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ACOUSTIC AIR



Lychgate Lane, Burbage
Acoustics and Overheating Assessment
June 2022

Report Ref: 27139-ENV-0402

Lychgate Lane, Burbage

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REPORT REF: 27139-ENV-0402

CLIENT: Avant Homes Ltd

ENGINEER: Mewies Engineering Consultants Ltd
The Old Chapel
Station Road
Hugglescote
Leicestershire
LE67 2GB

Tel: 01530 264 753
Email group@m-ec.co.uk

REGISTRATION OF AMENDMENTS

Date	Rev	Comment	Prepared By	Checked By	Approved By
June 2022	-	First issue	Harry Johnson BSc (Hons) Assistant Acoustics Consultant	Adam Walker BSc (Hons) AMIOA MinstSCVE Acoustics Consultant	Tim Rose BA (Hons) MCIHT MTPS Director

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1.0 INTRODUCTION

- 1.1 Mewies Engineering Consultants Ltd (M-EC), has been commissioned by Avant Homes Ltd (hereafter referred to as 'the Client') to undertake an Acoustics and Overheating Assessment for a proposed residential development at Lychgate Lane in Burbage (hereafter referred to as 'the Site').

Assessment Scope

- 1.2 This assessment sought to establish existing sound levels at the Site, and using acoustic modelling to, determine the risk of potential impacts from noise on the future occupants and, where necessary, propose suitable mitigation measures. The following scope of works has been undertaken:
- Consultation has been held with the Local Authority to determine the proposed methodology is acceptable;
 - An environmental sound survey has been undertaken on the northern and southern boundary of the Site;
 - The data has been analysed and has been used to create a 3D acoustic model whereby noise contours have been mapped across the Site;
 - Where required, embedded façade mitigation measures in the form of glazing specifications and whole-dwelling ventilation specifications have been provided to demonstrate compliance with the guidance contained within ProPG¹, the British Standard BS 8233² and AD-F³.
 - Following the assessment of typical conditions, the data has been analysed to determine whether bedrooms can achieve internal night-time sound levels outlined in Section 3.3 of AD-O⁴ during periods of overheating with the provision of an open window. Where this is not possible, consideration has been given to potential suitable ventilation provisions to comply with internal noise criteria outlined in AD-O.
 - This report has not considered Dynamic Thermal Modelling (DTM) in accordance with CIBSE TM59⁵. It is therefore recommended that this is undertaken at the earliest opportunity to ensure any suggested ventilation measures outlined in this report demonstrate compliance with Requirement O1 of AD-O.
 - Consideration has also been given to internal sound levels during periods of overheating in the daytime assessment period, which whilst not considered within the scope of AD-O, is recommended within AVOG⁶.
- 1.3 Overall, this assessment has been undertaken with reference to guideline values contained in BS 8233, ProPG and consideration has been given to overheating guidance and regulation in AVOG and AD-O.

Disclaimer

- 1.4 M-EC 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 M-EC.

¹ Professional Practice Guidance on Planning and Noise, May 2017.

² BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'

³ The Building Regulations 2010, Ventilation, Approved Document 'F'.

⁴ The Building Regulations 2010, Overheating, Approved Document 'O'.

⁵ The Building Regulations 2010, Ventilation, Approved Document 'F'.

⁶ Acoustics Ventilation and Overheating, Residential Design Guide, V1.1. January 2020.

1.5 M-EC 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.

3.0 STANDARDS AND GUIDANCE

General

- 3.1 An acoustic glossary is provided in **Appendix B** to assist the reader.

Consultation with Hinckley and Bosworth Borough Council

- 3.2 The Environmental Health department at Hinckley and Bosworth Borough Council (hereafter referred to as the 'Local Authority' or 'LA') was contacted on 23rd February 2022 to discuss the proposed methodology. The proposed methodology was accepted by the Local Authority on 23rd February 2022.
- 3.3 The consultation is presented in **Appendix C**.
- 3.4 It should be noted that with regards to overheating, since the initial consultation with the LA, AD-O has come into effect which contains new internal noise limits during the night-time. Therefore, the following assessment will take into consideration the noise limits contained in AVOG for the daytime and AD-O for the night-time.

Summary of Guidance and Standards

- 3.5 The following guidance and standards relevant to the assessment presented herein:

- National Planning Policy Framework (NPPF) 2021;
- Noise Policy Statement for England (NPSE) 2010;
- BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings';
- Professional Practice Guidance on Planning and Noise (ProPG) 2017;
- The Building Regulations, Approved Document F, Ventilation (AD-F);
- The Building Regulations, Approved Document O, Overheating (AD-O); and
- Acoustics Overheating and Ventilation Guide (AVOG) 2020.

ProPG

- 3.6 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.
- 3.7 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.
- 3.8 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.

- 3.9 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 3.1.
- 3.10 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

- 3.11 BS 8233 provides recommendations for the control of noise in and around buildings.
- 3.12 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 3.1

Table 3.1: 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

- 3.13 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.
- 3.14 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.
- 3.15 The guidance also indicates that where developments are considered necessary or especially desirable, the internal targets may be relaxed by up to 5 dB with reasonable conditions still achieved.
- 3.16 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.
- 3.17 It states that a compromise between elevated noise levels and other factors, such as convenience of living or making efficient use of land resources to ensure development needs can be met, might be warranted. It also important to note that the standard states that for balconies, roof gardens and terraces it is important that specification of noise limits is not necessarily appropriate.

The Building Regulations, Approved Document F

- 3.18 Guidance on ventilation requirements for dwellings under The Building Regulations is described in AD-F.
- 3.19 AD-F describe three types of ventilation provision and associated ventilation rates for dwellings:
- Whole Dwelling Ventilation – continuous ventilation of rooms at a relatively low rate;
 - Extract Ventilation – the removal of air directly from a space to outside; and
 - Purge Ventilation – manually controlled ventilation of rooms at a relatively high rate.
- 3.20 'Whole dwelling ventilation' can be provided by a number of means, but is generally insufficient to provide ventilation to combat overheating unless the initial ventilation strategy is provided through mechanical ventilation with summer by-pass options. Whole dwelling ventilation is typically provided by trickle ventilators, passive-stack ventilation or passive through wall ventilation which require acoustics consideration due to external to internal noise break-in.
- 3.21 Extract ventilation is considered for bathrooms and kitchen areas (for example cooker hood extracts) and is typically not a consideration for acoustics.
- 3.22 It is important to differentiate between the need to provide 'purge ventilation' as required occasionally under AD-F (e.g., opening a window to rapidly remove smoke from a kitchen), against the provision of additional ventilation to help control overheating. Providing additional ventilation to combat overheating is considered in AD-O and acoustics consideration relating to overheating found in AVOG.
- 3.23 The provision of opening a window can be used to control overheating as well as being used for the purge ventilation requirement of AD-F. However, for the former, internal noise levels need to be considered in parallel, which is outside the scope of AD-F and thus specific overheating guidance should be reviewed.
- 3.24 Please note, this report does not demonstrate that the ventilation rates outlined in AD-F have been complied with. Instead, the report prescribes acoustic specifications that whole dwelling ventilators should achieve in order to ensure noise transfer through the whole dwelling ventilators allows internal noise levels to comply with BS 8233.

The Building Regulations, Approved Document O

- 3.25 AD-O comprises new regulations, effective from 15th June 2022, which means all new residential development must include consideration and mitigation against overheating whilst also giving consideration to the reasonable enjoyment of residents.
- 3.26 AD-O has two major requirements outlined as follows:
- Requirement O1: Reasonable provision must be made to limit solar gains in summer, and provide adequate means to remove heat from the indoor environment.
 - Requirement O1(2)(a): Account must be taken of the safety of any occupant and their reasonable enjoyment of the residence.

- 3.27 Requirement O1 is demonstrated through a simplified method (glazing and free area percentage criteria) or through the use of Dynamic Thermal Modelling (DTM).
- 3.28 The simplified method is appropriate in some instances and uses minimum free area criteria and maximum glazing percentages to demonstrate that excess heat can be removed and that solar gains have been limited. The exact criteria depend on whether the Site falls in the “Moderate-Risk” area of England or “High-Risk”. High-Risk in this instance is classified as Greater London and Central Manchester; all other areas of England are considered to be Moderate-Risk. The free area and glazing percentages needed to comply with Requirement O1 are found in AD-O and not presented in this report.
- 3.29 However, using the simplified method is also dependent on external noise criteria as Requirement O1 and O1(2)(a) need to be adhered to concurrently (i.e., you cannot combat overheating with windows open if internal noise levels will be exceeded).
- 3.30 Research indicates that for Moderate-Risk areas, an external to internal reduction of 9 dB is afforded with open windows when considered the required free area in bedrooms; but in High-Risk areas, due to the increased free area required, only a 4 dB reduction is afforded.
- 3.31 If Requirement O1(2)(a) cannot be met in terms of noise limits due to open windows, then the simplified method is no longer appropriate and DTM must be undertaken instead to demonstrate that a mitigation strategy to combat overheating has been established and is suitable whilst giving consideration to internal noise levels.
- 3.32 Requirement O1(2)(a) from an acoustics perspective applies increased internal noise levels, above BS 8233 criteria, and as discussed above helps to determine what type of method is appropriate for satisfying requirement O1. The noise limits are only applicable during the night-time and are presented in Table 3.2

Table 3.2: Approved Document O, Night-time Overheating Internal Criteria

Assessment Parameter	AD-O Internal Noise Limit
Ambient Sound Level	40 dB $L_{Aeq, 8hr}$
Typical Maximum Event Level ^(a)	55 dB $L_{AFmax, 5min}$
^(a) Level not exceeded more than 10 times per night.	

- 3.33 Considering the reductions outlined in section 3.30 in moderate risk areas if external free-field noise levels exceed 49 dB (ambient) or 64 dB (typical maximum) then DTM must be undertaken. In High-Risk areas the levels are 44 dB (ambient) and 59 dB (typical maximum).
- 3.34 It should be noted, that the glazing percentage and free area criteria for the simplified method are onerous and may be difficult to achieve in practice across a large development. Where this is the case, this does not automatically mean that Requirement O1 cannot be met with openable windows, subject to external noise levels.

- 3.35 For example, should a dwelling fail to meet Requirement O1 glazing and free area criteria, but with an open window could achieve Requirement O1(2)(a), DTM would still need to be undertaken to demonstrate that TM59 criteria can be achieved during the night-time and that the overheating mitigation strategy would work and thus the satisfaction of Requirement O1.
- 3.36 This aspect would be considered at a later stage and should not factor into initial planning decisions as from an acoustics perspective, all matters of Environmental Health would be satisfied in relation to acoustics and the Building Regulations.
- 3.37 Should open windows not be sufficient due to acoustics limitations, AD-O states that guidance on reducing the passage of external noise into buildings can be found in various guidance including AVOG.

AVOG

- 3.38 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.
- 3.39 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.
- 3.40 AVOG prescribes a two-level assessment procedure, however, as AD-O is a Building Regulations and AVOG is industry guidance, AD-O takes precedence for night-time assessments. However, as AD-O has no noise level criteria during daytime, a Level 2 AVOG assessment for daytime periods is appropriate for considering acoustics and overheating concurrently.
- 3.41 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).
- 3.42 The sliding scale in AVOG is presented in Table 3-3 of AVOG with an interpretation presented in this report in Table 3.3.

Table 3.3: AVOG Level 2 Criteria

Effect Level	Daytime Internal Noise Level $L_{Aeq, 16hr}$ dB
NOAEL	< 35
LOAEL	35
SOAEL	40 – 50

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.

Summary of Criteria

- 3.43 For the avoidance of doubt, the criteria outlined in Table 3.4 are appropriate for the assessment of residential amenity.

Table 3.4: Site Criteria Summary

Scenario	Location	Daytime	Night-time	
		07:00 – 23:00 ($L_{Aeq, 16hr}$ dB)	23:00 – 07:00 ($L_{Aeq, 8hr}$ dB)	23:00 – 07:00 ($L_{AFmax, T}$ dB)
Typical	Living Room	35	-	-
	Dining Area	40	-	-
	Bedroom	35	30	45
Overheating	Bedroom	35 – 50 ^(a)	40	55
All	External Amenity	50 – 55	-	-

^(a) Daytime internal criteria during periods of overheating are dependent upon the likelihood and duration of overheating.

4.0 ENVIRONMENTAL SOUND SURVEY

Methodology

- 4.1 Prevailing sound levels at the site have been established by undertaking an environmental sound survey. The survey was undertaken in full accordance with the guidance set out in BS 7445⁷.
- 4.2 Sound Level meters (SLMs) were installed at two locations:
- 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.
- 4.3 The survey was undertaken continuously between 09:00 on Wednesday 2nd March and 08:00 on Monday 7th March 2022.
- 4.4 A monitoring location plan is provided in Figure 4.1

Figure 4.1: Measurement Positions



Equipment

- 4.5 Measurements were taken using Class 1 integrating/averaging SLMs housed in environmental protection apparatus. The SLMs were field calibrated before and after the survey using a Class 1 calibrator, with no significant drift in calibration noted.

⁷ BS 7445-1:2003 'Description and measurement of environmental noise, Part 1: Guide to quantities and procedures.'

- 4.6 The SLMs were set up to capture the following parameters at a minimum: L_{Aeq} and L_{AFmax} values.
- 4.7 Full details of the equipment used to undertake the survey are presented in Table 4.1.

Table 4.1: 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

- 4.8 The SLMs were set at a height of approximately 1.5m above local ground level at both positions, in free field locations.

Meteorological Conditions

- 4.9 Weather conditions generally remained dry and overcast across the survey period.
- 4.10 Continuous moderate precipitation occurred throughout the daytime period on Wednesday 2nd March, with brief, intermittent, light precipitation periods occurring on Friday 4th March.
- 4.11 During setup of the SLM, wind speeds were observed to be < 0.5 m/s. During collection of the sound level meter, wind speeds were observed to be < 1 m/s. Therefore, it can be concluded that wind speeds were suitable for environmental sound survey conditions.

Observations

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

Results

- 4.13 Table 4.2 and Table 4.3 provide a summary of measured $L_{Aeq,T}$ levels and $L_{AFmax,T}$ levels at CM1 and CM2 respectively.
- 4.14 The time history graphs showing the data are presented in **Appendix D**.

Table 4.2: Summary of Measured Sound Levels, CM1

Date	Daytime 07:00 – 23:00 L _{Aeq, T} dB	Night-time 23:00 – 07:00 L _{Aeq, 8hr} dB	Typical Maximum Event Level ^(a) L _{AFmax, 5min} dB
2 nd March	61 ^(c)	55	66
3 rd March	59	46	65
4 th March	51	44	60
5 th March	52	47	62
6 th March	56	52	62
7 th March	59 ^(d)	-	-
(a) Maximum noise level exceeded for 90% of the time. (b) Maximum repeatable event level used for overheating conditions assessments only. (c) T = 14hr (d) T = 1hr			

- 4.15 It should be noted that, due to a fault with the SLM at CM2 on Saturday 5th March the data, from this point onwards, cannot be relied up on for the remainder of the survey period. This data has therefore not been included in the assessment. The remaining data, suitable for assessment purposes, is presented in Table 4.3.

Table 4.3: Summary of Measured Sound Levels, CM2

Date	Daytime 07:00 – 23:00 L _{Aeq, 16hr(T)} dB	Night-time 23:00 – 07:00 L _{Aeq, 8hr} dB	Typical Maximum Event Level ^(a) L _{AFmax, 5min} dB
2 nd March	62 ^(c)	55	66
3 rd March	59	45	60
4 th March	49	45	59
(a) Maximum noise level exceeded for 90% of the time. (b) Maximum repeatable event level used for overheating conditions assessments only. (c) T = 14hr			

- 4.16 It is considered that weather conditions on Wednesday 2nd March significantly influenced higher sound levels due to the wet road surfaces. This data has therefore not been considered reliable as typical conditions and has not been considered when deriving the assessment levels.
- 4.17 Considering the above points, and to provide a robust assessment, the highest sound levels from the remainder of the survey period have been used for this assessment.

4.18 The sound levels, used to calibrate the acoustic model, at an approximate distance of 6m from Lychgate Lane (CM1), for assessment are as follows:

- Daytime, $L_{Aeq, 16hr}$ – 59 dB
- Night-time, $L_{Aeq, 8hr}$ – 52 dB
- Night-time Typical Maximum, $L_{AFmax, 5min}$ – 65 dB

4.19 The sound levels, used to calibrate the acoustic model, on the southern boundary (CM2), for assessment are as follows:

- Daytime, $L_{Aeq, 16hr}$ – 59 dB
- Night-time, $L_{Aeq, 8hr}$ – 45 dB
- Night-time Typical Maximum, $L_{AFmax, 5min}$ – 60 dB

5.0 ASSESSMENT METHODOLOGY

Assessment Summary

- 5.1 For clarity, this section explains the methodology undertaken as part of this acoustics and overheating assessment to assist the reader with the new regulations.
- 5.2 As aforementioned, acoustics and overheating needs to be considered in tandem, especially at residential developments near to major transportation sources and therefore, this report considers both aspects and produces suitable mitigation measures for typical conditions (i.e., during periods where overheating does not occur) and overheating conditions.
- 5.3 The assessment will follow the methodology outlined below:
- Using the 3D acoustic model to quantify external noise levels at worst effected receptors on both the northern and southern boundaries of the Site, apply a ProPG risk category;
 - Undertake calculations in accordance with BS 12354-3⁸ and produce mitigation scenarios for typical conditions to comply with AD-F, BS 8233 and ProPG;
 - Consideration against AD-O will be limited to Requirement O1(2)(a) which from an acoustics perspective considers internal noise levels during night-time periods only. Mitigation measures to provide increased ventilation during periods of overheating whilst achieving internal acoustic conditions outlined in AD-O will be considered, should this be required;
 - Consideration will also be given to internal acoustics conditions during the daytime, during periods of overheating, in accordance with AVOG.
- 5.4 As the layout and house types have not been finalised, it is not currently possible to undertake a detailed Overheating assessment. However, this should not factor into planning considerations as such assessments are typically undertaken at detailed design stage as part of any future reserved matters applications, or post-planning as part of Building Control matters. Typical condition mitigation measures to reduce external to internal sound levels are provided through the means of glazing specifications and whole dwelling ventilation performance requirements (to comply with AD-F and BS 8233/ProPG).
- 5.5 Overheating mitigation measures will follow a hierarchy of measures taken from a combination of The London Plan⁹ and AD-O as follows:
- Minimise the internal heat generation through energy efficient design;
 - Reduce the amount of heat entering a building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and walls;
 - Manage the heat within the building through exposed internal thermal mass and high ceilings;
 - Inclusion of fixed shading devices including: shutters, external blinds, overhangs and awnings;
 - Consideration of glazing design including: size, orientation, reduced g-value, depth of window reveal;

⁸ 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.'

⁹ The London Plan – Policy 5.9 'Overheating and Cooling', Greater London Authority, 2016.

- Provision of passive ventilation;
- Provision of mechanical ventilation; and finally
- Provision of active cooling systems.

Acoustic Model Parameters

- 5.6 In order to undertake the above assessment methodology, an acoustic model of the Site and environs has been generated in Datakustik CadnaA® modelling software. The model was generated to determine sound levels across the Site and sound source emissions have been informed by survey data.
- 5.7 CadnaA® considers various inputs, including topography, buildings and road sound 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 9613¹⁰.
- 5.8 The modelling assumptions and input information for the acoustic model are as follows:
- Digital Terrain Model (DTM) – Lidar DTM 2m (DEFRA, downloaded on 4th March 2022)
 - Open Street Map data (publicly available);
 - Ground absorption for the Site = 0.5 (soft porous ground, except for the development area and roads which has ground absorption of 0, hard ground);
 - Building heights estimated following site observations;
 - First order reflections included in the modelling;
 - Temperature set to 10°C; and
 - Relative humidity set to 70%
- 5.9 With reference to the noise criteria outlined in Section 3.0 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;
 - Night-time 'Typical' $L_{AFmax,5min}$ external sound levels at first floor (4m) height; and

¹⁰ ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation.

6.0 INITIAL ASSESSMENT

6.1 This part of the assessment considers:

- ProPG Risk Grading through the Initial Noise Risk Assessment (INRA) procedure for the most exposed receptors;
- Consideration of external amenity areas for the Site; and
- An initial assessment in accordance with AD-O and AVOG.

ProPG Initial Noise Risk Assessment

6.2 An INRA as required by the ProPG is presented in Table 6.1.

Table 6.1: Initial Site Noise Risk Assessment

Risk	Negligible		Low		Medium		Hight	
Period	Day	Night	Day	Night	Day	Night	Day	Night
Pro PG Threshold ^(a)	< 50	< 40	50 – 60	40 – 50	60 – 70	50 – 60	> 70	> 60
Northern Boundary ^(a)			57			51		
Risk Assessment			Low			Medium		
Southern Boundary ^(a)			59	46				
Risk Assessment			Low					
^(a) L _{Aeq} , 16hr dB for daytime assessment purposes and L _{Aeq} , 8hr dB for night-time assessment purposes.								

6.3 Based on the modelled sound levels, the receptor most exposed to the northern boundary adjacent to Lychgate Lane falls within the ProPG risk category of ‘Low’ for the daytime, for which the guidance states *“the site is likely to be acceptable from a noise perspective”*; and Medium for night-time for which the guidance states the Site should follow a good acoustic design process which confirms how the adverse impacts of noise will be mitigated and minimised.

6.4 The receptor most exposed façade on the southern boundary falls within the ProPG risk category of ‘Low’ for both the day and night-time, for which the guidance states *“the site is likely to be acceptable from a noise perspective”*. However, due to the high measured L_{AFmax} levels experienced, this façade should follow a good acoustic design process to achieve suitable internal criteria at night-time.

BS 8233 External Amenity Areas

- 6.5 The noise criterion often the most difficult to meet in residential environments situated next to busy transportation sources are the criterion of 50 – 55 dB $L_{Aeq, 16hr}$ applicable to private external amenity spaces such as gardens.
- 6.6 The noise contour map (drawing 27139_04_120_01), provided in **Appendix E**, shows daytime external $L_{Aeq, 16hr}$ sound levels with the proposed development in-situ.
- 6.7 The contour map shows that, without additional mitigation, sound levels within private external amenity areas currently achieve the criteria outlined in BS 8233.

Approved Document O – Initial Assessment

- 6.8 An initial assessment for AD-O requirements is presented in Table 6.2.
- 6.9 As a detailed layout is currently unavailable, for the purpose of the assessment, the most exposed receptor to the north will be referred to as Plot X and the most exposed receptor to the south will be referred to as Plot Y. This is identified in drawings provided in **Appendix E**
- 6.10 The assessment presents the predicted façade level at each of the worst affected façades and compares the predicted internal noise level (through the reduction of 9 dB provided by an open window due to the Site falling within the “Moderate-Risk” area) against the AD-O night-time criteria.

Table 6.2: AD-O Initial Assessment

Plot	Parameter	Predicted External Level dB ^(a)	Internal Criteria dB ^(a)	Internal Level dB ^(a)	Compliant?
X	Night-time Ambient	51	40	42	No
	Night-time Maximum	64	55	55	Yes
Y	Night-time Ambient	46	40	37	Yes
	Night-time Maximum	61	55	52	Yes
(a) $L_{Aeq, 8hr}$ for ambient assessment purposes and $L_{AFmax, 5min}$ for maximum assessment purposes.					

- 6.11 The data has been reviewed and shows that Plot X will not achieve AD-O criteria with windows open and thus will require DTM from an acoustics perspective.

AVOG Level 1 Assessment

- 6.12 Due to the implementation of AD-O, AVOG criteria is applicable during daytime assessment periods and AD-O criteria is applicable during night-time assessment periods.
- 6.13 AVOG prescribes a two-stage assessment. Level 1 looks to determine if overheating needs to be considered, based on external predicted façade levels and Level 2 considers the adverse impacts of overheating and acoustics concurrently. The initial Level 1 assessment is presented in Table 6.3.

Table 6.3: AVOG Daytime Level 1 Assessment

Plot	Predicted Daytime Level L _{Aeq, 16hr} dB	Level 1 Risk Grading	Level 2 Advised?
X	57	Low	Optional
Y	59	Medium	Recommended

- 6.14 The results demonstrate that at the north façade of Plot X, an AVOG Level 2 assessment, based upon ambient daytime levels, is optional as internal noise levels are likely to achieve NOAEL – LOAEL (see Figure 3-2 of AVOG). However, due to the higher night-time ambient sound levels experienced at the Site, and on the northern façade, DTM is required for the Site to satisfy AD-O. As DTM is required for the Site to satisfy AD-O; the risk of overheating during the daytime will also be determined through this method and an AVOG Level 2 assessment can be informed at a later stage.
- 6.15 The results demonstrate that at the southern façade of Plot Y, an AVOG Level 2 assessment during the daytime is recommended as internal noise levels are likely to encroach or exceed the SOAEL line in AVOG through the provision of an open window.

7.0 DETAILED INTERNAL ASSESSMENT

- 7.1 Historically, acoustics assessments have typically relied upon closed window mitigation strategies to achieve criteria outlined in BS 8233 and ProPG. Whilst this strategy is still typically required across many residential developments in the UK due to the fact that whole-dwelling ventilation requirements can be achieved through window mounted or through wall trickle vents; consideration has to be given to the purge ventilation requirements and ventilation during periods of overheating where increased airflow is required.

BS8233 and ProPG Criteria

- 7.2 Initially, the required external to internal reduction provided by the façade to achieve BS 8233 and ProPG criteria should be determined.
- 7.3 Table 7.1 presents the required external to internal reduction requirements for each façade.

Table 7.1: Required Façade Performance

Plot	Parameter	External Level (dB)	Internal Criteria (dB)	Required Reduction ^(a) (dB)
X	Daytime Ambient L _{Aeq} , 16hr	57	35	22
	Night-time Ambient L _{Aeq} , 8hr	51	30	21
	Night-time Maximum L _{AFmax} , 5min	64	45	19
Y	Daytime Ambient L _{Aeq} , 16hr	59	35	24
	Night-time Ambient L _{Aeq} , 8hr	46	30	16
	Night-time Maximum L _{AFmax} , 5min	61	45	16
(a) External to internal reduction to achieve BS 8233 and ProPG criteria.				

- 7.4 Analysis of the data indicates that for all habitable bedrooms, night-time ambient noise levels will drive the acoustic design; and for all other habitable rooms, daytime ambient sound levels will drive the acoustic design for embedded façade mitigation during Typical Conditions.
- 7.5 To summarise Table 7.1, it can be seen that for habitable bedrooms a required reduction of 21 dB is needed at Plot X and 16 dB at Plot Y.
- 7.6 For all other habitable rooms, a reduction of 22 dB is needed at Plot X and 16 dB at Plot Y.

Window Strategy and Glazing Requirements

- 7.7 The required reductions are greater than the reduction provided by an open window (9-13 dB dependent upon free area provided by the window opening) and therefore, the acoustics mitigation strategy will be for a closed window approach and thus alternative purge and overheating ventilation is required.

- 7.8 Notwithstanding the assessment for overheating conditions, typical constructions presented in Table 7.2 would likely achieve the required reduction values presented in Table 7.1 to subsequently achieve internal noise criteria for BS 8233, subject to onsite workmanship, and would be recommended for the most exposed dwellings under typical conditions.

Table 7.2: Most Exposed Façade Specification

Room	Glazing Specification	Ventilator Specification
Habitable Bedroom	4mm glass panel	Trickle Vent with Direct Air Path
All other habitable rooms (non-bedrooms)	12mm air gap 4mm glass panel	

- 7.9 The above glazing and ventilation (for AD-F purposes only) specifications are not considered to be onerous and are found commonplace in all residential developments around the country. The glazing specification is typical, affordable, double glazing and the trickle vents can be sought from the simplest of solutions.
- 7.10 Whilst at this stage of the assessment it has been assumed that a natural ventilation strategy is desired, notwithstanding a formal DTM assessment, the ventilation strategy could alter when giving consideration to overheating conditions. For example, it may be more beneficial to provide Mechanical Ventilation systems for residents such that thermal comfort can be achieved during periods of overheating. However as mentioned previously, house types for the development and a detailed layout have not yet been established, therefore this should be considered in greater detail at detailed design stage.
- 7.11 Instead, to give confidence to the Local Authority that the scheme is deliverable and suitable for residential amenity, early considerations have been given to internal acoustic conditions during periods of overheating below.

Overheating Criteria

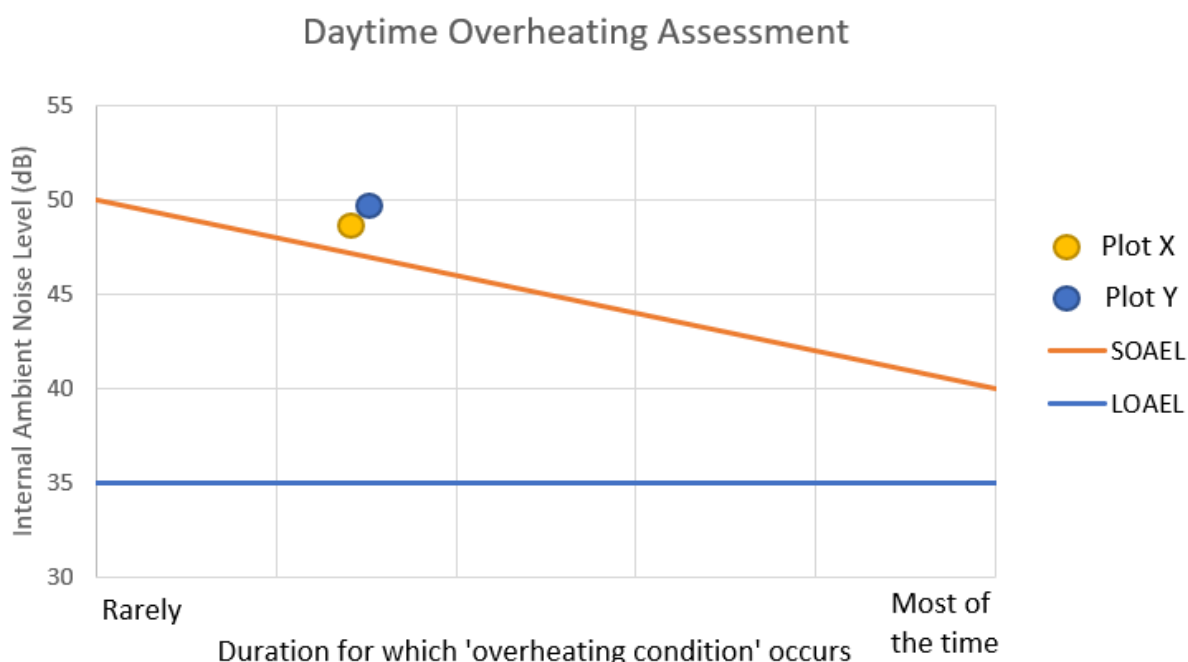
Daytime Considerations

- 7.12 As aforementioned, the sound levels experienced during the daytime are greater than the permissible level to allow open windows during periods of overheating, and whilst AD-O does not present any noise limits for daytime conditions; and there is subsequently no obligation to undertake a daytime overheating assessment with respect to Building Regulations, it does not mean that Environmental Health matters do not apply during the daytime, and residents should be able to experience thermal comfort without adverse acoustic conditions at all times.
- 7.13 In the absence of Building Regulation or British Standard limits, guidance and internal noise limits can be sought from AVOG. AVOG indicates a sliding scale of acceptable internal noise criteria dependent upon the likelihood of overheating. The likelihood of overheating is typically determined by either a qualitative assessment through the GHA Toolkit¹¹ or through DTM.

¹¹ Good Homes Alliance, Early-Stage Overheating Risk Too, V1, July 2019.

- 7.14 At this stage, DTM has not been undertaken and therefore, a qualitative assessment is presented using the GHA Toolkit, with the outcome shown in Figure 7.1 indicating a low risk risk of overheating. Whilst this falls in the low risk category, it should be noted that it falls on the upper boundary of the low risk category and therefore a low to medium risk grading will be assumed for the following assessment.
- 7.15 A copy of the GHA Toolkit for the Site is presented in **Appendix F**.
- 7.16 An AVOG Level 2 assessment for daytime conditions based upon an open window would yield an internal sound level of circa 48 dB at Plot X and 50 dB at Plot Y. Both levels would be considered above SOAEL and therefore, mitigation to combat overheating is required.

Figure 7.1: AVOG L2 Assessment, Open Windows



Night-time Considerations

- 7.17 In order to mitigate against overheating, an increased ventilation flow rate is typically required to remove excess heat from the property, this is referenced in Requirement O1 of AD-O. The exact flow rate will be determined through the DTM procedure which, as mentioned, cannot be undertaken until detailed design stage due to the requirement to have fixed house types. Instead, based upon M-EC's experience of working on similar sites across the country, indicative measures are considered within this section to demonstrate to the Local Authority that the means to combat overheating are typical of other modern developments since the rollout of AD-O.
- 7.18 The means in which increased ventilation flow rates can be achieved, without opening windows, is typically viable through a passive ventilator, such as a through-wall acoustically attenuated louvre. Such measures would not be appropriate for whole-dwelling ventilation and so the aforementioned window mounted trickle vents would still be required, if natural ventilation for overheating was determined suitable by the Client.

- 7.19 Alternatively, increased ventilation flow rates can be achieved through mechanical ventilation which would remove the need for window mounted trickle vents, or passive acoustic louvres, as the mechanical system would provide the ventilation requirements to combat overheating and satisfy the ventilation strategy needed for AD-F.
- 7.20 The reason that passive ventilative means are presented in this report is due to the fact that both AVOG and AD-O specify that overheating should be mitigated through passive means as much as possible, albeit this is not an obligation and this statement does not give due consideration to contextual factors, which should be considered throughout the design stage.



8.0 MITIGATION SUMMARY

External Sound Levels

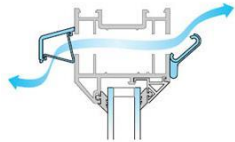
- 8.1 As discussed in Section 6.0, external amenity areas meet the BS 8233 criteria without the need for additional mitigation. The current Site layout has been designed in a way in which gardens have been positioned behind dwellings and are therefore screened from road traffic noise emanating from the M69. This is good acoustic design in accordance with ProPG and should be followed at the detailed design stage. Where gardens are exposed to road traffic noise emanating from Lychgate Lane, it has been demonstrated that the external amenity area criteria can be met with standard 1.8m high close boarded fencing.

Internal Sound Levels

- 8.2 Acoustic measurements have demonstrated potential façade sound levels and, in accordance with BS 8233, ProPG, AVOG and AD-O, sound reduction performance requirements of the façade have been determined.
- 8.3 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.
- 8.4 Drawing on the above, and the acoustic modelling undertaken, it is likely that the most exposed receptors can meet the internal sound level criteria using typical, affordable double glazing with trickle vents that can be sought from the simplest of solutions (as shown in Table 7.2). Therefore, it is considered that this glazing and ventilation specification can be adopted on all habitable rooms across the entire Site dependent on the final Site orientation and layout. This should be further assessed, at the detailed design stage.
- 8.5 Drawing on the above, and the acoustic modelling undertaken, Table 8.1 provides 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 the ventilation rates of AD-F.
- 8.6 This table should be read in conjunction with the drawing 27139_04_120_04 (presented in **Appendix G**) which demonstrates the required reduction for all habitable rooms dependent on the final Site orientation and layout. This should be further assessed, at the detailed design stage.
- 8.7 The table includes some additional ventilation considerations to combat overheating. However, this would need to be further assessed via DTM once the layout and house types have been finalised.
- 8.8 Dependent on the results of the DTM, should additional ventilation be required to combat overheating, it should be noted that if a passive acoustic louvre is used to achieve suitable internal acoustic conditions, trickle ventilation will still need to be applied through window mounted trickle vents.
- 8.9 However, if a whole dwelling MVHR system is preferred to combat overheating, no trickle, or through wall ventilators will be required as the MVHR system will provide whole dwelling ventilation in accordance with

AD-F and be sufficient to combat overheating (providing the MVHR unit is oversized or has a boost/bypass function which can be determined at detailed design stage).

Table 8.1: Indicative Mitigation Measures

Mitigation Ref.	Example Glazing Solution	Example Ventilation Solution (AD-F)	Example Ventilation Solution (AD-O) ^(a)
Ref. A	4mm glass pane 12mm air space 4mm glass pane	<u>Standard Non-Acoustic Trickle Vent</u> Slots typically located in the window frame 	<u>High Performance Acoustic Vent</u> Acoustically attenuated vent typically located above or next to a window. Typically operated with a manual actuator.  or <u>MV System</u> Mechanical Ventilation Systems to provide whole dwelling, extract and purge ventilation. 
^(a) Dependent on results of DTM.			

9.0 CONCLUSIONS

- 9.1 Mewies Engineering Consultants Ltd, has been commissioned by Avant Homes Ltd to undertake an Acoustics and Overheating Assessment for a proposed residential development at Lychgate Lane in Burbage.
- 9.2 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.
- 9.3 Contours have been mapped in terms of sound level contours which demonstrate that external amenity area criteria will be met without the inclusion of additional mitigation measures providing the detailed masterplan follows the current indicative masterplan such that dwelling orientation along the southern portion of the Site is designed so that associated gardens are screened from the M69.
- 9.4 Embedded façade mitigation measures have been suggested in order to achieve internal noise level criteria in line with BS 8233 and ProPG. Measures include typical, affordable, double glazing and trickle vents which can be sought from the simplest of solutions.
- 9.5 In terms of increased ventilation during periods of overheating, due to ambient sound levels, an open windows acoustics strategy is not suitable for a portion of proposed dwellings, based upon the initial assessment undertaken thus far, however, this assessment for daytime does not consider heightened noise criteria outlined in AVOG which may be applicable based upon the outcome of a detailed Overheating Assessment. Therefore, solutions to increase airflow during periods of overheating have been suggested in the form of additional acoustic louvres or mechanical ventilation systems. The suitability of such measures will need to be assessed further at the detailed design stage when the house types and layout has been finalised such that Requirement O1(2)(a) of AD-O is satisfied and internal noise criteria outlined in AVOG is adhered to.
- 9.6 In summary, it can be concluded that this report considers acoustics and overheating concurrently, and with the mitigation measures presented in this report, the Site is suitable for residential development from an acoustics perspective.
- 9.7 With regards to overheating, additional analysis including DTM, should be undertaken at detailed design stage. However, it is considered that the additional ventilation recommended in the assessment would likely provide the required ventilation flow rates in order to combat overheating and satisfy both matters of Environmental Health and the requirements of Building Regulations.



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APPENDIX A



- Application site boundary
- Existing (retained) trees & hedgerow
- Indicative proposed planting
- Open space
- Indicative surface water attenuation basin
- Potential for equipped play/LEAP
- Proposed street
- Shared surface street
- Private drive
- Proposed pedestrian routes
- Proposed Building

Land Budget

Site Area:	2.76ha
Developable Area:	2.06ha
Open Space:	0.55ha
Surface Water Attenuation:	0.15ha
No. of Dwellings:	up to 85 Dwellings



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APPENDIX B

GLOSSARY OF TECHNICAL TERMS

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 LAeq, LA90 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.

An indication of the range of sound levels commonly found in the environment is given in the following table.

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 20µPa (20x10 ⁻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 20µPa.
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.
$L_{Max, T}$	A noise level index defined as the maximum noise level during the period, T . L_{Max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is 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.

Descriptor	Terminology
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.



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APPENDIX C

Harry Johnson

From: Giles Rawdon [REDACTED]
Sent: 23 February 2022 13:06
To: Harry Johnson
Subject: RE: 27139 - Lychgate Lane, Burbage - Acoustics Assessment Scope

Good afternoon Harry

Thank you for the email. That sounds fine.

Regards

Giles Rawdon
Environmental Health Officer (Pollution)
Hinckley & Bosworth Borough Council
Environmental Health
Hinckley Hub
Rugby Road
Hinckley
Leics LE10 0FR
[REDACTED]

From: Harry Johnson [REDACTED]
Sent: 23 February 2022 10:46
To: Giles Rawdon [REDACTED]
Subject: 27139 - Lychgate Lane, Burbage - Acoustics Assessment Scope

Good morning Giles,

I hope you are well. We have consulted with you regarding development sites in the past. Subsequently, we were hoping to get your response to our proposed methodology for an Acoustics Assessment for a site in Burbage. If you require this to be sent to an alternative email address, please let us know.

We have been commissioned to undertake an Acoustics Assessment to accompany a planning application relating to a residential development at Lychgate Lane, Burbage. Please see site location below.



Depending on secure locations, we intend on undertaking a 6-day long survey at two positions, one on the northern boundary, adjacent to Lychgate Lane and the other on the southern boundary to obtain noise levels from the M69.

It should be noted that we have previously undertaken measurements adjacent to the M69 and Lutterworth Road in 2019 for a site located on the plot of land to the south west. Therefore, we will verify our results from this survey with the results from 2019.

An assessment in accordance with guidance found in BS 8233 and ProPG would be undertaken. If sound levels exceed the criteria set out in BS 8233 and ProPG, we will propose mitigation options at the site, in order to attenuate sound levels.

In addition, an AVOG lead overheating assessment will be undertaken. Depending on façade levels, suitable mitigation in order to minimise the risk of overheating will be determined whilst giving consideration to the noise criteria in AVOG.

If the Council have any specific noise criteria, would you please send it through so that we can refer to it in our assessment?

I hope this will meet with the Council's requirements, if you have any comments regarding the assessment, please let us know.

Kind regards,

Harry Johnson BSc (Hons)
Assistant Acoustic Consultant

T: [REDACTED]
E: [REDACTED]
W: www.m-ec.co.uk



The Old Chapel | Station Road | Hugglescote | Leicestershire | LE67 2GB

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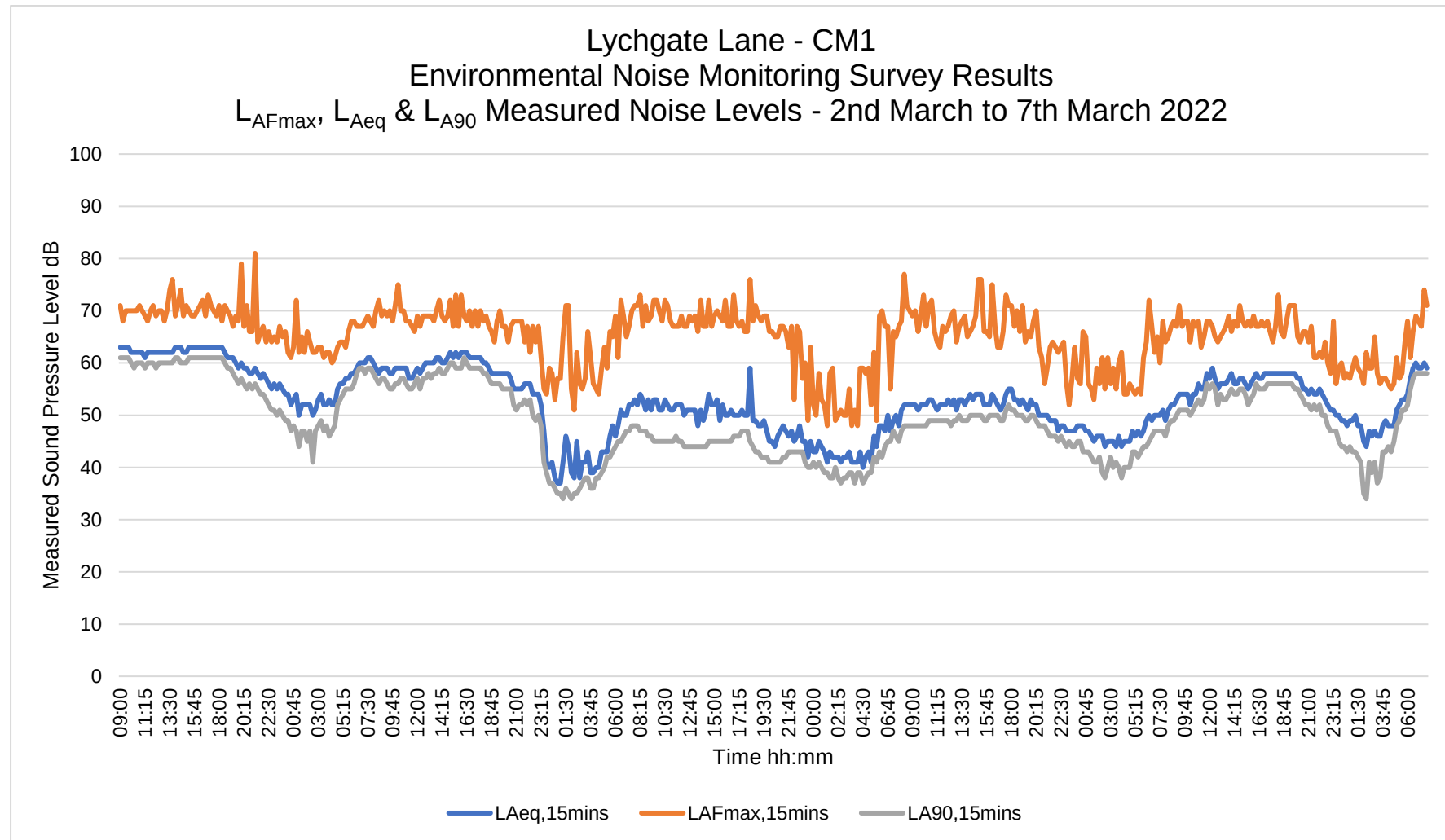
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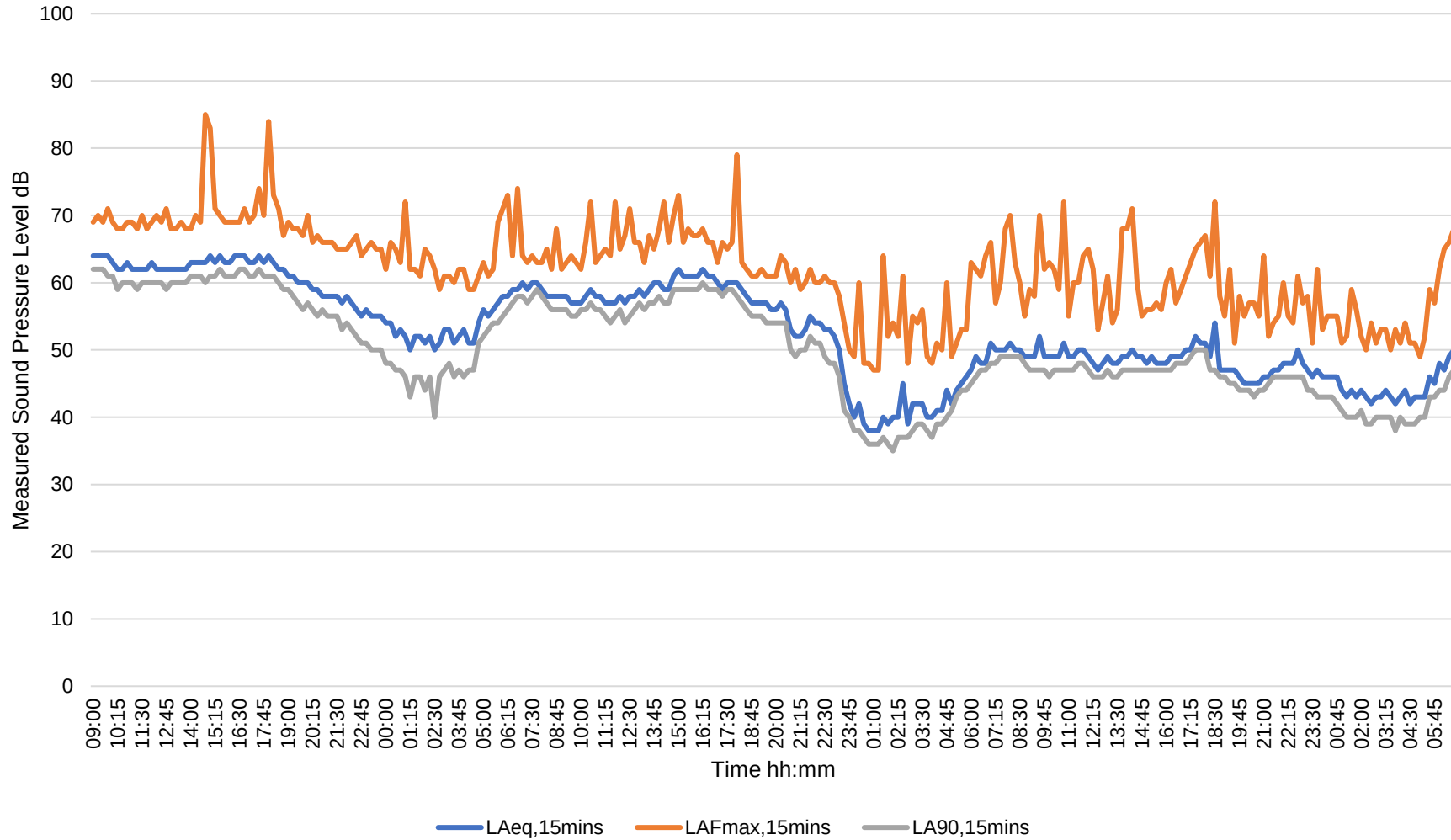


APPENDIX D

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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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)

REV:	AMENDMENTS:	HL	AW	AS	27.06.22
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_01

REVISION:	SHEET SIZE:	SCALE:
-	A3	NTS

STATUS: FOR INFORMATION

Telephone: 01530 264 753
Email: group@m-ec.co.uk
Website: www.m-ec.co.uk

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File Location: T:\M-EC_3rd Book\27139\Acoustic\05 DWG\27139_04_120_01 Day.dwg
Printed: 23.06.2022



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	70–75dB(A)
	75–80dB(A)
	>80dB(A)

REV:	AMENDMENTS:	HL	AW	AS	27.06.22
PROJECT:	LYCHGATE LANE, BURBAGE				
DRAWING TITLE:	NIGHT-TIME AMBIENT SOUND LEVELS LAeq,8hour				
CLIENT:	AVANT HOMES LTD				
DRAWING NUMBER:	27139_04_120_02				
REVISION:	SHEET SIZE:	SCALE:			
-	A3	NTS			
STATUS: FOR INFORMATION					
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	60–65dB(A)
	65–70dB(A)
	70–75dB(A)
	75–80dB(A)
	>80dB(A)

REV:	AMENDMENTS:	HL	AW	AS	27.06.22
REV:	AMENDMENTS:	DRN	CHK	APP	DATE

PROJECT: LYCHGATE LANE, BURBAGE

DRAWING TITLE:
NIGHT-TIME MAXIMUM SOUND LEVELS
LAFmax,T

CLIENT: AVANT HOMES LTD

DRAWING NUMBER: 27139_04_120_03

REVISION:	SHEET SIZE:	SCALE:
-	A3	NTS

STATUS: FOR INFORMATION

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APPENDIX F

Good Homes Alliance Risk Tool

Question	Answer	Points
#1 Where is the scheme in the UK?	Rest of England & Wales	+2
#2 Is the site likely to see an Urban Heat Island effect?	Village	0
#3 Does the site have barriers to windows opening?	Day – barriers some of the time	+4
	Night – barriers some of the time	+4
#4 Are the dwellings flats?	No	0
#5 Does the scheme have community heating?	Unknown – assumed not	0
#6 What is the estimated average glazing ratio for the dwellings?	< 35%	0
#7 Are the dwellings single aspect?	No	0
#8 Do the site surroundings feature significant blue/green infrastructure?	No	0
#9 Are immediate surrounding surfaces in majority pale in colour, or blue green?	Open fields to the south of the Site	-1
#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?	Yes	-2
Total		7
Overheating Risk		Low



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APPENDIX G



- NOTES:
1. DO NOT SCALE THIS DRAWING.
 2. Please refer to report reference 27139-ENV-0402 for details on the proposed glazing and ventilation references.

KEY

Ref. A

REV.	AMENDMENTS:	HJ	AW	AB	APP	DATE:
PROJECT:		LYCHGATE LANE, BURBAGE				
DRAWING TITLE: MITIGATION REFERENCE FOR ALL HABITABLE ROOMS						
CLIENT: AVANT HOMES LTD						
DRAWING NUMBER: 27139_04_120_04						
REVISION: -	SHEET SIZE: A3		SCALE: NTS			
STATUS: FOR INFORMATION						
			Telephone: 01530 264 753 Email: group@m-ec.co.uk Website: www.m-ec.co.uk			
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The Old Chapel
Station Road, Hugglescote
Leicestershire LE67 2GB
T: 01530 264753
E: group@m-ec.co.uk
www.m-ec.co.uk