 50 dB and 40 dB represent the thresholds between negligible and low for the day and night-time periods respectively. As discussed subsequently, the daytime level of 50 dB is the bottom of the criteria range applied to external amenity areas, whilst the equivalent level inside a dwelling based on a window being partially open (providing 10-15 dB reduction) would be 35-40 dB, which is in keeping with the relevant criteria, also discussed subsequently. The same is broadly the case in terms of the night-time period; although, since the day and night internal criteria are only 5 dB apart (shown later), and the external thresholds are 10 dB apart, the external night threshold is more stringent relative to the daytime equivalent.

Applying a banding of 10 dB results in the following thresholds in the below table, which correspond well with the ProPG table reproduced above.

Table B-3: Interpretation of the Level 1 initial site noise risk assessment thresholds

Noise risk category	$L_{Aeq,16h}$ (07-23)	$L_{Aeq,8h}$ (23-07)	L_{AFmax} (23-07)	Level 2 assessment?	Pre-planning application advice
High	> 70 dB	> 60 dB	> 10 events > 60 dB	Required	"…an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process…"
Medium	61 – 70 dB	51 – 60 dB			"…application may be refused unless a good acoustic design process is followed and is demonstrated… how the adverse impacts of noise will be mitigated and minimised, and… a significant adverse noise impact will be avoided…"
Low	51 – 60 dB	41 – 50 dB			"…the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed…"
Negligible	≤ 50 dB	≤ 40 dB	Less than the above	Not normally required	"…the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds."

As noted above, the rating or categorisation at this stage is not to be taken as the final word on the site, but rather an initial guide as to the degree of measures likely to be required to achieve an acceptable development.

In achieving 'Good Acoustic Design' ProPG states: "Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7".

Note 7 states that "Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form."

In summary, exceeding the WHO guideline internal values (which are the same as those in BS 8233) by up to 5 dB is likely to be acceptable, but where they are exceeded by more than 10 dB, then this may be unacceptable to occupants. It is as this point, therefore, where occupants may wish to close windows, and where, therefore, alternative means of ventilation and/or overheating control may be required.

B.5 BRITISH STANDARD 8233

BS 8233:2014 [9] provides guideline values for internal noise levels within a number of building types including residential dwellings.

In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values in table below.

[9] The British Standards Institution - BS 8233:2014 Guidance on sound insulation and noise reduction for buildings

Table B-4: British Standard 8233 Indoor Noise Levels

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

In respect of external noise levels, the guidance in BS 8233:2014 suggests that "it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments". BS 8233:2014 however acknowledges that "these guideline values are not achievable in all circumstances where development might be desirable", and that "...a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited".

In respect of balconies, roof gardens and terraces, BS 8233:2014 states that "In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying, washing, or growing pot plants, and noise limits should not be necessary for these uses; however, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas but should be achievable in some areas of the space".

BS 8233:2014 suggests that proposed development within noisy environments should be designed to ensure that the recommended internal design standards are achieved, and that noise levels in external amenity areas are designed to effectively control and reduce noise levels; although it acknowledges that in certain circumstances meeting the external design recommendations may not be feasible, or necessary, especially where the provision of such spaces is desirable for other technical, planning or policy reasons.

B.6 WORLD HEALTH ORGANISATION GUIDELINES

The following guideline values for community ambient noise levels in specific environments are presented in the World Health Organization (WHO) Guidelines for Community Noise.

Table B-5: WHO Guideline Noise Values

Specific Environment	Critical Health Effect(s)	dB $L_{Aeq,T}$	Time Base hours	dB $L_{Amax,F}$
Dwelling indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45

The 45 dB $L_{Amax,F}$ criterion applies to "single sound events" within bedrooms at night. This guideline is generally interpreted as the value that individual noise events should not normally exceed more than 10 times a night.

B.7 BS 8233

British Standard BS 8233: 2014 provides guideline values for internal noise levels within a number of building types including residential dwellings. In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values presented below.

Table B-8: British Standard 8233 residential indoor noise level

Activity	Location	Daytime	Night-time
Resting	Living room	35 dB $L_{Aeq, 16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq, 16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16hour}$	30 dB $L_{Aeq, 8hour}$

Notes: Daytime assessment period – 07:00 to 23:00 hrs
Night-time assessment period – 23:00 to 07:00 hrs

Furthermore, the Standard notes that, "*Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values.*" No thresholds/criteria are provided within the Standard, however.

The previous, 1999 version of the Standard included the note that, "*For a reasonable standard in bedrooms at night, individual noise events (measured with F time-weighting) should not normally exceed 45 dB L_{Amax}.*". This is the same threshold (i.e. 45 dB) given in the World Health Organization (WHO) Guidelines for Community Noise, and it is, therefore, considered to remain relevant and is described below.

The following guideline values for community ambient noise levels in specific environments are presented in the World Health Organization (WHO) Guidelines for Community Noise.

Table B-9: WHO guideline noise values

Specific Environment	Critical Health Effect(s)	dB $L_{Aeq,T}$	Time Base hours	dB $L_{Amax,F}$
Dwelling indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45

The 45 dB $L_{Amax,F}$ criterion applies to "single sound events" within bedrooms at night. This guideline is generally interpreted as the value that individual noise events should not normally exceed more than 10 times a night.

B.8 BS 4142

Guidance on the rating of noise from fixed installations and sources of an industrial nature is provided in BS 4142. This standard provides a procedure for the measurement and rating of noise levels outside dwellings in mixed residential and industrial areas. A methodology for predicting the likelihood of adverse impact is also provided in this document although the assessment of nuisance explicitly falls outside the scope of this British Standard.

The rating level ($L_{Ar,Tr}$) as defined in BS 4142 is used to rate the industrial source (known as the specific noise source) outside residential dwellings. This level is obtained by adding a correction of between 0 and 6 dB for tonal noises and between 0 and 9 dB for impulsive sources. Additionally, corrections of 3 dB can be made for other sound characteristics and intermittency of noise source.

Reference time intervals T_r, of 1 hour and 15 minutes are specified for the determination of rating levels during day and night respectively.

The method for predicting the likelihood of complaints is based on differences between the rating level and the background $L_{A90,T}$ sound level. The standard states that:

"a) Typically, the greater this difference, the greater the magnitude of impact.

b) A difference of around +10 dB or more is likely to be an indication of 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 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."