BLENHEIM ESTATE

HOMES

Land East of Park View Woodstock

Noise Assessment

June 2025

RSK Acoustics

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Land East of Park View, Woodstock

Road Noise Assessment

Report 206/0158/R1

Land East of Park View, Woodstock

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Blenheim Estate Homes

Blenheim Palace
Woodstock
Oxfordshire
OX20 1PP

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Site plan showing unattended measurement positions.

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Time History graph illustrating survey results at position MP1, MP2, MP3 and MP4 respectively.

206/0581/SP2
Proposed Land Use Parameter Plan.

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Road noise impact assessments results

Appendix A
Planning and noise guidance.

End of Section

1 Introduction

1.1 Outline planning permission is being sought for the development of Land East of Park View, Woodstock, to be used for residential accommodation. RSK Acoustics have been appointed to undertake a noise survey and assessment of road traffic noise sources in order to inform the design and planning processes.

1.2 This report sets out details of a noise survey undertaken at the Development Site in order to quantify the existing noise climate, along with a noise intrusion assessment for the dwellings within the proposed development. An assessment of potential impacts on existing sensitivities due to increases in traffic has also been undertaken.

2 Site Description

2.1 Existing Site

2.1.1 The site proposed for development is located to the south east of Woodstock, and is shown on attached site plan 206/0581/SP1.

2.1.2 The area directly adjacent to the site to the west is occupied by another development, within which construction work has already commenced. Beyond this is Woodstock's current south-eastern extent, which is occupied by detached residential properties.

2.1.3 The residential property known as Pest House is located on a limb of land which protrudes some 220m along the site's western boundary from the north.

2.1.4 To the north of the site is a large area of farmland and its associated farmhouse at Perdiswell Farm beyond Shipton Road. The A4095 (Upper Campsfield Road) runs along the eastern boundary of the site. There are a small number of residential properties along the eastern side of the road towards the northern end of the site.

2.1.5 The site's southern boundary is defined by the A44, Oxford Road, beyond which is a large private residence and adjoining grounds, owned by Blenheim Palace, and the Bladon Chains Caravan and Motorhome Club Site to its west.

2.1.6 The site is within the jurisdiction of Cherwell District Council.

London Oxford Airport

2.1.7 To the south east beyond the A4095 lies Oxford (Kidlington) Airport. The airport has one operational runway (operated in 2 directions); designated runway 01/19 and runs approximately north-south.

2.1.8 Generally speaking, the airport caters for single and twin engine propeller aircraft, smaller jet aircraft and helicopters. Aircraft arrive and depart the runway to/from the north and south,

turning far north or far south of the proposed development site. Fixed wing aircraft use a training circuit which runs to the east of the airport, away from the proposed development site.

2.1.9 Helicopters only make up approximately 10% of total flights and there is no 'base' for training for helicopters at site. Most helicopter movements are general arrivals and departures, with only occasional use of 'circuits' typically if a new pilot to the aerodrome requires familiarisation with the site. The helicopter landing area to towards the west of the site, along the western section of the former cross runway (which was decommissioned for fixed wing aircraft use a number of years ago).

2.1.10 Ground running of aircraft when engines are being tested (typically following maintenance) occurs rarely (more commonly twice a week), at a location toward the west of the site, towards the ends of the former cross runway. Such engine tests typically last for approximately 5 minutes, although on very rare occasion could be as long as an hour.

Noise Sources

2.1.11 Road traffic is the dominant noise source perceived on site. Traffic was noted to be busy, with a variety of different vehicle types operating along the A4095 (Upper Campsfield Road. The A44 to the south is also busy, but the areas proposed for residential use are some 300m away from the road, so has little influence compared to the A4095.

2.1.12 Noise contributions from aircraft activity associated with London Oxford Airport were also noted, but these were away from the proposed development site. No helicopter movements over the site were noted while visiting site.

2.1.13 During the site noise survey (as set out later) there was some construction noise coming from the west of the site. This report is concerned with road traffic (being the dominant noise source), with aviation noise considered in a separate report. Given the nature of aircraft noise and how it might potentially affect the proposed development, there is little cumulative effect on the proposed development; therefore, it is appropriate to consider these noise sources separately.

2.2 **Proposal**

2.2.1 The proposed Land Use Parameter Plan can be seen in the attached site plan Figure 206/0581/SP2. It highlights the areas of the overall site where residential uses are proposed to be located.

2.2.2 Outline planning is being sought for the development comprising:

- Up to 500 high-quality new homes which will include a range of house types, sizes and tenures to deliver market and affordable housing for young people, families and the elderly;
- Inclusion of green corridors and dedicated cycle and pedestrian linkages through the development;
- Adoption of a sensitive landscape approach resulting in notable heritage benefits with the enhanced setting for Blenheim Roman Villa;

- Inclusion of a significant area of open space creating a semi-rural character with long grassland meadows and parkland tree planting;
- Provision of community open space within the masterplan, including allotments.

2.2.3 This application is for an outline application, therefore the specific housing arrangements are not yet developed. At detailed design / reserved matters stage further detail on layout and orientation of buildings will be provided as well as details of the constructions of the houses (i.e. façade, glazing and ventilation specifications) and any garden fencing.

2.2.4 At this stage, for the purpose of the outline application, this report sets out the feasibility and outline design considerations for residential use in the context of the existing noise sources. This is to demonstrate that at the future detailed design stage it will be possible to provide adequate amenity to future residents.

3 Noise Survey

3.1 Methodology

3.1.1 In order to establish the existing noise climate on site, an unattended noise survey was undertaken at the site from Thursday 27th to Monday 31st January 2022 throughout a representative midweek and weekend period.

3.1.2 Measurements of noise levels were taken from positions on the northern, eastern and southern site boundaries. These positions have been illustrated on the attached site plan 206/0581/SP1, and are described below:

Ref.	Location	Location
MP1	East of the proposed site, adjacent to residential properties, set back approximately 25m from the A4095 (Upper Campsfield Road)	51°50'23.0"N 1°20'21.5"W
MP2	South of the proposed site, set back approximately 10m from the A44	51°50'33.4"N 1°19'48.0"W
MP3	Northeast of the proposed site adjacent to Periswell Farm, set back approximately 25m from Shipton Road	51°50'39.6"N 1°19'53.7"W
MP4	North of the proposed site adjacent to farmland, set back approximately 20m from Shipton Road	51°50'44.8"N 1°20'11.0"W

T1 Measurement location details

3.1.3 These positions were selected to quantify ambient noise levels at the site boundaries, which are deemed to be representative of those incident on the nearest proposed dwellings to the main noise sources surrounding the site.

3.2 Survey Equipment

3.2.1 Measurements of the L_{Aeq}, L_{Amax} and L_{A90} indices were recorded over consecutive 15-minute periods for the duration of the noise survey works using the equipment listed within Table T2 (see attached Glossary of Acoustic Terms for an explanation of the noise units used).

Item	Type	Serial Number	Calibration Date
Sound Level Analyser	Rion NL-52	00197783	19/04/2021
Sound Level Analyser		00453835	10/09/2021
Sound Level Analyser		01276553	03/08/2020
Sound Level Analyser		00197782	28/06/2021
Acoustic Calibrator	Rion NC-75	34378202	13/08/2021
Weatherproof windshield x4	Rion WS-15	n/a	n/a

T2 Equipment used during noise survey.

3.2.2 The microphones were fitted within weatherproof enclosures and the sound level meters calibrated before and after the survey to confirm an acceptable level of accuracy. A field verification was undertaken before and after the measurements, using the acoustic calibrator at 94 dB at 1 kHz; no significant (±0.5) calibration drift was noted.

3.2.3 The sound level meters used conform to the requirements of BS EN 61672-1: 2013 Electroacoustics. Sound level meter, Specifications. The calibrator used conforms to the requirements of BS EN 60942: 2018 Electroacoustics, Sound calibrators. The equipment used has a calibration history that is traceable to a certified calibration institution. Under BS EN 61672-1, Sound Level Meters are required for calibration every 2 years, with acoustic calibrators requiring calibration annually. The calibration certificates for all equipment used during the survey are available upon request.

3.2.4 The weather conditions when setting up the noise monitoring equipment were clear and cool with dry roads and some breeze. When collecting the equipment, weather conditions were observed to be warm and cloudy with dry roads and some breeze. These conditions are deemed acceptable and are not considered to have affected measurement results.

3.3 Noise Environment

3.3.1 The unattended noise measurements undertaken in January 2022 were generally dominated by road traffic noise from the A4095 to the east and A44 to the south, as there are no significant industrial/commercial sites nearby that could impact the area and most of the site is bounded by agricultural land and residential estates.

3.3.2 There was some minor contribution to the general noise climate from aircraft activity associated with the nearby airport, but no specific aircraft flyovers were witnessed over the site during the set up or collection of the equipment.

3.3.3 There was some construction noise present during some daytime hours from the development site to the west, but this was relatively quiet, especially to the survey position to the east.

3.4 Weather Conditions

3.4.1 Conditions during the noise survey undertaken in January 2022 were noted to be dry, calm and warm during site attendance. Available weather records were obtained from www.wunderground.com (weather station ID: IWOODS40) and are summarised in table T3 below.

Date/Time		Average Temperature (ºC)	Average Wind Speed (ms-1)	Dominant Wind Direction	Accumulated Precipitation (mm)
Thursday	27/01/2022	8	2	WSW	0
Friday	28/01/2022	4	1	SW	0
Saturday	29/01/2022	13	4	WSW	0
Sunday	30/01/2022	8	2	WSW	0
Monday	31/09/2022	6	4	W	0

T3 Weather data during noise survey (weather station ID: IWOODS40)

3.5 Results

3.5.1 The results of the unattended noise measurements are presented in attached time history figures 206/0581/TH01 - TH04 for positions MP1 – MP4 respectively.

3.5.2 The noise climate observed at each position on-site has been noted below:

- MP1: Noise climate dominated by road traffic noise from the A4095. Aircraft noise to the east from London Oxford Airport also noted;
- MP2: Noise climate dominated by road traffic noise along the A44;
- MP3: Noise climate dominated by road traffic noise along the A4095 and occasional road activity along Shipton Road. Distant construction works from Coswell Road also perceptible. Aircraft noise to the east from London Oxford Airport also noted;
- MP4: Noise climate dominated by road activity along Shipton Road and construction works from Coswell Road. Aircraft noise to the east from London Oxford Airport also noted.

3.5.3 The resultant average day and night time period noise levels recorded at the unattended measurement position are presented in Table 3.4 below.

Position	Daytime	Night Time	
	$L_{Aeq, 16h}$	$L_{Aeq, 8h}$	Typical L_{AFmax}
MP1: Site's eastern boundary, along A4095	60	52	69
MP2: Site's southern boundary, along A44	65	56	76
MP3: Site's north-eastern boundary, along Shipton Road.	53	45	68
MP4: Site's northern-western boundary, along Shipton Road.	60	52	65*

T4 Average period noise levels. *more variable if cars pass on access road

3.5.4 The minimum background noise levels recorded during the day and night time measurement hours during the survey duration are set out in table T5 below:

Location	Minimum Background Noise Level, dB(A)	
	Daytime (0700-2300 only)	Night time (24-hour)
MP1: Site's eastern boundary, along A4095	34	22
MP2: Site's southern boundary, along A44	36	22
MP3: Site's north-eastern boundary, along Shipton Road.	33	20
MP4: Site's northern-western boundary, along Shipton Road.	31	20

T5 Lowest measured background noise levels, L_{A90}.

4 Road Traffic Noise Assessment

4.1 Overview

4.1.1 Relevant planning policy and guidance is set out in detail in attached Appendix A, with key criteria summarised in the following sections for ease of reference.

4.2 Summary of Proposed Noise Criteria

4.2.1 Based on the planning policy and guidance, the following noise criteria are proposed due to road traffic noise sources:

Proposed Receptors

- Daytime internal $L_{Aeq,16hour}$ to all habitable rooms no greater than 35dB;
- Night time internal $L_{Aeq,8hour}$ to all bedrooms no greater than 30dB;
- Night time internal $L_{Amax,f}$ to bedrooms no greater than 45dB (due to typically occurring events).

- Garden areas should be provided within an area which observes noise levels no greater than 55dB $L_{Aeq,16hour}$ wherever practicable.

4.3 Overview and Assumptions

4.3.1 As discussed in Section 4.2.1 above, we suggest suitable design standards based upon guidance presented in BS 8233:2014 should apply, in order for the amenity of future residents on this site to be of a satisfactory standard.

4.3.2 As noted, this is an outline planning application and the housing layouts have not yet been specifically defined, although the Land Use Parameter Plan sets out the areas of the wider site that are proposed for residential use. This plan is shown in attached figure 206/0581/SP2. Our assessment is based upon the locations indicated on this. With noise levels assessed to these worst case locations, noise levels to areas set further back within the development will be lower.

4.3.3 For the purposes of this assessment, the distance between nearest possible dwelling and the A4095 is taken to be 40 metres. This does not necessary preclude development closer than this distance but further assessment work would need to be undertaken at the detailed design stage to confirm the requirement mitigation measures.

4.3.4 As the development is at an outline concept stage, living room and bedroom dimensions and areas of glazing for the proposed dwellings are yet to be established. Therefore, the following assumptions have been made:

Room	Dimension		
	Floor Area (m^2)	Height (m)	Glazing Area (m^2)
Bedroom	12	2.7	3.6
Living Room	20	2.7	8.0

Table 4.1 Assumed typical room dimensions

4.3.5 These dimensions are provided for information only, to illustrate the assumptions made for the purposes of our assessment. They should not be taken as constraints in terms of the design of the proposed dwellings. However, should the finalised room or glazing dimensions vary significantly from the figures above, further assessment will be required.

4.3.6 It has also been assumed that a cavity masonry façade construction will be utilised across the development with a traditional tiled roof construction. This does not preclude the use of other materials or constructions, but the specification of these elements and associated glazing and ventilation would need to be reviewed.

4.3.7 The impact of expected noise levels from relevant noise sources to windows of habitable rooms have taken into account losses from distance as appropriate. At this stage we have not considered any potential screening to the fronts of houses.

4.3.8 Representative night time L_{Amax} noise levels from potential noise sources have been derived through analysis of the measured continuous one-minute noise levels across the survey duration's night time hours. The 10th highest of these one-minute measurements has then been used within our assessments to ensure a pessimistic and robust methodology.

4.3.9 Our assessment of noise levels within external amenity areas takes account of the expected $L_{Aeq,16h}$ noise levels within gardens only, with the calculated levels taking account of distance and screening losses where appropriate.

4.4 Assessment and Mitigation

4.4.1 Taking into account the assumptions made in the previous section, considering the effects of distance attenuation only, the expected free field noise levels in a position representative of the most exposed possible residential façade adjacent to the A4095 would be 59dB $L_{Aeq,16h}$ during the daytime and 51dB $L_{Aeq,8h}$ during the night time. Typical night time maximum noise levels are assessed to be approximately 68dB L_{Amax} at the proposed closest facades.

4.4.2 On the basis of the above noise levels, it has been calculated that standard thermal double glazing will be sufficient in order to control internal noise to the proposed dwellings.

4.4.3 Similarly, background ventilation to these dwellings will be possible through the installation of standard, non-acoustic direct path trickle ventilators.

4.4.4 With the above measured in please, noise levels meeting or below the appropriate assessment criteria will be provided to all proposed sensitive receptors.

4.5 Noise Levels in External Amenity Areas

4.5.1 Assuming the nearest external amenity area may be located at a comparable distance from the A4095 as the nearest residential facades, a noise level of approximately 59dB $L_{Aeq,16h}$ could be expected in such spaces.

4.5.2 Line of sight screening can be expected to provide at least 5dB of attenuation. Assuming therefore, that garden areas to the front of the site are screened from the A4095 by use of a 1.8m high close board timber fence, it will be possible to provide noise levels meeting the appropriate criteria (55dB $L_{Aeq,16h}$) within all garden areas across the proposed development.

4.5.3 We note that in the proving layout illustrates the houses arranged in an outward facing orientation, with gardens located 'behind' the houses. This will equally provide the necessary level of acoustic screening required to meet BS8233 noise levels to garden spaces without the need for acoustic grade fencing.

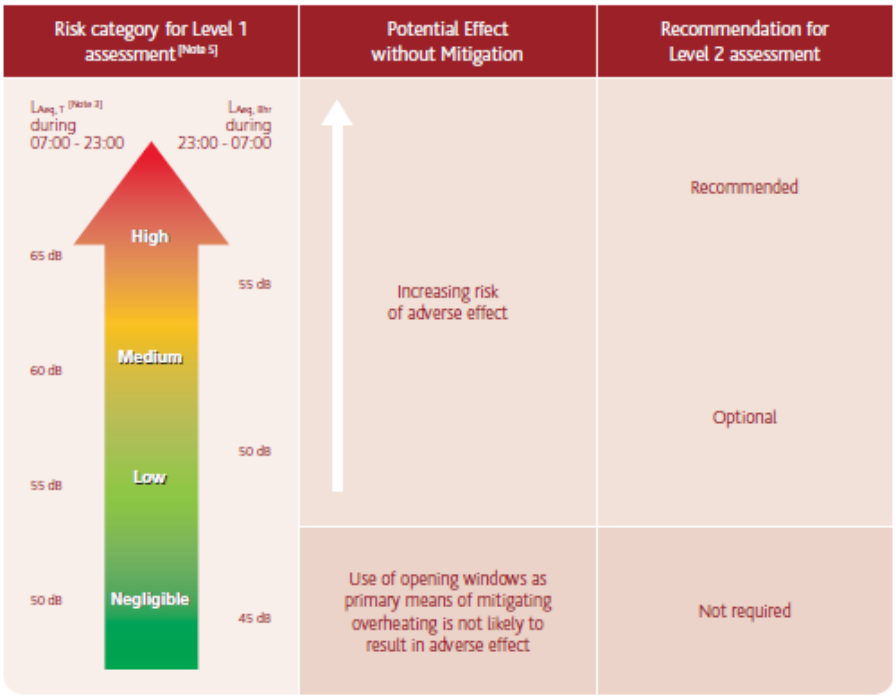
4.5.4 Therefore due to road traffic noise outward facing design is not a constraint on the scheme and gardens could potentially be placed on the 'road side' of the dwellings, providing acoustic grade garden fences are installed.

4.5.5 With the above measures in place, it should be possible to provide all residences with an external amenity area which observes daytime noise levels of below 55dB $L_{Aeq, 16h}$ (assuming the distances noted in section 4.1 are maintained). Dwellings could be constructed closer to the road than the current 40m offset, but in such instances outward facing orientation would likely be necessary.

4.5.6 At detailed design / reserved matters stage, the actual proposed definitive housing layout can be reviewed and details of any mitigation finalised. However at this outline stage, it has been demonstrated that suitable levels of amenity can be provide without any significant acoustic measures beyond the potential for a basic acoustic fence.

4.6 Overheating Control

4.6.1 Attached Appendix A sets out details of the Association of Noise Consultants (ANC) document Acoustics Ventilation and Overheating Residential Design Guide (AVO). A level 1 AVO assessment has been carried out in accordance with the guidance detailed in. This assessment takes into consideration the worst-case day and night-time noise levels at each assessment position. The outcomes of this assessment are compared against the AVO level 1 risk assessment tool below. The 'risk' here is applied to relate the potential for issues to arise in respect to the levels of noise affecting receptors when overheating control is provided via open windows.



Level 1 AVO assessment

4.6.2 The results of the assessment at relevant locations are shown below:

Location	Noise Level, $L_{Aeq, T}$ Day (16h)	Night (8h)	AVO Level 1 risk Day	Night
Dwellings at worst case location	59	51	Low/Medium	Low/Medium

T6 AVO Level 1 Assessment

4.6.3 It can be seen that during the day and night some areas of façade are categorised as 'Low/Medium' risk following guidance in the AVO and so a Level 2 assessment would be 'optional'. We also note that one should also consider the guidance of *Approved Document O*.

4.6.4 When considering the noise to both the front and rear of the site, the assessed night time internal noise levels considering a partially open window (i.e. ≈13dB reduction) would be below the guidance value within *Approved Document O*, where it says any overheating assessment should then be made considering the windows likely to be closed. Therefore it can be said that the opening of windows is a suitable method of controlling heat within rooms even at the most exposed locations on site.

5 Road Traffic Noise Impact Assessment

5.1 Introduction

5.1.1 This section of the report reviews the potential noise impact on existing sensitivities due to increases in road traffic that might be introduced because of the new development. One considers these impacts against the baseline noise climate that would exist in the future when the additional traffic from this development starts using the roads.

5.1.2 These assessments can be made with and without the effects of other consented development schemes that might already increase the future baseline noise levels in the future. Impacts should also be considered in terms of both short term and long term (i.e. from when the development might first come into use, and at a point in the future once all development is complete).

5.2 Methodology

5.2.1 When assessing potential noise effects due to changes in road traffic flows as a result of a development, it is appropriate to refer to the Design Manual for Roads and Bridges (DMRB). Full details of the assessment methodology are presented in attached Appendix A. Appendix A also includes more general details of national planning policy against which applications should be judged and against which the conclusions of individual assessments are considered.

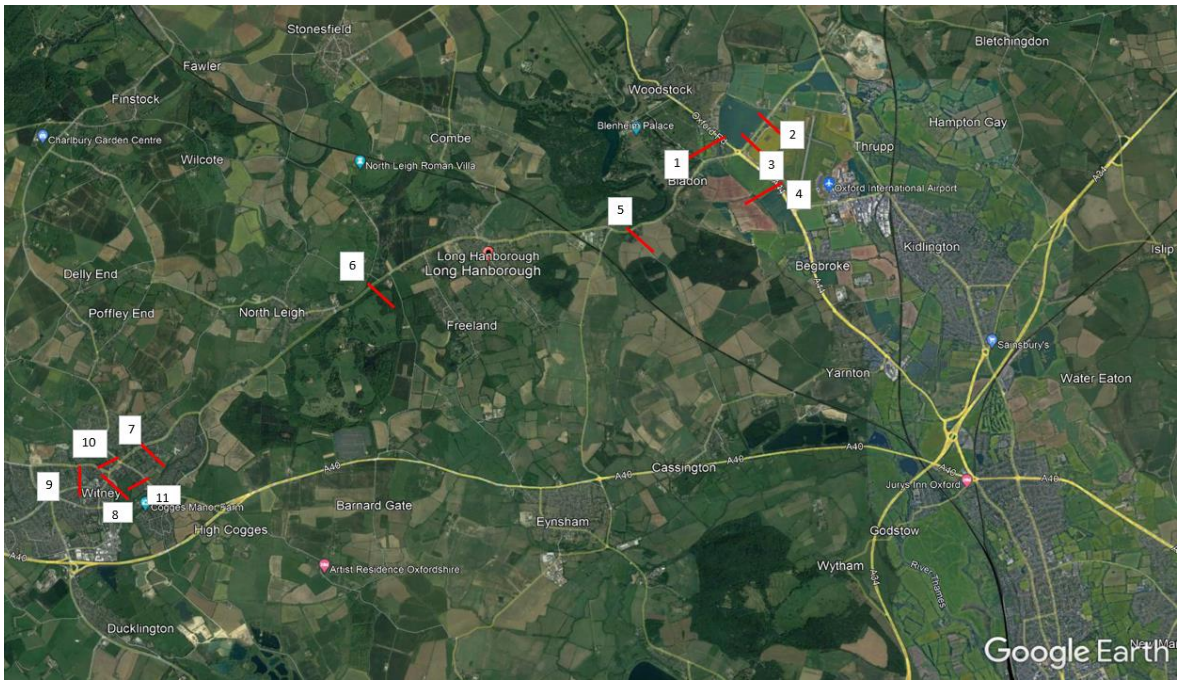
5.2.2 The flows utilised in DMRB assessments are typically the average weekday traffic flows. The average annual weekday traffic (AAWT) is the relevant parameter.

5.2.3 In summary, any increase in noise level should be restricted to no more than 3dB to ensure any such impact is no more than 'Negligible' or 'Minor Adverse'. In achieving such criteria the scheme would be assessed to be compliant with the requirements of the NPPF to avoid significant adverse impacts.

5.3 Assessment

5.3.1 Utilising raw data provided by the traffic consultants for the scheme (DTA Transport Planning Consultants) for the various road links as illustrated below, we have assessed the potential noise increase due to changes in traffic flows. Calculations have been conducted in accordance with DMRB and Calculation of Road Traffic Noise (CRTN) methods.

5.3.2 There is no phasing information for when individual buildings may commence use, but data is provided for the full development scenario. Technically this is the 'long term' parameter as per DMRB methods (as it is the maximum traffic flows) however, we will consider the with and without development scenarios of this against the short and long term outcome scale. We have considered the 'with development' and 'without development' scenario against the opening year of 2023 flows for short term and against 2038 for long term. Both include natural traffic growth from the current 2019 'baseline' flows.



5.4 Results

5.4.1 The full assessment information is contained in attached schedules 206/0581/SCH1, with a summary of the results for the short term and long term in the tables below:

		Without Committed Development		With Committed Development	
Link Ref	**Road**	**Impact (dB)**	**Magnitude**	**Impact (dB)**	**Magnitude**
1	A44 Oxford Road	+0.1	Negligible	0.0	No Change
2	A4095 Upper Campsfield Road North of Site Access	+0.0	No Change	+0.1	Negligible
3	A4095 Upper Campsfield Road South of Site Access	+1.1	Minor	+0.9	Negligible
4	A44 Woodstock Road	+0.3	Negligible	+0.3	Negligible
5	A4095 Bladon	+0.2	Negligible	+0.2	Negligible
6	A4095 Witney Road	+0.2	Negligible	+0.1	Negligible
7	A4095 Woodgreen Road	+0.1	Negligible	0.0	No Change
8	A4095 Bridge Street	0.0	No Change	0.0	No Change
9	A4095 Mill Street	0.0	No Change	0.0	No Change
10	B4022 West End	0.0	No Change	0.0	No Change
11	B4022 Newland	0.0	No Change	0.0	No Change

T7 Short-term road traffic noise impacts

Link Ref	Road	Without Committed Development		With Committed Development	
		Impact (dB)	Magnitude	Impact (dB)	Magnitude
1	A44 Oxford Road	+0.1	Negligible	+0.1	Negligible
2	A4095 Upper Campsfield Road North of Site Access	0.0	No Change	0.0	No Change
3	A4095 Upper Campsfield Road South of Site Access	+0.9	Negligible	+0.8	Negligible
4	A44 Woodstock Road	+0.3	Negligible	+0.2	Negligible
5	A4095 Bladon	+0.2	Negligible	+0.1	Negligible
6	A4095 Witney Road	+0.1	Negligible	+0.1	Negligible
7	A4095 Woodgreen Road	0.0	No Change	+0.1	Negligible
8	A4095 Bridge Street	0.0	No Change	+0.1	Negligible
9	A4095 Mill Street	0.0	No Change	0.0	No Change
10	B4022 West End	0.0	No Change	0.0	No Change
11	B4022 Newland	0.0	No Change	0.0	No Change

T8 Long-term road traffic noise impacts

5.4.2 It can be seen that impacts along the road links are almost all 'no change' (i.e. no impact) or 'negligible', with only one link being assessed to have a 'minor' impact at worst in the short term, and not considering the potential future traffic growth due to other consented developments. In the long term all impacts are likely to be considered 'no change' (i.e. no impact) or 'negligible'.

5.4.3 With such low impacts the scheme can be considered compliant with the aims of the Noise Policy Statement for England (NPSE), Planning Practice Guidance (PPG) and National Planning Policy Framework (NPPF).

6 Conclusions

6.1 It is proposed to develop a site for residential use at Land East of Park View, Woodstock, Oxfordshire. RSK Acoustics have conducted a noise survey at the site in order to establish the existing noise climate. Details of this survey and subsequent noise intrusion assessment have been provided within this report.

6.2 In terms of road traffic noise, based on our assumptions of typical room habitable room sizes and glazing areas, our assessment indicates that is possible to provide a suitable internal noise environment to protect the amenity of future residents, with glazing of a specification of standard thermal double glazing. Background ventilation would be appropriate via non-acoustic trickle vents and overheating control can be applied by use of openable windows and the acoustic guidance of Approved Document O maintained.

6.3 Noise to possible external amenity areas across the development have been considered and guidance to achieve acceptable noise levels within such spaces has been provided. This includes the use of the inherent site layout to provide screening, and localised acoustic garden fencing if/where appropriate.

6.4 Assessment of the potential noise impacts of road traffic increases have been undertaken. Most impacts are found to be of no change or otherwise just 'negligible', with one road link assessed with just a 'minor' impact.

6.5 It has been demonstrated that, in principle, noise to receptors across the proposed development and to existing receptors can be controlled to acceptable levels and that future noise impacts to roads will be negligible. Further assessment may be required at a later stage once a detailed site layout has been developed.

End of Section

Glossary of Acoustic Terms

L_{Aeq}:

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq}.

L_{Amax}:

The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, L_{Amax} is measured using the "fast" sound level meter response.

L_{A10} & L_{A90}:

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

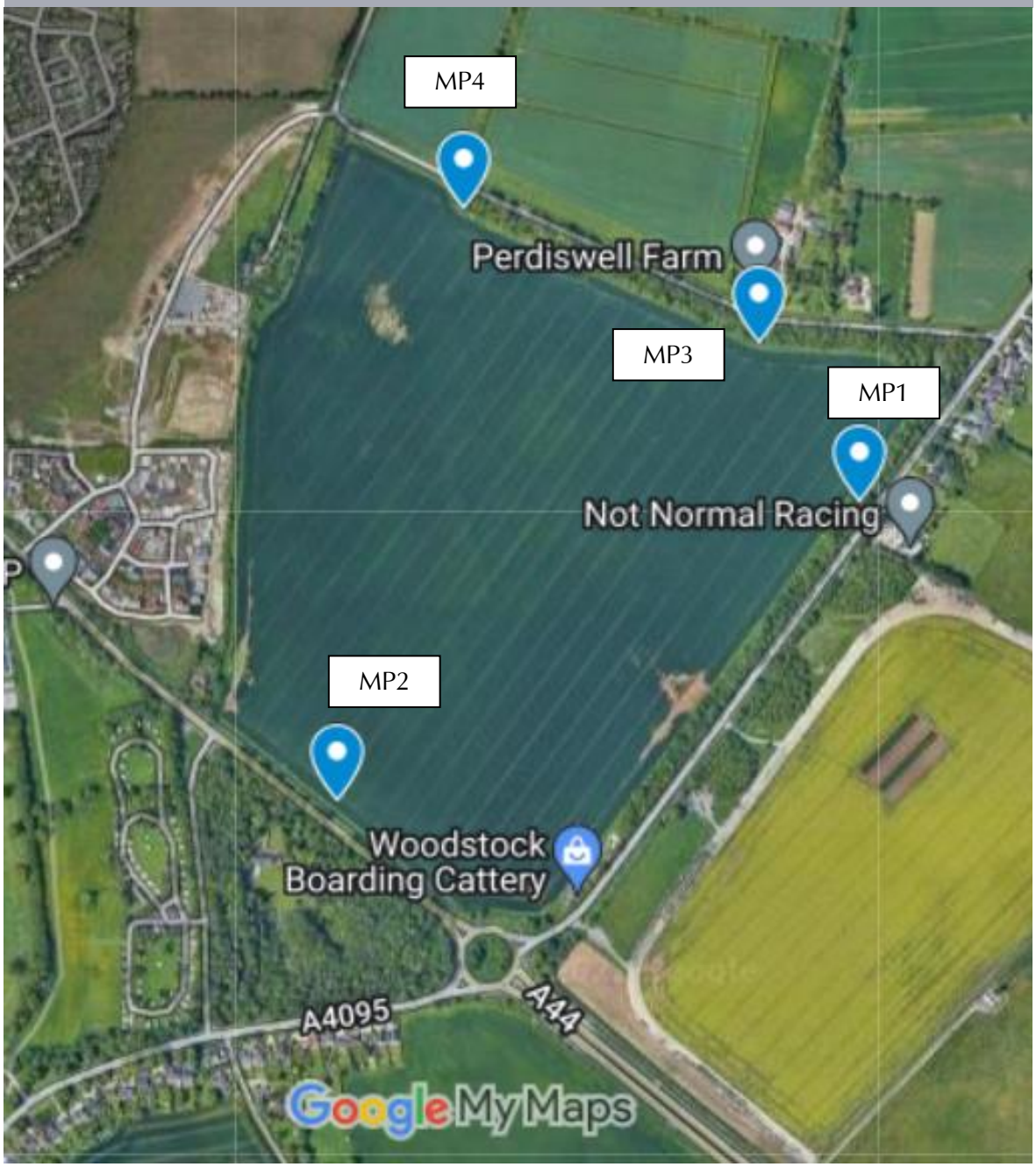
L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_n.

L_{AX}, L_{AE} or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise. The L_{AX} term can sometimes be referred to as Exposure Level (L_{AE}) or Single Event Level (SEL).

End of Section

Figure 206/0581/SP1

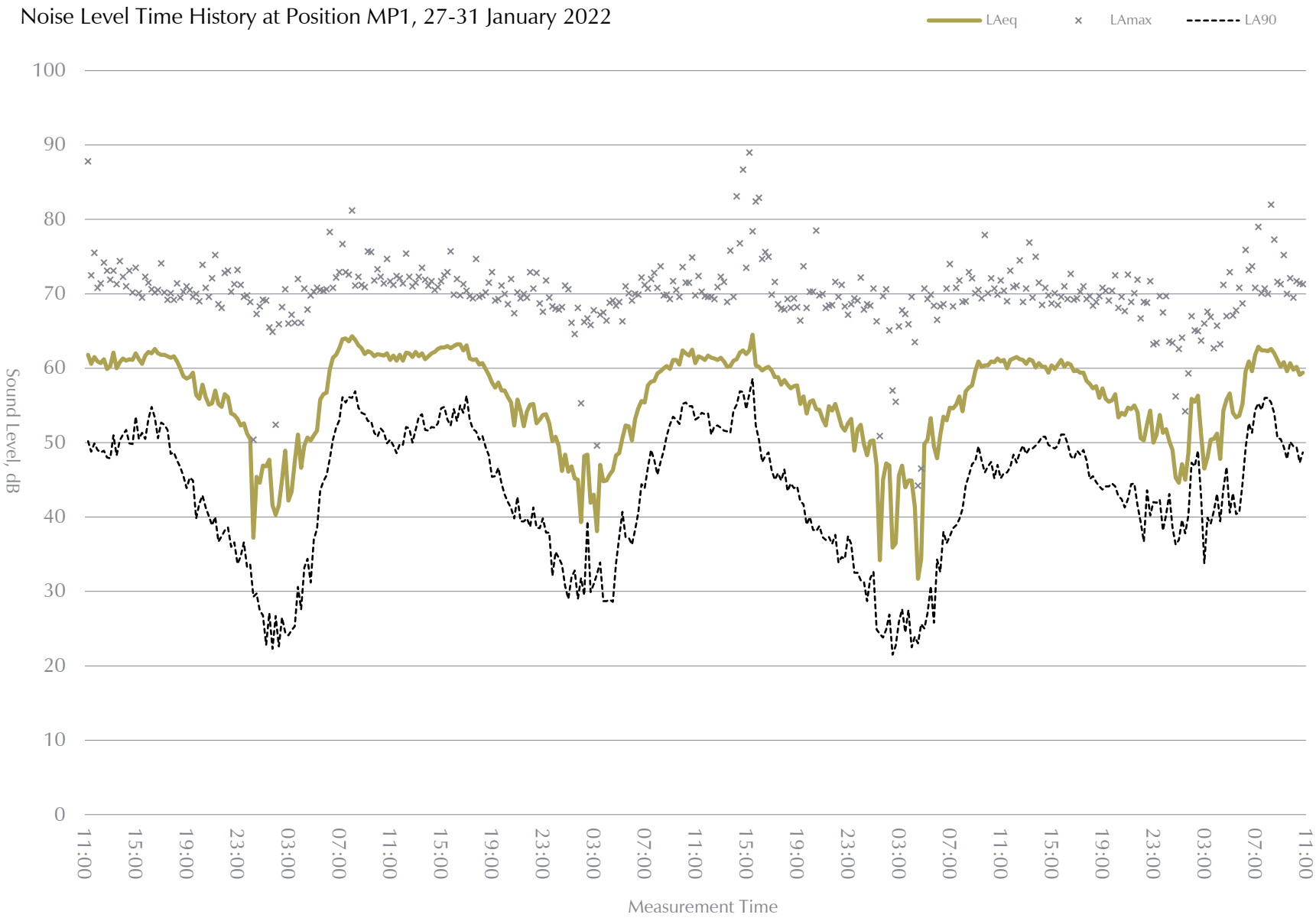


Title: Noise survey monitoring positions

Project: Land East of Park View, Woodstock

Date: May 2022

Scale: Not to scale



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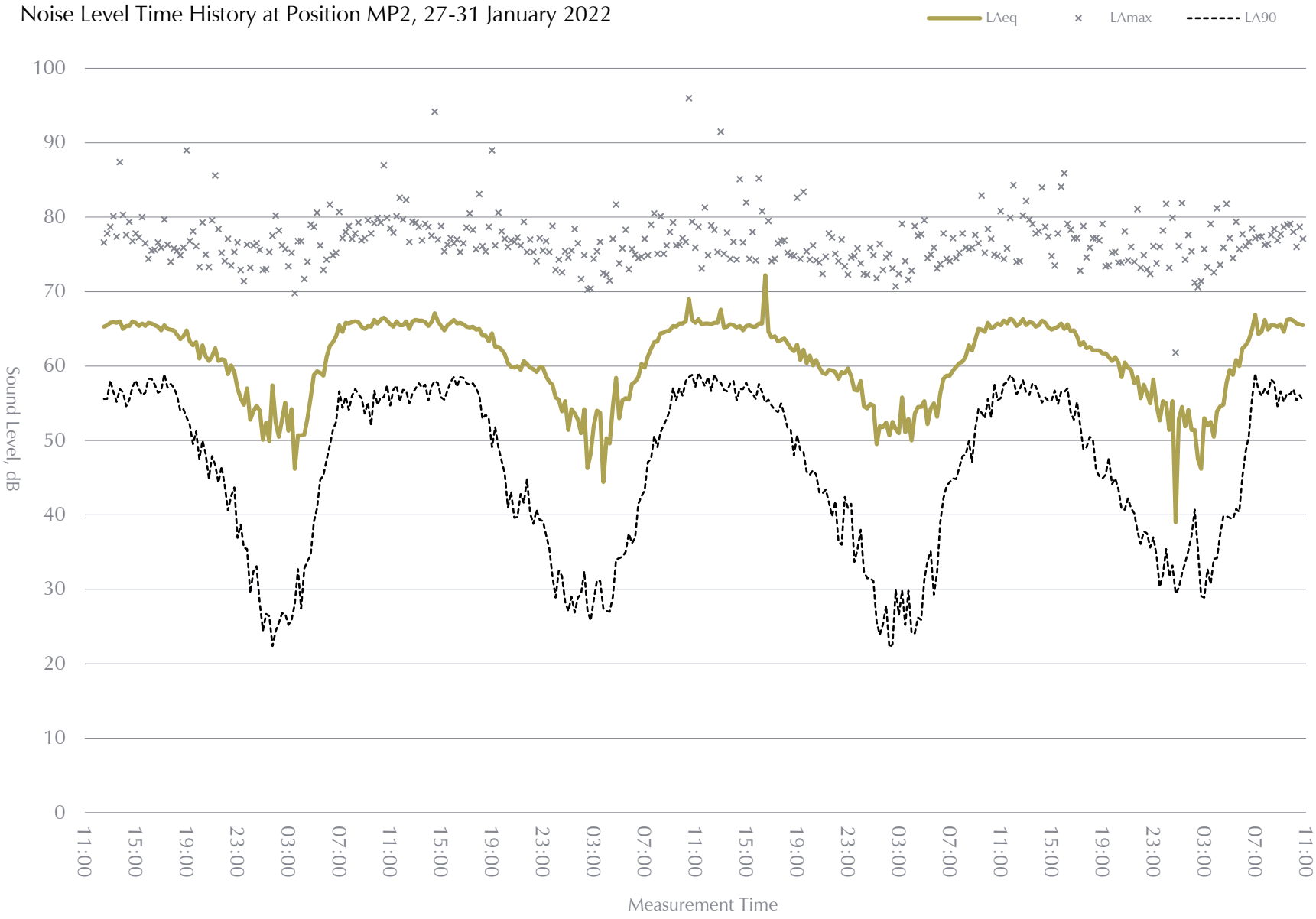

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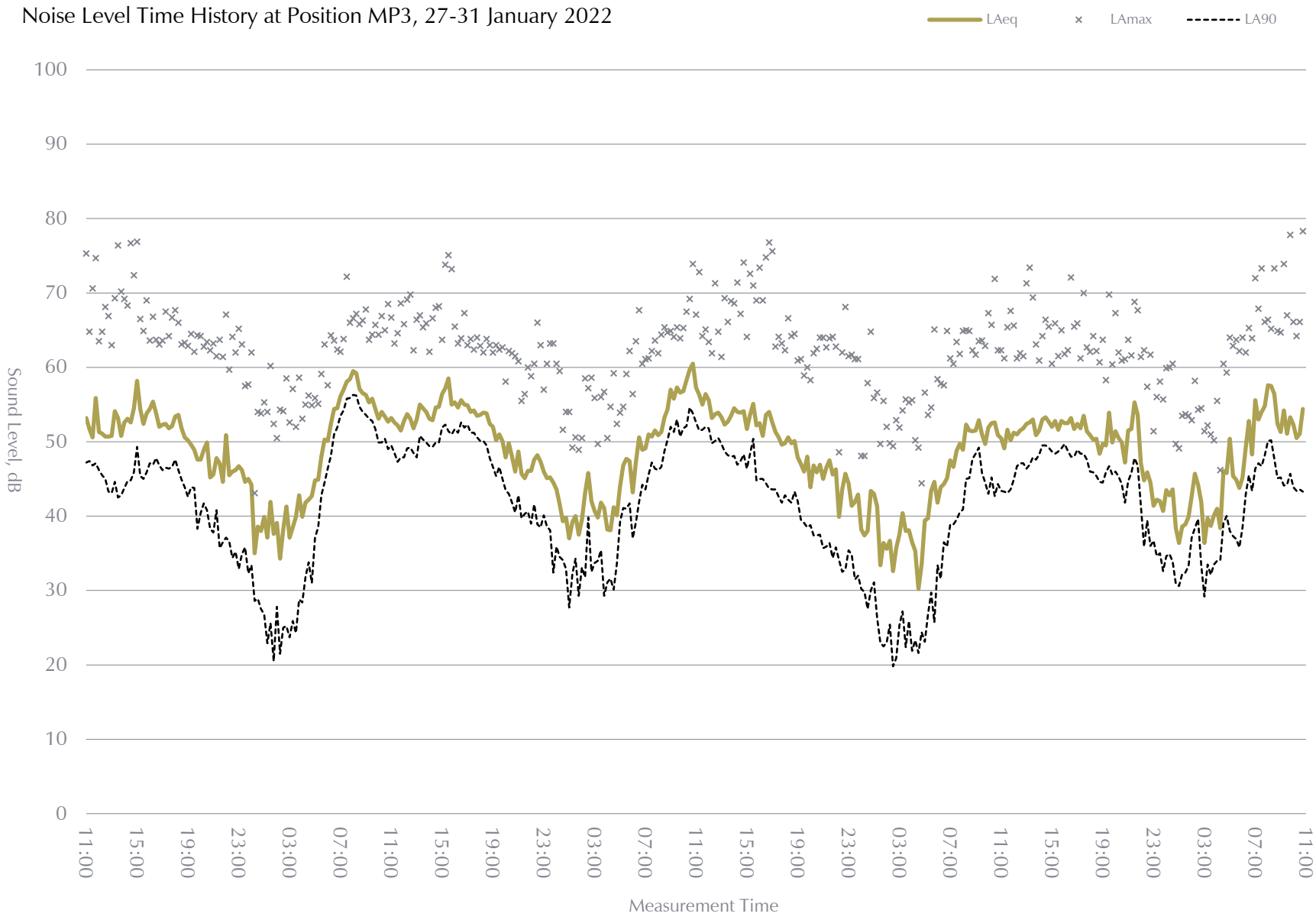

Figure 206/0581/TH03

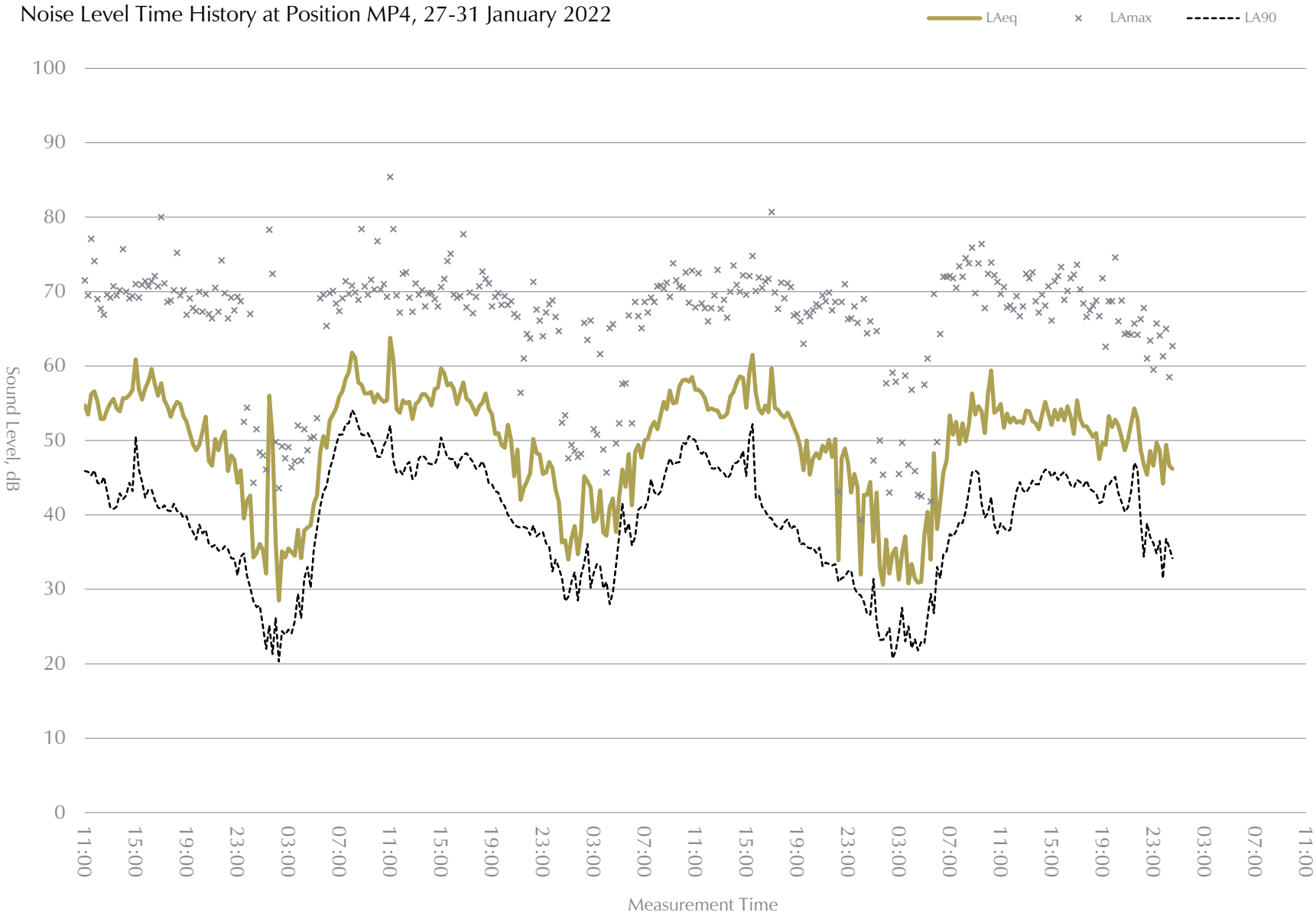

Figure 206/0581/TH04

RSK Acoustics

Figure 206/0581/SP2

Title: Land Use Parameter Plan showing areas to be developed

Project: Land East of Park View, Woodstock

Date: May 2022

Scale: Not to scale

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Short term traffic noise impacts without committed development

		2023			Without committed development			Noise impact	Magnitude
Link Ref	**Road**	**18 Hour AAWT**	**% HGV**	**Speed (km/h)**	**18 Hour AAWT**	**% HGV**	**Speed (km/h)**		
1	A44 Oxford Road	16271	1.1	67.9	16633	1.1	67.9	0.1	Negligible
2	A4095 Upper Campsfield Road North of Site Access	8764	1.1	86.1	8876	1.1	86.1	0.0	No Change
3	A4095 Upper Campsfield Road South of Site Access	8764	1.1	86.1	11220	0.9	86.9	1.1	Minor
4	A44 Woodstock Road	23699	1.1	91.7	25352	1.0	91.7	0.3	Negligible
5	A4095 Bladon	11120	1.7	46.8	11562	1.7	46.8	0.2	Negligible
6	A4095 Witney Road	9952	0.9	62.8	10261	0.9	62.8	0.2	Negligible
7	A4095 Woodgreen Road	14049	2.9	48.3	14303	2.8	48.3	0.1	Negligible
8	A4095 Bridge Street	10817	1.0	48.3	10944	1.0	48.3	0.0	No Change
9	A4095 Mill Street	7354	1.0	48.3	7390	1.0	48.3	0.0	No Change
10	B4022 West End	13100	2.6	48.3	13100	2.6	48.3	0.0	No Change
11	B4022 Newland	12493	2.6	48.3	12493	2.6	48.3	0.0	No Change

Short term traffic noise impacts with committed development

		2023			With committed development			Noise impact	Magnitude
Link Ref	**Road**	**18 Hour AAWT**	**% HGV**	**Speed (km/h)**	**18 Hour AAWT**	**% HGV**	**Speed (km/h)**		
1	A44 Oxford Road	17418	1.0	67.9	17780	1.0	67.9	0.0	No Change
2	A4095 Upper Campsfield Road North of Site Access	9561	1.0	86.1	9672	1.0	86.1	0.1	Negligible
3	A4095 Upper Campsfield Road South of Site Access	9561	1.0	86.1	12017	0.8	86.9	0.9	Negligible
4	A44 Woodstock Road	25265	1.0	91.7	26918	1.0	91.7	0.3	Negligible
5	A4095 Bladon	11690	1.6	46.8	12131	1.6	46.8	0.2	Negligible
6	A4095 Witney Road	10248	0.9	62.8	10556	0.8	62.8	0.1	Negligible
7	A4095 Woodgreen Road	15566	2.6	48.3	15819	2.5	48.3	0.0	No Change
8	A4095 Bridge Street	11353	1.0	48.3	11480	0.9	48.3	0.0	No Change
9	A4095 Mill Street	7708	1.0	48.3	7744	0.9	48.3	0.0	No Change
10	B4022 West End	13106	2.6	48.3	13106	2.6	48.3	0.0	No Change
11	B4022 Newland	12505	2.6	48.3	12505	2.6	48.3	0.0	No Change

Long term traffic noise impacts without committed development

		2038			Without committed development			Noise impact	Magnitude
Link Ref	**Road**	**18 Hour AAWT**	**% HGV**	**Speed (km/h)**	**18 Hour AAWT**	**% HGV**	**Speed (km/h)**		
1	A44 Oxford Road	18652	1.1	67.9	19014	1.1	67.9	0.1	Negligible
2	A4095 Upper Campsfield Road North of Site Access	10046	1.1	86.1	10158	1.1	86.1	0.0	No Change
3	A4095 Upper Campsfield Road South of Site Access	10046	1.1	86.1	12503	0.9	86.9	0.9	Negligible
4	A44 Woodstock Road	27167	1.1	91.7	28820	1.0	91.7	0.3	Negligible
5	A4095 Bladon	12747	1.7	46.8	13189	1.7	46.8	0.2	Negligible
6	A4095 Witney Road	11408	0.9	62.8	11717	0.9	62.8	0.1	Negligible
7	A4095 Woodgreen Road	16105	2.9	48.3	16358	2.8	48.3	0.0	No Change
8	A4095 Bridge Street	12400	1.0	48.3	12527	1.0	48.3	0.0	No Change
9	A4095 Mill Street	8429	1.0	48.3	8466	1.0	48.3	0.0	No Change
10	B4022 West End	15017	2.6	48.3	15017	2.6	48.3	0.0	No Change
11	B4022 Newland	14321	2.6	48.3	14321	2.6	48.3	0.0	No Change

Long term traffic noise impacts with committed development

		2038			With committed development			Noise impact	Magnitude
Link Ref	**Road**	**18 Hour AAWT**	**% HGV**	**Speed (km/h)**	**18 Hour AAWT**	**% HGV**	**Speed (km/h)**		
1	A44 Oxford Road	19799	1.0	67.9	20161	1.0	67.9	0.1	Negligible
2	A4095 Upper Campsfield Road North of Site Access	10843	1.0	86.1	10955	1.0	86.1	0.0	No Change
3	A4095 Upper Campsfield Road South of Site Access	10843	1.0	86.1	13299	0.8	86.9	0.8	Negligible
4	A44 Woodstock Road	28732	1.0	91.7	30385	1.0	91.7	0.2	Negligible
5	A4095 Bladon	13317	1.7	46.8	13758	1.6	46.8	0.1	Negligible
6	A4095 Witney Road	11704	0.9	62.8	12013	0.8	62.8	0.1	Negligible
7	A4095 Woodgreen Road	17621	2.6	48.3	17875	2.6	48.3	0.1	Negligible
8	A4095 Bridge Street	12936	1.0	48.3	13063	0.9	48.3	0.1	Negligible
9	A4095 Mill Street	8784	1.0	48.3	8820	1.0	48.3	0.0	No Change
10	B4022 West End	15023	2.6	48.3	15023	2.6	48.3	0.0	No Change
11	B4022 Newland	14333	2.6	48.3	14333	2.6	48.3	0.0	No Change

Appendix A

Subject:	**Planning Considerations and Guidance**		
Project:	**Land East of Park View, Woodstock**		
Date:	**May 2022**	**Prepared:**	**NM**
Revision:	**0**	**Approved:**	**LM**

This document sets out the various standards and national guidance upon which the design advice has been based.

A1 National Planning Policy Framework (NPPF)

A1.1 The National Planning Policy Framework (NPPF), published in March 2012 and updated in July 2021, is currently the relevant document for defining the national policy toward noise sensitive development. It refers to the Noise Policy Statement for England (NPSE), which is discussed in the subsequent section.

A1.2 The current policy on sustainable development influences the emphasis of any noise assessment. The development of a quiet, rural site is by most measures less sustainable than the development of a site located near existing infrastructure and facilities. The rating of development sites based on prevailing noise levels should reflect this.

A1.3 Specifically, on the subject of noise, paragraph 185 of NPPF states:

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

a. mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b. identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;"

A1.4 Paragraph 185 references the Noise Policy Statement for England and no other particular standards.

A1.5 On the general issue of amenity, paragraph 130 states that planning policies and decisions should ensure that developments:

"create places that […] promote health and well-being, with a high standard of amenity for existing and future users…"

A1.6 Further to this, paragraph 174 states that planning policies and decisions should contribute to and enhance the natural and local environment by:

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

A1.7 A notable inclusion in the July 2018 edition of NPPF is the 'agent of change' principle in paragraph 187. In terms of noise, this principle requires that those proposing a new noise sensitive development incorporate sufficient mitigation such that the operation of existing premises in the area is not unreasonably restricted in order to control noise impact upon the new development:

"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

A2 Noise Policy Statement for England (NPSE)

A2.1 This NPSE does not set quantitative guidelines for the suitability of noise sensitive development in an area depending on the prevailing levels of noise. Absent, therefore, is reference to specific noise thresholds (e.g. the Noise Exposure Categories as defined in the withdrawn PPG 24) which determine whether noise sensitive development is suitable and, if so, whether particular mitigation factors need to be considered.

A2.2 Instead, the NPSE sets out three aims:

The first aim of the Noise Policy Statement for England

"Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

The second aim of the Noise Policy Statement for England

"Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

The third aim of the Noise Policy Statement for England

"Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

A2.3 Paragraph 2.24 states that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life. It also states that this does not mean that such adverse effects cannot occur.

A2.4 In essence, therefore, each development site must be judged on its ability to deliver on each of the stated aims. Quantifying the prevailing noise levels is therefore an essential first step in assessing a given site.

A2.5 The NPSE refers to SOAEL, the Significant Observed Adverse Effect Level. This is defined as the level above which significant adverse impacts on health and quality of life occur. Given the overall thrust of the NPSE, the SOAEL is therefore an important assessment standard although the document also comments that:

"It is not possible to have a single objective noise based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times."

A2.6 Attention is drawn to the fact that the SOAEL is the level above which significant adverse effects can be observed. Importantly, it should be noted that the overall objective is to avoid or minimise significant adverse impacts; some degree of impact is acceptable and it is not necessary to seek to achieve no impact at all.

A3 Planning Practice Guidance (PPG)

A3.1 The Department for Communities and Local Government 'Planning Practice Guidance' (PPG) was published on 6 March 2014 and updated in July 2019.

A3.2 The PPG on Noise expands upon the NPPF and NPSE and sets out more detailed guidance on noise assessment. Like the NPPF and NPSE, the guidance does not include any specific noise levels but sets out further principles that should underpin an assessment.

A3.3 The PPG includes a section on noise, which states:

"*Plan-making and decision making need to take account of the acoustic environment and in doing so consider:*

whether or not a significant adverse effect is occurring or likely to occur;

whether or not an adverse effect is occurring or likely to occur; and

whether or not a good standard of amenity can be achieved."

A3.4 It then refers to the NPSE and states that the aim is to identify where the overall effect of the noise exposure falls in relation to Significant Observed Adverse Effect Level [1] (SOAEL), the Lowest Observed Adverse Effect Level [2] (LOAEL) and the No Observed Effect Level [3] (NOEL).

A3.5 The guidance then presents a table, which is reproduced as table 0 overleaf. The implication of the final line of the table is that only the 'noticeable and very disruptive' outcomes are unacceptable and should be prevented. All other outcomes (i.e. all other lines in the table) can be acceptable, depending upon the specific circumstances and factors such as the practicalities of mitigation.

[1] The level of noise exposure above which significant adverse effects on health and quality of life occur.
[2] The level of noise exposure above which adverse effects on health and quality of life can be detected.
[3] The level of noise exposure below which no effect at all on health or quality of life can be detected.

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

AT1 Summary of Noise Exposure Hierarchy (from PPG)

A3.6 Under the topic of further considerations relating to mitigating the impact of noise on residential developments, the PPG states:

"Noise impacts may be partially offset if residents have access to one or more of:

a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling;

a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced if this area is exposed to noise levels that result in significant adverse effects;

a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or

a relatively quiet, protected, external publically accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance)."

A3.7 This is not to say that access to the above items is mandatory, rather that it can help to offset any noise impacts.

A3.8 The PPG also considers the potential risk of conflict between new development and existing businesses. It states that it may be necessary for mitigation to be put in place as part of a new development, to avoid existing activities having a significant adverse effect on residents or users of the proposed scheme. It goes on to state:

"The agent of change will also need to define clearly the mitigation being proposed to address any potential significant adverse effects that are identified. Adopting this approach may not prevent all complaints from the new residents/users about noise or other effects, but can help to achieve a satisfactory living or working environment, and help to mitigate the risk of a statutory nuisance being found if the new development is used as designed (for example, keeping windows closed and using alternative ventilation systems when the noise or other effects are occurring).

It can be helpful for developers to provide information to prospective purchasers or occupants about mitigation measures that have been put in place, to raise awareness and reduce the risk of post-purchase/occupancy complaints."

A3.9 It goes on to make the further note:

"For noise sensitive developments, mitigation measures can include […] optimising the sound insulation provided by the building envelope."

A4 Internal and External Noise Design Criteria

A4.1 **The World Health Organisation (WHO) Guidelines 1999**

A4.1.1 The Guidelines for Community Noise (World Health Organisation, 1999) included values for community noise in specific environments.

A4.1.2 It is important to note that the WHO Guidelines are aspirational, as illustrated by the National Noise Incidence Study (NNIS, 2000), which indicates that 55% of the population of England and Wales are exposed to external noise levels above 55 dB $L_{Aeq, day}$. A National Physical Laboratory (NPL) report (with reference CMAM 16, dated September 1998) reviewing the original 1980 WHO Guidelines and the 1995 draft version of the current Guidelines stated:

"*Exceedances of the WHO guideline values do not necessarily imply significant noise impact and indeed, it may be that significant impacts do not occur until much higher degrees of noise exposure are reached.*"

"*As such, it would be unwise to use the WHO guidelines as targets for any form of strategic assessment, since, given the prevalence of existing noise exposure at higher noise levels, there might be little opportunity for and little real need for any across the board major improvements. On the other hand, the most constructive use for the WHO guidelines will be to set thresholds above which greater attention should be paid to the various possibilities for noise control action when planning new developments. It is important to make clear at this point that exceedances do not necessarily imply an over-riding need for noise control, merely that the relative advantages and disadvantages of noise control action should be weighed in the balance.*"

A4.1.3 To prevent moderate annoyance in outdoor living areas, such as gardens and balconies of dwellings, the WHO guideline value is 50 dB $L_{Aeq, 16h}$. This can be described as an upper limit for the average noise level across the daytime and evening period (07:00h to 23:00h). The corresponding guideline value to prevent serious annoyance is stated as 55 dB $L_{Aeq, 16h}$. However, it is again noted that these levels are aspirational in nature, as described in A4.1.2 above.

A4.1.4 In terms of the internal noise environment, in order to achieve maximum speech intelligibility and to avoid moderate annoyance, the guideline value for noise levels within dwellings is stated as 35 dB $L_{Aeq, 16h}$ (covering the day and evening 07:00h to 23:00h). The corresponding value for the night period (23:00h to 07:00h) to avoid sleep disturbance is 30 dB $L_{Aeq, 8h}$.

A4.1.5 Additionally in terms of sleep disturbance, a guideline value of 45 dB L_{Amax} is given. In relation to this value, the Guidelines state:

"When the background noise is low, noise exceeding 45 dB L_{Amax} should be limited, if possible…"

"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10–15 times per night…"

A4.2 British Standard BS 8233:2014

A4.2.1 Guideline values for dwellings with respect to internal and external noise levels are included in BS 8233:2014 Guidance on sound insulation and noise reduction for buildings (BSi).

A4.2.2 The standard states 50 dB $L_{Aeq,\,T}$ as being desirable as a steady state noise level not to be exceeded in gardens. It also states 55 dB $L_{Aeq,\,T}$ as an upper guideline value. The time period *T* is usually taken to be the 16 hour day (07:00h to 23:00h).

A4.2.3 Paragraph 7.7.3.2 of the standard goes on to say the following:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, 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.

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space."

A4.2.4 It can be seen that external noise levels, especially on small balconies to apartment blocks, are not proposed to be a controlling index by which suitability of a residential site is defined.

A4.2.5 Therefore, when designing noise sensitive developments that incorporate gardens or other external amenity areas, the intent shall be to provide an area for each property in which the noise levels are consistent with these standards. Where these standards cannot be achieved, then reasonable measures shall be employed to provide screening or other forms of mitigation so as to minimise the noise levels in the external amenity areas.

A4.2.6 An important principle here is that sustainable development sites will often be exposed to relatively high levels of environmental noise, and while means are available to insulate internal spaces, they are not always available to protect external spaces. Strict adherence to the enforcement of such external noise criteria would preclude development in the majority of areas considered for development in semi-urban or urban environments or in areas in the vicinity of transportation noise sources. This is why the external standards shall be viewed as targets or triggers of mitigation measures rather than thresholds not to be exceeded in all circumstances.

A4.2.7 Buildings can be designed to achieve specific levels of insulation against external noise. It is reasonable, therefore, to set specific internal noise standards as the test of whether a development satisfies the requirements of the NPPF and the aims of the NPSE. In essence, these require a high quality design that achieves a good standard of amenity.

A4.2.8 Guidance in respect of indoor ambient noise levels is contained in Table 4 of BS 8233:2014 and tabulated below.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq, 16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq, 16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16h}$	30 dB $L_{Aeq, 8h}$

Note 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

AT2 Table 4 of BS 8233:2014

A4.2.9 The previous edition of BS 8233 included quantitative guidance with respect to night-time L_{Amax} noise levels in bedrooms. BS 8233:2014 does not provide such guidance, however in paragraph 7.7.5.1.1 it is noted that the recommendations for ambient noise in hotel bedrooms are similar to those for living accommodation and Table H.3 in Annex H.3 gives example night-time L_{Amax} limits in hotel bedrooms of 45-55 dB.

A4.2.10 The WHO study informing the 1999 Guidelines derived the L_{Amax} night time noise standard on the basis of 10 to 15 occurrences per night.

A4.3 ProPG: Planning and Noise (2017)

A4.3.1 ProPG is a guidance document prepared by a working group consisting of representatives of the Association of Noise Consultant (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH). It provides professional practice guidance on Planning and Noise with regard to new residential development that will be exposed to airborne noise from transport sources. It is also noted that good professional guidance should have regard to any reasonably foreseeable changes to existing, and/or new sources, as well as sources currently effecting the site.

A4.3.2 ProPG provides two stages of assessment, the first being an initial site risk assessment and the second being a full assessment. The second is only necessary when the initial risk assessment and circumstances dictate.

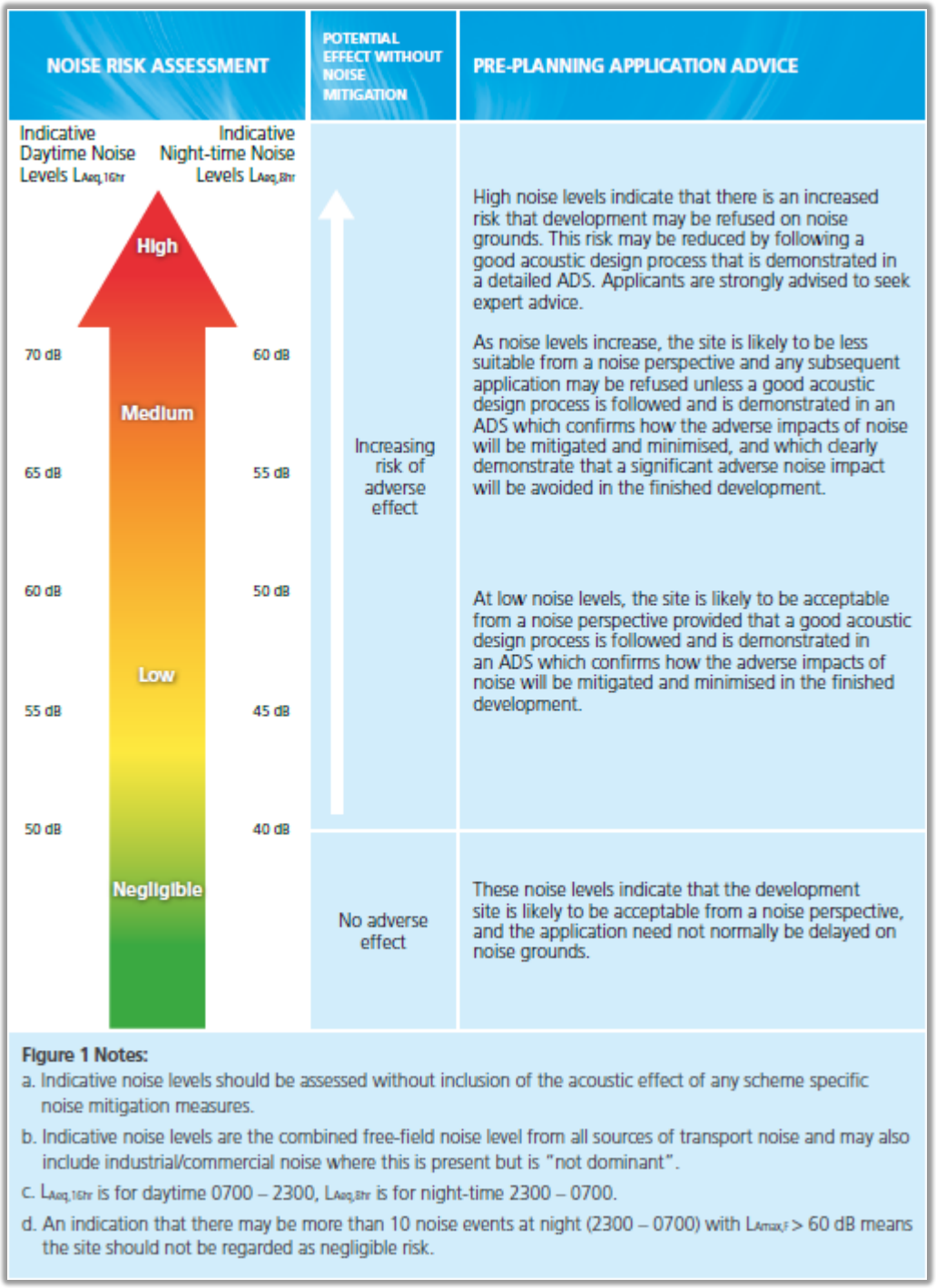
Stage 1: Initial Site Noise Risk Assessment

A4.3.3 ProPG suggests that a Stage 1 initial site risk assessment should be undertaken on all sites at the earliest possible opportunity in order to gauge the potential effect of noise on future residential premises, without the benefit of any noise mitigation measures.

A4.3.4 It is important to note that the initial 'Stage 1' assessment at a proposed residential development is not the basis for the eventual recommendation to the decision maker. It is intended to highlight the importance of good acoustic design within a scheme. For example, a site with a high risk of adverse effect without noise mitigation may not necessarily be unsuitable for development; however, the importance of good acoustic design provided by experts would be critical at such a site, with a detailed acoustic design statement provided.

A4.3.5 ProPG states that a site which displays a low risk of adverse effect without noise mitigation is more likely to be acceptable from a noise perspective, provided that a good acoustic design process is followed, and sites with no risk of adverse effect need not normally be delayed on noise grounds.

A4.3.6 The criteria provided for Stage 1 assessment of the L_{Aeq} noise levels for day and night within the initial site risk assessment are provided below:



A4.3.7 The initial noise risk assessment also considers the effect of L_{Amax} maximum noise levels at night (2300-0700h), where the guidance states:

"An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,F}$ > 60 dB means the site should not be regarded as a negligible risk."

Stage 2: Overview

A4.3.8 Stage 2 of the ProPG guidance provides a systematic consideration of key elements of acoustic design. The guidance advocates a proportional, risk based approach to the Stage 2 assessment. The Stage 1 risk assessment should inform whether careful consideration is required, with the detailed input of specialist acoustic consultants essential at higher risk sites, or straightforward accelerated decision making potentially possible in relation to lower risk sites.

Stage 2: Element 1 – Good Acoustic Design Process

A4.3.9 ProPG states that a good acoustic design process is an implicit part of achieving the requirements of government noise policy, as set out in the NPSE and NPPF, and outlined in Supplementary Document 1 of the ProPG.

A4.3.10 However, it is also stated that good acoustic design does not simply constitute compliance with recommended internal and external criteria, if the solution adversely affects living conditions within the spaces, and hence the quality of life of the inhabitants. The following example is provided:

"Using fixed unopenable glazing for sound insulation purposes is generally unsatisfactory and should be avoided; occupants generally prefer the ability to have control over the internal environment using openable windows, even if the acoustic conditions would be considered unsatisfactory when open. Solely relying on sound insulation of the building envelope to achieve acceptable acoustic conditions in new residential development, when other methods could reduce the need for the approach, is not regarded as good acoustic design."

A4.3.11 Applicants must therefore consider all possibilities for mitigation including but not limited to:

- Checking the feasibility of relocating, or reducing noise levels from relevant sources;
- Considering options for planning the site or building layout;
- Considering the orientation of proposed building(s);
- Selecting construction types and methods for meeting building performance requirements;
- Assessing the viability of alternative solutions;
- Assessing external amenity area noise;
- Examining the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc.

Stage 2: Element 2 – Internal Noise Level Guidelines

A4.3.12 ProPG considers the guidance provided within BS 8233:2014 to be suitable for the assessment of internal noise levels. However, the ProPG provides additional commentary. The following table reproduces the internal ambient criteria provided within Figure 2 of ProPG. The guidance from BS 8233:2014 is displayed in black, with additional comments and criteria from ProPG in blue:

Activity	Location	0700h to 2300h	2300h to 0700h
Resting	Living room	35 dB $L_{Aeq, 16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq, 16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16h}$	30 dB $L_{Aeq, 8h}$ 45 dB $L_{Amax,F}$ (Note 4)

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A [which advocates reference to available dose-response relationships appropriate for the types of noise source being considered]).

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (see Section 3.D [which states that if certain criteria are fulfilled the noise practitioner should recommend refusal on noise grounds alone, regardless of any case for the development]).

AT3 Table 4 of BS 8233:2014 with ProPG annotations in blue

A4.3.13 It should be noted that the guidance above includes criteria for L_{Amax} noise levels, along with further guidance relating to the assessment of maximum levels in Note 4.

A4.3.14 The ProPG also states in Note 5 that where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed. However, any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position.

Stage 2: Element 3 – External Amenity Area Noise Assessment

A4.3.15 With regard to external amenity spaces, ProPG references the guidance provided within BS 8322:3014, section 6. ProPG presents a statement summarising BS 8233:2014 section 6 which states:

"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq, 16h}$"

A4.3.16 The standard continues:

"These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited."

A4.3.17 ProPG also references guidance within the PPG on noise, which states:

"If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended"

A4.3.18 It is highlighted within ProPG that both BS 8233:2014 and the PPG on noise require a decision to be made as to whether or not external amenity areas are intrinsically important to the required design. However, it is noted that the PPG also states that noise impacts may be partially offset if the residents of affected dwellings are provided, through the design of the development or the planning process, with access to alternative spaces as set out in paragraph A3.6 of this appendix.

A4.3.19 ProPG section 2.51 states that Local Planning Authorities (LPAs) will be best placed to provide guidance in relation to what is 'relatively quiet', as the concept will inherently vary between scenarios.

A4.3.20 The advice in section 2.52 of ProPG highlights the increased importance of LPAs protecting publically accessible external amenity spaces in areas that typically exhibit heightened existing noise climates, such as cities, where development is necessary but private external amenity areas below 55 dB $L_{Aeq,16h}$ are not practicable. Publically accessible spaces such as parks and squares in these areas may be providing respite for nearby residents and, therefore, should be protected.

Stage 2: Element 4 – Assessment of Other Relevant Issues

A4.3.21 This section of the guidance relates to all other relevant issues and seeks to build upon relevant national and local planning and noise policies. Examples are provided including, but not limited to, the following:

- Compliance with relevant national and local policy
- Magnitude and extent of compliance with ProPG
- Likely occupants of the development
- Acoustic design v unintended adverse consequences
- Acoustic design v wider planning objectives

A4.3.22 Other issues specific to the site may be added by the LPA, where relevant.

A4.4 The AVO Guide

A4.4.1 The Association of Noise Consultants document '*Acoustics, Ventilation and Overheating Guide'* (AVO) provides guidance for internal noise criteria when additional ventilation is required for thermal comfort.

A4.4.2 A key principle which must be understood is that "Overheating" in the context of the AVO relates to "chronic" overheating. This does not cover overheating during short term heatwaves or similar such events, but rather sustained periods where the internal spaces within a building remain at elevated temperatures.

A4.4.3 Overheating within buildings is a complex problem to measure and analyse and there is no single temperature above which an internal space can be classed as "overheating". The overheating condition is dependent on many factors such as duration, external ambient temperatures and other factors.

A4.4.4 The Chartered Institute of Building Services Engineers (CIBSE) have issued two main tools which are intended to help building designers determine whether internal areas are overheating and to determine thermal comfort (not in relation to acoustics). These are known as TM52[4] and TM59[5].

A4.4.5 Whilst these tools are not directly relevant to acoustics, TM59 is referenced in the AVO as an assessment tool (which would be utilised by services engineers or similar) which can be drawn from to help inform an AVO assessment.

A4.4.6 The three main methods for providing control of overheating provided by the AVO guidance are:

- Passive ventilative cooling – Introducing external air to a space to provide a cooling effect without the use of fans. The most common method is to use open windows but other façade openings can also be used. Note that trickle vents do not enable sufficient airflow to have a significant cooling effect.
- Mechanical ventilative cooling – Using fans to introduce external air to a space to provide a cooling effect. Due to the airflow required, this type of system often involves significant plant and duct size requirements.
- Comfort cooling – Using a mechanical system to cool the air within a space to achieve a user-defined setpoint. This type of system will require some form of mechanical device to cool the air, such as a fan coil unit (FCU), linked to an external condenser unit.

[4] CIBSE TM52: *The Limits of Thermal Comfort: Avoiding Overheating in European Buildings* (2018)
[5] CIBSE TM59: *Design methodology for the assessment of overheating risk in homes* (2017)

A4.4.7 Where windows are opened in order to provide passive ventilative cooling to a residential building, the AVO guidance states that it is reasonable for the internal ambient noise levels to be higher than those set out in BS 8233:2014 for background ventilation:

'It is suggested here that the desirable internal noise standard within Table 4 of BS 8233:2014 should be achieved when providing adequate ventilation as defined by ADF whole dwelling ventilation. However it is considered reasonable to allow higher levels of internal ambient noise from transport sources when higher rates of ventilation are required in relation to the overheating condition.'

A4.4.8 The guidance suggests an initial 'Level 1' assessment, where day and night-time **external** noise levels are correlated to a number of risk categories ranging from 'Negligible' to 'High'. The "risk" is taken to relate the potential for issues to arise in respect to the levels of noise affecting receptors, when overheating control is provided via open windows.

A4.4.9 Table 3-2 of the guidance, which sets out the Level 1 risk assessment categories, potential effects and recommendations for further assessment is reproduced below (along with its explanatory notes):

Risk category for Level 1 assessment [Note 5]	Potential Effect without Mitigation	Recommendation for Level 2 assessment
$L_{Aeq,\ T}$ [Note 3] during 07:00 - 23:00 / $L_{Aeq,\ 8hr}$ during 23:00 - 07:00 High: 65 dB / 55 dB Medium: 60 dB / 50 dB Low: 55 dB / 50 dB Negligible: 50 dB / 45 dB	Increasing risk of adverse effect	Recommended Optional
	Use of opening windows as primary means of mitigating overheating is not likely to result in adverse effect	Not required

T1 Table 3-2 Guidance for Level 1 site risk assessment of noise from transport noise sources [Note 1] relating to overheating condition.

Note 1 - The noise levels suggested assume a steady road traffic noise source but may be adapted for other types of transport. All levels are external free-field noise levels.

Note 2 - The values presented in this table should not be regarded as fixed thresholds and reference can also be made to relevant dose-response relationships [15, 17].

Note 3 - A decision must be made regarding the appropriate averaging period to use. The averaging period should reflect the nature of the noise source, the occupancy profile and times at which overheating might be likely to occur. Further guidance can be found within the 2014 IEMA Guidelines.

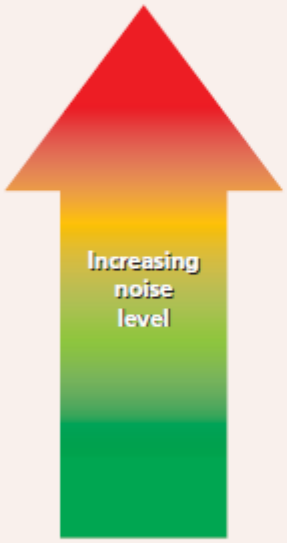
Note 4 - Refer also to references [1, 17, 18, 22] for further guidance regarding individual noise events. Where 78dB $L_{AF,max}$ is normally exceeded during the night-time period (2300 – 0700), a Level 2 assessment is recommended.

Note 5 - The risk of an adverse effect occurring will also depend on how frequently and for what duration the overheating condition occurs. Refer to Figure 3-2.

Note 6 - To evaluate the risk category for a dwelling, all three aspects of external noise exposure (i.e. daytime, night-time and individual noise events) should be evaluated. The highest risk category for any of the three aspects applies.

A4.4.10 If following the initial Level 1 assessment, it is determined that a more detailed Level 2 assessment may be necessary, a more involved and detailed consideration of **internal** noise levels can be undertaken. The Level 2 assessment considers internal noise levels and the proposed façade mitigation measures (including the method of providing cooling). The duration over which overheating may occur is also an important consideration.

A4.4.11 The noise levels within habitable rooms, with the cooling strategy in place, are calculated and compared to the thresholds provided within Table 3-3 “Guidance for Level 2 assessment of noise from transport noise sources relating to overheating condition”. This table is reproduced below (again with the associated informative notes):

Internal ambient noise level [Note 2]			Examples of Outcomes [Note 5]	
$L_{Aeq,T}$ [Note 3] during 07:00 – 23:00 [Note 6]	$L_{Aeq,8h}$ during 23:00 – 07:00	Individual noise events during 23:00 – 07:00 [Note 4]		
> 50 dB	> 42 dB	Normally exceeds 65 dB $L_{Ar,max}$	Noise causes a material change in behaviour e.g. having to keep windows closed most of the time	Avoiding certain activities during periods of intrusion. Having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.
			Increasing likelihood of impact on reliable speech communication during the day or sleep disturbance at night	At higher noise levels, more significant behavioural change is expected and may only be considered suitable if occurring for limited periods. As noise levels increase, small behaviour changes are expected e.g. turning up the volume on the television; speaking a little more loudly; having to close windows for certain activities, for example ones which require a high level of concentration. Potential for some reported sleep disturbance. Affects the acoustic environment inside the dwelling such that there is a perceived change in quality of life. At lower noise levels, limited behavioural change is expected unless conditions are prevalent for most of the time. [Note 8]
≤ 35 dB	≤ 30 dB	Do not normally exceed $L_{Ar,max}$ 45 dB more than 10 times a night	Noise can be heard, but does not cause any change in behaviour	Noise can be heard, but does not cause any change in behaviour, attitude, or other physiological response [Note 9]. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.

T2 Table 3-3 Guidance for Level 2 assessment of noise from transport noise sources [note 1] relating to overheating condition.

Note 1 - The noise levels suggested in Tables 3-2 and 3-3 assume a steady road traffic noise source but may be adapted for other types of transport.

Note 2 - The values presented in this table should not be regarded as fixed thresholds and reference can also be made to relevant dose-response relationships such as those described in a DEFRA 2014 study [15, 21, 22]. With the exception of individual noise events, the references [15, 21] are based on evidence drawn from external noise levels. There is currently very little robust

evidence linking internal averaged noise levels with health outcomes and occupant behaviour. Internal ambient noise levels would normally be considered for living rooms and bedrooms during the daytime. At night, the levels would normally only be applicable to bedrooms.

Note 3 - A decision must be made regarding the appropriate averaging period to use. The averaging period should reflect the nature of the noise source, the occupancy profile and times at which overheating might be likely to occur. Further guidance can be found within the 2014 IEMA Guidelines.

Note 4 - Refer to references [1, 17, 18, 22] for further guidance regarding individual noise events. The $L_{AF,max}$ indicator associated with the upper category is intended for road traffic; it may be more appropriate to use the "one additional noise-induced awakening" method for noise from rail traffic or aircraft.

Note 5 - The potential for adverse effect will also depend on how frequently and for what duration the overheating condition occurs. Refer to Figure 3-2.

Note 6 - The daytime levels presented in this table may not be appropriate for residential care homes or other situations where conditions for daytime resting are known to be of particular importance.

Note 7 - When evaluating the potential for adverse effect, all three aspects of noise exposure (i.e. daytime, night-time and individual noise events) should be evaluated.

Note 8 - BS 8233 states that where development is considered necessary or desirable, the internal target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved.

Note 9 - It is known that physiological responses do occur at lower levels of L_{AFmax} than 45dB.

A4.4.12 As detailed in Note 5 above, the level of assessed impact varies depending on the duration for which the 'overheating condition' occurs. Figure 3-2 provides qualitative guidance on combined effect of internal ambient noise level and duration for the overheating situation and is reproduced below (notionally referred to as an AVO diagram):

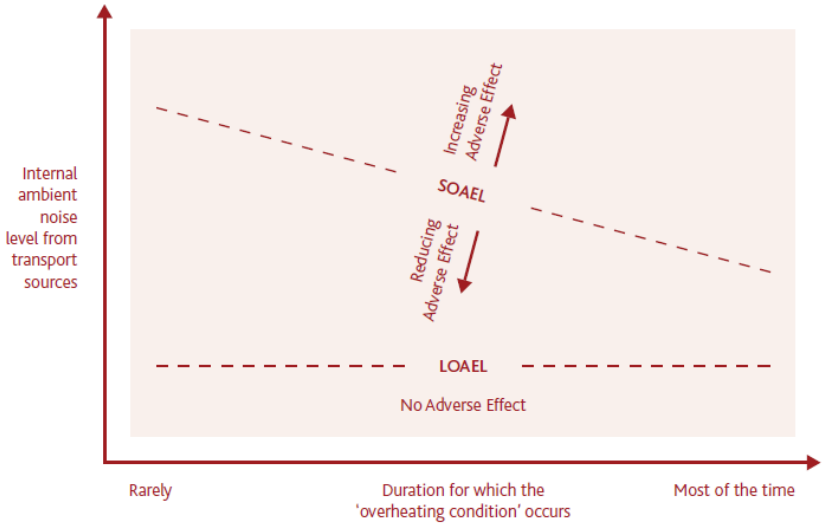


Figure 3-2 Qualitative guidance on combined effect of internal ambient noise level and duration for the overheating situation

A4.4.13 The aim would be to ensure that internal noise levels are mitigated to fall below the Significant Observed Adverse Effect Levels (SOAEL), taking due account of the duration over which overheating occurs. No quantitative guidance is provided in respect to the "Duration" aspect of the plot above, and consultants are required to use professional judgement to determine appropriate levels to be adopted for the SOAEL and Lowest Observed Adverse Effect Level (LOAEL).

A4.4.14 The guidance notes that no specific single noise threshold can be determined, and it suggests each site is considered on its own merits; however, it does indicatively suggest that a range of external noise levels of 53 and 63dB $L_{Aeq,16h}$ daytime and 48 and 55dB $L_{Aeq,8h}$ night time as thresholds of Medium and High risk sites, depending on duration and occurrence of overheating, as well as context.

A4.4.15 The duration for which overheating occurs is clearly a significant consideration. To provide context – a receptor which may be classified as Medium and High risk (in the context of the AVO) at Level 1 assessment stage (using openable windows as a cooling strategy), may in fact be acceptable with no change to the ventilation strategy, providing the overheating condition only occurs rarely.

A4.5 The Building Regulations Part O

A4.5.1 Approved Document O was released on 15 December 2021 and takes effect on 15 June 2022 for use in England.

A4.5.2 The approved document gives a Requirement O1 which aims to protect the health and welfare of occupants of a building by reducing the occurrence of high indoor temperatures. This requirement is as follows:

"(1) Reasonable provision must be made in respect of a dwelling, institution or any other building containing one or more rooms for residential purposes, other than a room in a hotel ("residences") to –

(a) limit unwanted solar gains in summer;
(b) provide an adequate means to remove heat from the indoor environment.

(2) In meeting the obligations in paragraph (1) –

(a) account must be taken of the safety of any occupant, and their reasonable enjoyment of the residence; and
(b) mechanical cooling may only be used where insufficient heat is capable of being removed from the indoor environment without it."

A4.5.3 To meet the above requirement, the standard recommends that a building be designed and constructed to meet both of the following points:

"a. Limiting unwanted solar gains in summer.
b. Providing an adequate means of removing excess heat from the indoor environment."

A4.5.4 It then goes on to state that compliance with *Requirement O1* can be demonstrated by using one of the following methods:

"a. The simplified method for limiting solar gains and providing a means of removing excess heat.
b. The dynamic thermal modelling method."

A4.5.5 The simplified method starts by defining the overheating risk category of a new residential building based on location and whether it has cross-ventilation. Based on the risk category it then recommends limiting unwanted solar gains in summer or providing an appropriate means of removing excess heat from the indoor environment.

A4.5.6 The dynamic thermal modelling method provides a standardised approach to predicting overheating risk for residential buildings using dynamic thermal modelling as an alternative to the simplified method and gives designers more flexibility over the simplified method. It goes on to suggest acceptable strategies for reducing solar gains and removing excess heat.

A4.5.7 Section 3 of the document addresses whether the overheating mitigation strategy is usable. Regarding noise, Paragraphs 3.2 and 3.3 state the following:

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

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

a. *40 dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).*
b. *55 dB L_{AFmax}, more than 10 times a night (between 11pm and 7am)."*

A4.5.8 Compliance with the Building Regulations Part O document is a statutory requirement. The AVO Guide which is detailed above is not a statutory requirement however it provides guidance on assessing and mitigating overheating.

A5 Road Network Traffic Noise

A5.1.1 When assessing potential noise effects due to changes in road traffic flows as a result of a development, it is appropriate to refer to the Design Manual for Roads and Bridges (DMRB). The Manual sets out noise assessment procedures to be followed when undertaking highway works such as building new roads.

A5.1.2 DMRB sets out thresholds at which potential effects may start to become apparent, based on changes in 18-hour daytime noise levels (0600-2400h) within the short and long terms. These thresholds are set out below:

Change in Noise Level	Magnitude of Adverse and Beneficial Noise Impacts in the Short Term	Magnitude of Adverse and Beneficial Noise Impacts in the Long Term
0.0	No Change	No Change
0.1 to 0.9	Negligible	Negligible
1.0 to 2.9	Minor	Negligible
3.0 to 4.9	Moderate	Minor
5.0 to 9.9	Major	Moderate
10+	Major	Major

AT4 Traffic Noise Assessment Criteria.

A5.1.3 The short term assessment according to DMRB is considered to be a comparison of the year of opening with and without the introduction of a development. The long term assessment, again according to DMRB, is considered to be a comparison between the year of opening and the year during which the greatest traffic flows will occur within 15 years of opening. In addition, it is appropriate to consider comparisons between future scenarios, with and without the development, as a long term assessment.

A5.1.4 The presentation of changes in sound level in the table above to one decimal place is not a reflection of accuracy of the assessment but rather serves to provide a clear threshold between adjacent impact descriptions.

A5.1.5 When considering the noise impact above, Negligible or Minor Adverse impacts would be expected to be consistent with the requirements of the NPPF, specifically paragraph 123, to

avoid significant adverse impacts. It is important to note that where noise impacts are concerned, any identified to be of major significance may not necessarily have effects beyond a local scale i.e. in close proximity to the source of noise.

End of Section

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