



MEC
Consulting Group

ACOUSTIC AIR



Lychgate Lane, Burbage
Acoustics Assessment
July 2024

Report Ref: 27139-ENV-0403 Rev A

Lychgate Lane, Burbage

Acoustics Assessment

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REPORT REF: 27139-ENV-0403 Rev A

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CONTENTS

1.0	INTRODUCTION	4
2.0	STANDARDS AND GUIDANCE	6
3.0	ENVIRONMENTAL SOUND SURVEY	9
4.0	ASSESSMENT METHODOLOGY	13
5.0	ACOUSTICS ASSESSMENT	14
6.0	ACOUSTICS-LED OVERHEATING ASSESSMENT	17
7.0	MITIGATION	21
8.0	CONCLUSIONS	24

APPENDICES

A.	PROPOSED SITE LAYOUT
B.	SCOPING CORRESPONDENCE
C.	ACOUSTIC GLOSSARY
D.	ENVIRONMENTAL SOUND SURVEY DATA
E.	SOUND LEVEL CONTOUR MAPS
F.	GHA TABLE
G.	MITIGATION REQUIREMENT DRAWINGS
H.	GLAZING AND VENTILATION PERFORMANCE REQUIREMENTS

1.0 INTRODUCTION

1.1 MEC Consulting Group Ltd (MEC) has been commissioned by Avant Homes Ltd (hereafter referred to as 'the Client'), to undertake an Acoustics Assessment aimed at discharging condition 6 of the planning permission, pertaining to the proposed residential development at Lychgate Lane, Burbage (hereafter referred to as 'the Site').

1.2 Planning condition 6 requires the following:

"6. *Noise Attenuation*

- a). *Development shall not begin until a scheme for protecting the proposed dwellings from noise from the road network has been submitted to and approved in writing by the Local Planning Authority.*
- b). *All works which form part of the scheme shall be completed before any of the permitted dwellings are first occupied and shall be retained thereafter."*

Existing Site

1.3 The Site lies approximately 0.5 km east of Burbage and approximately 3 km southeast of Hinckley. The Site is bound to the north by Lychgate Lane, to the east by Lychgate Farm; to the south by open fields, with the M69 located beyond; and to the west by existing residential.

1.4 The principal source of noise affecting the Site is from road traffic using Lychgate Lane, adjacent to the northern site boundary, and the M69 motorway to the south.

1.5 An approximate redline boundary is presented in Figure 1.1.

Figure 1.1: Approximate Redline Boundary



Development Proposals

- 1.6 Development proposals comprise the erection of 79 residential dwellings, with associated infrastructure and access via Lychgate Lane.
- 1.7 The proposed site layout is provided in **Appendix A**.

Assessment Scope

- 1.8 The assessment scope has been discussed and agreed with the Local Planning Authority's (LPA) Environmental Health Officer (EHO), and the relevant correspondence is presented in **Appendix B**.
- 1.9 As agreed with the EHO, this assessment utilises the environmental sound survey data obtained in March 2022, and presented within the Acoustics Assessment prepared for the outline planning application (report ref: 27139-ENV-0401).
- 1.10 The following scope of works has been undertaken:
- Appropriate noise limits for a pumping station, which is proposed along the southern boundary, have been defined in accordance with BS 4142¹, based on the measured sound survey data;
 - The measured sound survey data has been used to create an acoustic model in order to predict sound levels across the Site for comparison against relevant criteria contained within ProPG² and the British Standard BS 8233³;
 - An acoustic-led overheating assessment has been undertaken to determine the number of dwellings that can achieve internal sound levels outlined in AVOG⁴; and
 - Where required, embedded façade mitigation measures in the form of glazing and whole-dwelling ventilation specifications have been provided to demonstrate compliance with the relevant standards.
- 1.11 The conclusions of this report aim to demonstrate to the LPA that internal acoustic conditions will be compliant with the relevant British Standards and Acoustics Guidance.

Disclaimer

- 1.12 MEC has completed this report for the benefit of the individuals referred to in Paragraph 1.1 and any relevant statutory authority which may require reference in relation to approvals for the proposed development. Other third parties should not use or rely upon the contents of this report unless explicit written approval has been gained from MEC.
- 1.13 MEC accepts no responsibility or liability for:
- The consequence of this documentation being used for any purpose or project other than that for which it was commissioned;
 - The issue of this document to any third party with whom approval for use has not been agreed.

¹ BS 4142:2014 +A1:2019 'Methods for rating and assessing industrial and commercial sound.'

² Professional Practice Guidance on Planning and Noise, May 2017.

³ BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'

⁴ Acoustics Ventilation and Overheating, Residential Design Guide, V1.1. January 2020.

2.0 STANDARDS AND GUIDANCE

General

2.1 An acoustic glossary is provided in **Appendix C** to assist the reader.

Summary of Guidance and Standards

2.2 The following guidance and standards relevant to the assessment are outlined below:

- National Planning Policy Framework (NPPF) 2023;
- Noise Policy Statement for England (NPSE) 2010;
- Professional Practice Guidance on Planning and Noise (ProPG) 2017;
- BS 8233:2014 '*Guidance on sound insulation and noise reduction for buildings*'; and
- Acoustics Overheating and Ventilation Guide (AVOG) 2020.

2.3 For conciseness, the guidance and standards most appropriate to this assessment are summarised in this section.

ProPG

2.4 ProPG seeks to secure good acoustic design for new residential developments. The guidance includes a framework to enable situations where noise is not an issue but to help identify the extent of risk at noisier sites. The guidance does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy.

2.5 The guidance is restricted to sites that are exposed predominantly to noise from transportation sources. Where industrial or commercial noise is present on the site but is "not dominant", its contribution may be included in the noise level used to establish the degree of risk. However, if the industrial/commercial source is dominant, an assessment in accordance with BS 4142 should be conducted.

2.6 A two-stage approach is considered whereby:

- Stage 1 – an initial noise risk assessment of the proposed development site is undertaken;
- Stage 2 – a systematic consideration of internal and external noise levels is considered ensuring good acoustic design and consideration of other relevant issues is recognised.

2.7 ProPG also references the World Health Organisation (WHO) guidance on maximum noise levels at night. Guidance from the WHO states that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10 – 15 times per night. ProPG indicates that individual noise events do not exceed 45 dB L_{AFmax} more than 10 times a night and therefore this is considered as criteria in addition to that outlined in Table 2.1.

2.8 Upon completion of the ProPG's Stage 1 and 2 assessments, the findings should enable one of four possible recommendations to be presented to the decision maker, namely to grant permission without conditions, grant with conditions, 'avoid' or 'prevent'.

BS 8233

- 2.9 BS 8233 provides recommendations for the control of noise in and around buildings.
- 2.10 The guidance provided includes appropriate internal and external noise level criteria which are applicable to residential buildings exposed to steady external noise sources. It is stated in the British Standard that it is desirable for internal ambient noise levels to not exceed the criteria set out in Table 2.1.

Table 2.1: BS 8233: 2014 Table 4 – Indoor Ambient Noise Levels for Dwellings

Activity	Location	07:00 – 23:00 L _{Aeq,16hr} dB	23:00 – 07:00 L _{Aeq,8hr} dB
Resting	Living Room	35	-
Dining	Dining Room/Area	40	-
Sleeping (daytime resting)	Bedroom	35	30

- 2.11 Additional guidance in BS 8233 indicates that appropriate ventilation should be provided, if relying on closed windows to meet the guide values, and that such ventilation should not compromise the façade insulation and resulting noise levels.
- 2.12 BS 8233 additionally includes guidance on external amenity areas whereby it states that external noise levels should not exceed 50 dB L_{Aeq,T} with an upper guideline of 55 dB L_{Aeq,T} which would be acceptable in noisier environments.
- 2.13 Furthermore, due to the nationwide difficulty in satisfying the external criteria outlined above, the standard provides an over-arching consideration of how to treat external amenity areas as follows:

“... it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.”

AVOG

- 2.14 The AVOG was published by the Association of Noise Consultants (ANC) and The Institute of Acoustics (IOA) in 2020. The guide outlines a methodology for the assessment of airborne sound during overheating conditions, and emphasises the co-dependency of acoustics, ventilation and overheating design.
- 2.15 Many developments require closed windows to provide good internal acoustic conditions. This is in direct contrast to the fact that residents typically open windows in order to keep a building cool. These opposing requirements are becoming a major issue in the design of buildings, in particular for housing, especially as the aim is to avoid widespread use of mechanical ventilation and cooling systems.
- 2.16 AVOG prescribes a two-level assessment procedure, as follows:

- Level 1 – Site Risk Assessment, based on external free-field noise levels (similar to that of ProPG); and
- Level 2 – Assessment of Adverse Effect, based on internal ambient noise level and duration.

2.17 An AVOG Level 2 assessment gives consideration to internal noise levels on a sliding scale depending on the likelihood and duration of overheating. The internal noise levels can be associated with adverse effect levels such as:

- NOAEL – No Observed Adverse Effect Level (no effect can be detected, typically BS 8233 criteria);
- LOAEL – Lowest Observed Adverse Effect Level (adverse effects start to be detected); and
- SOAEL – Significant Observed Adverse Effect Level (significant adverse effects on health and quality of life occur).

2.18 An interpretation of the sliding scale within AVOG is presented in Table 2.2.

Table 2.2: AVOG Level 2 Criteria

Effect Level	Internal Noise Level Criteria		
	Daytime L _{Aeq,16hr} dB	Night-time L _{Aeq,8hr} dB	Night-time Maximum L _{AFmax,2min} dB
NOAEL	< 35	< 30	Fixed Criteria of 65 dB
LOAEL	35	30	
SOAEL	40 – 50	35 – 42	
Note: As internal noise levels rise from LOAEL to SOAEL, there is an increasing risk of an adverse effect level and mitigation measures may be required. Furthermore, SOAEL is dependent on how often overheating is likely to occur as higher noise levels may only be tolerable for shorter periods.			

3.0 ENVIRONMENTAL SOUND SURVEY

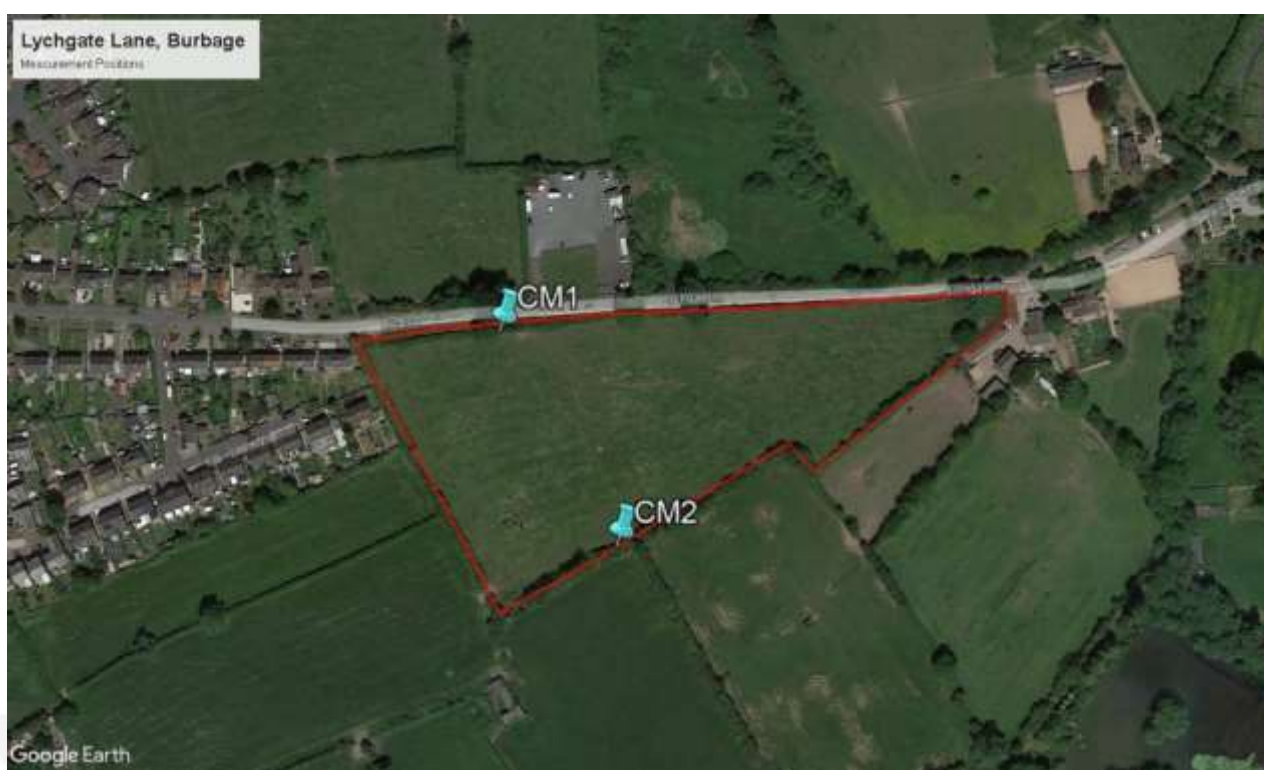
3.1 An environmental sound survey was undertaken between Wednesday 2nd and Monday 7th March 2022. The survey was undertaken in full accordance with the guidance set out in BS 7445⁵.

3.2 Sound Level Meters (SLMs) were installed at two locations, as follows:

- Continuous Measurement 1 (CM1): On the northern boundary of the Site, adjacent to Lychgate Lane;
- Continuous Measurement 2 (CM2): Located to the southern boundary of the Site to determine prevailing noise levels from the M69 to the south, which is considered the dominant noise source at the Site.

3.3 A monitoring location plan is provided in Figure 3.1.

Figure 3.1: Measurement Positions



Equipment

3.4 Measurements were taken using Class 1 integrating/averaging SLMs housed in environmental protection apparatus. The SLMs were installed in a free field position at a height of 1.5m above local ground level, and field calibrated before and after the survey using a Class 1 calibrator, with no significant drift in calibration noted.

3.5 The SLMs were set up to capture the following parameters at a minimum: L_{Aeq} , L_{A90} and L_{AFmax} values, and full details of the equipment used to undertake the survey are presented in Table 3.1.

⁵ BS 7445-1:2003 'Description and measurement of environmental noise, Part 1: Guide to quantities and procedures.'

Table 3.1: Equipment and Calibration Details

Measurement Position	Description	Manufacturer & Type No.	Serial No.	Calibration Due Date
CM1	Sound Level Meter	Type NOR140	1407773	17/11/2023
	Pre-Amplifier	Type 1209	23168	
	Microphone	Type 1225	413180	
	Calibrator	Norsonic 1255	125525772	18/11/2022
CM2	Sound Level Meter	Type NOR140	1407599	19/09/2022
	Pre-Amplifier	Type 1209	22646	
	Microphone	Type 1225	384571	
	Calibrator	Norsonic 1255	125525494	12/09/2022

Meteorological Conditions

- 3.6 During setup of the SLMs, wind speeds were observed to be < 0.5 m/s. During collection of the SLMs, wind speeds were observed to be < 1 m/s. Therefore, it can be concluded that wind speeds were suitable for environmental sound survey conditions.
- 3.7 Weather conditions generally remained dry and overcast across the survey period. However, continuous moderate precipitation occurred throughout the daytime period on Wednesday 2nd March, with brief, intermittent, light precipitation periods occurring on Friday 4th March. Nevertheless, the wet conditions and subsequent wet roads during these periods will have increased the noise exposure and therefore, will represent a robust scenario when determining mitigation.

Observations

- 3.8 During site walkover it was noted that road traffic noise from the M69 was subjectively the dominant source across the Site.

Results

- 3.9 Table 3.2 and Table 3.3 provide a summary of the measured assessment appropriate sound levels at CM1 and CM2 respectively.
- 3.10 Time history graphs of the measured data are provided in **Appendix D**.

Table 3.2: Summary of Measured Sound Levels at CM1, dB

Date	Daytime 07:00 – 23:00	Night-time 23:00 – 07:00	
	$L_{Aeq,T}$	$L_{Aeq,8hr}$	Typical Maximum Event Level ^(a) $L_{AFmax,5min}$
Wed 2 nd	61 ^(b)	55	66
Thu 3 rd	59	46	65
Fri 4 th	51	44	60
Sat 6 th	52	47	62
Sun 7 th	56	52	62
Mon 8 th	59 ^(c)	-	-
(a) Maximum noise level not exceeded more than 10 times per night. (b) T = 14hr (c) T = 1hr			

- 3.11 The measured daytime $L_{Aeq,T}$ ranged between 51 dB and 61 dB (rounding to the nearest whole number for assessment purposes), while the measured night-time $L_{Aeq,8hr}$ ranged between 44 dB and 55 dB.
- 3.12 Analysis of the night-time $L_{AFmax,5min}$ sound levels shows that the individual noise events did not exceed 66 dB more than 10 times during any measured night-time period. Therefore, a value of 66 dB L_{AFmax} is considered appropriate for assessment purposes.
- 3.13 Due to a fault with the SLM at CM2 on Saturday 5th March, the data from this point forward cannot be relied upon. Subsequently, Table 3.3 only includes data prior to this fault.

Table 3.3: Summary of Measured Sound Levels at CM2, dB

Date	Daytime 07:00 – 23:00		Night-time 23:00 – 07:00		
	$L_{Aeq,T}$	$L_{A90,1hr}$	$L_{Aeq,8hr}$	$L_{A90,15min}$	Typical Maximum Event Level ^(a) $L_{AFmax,5min}$
Wed 2 nd	62 ^(b)	53 – 62	55	40 – 58	66
Thu 3 rd	59	50 – 59	45	35 – 48	60
Fri 4 th	49	44 – 49	45	38 – 47	59
(a) Maximum noise level not exceeded more than 10 times per night. (b) T = 14hr					

- 3.14 The measured daytime $L_{Aeq,T}$ ranged between 49 dB and 62 dB, while the measured night-time $L_{Aeq,8hr}$ ranged between 45 dB and 55 dB.
- 3.15 The $L_{A90,1hr}$ background sound level ranged between 44 dB and 62 dB during the daytime, while at night, the $L_{A90,15min}$ ranged between 35 dB and 58 dB.
- 3.16 Analysis of the night-time $L_{AFmax,5min}$ sound levels shows that the individual noise events did not exceed 66 dB more than 10 times during any measured night-time period. Therefore, a value of 66 dB L_{AFmax} is considered appropriate for assessment purposes.

Background Sound Levels

- 3.17 With regard to derivation of the L_{A90} background sound level for assessment purposes, CM2 is considered to be appropriately representative of typical conditions for new dwellings closest to the pumping station.
- 3.18 Section 8 of BS 4142 makes it clear that the objective of the assessment *“is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.”*
- 3.19 Paragraph 8.14 of BS 4142 similarly remarks that *“The monitoring duration should reflect the range of background sound levels for the period being assessed. In practice, there is no ‘single’ background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed.”*
- 3.20 The subsequent Note 1 states that *“A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value”*.
- 3.21 The noise measurements demonstrate that the background sound levels varied substantially throughout both the day and night-time periods, with a range in values of up to 18 dB during the daytime $L_{A90,1hr}$ period, and up to 23 dB during the night-time $L_{A90,15min}$ period.
- 3.22 Therefore, to inform a robust assessment approach, the lower value of 44 dB $L_{A90,1hr}$ is considered to be an appropriate value to use for noise control purposes during the daytime, with the lower value of 35 dB $L_{A90,15min}$ applicable for noise control purposes during the night-time.

4.0 ASSESSMENT METHODOLOGY

Acoustic Modelling

- 4.1 An acoustic model of the Site and environs has been generated in Datakustik CadnaA® modelling software. Noise source emissions have been informed by the environmental sound survey information outlined in Section 3.0.
- 4.2 Based on the environmental sound survey, the sound levels used to calibrate the 3D acoustic model are presented in Table 4.1.

Table 4.1: Sound Levels Used to Calibrated 3D Acoustic Model, dB

Parameter	CM1	CM2
Daytime Ambient L _{Aeq,16hr}	59	59
Night-time Ambient L _{Aeq,8hr}	52	45
Night-time Maximum L _{AFmax,5min}	66	66

- 4.3 CadnaA® considers various inputs, including topography, buildings and road noise sources, and calculates sound levels in accordance with national and international standards; in this case, the relevant UK standards are the procedures set out within ISO 9613-2⁶.
- 4.4 The modelling assumptions and input information for the acoustic model are as follows:
- Digital Terrain Model – Lidar 1m (Environment Agency, downloaded on 4th March 2022);
 - Open Street Map data (publicly available);
 - Ground absorption for the Site = 0.5 (mixed ground);
 - Building heights estimated following site observations or based upon masterplan;
 - Buildings set to be reflective only with no absorption coefficient;
 - First order reflections included in the modelling;
 - Temperature set to 10°C; and
 - Relative humidity set to 70%.
- 4.5 With reference to the noise criteria outlined in Section 2.0, the acoustic model has been used to predicted sound levels across the Site in the following scenarios:
- Daytime L_{Aeq,16hr} external sound levels at ground floor (1.5m) height;
 - Night-time L_{Aeq,8hr} external sound levels at first floor (4m) height; and
 - Night-time L_{AFmax,5min} external sound levels at first floor (4m) height.

⁶ ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation.

5.0 ACOUSTICS ASSESSMENT

Pumping Station

- 5.1 No manufacturer source noise data is available for the proposed pumping station at this stage. Therefore, the approach has been to devise an appropriate noise criterion that, applied to the selection and siting of the pumping station, will enable the equipment to operate during sensitive periods without adversely affecting the ambient noise climate and without causing complaints from new residents.
- 5.2 The background sound levels to be used for noise control purposes have been defined in Section 3.0. A value of 44 dB L_{A90} is recommended for the control of the pumping station during the daytime hours (07:00 – 23:00), and a value of 35 dB L_{A90} is recommended during night-time hours (23:00 – 07:00).
- 5.3 The operation of the pumping station would have no impact upon neighbouring dwellings if its operation produces a Noise Rating Level that does not exceed the L_{A90} background sound level as measured at 3.5 metres from the façade of the nearest noise sensitive premise.
- 5.4 On this basis, the design criterion for the pumping station shall be that the overall Rating Level measured at 3.5 metres from the facade of the nearest dwelling shall not exceed 44 dB for all daytime and evening operations, or 35 dB at night. The Rating Level must allow for any tonal content through the addition of appropriate acoustic character corrections as defined by BS 4142 where tonal noise is present.
- 5.5 Use of the above noise limits for the design and installation of the pumping station will ensure that its operation does not adversely affect the existing background noise level and does not give rise to adverse impacts under BS 4142.

BS 8233 External Amenity Criteria

- 5.6 The noise criterion often the most difficult to meet is the BS 8233 outdoor criterion of 55 dB $L_{Aeq,16hr}$ applicable to private amenity spaces such as gardens.
- 5.7 The daytime $L_{Aeq,16hr}$ sound level contour map, shown on drawing 27139_04_120_05 in **Appendix E**, indicates that, with the exception of Plots 56 – 59 and Plot 79, standard mitigation in the form of 1.8m high close boarded timber fencing will enable BS 8233's criterion of 55 dB $L_{Aeq,16hr}$ to be satisfied across the Site.
- 5.8 For Plots 56 – 59 and Plot 79, drawing 27139_04_120_05 shows that even with the use of acoustic screening of up to 2.2m high, marginal exceedances of up to 3 dB will be experienced.
- 5.9 However, these marginal exceedances need to be considered against the caveats expressed in Paragraph 2.13, namely, that *“... it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be*

designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.”.

Internal Acoustic Criteria

- 5.10 For conciseness, this report tabulates the most exposed receptor overlooking Lychgate Lane (Plot 69); and the M69 (Plot 73), to give context to the most stringent mitigation measures. All other receptors are assessed through the various sound level contour and mitigation reference drawings presented in the various appendices to this report.
- 5.11 Historically, acoustics assessments have typically relied upon closed window mitigation strategies to achieve criteria outlined in BS 8233 and ProPG.
- 5.12 This strategy is still typically required across many residential developments in the UK, however, as whole-dwelling ventilation can be provided through window mounted trickle ventilators with windows closed, ventilation required outlined in AD-F⁷ can still be satisfied as there are no acoustic considerations during brief periods of ‘purge’ ventilation.
- 5.13 However, with the introduction of AVOG, consideration is now required for internal acoustic conditions when increased ventilation is required to combat overheating. In this instance, increased acoustic criteria is permitted, as outlined in Section 2.0, due to the limited period of the year where overheating occurs.
- 5.14 Initially, the required external to internal reduction provided by the façade to achieve BS 8233 and ProPG criteria should be determined.
- 5.15 Table 5.1 presents the required external to internal reduction requirements for the most exposed receptor overlooking Lychgate Lane (Plot 69); and the M69 (Plot 73).

Table 5.1: Required Façade Performance, dB

Plot	Parameter	External Level	Internal Criteria	Required Reduction
69	Daytime Ambient L _{Aeq,16hr}	59	35	24
	Night-time Ambient L _{Aeq,8hr}	52	30	22
	Night-time Maximum L _{AFmax,5min}	67	45	22
73	Daytime Ambient L _{Aeq,16hr}	59	35	24
	Night-time Ambient L _{Aeq,8hr}	46	30	16
	Night-time Maximum L _{AFmax,5min}	68	45	23

⁷ The Building Regulations 2010, Ventilation, Approved Document ‘F’.

- 5.16 For the most exposed receptor overlooking Lychgate Lane (Plot 69), the results in Table 5.1 show that a sound reduction of up to 24 dB will be required to achieve the 35 dB $L_{Aeq,16hr}$ criteria within habitable rooms during the daytime, with a sound reduction of up to 22 dB required to achieve the $L_{Aeq,8hr}$ and $L_{Amax,5min}$ criteria within bedrooms during the night-time.
- 5.17 For the most exposed receptors overlooking the M69 (Plot 73), a sound reduction of up to 24 dB will be required to achieve the 35 dB $L_{Aeq,16hr}$ criteria within habitable rooms during the daytime, with maximum sound levels driving the acoustic design within bedrooms during the night-time, and a sound reduction of up to 23 dB required to achieve the 45 dB $L_{Amax,5min}$ criteria.

6.0 ACOUSTICS-LED OVERHEATING ASSESSMENT

- 6.1 This part of the report considers the assessment of overheating in accordance with AVOG, and looks to determine whether an open windows acoustics strategy is permissible across the Site.

AVOG Level 1 Assessment

- 6.2 AVOG prescribes a two-stage assessment. Level 1 looks to determine if overheating needs to be considered further, based on the predicted external façade levels for the most exposed receptors. The initial Level 1 assessment is presented in Table 6.1.

Table 6.1: AVOG Level 1 Assessment

Plot	Parameter	Predicted External Level dB	Level 1 Risk Grading	Level 2 Advised?
69	Daytime Ambient L _{Aeq,16hr}	59	Medium	Optional
	Night-time Ambient L _{Aeq,8hr}	52	Medium	Optional
73	Daytime Ambient L _{Aeq,16hr}	59	Medium	Optional
	Night-time Ambient L _{Aeq,8hr}	46	Negligible	Not required

- 6.3 The results demonstrate that at the most exposed receptors, an AVOG Level 2 assessment is optional. However, notwithstanding increased criteria typically permissible in AVOG, the required reductions needed to achieve the internal BS 8233 criterion are greater than the reduction provided by an open window in accordance with AD-O⁸ (9 dB) and therefore, the acoustics mitigation strategy will be for a **closed window** approach during typical conditions and thus, alternative overheating ventilation will be required.

Risk of Overheating

- 6.4 The likelihood of overheating can be determined via a qualitative assessment through the GHA Toolkit⁹.
- 6.5 A qualitative assessment using the GHA Toolkit is presented in **Appendix E**. The qualitative assessment indicates a 'High' risk of overheating, due to the fact that internal noise levels will be exceeded with windows open and therefore, the 'duration for which overheating occurs' is considered to be 'most of the time' in accordance with AVOG.
- 6.6 To combat overheating, an increased ventilation rate is typically required to remove excess heat from the property. The means in which increased ventilation can be achieved, without opening windows, is typically viable through a passive ventilator, such as a through-wall acoustically attenuated 'air brick' or, where significantly high external noise levels are present, through room specific Mechanical Ventilation (MV)

⁸ The Building Regulations 2010, Overheating, Approved Document 'O'.

⁹ Good Homes Alliance, Early-Stage Overheating Risk Tool, V1, July 2019 Toolkit

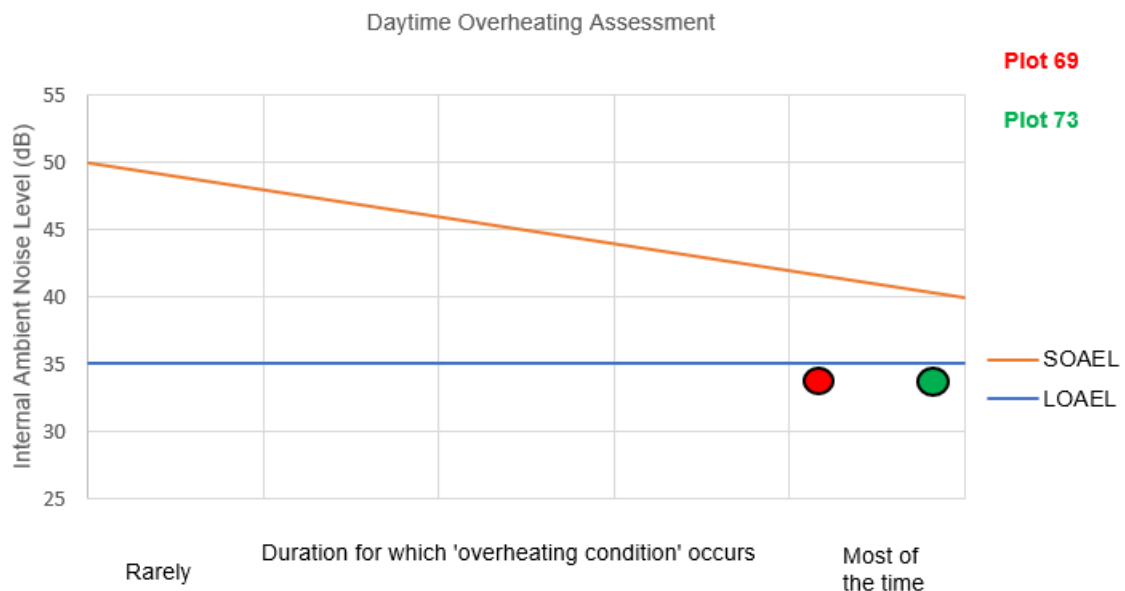
systems within affected habitable rooms, or whole dwelling Mechanical Ventilation with Heat Recovery (MVHR) systems.

- 6.7 For the purpose of this assessment, it will be assumed that a through-wall acoustically attenuated ‘air brick’ will be installed in noise affected habitable rooms. However, where a room specific MV system is employed, these are not as robust as typical whole-dwelling ventilation measures and thus they are not appropriate for ventilation in accordance with AD-F and subsequently, whole dwelling ventilators (such as window mounted trickle vents) will still be required.

AVOG Level 2 Assessment

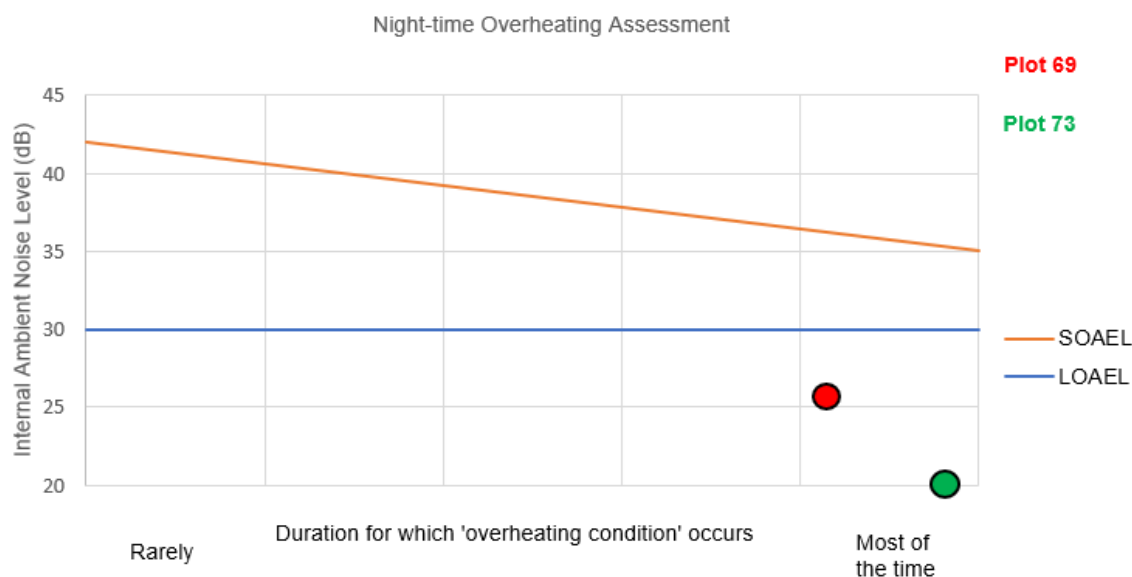
- 6.8 Calculations have been undertaken in accordance with BS 12354-3¹⁰ to determine the predicted internal noise levels using passive ventilation means for the most exposed receptors based upon a ‘High’ risk of overheating in accordance with the GHA toolkit.
- 6.9 It should be noted that this AVOG Level 2 Assessment can be seen as a worst-case scenario as the proposed ventilation measures would theoretically reduce the risk of overheating from that of a ‘High’ risk. Therefore, assuming a ‘High’ risk with the inclusion of the mitigation measures, would represents a robust assessment scenario.
- 6.10 The results of the AVOG Level 2 Assessment are presented in Figure 6.1 and Figure 6.2.

Figure 6.1: AVOG Level 2 Assessment of Daytime Conditions



¹⁰ BS EN ISO 12354-3:2017 'Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound.'

Figure 6.2: AVOG Level 2 Assessment of Night-time Conditions



- 6.11 The results in Figure 6.1 and Figure 6.2 indicate that internal sound levels, when using a through-wall acoustically attenuated 'air brick', would lie below both the SOAEL and LOAEL.

AVOG Assessment – Numerical Summary

- 6.12 Table 6.2 presents a summary numerical assessment for overheating conditions using a through-wall acoustically attenuated 'air brick' for the most exposed dwellings overlooking the respective noise sources.

Table 6.2: Overheating Acoustics Assessment, dB

Plot	Parameter ^(a)	Criteria	Calculated Internal Level
69	Daytime Ambient $L_{Aeq,16hr}$	40	33
	Night-time Ambient $L_{Aeq,8hr}$	35	26
	Night-time Maximum $L_{AFmax,5min}^{(b)}$	55	41
73	Daytime Ambient $L_{Aeq,16hr}$	40	33
	Night-time Ambient $L_{Aeq,8hr}$	35	20
	Night-time Maximum $L_{AFmax,5min}^{(b)}$	55	42
^(a) $L_{Aeq,T}$ criteria chosen as a point on the SOAEL based upon a high risk of overheating.			
^(b) L_{AFmax} criterion as presented within AD-O.			

- 6.13 The information in Table 6.2 demonstrates that, with the inclusion of appropriate passive ventilation means, AVOG criteria is satisfied. However, it should be noted that the above indicative ventilation strategy is based on the qualitative GHA Toolkit, which does not take into consideration the ventilation flow rates needed to satisfy CIBSE TM59¹¹.
- 6.14 Therefore, the mitigation schedule may be subject to change at Building Control stage based upon the outcome of any Dynamic Thermal Modelling undertaken to satisfy the requirements of AD-O.

¹¹ Design Methodology for the Assessment of Overheating Risk in Homes, TM59:2017.

- 6.15 Nevertheless, this should not influence the planning decision due to the fact that, as shown in this assessment, acoustics conditions have been considered during periods of overheating, and Environmental Health matters will be satisfied with an appropriate ventilation strategy.



7.0 MITIGATION

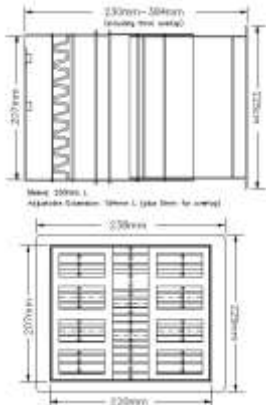
External Sound Levels

- 7.1 Modelling indicates that acoustic screening of up to 2.2m in height will be required, as identified in drawing 27139_04_120_05. It should be noted that unless highlighted otherwise within drawing 27139_04_120_05, the model has included for standard 1.8m high close boarded timber fence along all garden boundaries.
- 7.2 Where 2.2m acoustic screening is required, this is proposed through the provision of a brick wall. However, if acoustic fencing were to be used, the following specification is recommended as a minimum:
- Good quality timber with no warping, knots etc;
 - At least 25mm thick in all places;
 - Close-boarder and continued across the front of posts to minimise gaps;
 - Boards should overlap 25mm as a minimum;
 - No gaps should be present between gravel board and the ground; and
 - Minimum mass of 10 to 15kg/m².

Internal Sound Levels

- 7.3 Acoustic modelling has demonstrated potential façade sound levels and, in accordance with BS 8233, ProPG and AVOG, sound reduction performance requirements of the façade have been determined.
- 7.4 In terms of acoustics, windows and ventilation strategies are the 'weakest' acoustics point in any façade and subsequently, the composite sound reduction performance is typically dominated by these elements. Therefore, minimum performance requirements to be provided by the glazing and ventilation elements at all dwellings are presented herein.
- 7.5 Drawing on the above, and the acoustic modelling undertaken, Table 7.1 provides typical reduction requirements and potential glazing and ventilation solutions across the Site in order to demonstrate compliance with the internal sound level criteria outlined in BS 8233 and ProPG during typical conditions; internal sound level criteria outlined in AVOG during overheating conditions; whilst adhering to the ventilation requirements of AD-F.
- 7.6 This table should be read in conjunction with the drawings in **Appendix F**, whereby drawing 27139_04_120_08 demonstrates the required reduction for bedrooms and drawing 27139_04_120_09 demonstrates the required reduction for all other habitable rooms.
- 7.7 For each reference in Table 7.1, the sound reduction performance requirements, in octave band and weighted reduction format, are presented in **Appendix G**.

Table 7.1: Suggested Internal Mitigation Measures

Mitigation Ref.	Example Glazing Solution	Example Whole-Dwelling Ventilation Solution ^(a)	Example Overheating Ventilation Solution ^(b)
Ref. A-1			<u>No Overheating Mitigation Required.</u> Opening windows can be used to combat overheating and provide purge ventilation.
Ref. A-2	4mm glass panel 12mm air gap 4mm glass panel Approx. 27 dB $R_w + C_{tr}$	<u>Standard Trickle Vent</u> Direct airpath trickle vent located in the top of the window frame  Approx. $D_{n,e,w} + C_{tr} = 32$ dB	<u>Air Brick</u> Internal hit & miss grille manually adjusted with a sliding action allowing ventilation to be controlled as required.  Approx. $D_{n,e,w} + C_{tr} = 36$ dB or <u>MV System</u> Mechanical Ventilation Systems to provide room specific, or whole dwelling, extract and purge ventilation.  Overheating mitigation subject to change based upon the outcome of any future Dynamic Thermal Modelling.

^(a) Where a suitable 'air brick' is used, or if a whole dwelling MVHR system is to be installed, this would negate the need to install whole dwelling ventilation solutions for typical conditions (window mounted trickle vents).

^(b) Indicative overheating solution capable of achieving both SOAEL and LOAEL – subject to change at Building Control stage based upon the outcome of any Dynamic Thermal Modelling undertaken to satisfy the requirements of AD-O.

Glazing and Ventilation Summary

- 7.8 For the avoidance of doubt, each reference is summarised below, and the required glazing and ventilation specifications are identified in **Appendix F**. All bedrooms should follow the mitigation specifications in drawing reference 27139_04_120_08 and all other habitable rooms should follow the mitigation specifications in drawing reference 27139_04_120_09.

Reference A-1

- Glazing – 27 dB $R_w + C_{tr}$ (typically 4mm-12mm-4mm);
- Whole-Dwelling Ventilation – 32 dB $D_{n,e,w} + C_{tr}$ (typically a direct airpath trickle vent); and

- Overheating Ventilation – none required.

Reference A-2

- Glazing – 27 dB $R_w + C_{tr}$ (typically 4mm-12mm-4mm);
- Whole-Dwelling Ventilation – 32 dB $D_{n,e,w} + C_{tr}$ (typically a direct airpath trickle vent); and
- Overheating Ventilation – Mechanical Ventilation System; or
- Whole-Dwelling and Overheating Ventilation – 36 dB $D_{n,e,w} + C_{tr}$ (hit and miss air brick).



8.0 CONCLUSIONS

- 8.1 MEC has been commissioned by Avant Homes Ltd, to undertake an Acoustics Assessment aimed at discharging condition 6 of the planning permission, pertaining to the proposed residential development at Lychgate Lane, Burbage.

Pumping Station

- 8.2 The operation of the pumping station would have no impact upon new dwellings if its operation produces a Noise Rating Level that does not exceed the L_{A90} background noise level as measured at 3.5 metres from the façade of the nearest noise sensitive premise.
- 8.3 Based on the Site noise measurements, the design criterion for pumping station shall be that the overall Rating Level measured at 3.5 metres from the façade of the nearest dwelling shall not exceed 45 dB for all daytime and evening operations, or 35 dB at night. The Rating Level must allow for any tonal content through the addition of appropriate acoustic character corrections as defined by BS 4142 where tonal noise is present.

Residential Development

- 8.4 Detailed assessments of the Site, during typical conditions, have been undertaken in accordance with BS 8233 and ProPG criteria whilst giving consideration to typical condition ventilation requirements in AD-F.
- 8.5 Acoustic modelling has demonstrated that, with the exception of Plots 56 – 59, the outdoor criteria of 55 dB $L_{Aeq,16hr}$ will be satisfied for all new dwellings on the Site.
- 8.6 For Plots 56 – 59 and Plot 79, modelling indicates that even with the use of acoustic screening, external noise levels of up to 58 dB are predicted.
- 8.7 However, these marginal exceedances need to be considered against the expressed caveats, namely, that *“... it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.”*
- 8.8 With regards to internal acoustic conditions, embedded façade mitigation measures have been suggested in order to achieve internal noise level criteria in line with BS 8233 and ProPG which, for all new dwellings, would require standard thermal double glazing and standard direct airpath trickle ventilators.
- 8.9 The outcome of the AVOG assessment demonstrated that acoustic through wall ventilators are a viable option which could be installed from an acoustic perspective. However, any overheating mitigation measures presented within this report are presented to satisfy internal acoustic conditions only. The exact ventilation requirements to combat overheating will need to be considered during the Building Control process of the

Site, nevertheless, matters relating to noise in respects of Environmental Health have been fully considered within this report.

- 8.10 It is therefore considered that with the implementation of the recommended mitigation strategy, internal and external noise levels can be attenuated to achieve the requisite criteria, and condition 6 of the planning permission will be fully satisfied.





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APPENDICES



APPENDIX A



MATERIALS LAYOUT KEY

T B T - TILE
B - BRICK

NOTE: STRING & DETAIL BRICK TO MATCH MAIN BODY BRICK

RETAINING & SCREEN WALLS TO MATCH MAIN BODY BRICK OF ADJOINING PLOT

ROOF TILE
A DARK GREY - RUSSELL CALDERDALE EDGE

BRICK
1 TOBERMORE KINGSTON WARM RED
2 TOBERMORE KINGSTON COTTAGE RED

FRONT DOOR COLOURS: BLACK
FASCIA'S & SOFFIT'S: BLACK
RAINWATER GOODS/FOUL: BLACK
WINDOWS: WHITE
SIDE DOOR: WHITE
GARAGE DOOR: BLACK
FOOTPATH & PATIOS TO PLOTS: BUFF TEXTURED

PLANNING LAYOUT KEY:

— SITE BOUNDARY

— 1.8m TIMBER SCREEN FENCE

— 450mm TIMBER KNEE RAIL

— 1.8m SCREEN WALL

— 1.8m TIMBER GATE

— EXISTING EASEMENTS

— BIN STORAGE

— BIN COLLECTION POINT

1 PLOT NUMBERS

— ELECTRIC VEHICLE CHARGING POINT

— S106 AFFORDABLE RENTED HOMES

— S106 SHARED OWNERSHIP HOMES

— S106 FIRST HOMES

— EXISTING TREES AND HEDGING

— 6 x 4 Shed with Sheffield Hoop Stand Fixed to Concrete Base.

Schedule of Accommodation

S106 Affordable Housing

Name	NDSS Bed Size	Storey	Number
D1.1	1	2	4
Askham	1	2	6
E2.1	2	2.5	6
Total			16

Open Market Housing

Name	NDSS Bed Size	Storey	Number
Askham	1	2	19
Ferndale	2	2	8
Ripley	2	2	9
Eastbeck	2	2.5	2
Maltby	3	2	7
Leyburn	3	2	10
Baldon	3	2.5	4
Salbury	3	2.5	4
Total			63

Overall Total 79

AVANT homes

1 Phoenix Place, Phoenix Centre, Nottingham NG8 6BA
Tel: 0115 979 8800, Fax: 0115 979 8878
www.avanthomes.co.uk

DATE: 22.01.24 **SCALE:** 1:500 @ A1 **DRAWN BY:** DRH

DWG TITLE: Proposed Site Layout

PROJECT: Lychgate Lane, Burbage

DWG No: EM-LLB-200 **REV:** E



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APPENDICES



APPENDIX B

Harry Johnson

From: Giles Rawdon <[REDACTED]>
Sent: 02 July 2024 11:08
To: Harry Johnson
Subject: RE: Lychgate Lane, Burbage - Acoustics Assessment scope

Good morning Harry

The methodology sounds fine.

Regards

Giles Rawdon

Environmental Health Officer
(Environmental Protection)

Tel: [REDACTED]

Email: [REDACTED]

Web: www.hinckley-bosworth.gov.uk

Hinckley Hub, Rugby Road, Hinckley, Leics LE10 0FR



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From: Harry Johnson <[REDACTED]>
Sent: 01 July 2024 16:49
To: Giles Rawdon <[REDACTED]>
Subject: Lychgate Lane, Burbage - Acoustics Assessment scope

Hi Giles,

I believe we previously consulted with yourself regarding the acoustics assessment methodology for the above Site (see approximate redline boundary below). We have now been commissioned to update the assessment with the latest layout in order to discharge planning condition 6 relating to planning application 22/00192/OUT .



It is noted that we have measurement data obtained at the end of March 2022 for the outline assessment (report reference 27139-ENV-0401) in the locations outlined in the above screenshot.

The survey was undertaken continuously between 09:00 on Wednesday 2nd March and 08:00 on Monday 7th March 2022.

It is considered that these measurements are representative of the existing sound levels at the Site and results will therefore be used to inform the updated assessment.

As part of this assessment, we propose to undertake the following

- Using the sound level data obtained by MEC in March 2022, a 3D acoustic model will be calibrated, such that exposure levels across the Site can be predicted and graphically presented in the form of colour coded maps for absolute sound levels and mitigation references;
- Where necessary, the assessment will provide evidence of the mitigation measures in order to achieve external amenity criteria (typically comprising plot orientation, boundary fencing or increased height garden fences);
- The assessment will provide detailed evidence of the required embedded façade mitigation measures, i.e., glazing and whole dwelling ventilation performance specifications in order to comply with the relevant acoustics criteria;
- An acoustics led overheating assessment will be undertaken in accordance with AVOG and where necessary indicative overheating mitigation measures will be presented from an acoustics perspective;
- The assessment will be presented in a technical report suitable for submission to the Local Authority.

I trust this methodology meets the requirements of the Hinckley and Bosworth Borough Council.

However, should you have comments or any specific council guidance for us to consider as part of this assessment, please let us know.

Kind regards,

Harry Johnson BSc (Hons) AMIOA
Acoustics Consultant

[Redacted signature]

T: [Redacted]
W: m-ec.co.uk

Birmingham | Brighton | Leicester





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APPENDICES



APPENDIX C

GLOSSARY OF TECHNICAL TERMS

Noise

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurements, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

Typical sound levels found in the environment

Sound Level	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside a factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB(A)	Jet aircraft taking off
140 dB(A)	Threshold of pain

Descriptor	Terminology
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level	The sound level is the sound pressure relative to a standard reference pressure of $20\mu\text{Pa}$ (20×10^{-6} Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1 / s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$.
A-weighting (dB(A))	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq, T}$	A noise level index called the equivalent continuous noise level over the time period, T . This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{AFmax, T}$	A noise level index defined as the maximum noise level during the measurement period. L_{Max} is sometimes used for the assessment of discrete loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. It is typically measured using the 'fast' sound level meter response.
$L_{90, T}$	A noise level index. The noise level exceeded for 90% of the time over the period, T . L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10, T}$	A noise level index. The noise level exceeded for 10% of the time over the period, T . L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m.
Façade	At a distance of 1m in front of a large sound reflecting object such as a building facade.
Fast/Slow Time Weighting	Averaging times used in sound level meters.
Octave Band	A range of frequencies whose upper limit is twice the frequency of the lower limit
One-third Octave Band	A frequency band in which the upper limit is $2^{1/3}$ times the frequency of the lower limit.
Rating Level	The specific sound level, plus any adjustment for characteristic feature of sound in BS 4142.
Specific Sound Level	The A-weighted L_{eq} sound level produced by a sound source during a specified period of time. Commonly known as the sound source under investigation as defined in BS 4142.
Typical Maximum Level	The 90 th percentile maximum event level (L_{AFmax}) measured during a period. Used for assessing night-time maximum levels under typical and overheating conditions.



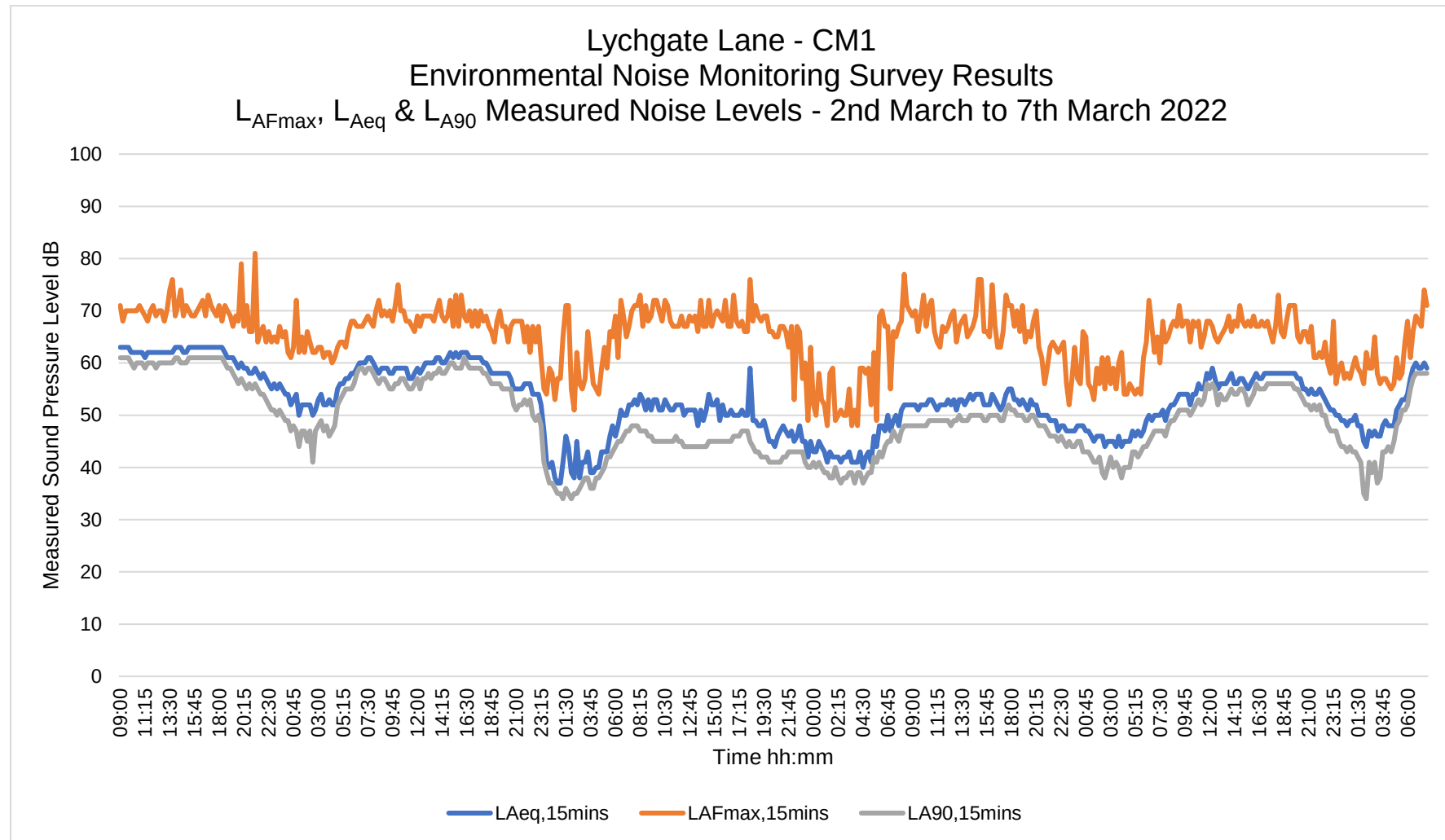
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APPENDICES

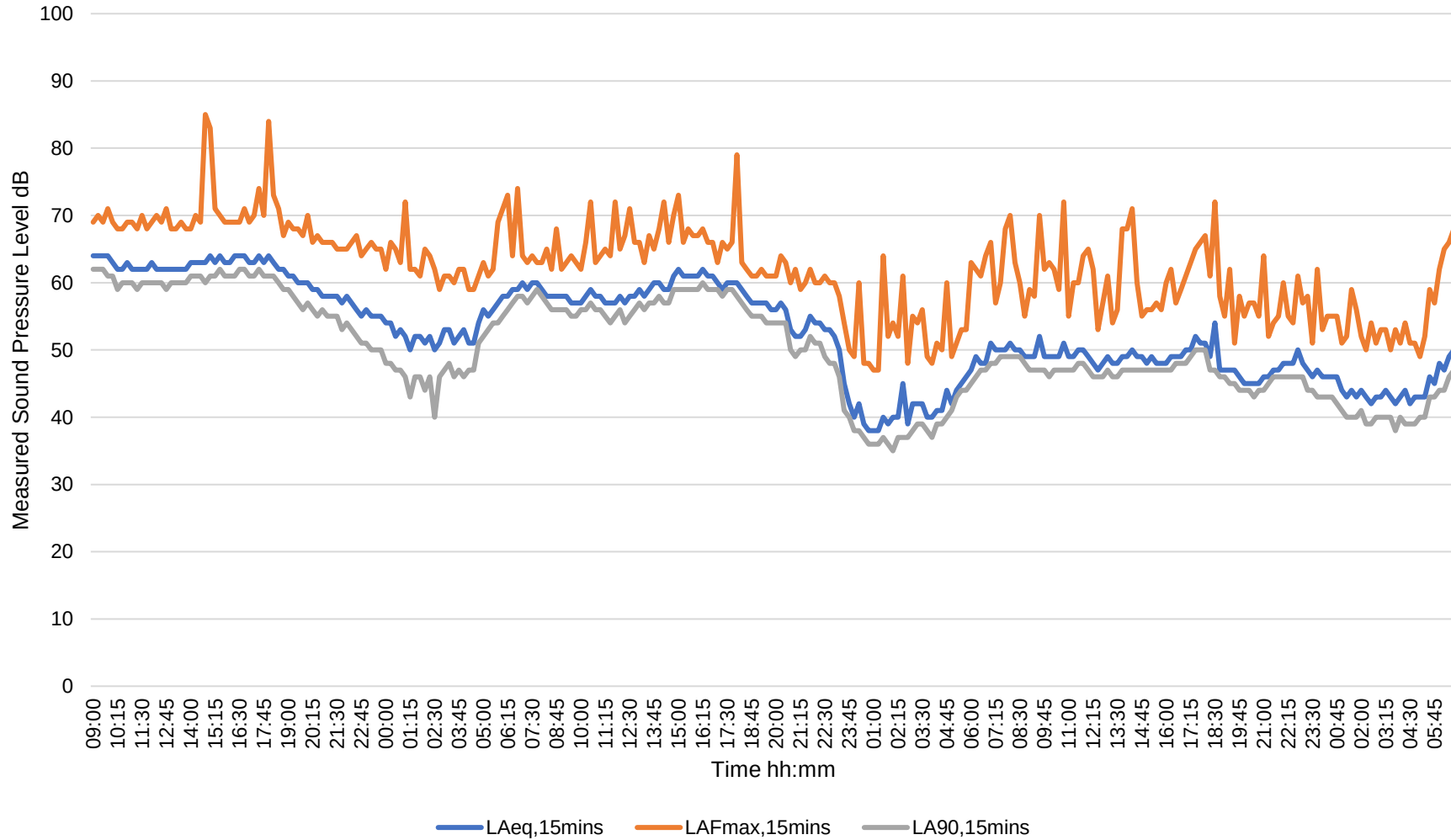


APPENDIX D

Environmental Sound Survey Data



Lychgate Lane - CM2
Environmental Noise Monitoring Survey Results
 L_{AFmax} , L_{Aeq} & L_{A90} Measured Noise Levels - 2nd March to 4th March 2022





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APPENDICES



APPENDIX E



NOTES:

1. DO NOT SCALE THIS DRAWING.

KEY

- 0-50dB(A)
- 50-55dB(A)
- 55-60dB(A)
- 60-65dB(A)
- 65-70dB(A)
- 70-75dB(A)
- 75-80dB(A)
- >80dB(A)

2.2m Acoustic Screening

REV:	AMENDMENTS:	EW	NF	AB	24.07.24
REV:	AMENDMENTS:	DRN	CHK	APP	DATE:
PROJECT: LYCHGATE LANE, BURBAGE					
DRAWING TITLE: DAYTIME AMBIENT SOUND LEVELS LAeq,16hour					
CLIENT: AVANT HOMES LTD					
DRAWING NUMBER: 27139_04_120_05					
REVISION:	SHEET SIZE:		SCALE:		
-	A3		NFS		
STATUS: FOR INFORMATION / APPROVAL					
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NOTES:

1. DO NOT SCALE THIS DRAWING.

KEY

	0–50dB(A)
	50–55dB(A)
	55–60dB(A)
	60–65dB(A)
	65–70dB(A)
	70–75dB(A)
	75–80dB(A)
	>80dB(A)

2.2m Acoustic Screening

REV:	AMENDMENTS:	EW	NF	AB	24.07.24
		DRN	CHK	APP	DATE:
PROJECT: LYCHGATE LANE, BURBAGE					
DRAWING TITLE: NIGHT-TIME AMBIENT SOUND LEVELS LAeq,8hour					
CLIENT: AVANT HOMES LTD					
DRAWING NUMBER: 27139_04_120_06					
REVISION: -	SHEET SIZE: A3		SCALE: NFS		
STATUS: FOR INFORMATION / APPROVAL					
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NOTES:

1. DO NOT SCALE THIS DRAWING.

KEY

	0–50dB(A)
	50–55dB(A)
	55–60dB(A)
	60–65dB(A)
	65–70dB(A)
	70–75dB(A)
	75–80dB(A)
	>80dB(A)

2.2m Acoustic Screening

REV:	AMENDMENTS:	EW	NF	AB	24.07.24
PROJECT:		DRW:	CHK:	APP:	DATE:
LYCHGATE LANE, BURBAGE					
DRAWING TITLE:					
NIGHT-TIME MAXIMUM SOUND LEVELS					
LAFmax,T					
CLIENT:					
AVANT HOMES LTD					
DRAWING NUMBER:					
27139_04_120_07					
REVISION:	SHEET SIZE:		SCALE:		
-	A3		NFS		
STATUS:					
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APPENDIX F

Question	Answer	Points
#1 Where is the scheme in the UK?	Rest of England and Wales	2
#2 Is the site likely to see an Urban Heat Island effect?	No	0
#3 Does the site have barriers to windows opening?	Day	4
	Night	4
#4 Are the dwellings flats?	No	0
#5 Does the scheme have community heating?	No	0
#6 What is the estimated average glazing ratio for the dwellings	>35%	4
#7 Are the dwellings single aspect?	No	0
#8 Do the site surroundings feature significant blue/green infrastructure?	Yes	-1
#9 Are immediate surrounding surfaces in majority pale in colour, or blue green?	No	0
#10 Does the site have existing tall trees or buildings that will shade solar-exposed glazed areas?	No	0
#11 Do dwellings have high exposed thermal mass AND a means for secure and quiet night ventilation?	No	0
#12 Do floor-to-ceiling heights allow for ceiling fans now, or in the future?	No	0
#13 Is there useful external shading?	No	0
#14 Do windows & opening support effective ventilation?	Part F Only	0
Total		13
Overheating Risk		High
^(a) Aside from the most exposed dwellings, all windows can be opened during the day and still achieve good acoustic conditions internally in accordance with BS 8233. ^(b) Calculations have been undertaken for select, most exposed plots to determine the average glazing ratio for the development.		



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APPENDICES



APPENDIX G



NOTES:

1. DO NOT SCALE THIS DRAWING.
2. Please refer to report reference 27139-ENV-0403 for the details on the proposed glazing and ventilation references.

KEY

- Ref. A-1
- Ref. A-2

REV:	AMENDMENTS:	EW	NF	AS	24.07.24
		DRN	CHK	APP	DATE:
PROJECT: LYCHGATE LANE, BURBAGE					
DRAWING TITLE: MITIGATION REFERENCE FOR HABITABLE BEDROOMS					
CLIENT: AVANT HOMES LTD					
DRAWING NUMBER: 27139_04_120_08					
REVISION:	SHEET SIZE:		SCALE:		
-	A3		NFS		
STATUS: FOR INFORMATION / APPROVAL					
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1. DO NOT SCALE THIS DRAWING.
2. Please refer to report reference 27139-ENV-0403 for the details on the proposed glazing and ventilation references.



Ref. A-2

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APPENDIX H

Reference A-1 Performance Requirements

Façade Element	Sound Insulation Performance Requirements (dB) in Octave Band Centre Frequencies (Hz)						$R_w / D_{ne,w}$ (dB)	C_{tr} (dB)
	125	250	500	1k	2k	4k		
Glazing	22	20	26	36	39	31	31	-4
Ventilation (Trickle)	32	32	31	33	31	31	32	0
Ventilation (Overheating)	-	-	-	-	-	-	-	-
The glazing reduction requirements can typically be found in a configuration of 4/12/4, where the information is presented in terms of the thickness of one pane of glass in mm, followed by the size of the air gap in mm, followed by the thickness of the second pane of glass in mm. The background ventilation requirements can be found in standard window mounted non-acoustic trickle ventilators.								

Reference A-2 Performance Requirements

Façade Element	Sound Insulation Performance Requirements (dB) in Octave Band Centre Frequencies (Hz)						R _w / D _{ne,w} (dB)	C _{tr} (dB)
	125	250	500	1k	2k	4k		
Glazing	22	20	26	36	39	31	31	-4
Ventilation (Trickle)	32	32	31	33	31	31	32	0
Ventilation (Overheating)	Mechanical Ventilation							
or								
Ventilation (Trickle & Overheating)	37	30	33	39	45	53	38	-2
The glazing reduction requirements can typically be found in a configuration of 4/12/4. The background and overheating ventilation requirements can be found through either standard window mounted non-acoustic trickle ventilators coupled with a room specific Mechanical Ventilation system, or , an acoustically attenuated air brick.								

Minimum performance requirements for overheating ventilation only applicable if passive ventilation is used. If mechanical ventilation is chosen, please refer to the main body of the acoustics report for suitable noise limits.

It is appreciated that it is impractical to achieve every octave band minimum performance requirement, therefore, during procurement of solutions, the $R_w + C_{tr}$ or $D_{ne,w} + C_{tr}$ should be adhered to at a minimum.

Minimum performance requirements for overheating ventilation only applicable if passive ventilation is used. If mechanical ventilation is chosen, the system should adhere to the following noise limits:

Room Type	Typical Conditions Limit ^(a) L _{Aeq, T} dB	Overheating Conditions Guidance Value ^(b) L _{Aeq, T} dB
Noise Sensitive Rooms	30	30 (±5)
Less Sensitive Rooms	45	35 (±5)
^(a) Taken from section 1.7 of Approved Document F, Volume 1, 2021 Edition. ^(b) Taken from AVOG.		

‘Noise Sensitive Rooms’ are defined as bedrooms and living rooms, with the likes of kitchens and bathrooms defined as ‘Less Sensitive Rooms’.



CIVIL ENGINEERING



TRANSPORT



FLOOD RISK & DRAINAGE



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ACOUSTIC AIR



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