



Land at West Hoathly Road, East Grinstead

Noise Impact Assessment

Report 2A2C.RP.1.1 // 6 January 2026

prepared for

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1.0 Introduction

1.1 A planning application is to be submitted for 44 dwellings on land off of West Hoathly Road, East Grinstead. Through pre-application discussions, Mid Sussex District Council have indicated that a Noise Impact Assessment should be submitted to accompany the planning application.

1.2 This report sets out an assessment of noise to the proposed residential development. Noise related local and national planning policy and guidance have been considered, noise conditions across the site have been quantified, good acoustic design practices have been considered, and an assessment has been undertaken to guide the noise control strategy for the scheme.

2.0 Site Locality and Planning Context

Wider Site Location and Description

2.1 The site is located on land to the southwest of West Hoathly Road on the south side of East Grinstead and is currently undeveloped.

2.2 To the southwest are arable fields. To the south are the playing fields of Trefoil Montessori Farm School. To the northeast is Coombe Hill Road, Tobias School of Art and Therapy, and Toybox Day Nursery. To the north is the Sunnyside Recreational Play Area, beyond which is East Grinstead.

Image 1. Site location

■ Approximate site boundary

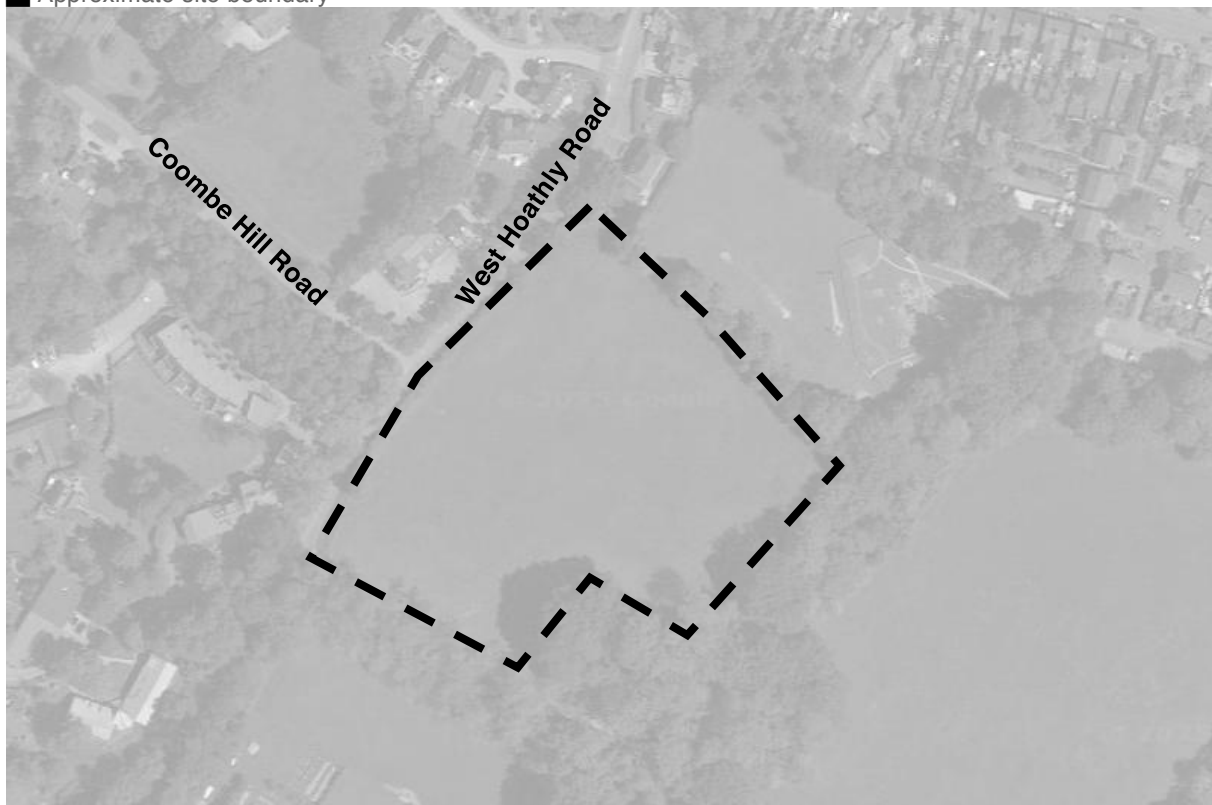


Image courtesy of Google Maps

Planning Context

2.3 The site is within the jurisdiction of Mid Sussex District Council (MSDC). The council have co-produced a guidance document advising on when noise impact assessments are recommended and the methodology to employ. This guidance is set out in *Planning Noise Advice Document: Sussex*, dated September 2021, and aims to complement national noise policy, as is set out in **Appendix C**.

2.4 The council's stance with regard to noise ingress to new dwellings centres around the internal noise level requirements set out within BS 8233:2014, in addition to the principles of good acoustic design set out within the ProPG. As such, the adopted design criteria set out within **section 3.0 (Design Criteria)** will take account of the requirements of MSDC.

2.5 The requirements of Building Regulations Approved Document O: Overheating has also been considered as part of the feasibility assessments to ensure that noise effects as a result of overheating can be suitably controlled.

3.0 Design Criteria

3.1 Based on the guidance within the Planning Noise Advice Document: Sussex and the relevant national standards and guidance documents detailed within **Appendix C**, the following design criteria are proposed.

Table 1 Noise assessment criteria

Location	Time Period	Single Number Criterion, dB	Noise Index	Note(s)
Habitable rooms (internal)	0700-2300	≤ 35	$L_{Aeq,16hour}$	-
	2300-0700	≤ 30	$L_{Aeq,8hour}$	-
		≤ 45	$L_{Amax,F}$	Not normally exceeded more than 10 times per night
External amenity areas (external)	0700-2300	≤ 55	$L_{Aeq,16hour}$	Aspirational upper threshold to be achieved where practicable

3.2 Additionally, to satisfy the noise requirements of the Building Regulations Approved Document O (ADO), in locations where external free field noise levels exceed 50 dB $L_{Aeq,8hour}$ and / 65 dB $L_{Amax,f}$ during the night time period, it is necessary to provide a building overheating control strategy that does not rely on partially open windows to bedrooms at night.

4.0 Noise Survey

4.1 An unattended noise survey was conducted at the site between Monday 29th September and Thursday 2nd October 2025. Full details of the noise survey can be seen in **Appendix A**.

4.2 Noise measurements were taken at one location for the duration of the survey, being positioned on the northern boundary of the site adjacent to West Hoathly Road. The measurement position can be seen in **Image 2**.

Image 2. Noise measurement positions

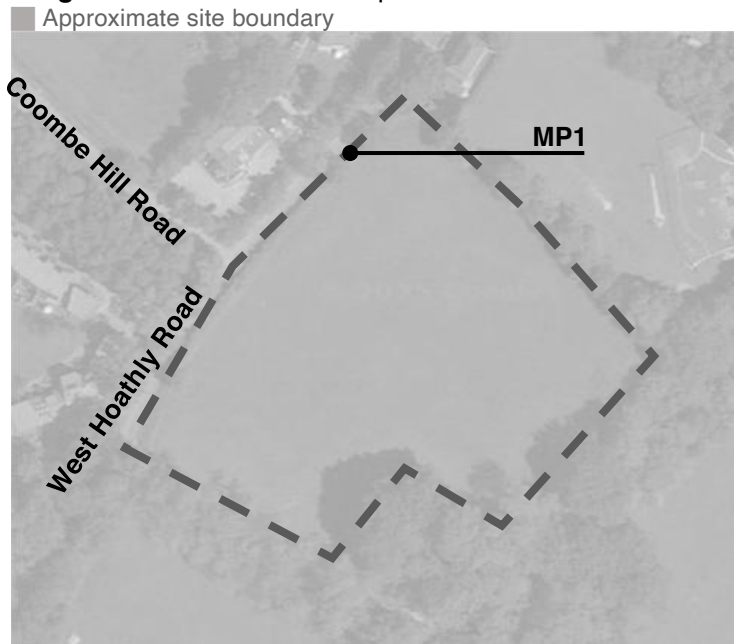


Image courtesy of Google Maps

4.3 The day and night-time noise levels captured during the noise survey are provided in **Table 2**.

Table 2 Summary period noise levels measured during the unattended noise levels

Measurement Position	Daytime (0700-2300)	Night-time (2300-0700)	
	$L_{Aeq,16hour}$	$L_{Aeq,8hour}$	$L_{Amax,F}$
MP1	65	54	80

5.0 Noise Assessment

Noise Model

5.1 An acoustic noise mapping program, *Wölfel Meßsysteme* "IMMI 2024", has been used to model noise propagation across the proposed development. The local area and proposed development have all been modelled using provided drawings and plans, including information on expected building heights. The model used CRTN¹ and ISO 9613² to calculate noise propagation from West Hoathly Road across the site. A full description of the noise modelling is set out in **Appendix B**.

5.2 Source emission levels within the model have been calibrated to ensure predictions at the unattended and spot measurement positions correspond closely to the levels measured at the site.

5.3 The modelled development layout is based on the *ECE Architecture* 'Site Layout' drawing (reference PL-01, dated 5th September 2025). It is noteworthy that the positioning of plots 27, 28, 29 and 30 will be negligibly different to that shown in the noise model outputs set out within this report.

¹ Calculation of Road Traffic Noise, Department of Transport, 1988

² ISO 9613-1:1993 – Acoustics – Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere

This change has no bearing on the wider outcomes of the assessment works not noise mitigation requirements.

5.4 The following window heights (to centre of windows) have been used within contour and point calculations at the proposed building façades to determine the likely required façade noise mitigation:

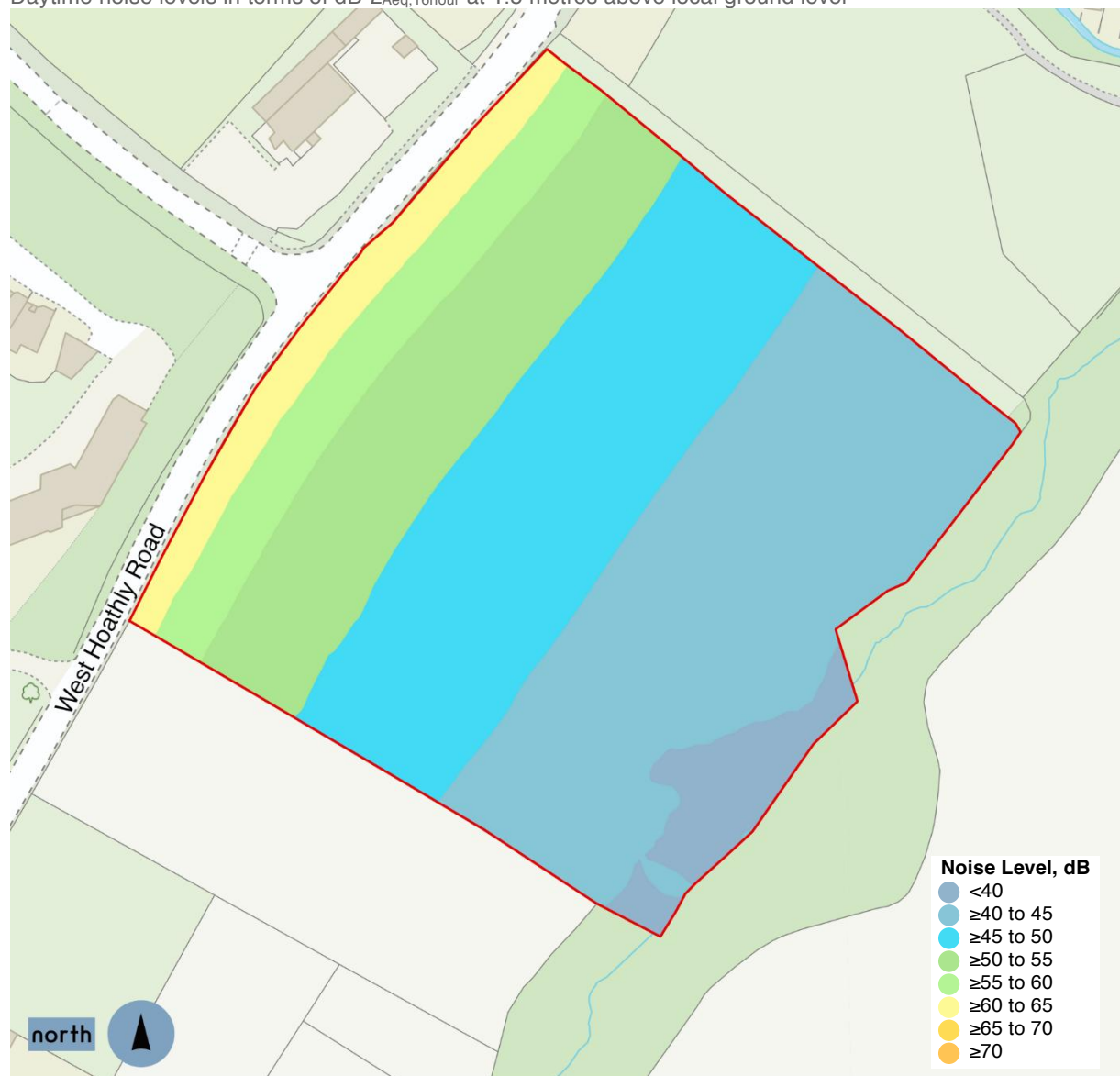
- Ground floor: 1.5 m; and
- First floor: 4.5 m.

Baseline Noise Conditions

5.5 The following **Image 3** shows the predicted daytime baseline noise conditions across the proposed development site, based on the results of the noise survey. Baseline noise predictions / contours have also been prepared for the night-time and are included within the attached **Appendix B**.

Image 3. Site Baseline – daytime noise contour plot

Daytime noise levels in terms of dB $L_{Aeq,16hour}$ at 1.5 metres above local ground level



Good Acoustic Design Considerations

5.6 The proposed layout has been developed to mitigate noise where practicable, taking into account the other non-noise related constraints that exist on the site. This is achieved through incorporating good acoustic design practices, such as careful building placement and orientation.

5.7 The use of large noise barriers / bunds as a primary mitigation measure to control noise from West Hoathly Road was not practicable due to the space available and visual / layout constraints. It is also not considered good placemaking in this instance. Dwellings are set back from the site boundary by at least 12 m to provide acoustic 'buffer zone' away from the road.

5.8 With respect to the development of the site layout, where practicable and taking into account non-acoustic factors, such as access, dwellings have been orientated such that garden areas are screened from noise sources by their attached dwellings or brick walls where necessary. This approach has reduced noise across the wider development site beyond the initial rows of dwellings.

5.9 The location and nature of the proposed development site means that dwellings will inevitably be affected (to varying degrees) by road noise but the layout has been optimised as far as practicable to minimise these noise impacts. The implementation of the measures set out within this report mean that a suitable noise climate can be expected to be provided both internally and externally, in line with the requirements of MSDC.

5.10 Noise contour plots illustrating the noise levels across the proposed development layout are presented in **Image 4** and **5** below, for daytime and night-time, respectively. Baseline and L_{max} noise contours are contained within **Appendix B**.

Image 4. Daytime noise contour plot with development

Daytime noise levels in terms of dB $L_{Aeq,16hour}$ at 1.5 metres above local ground level

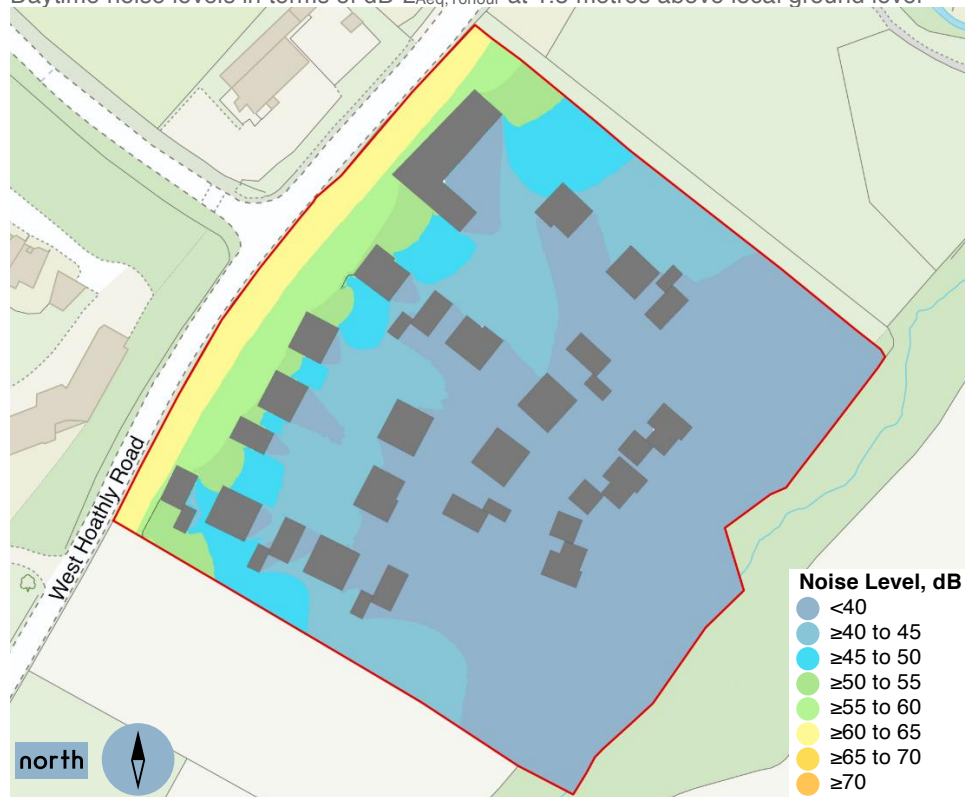
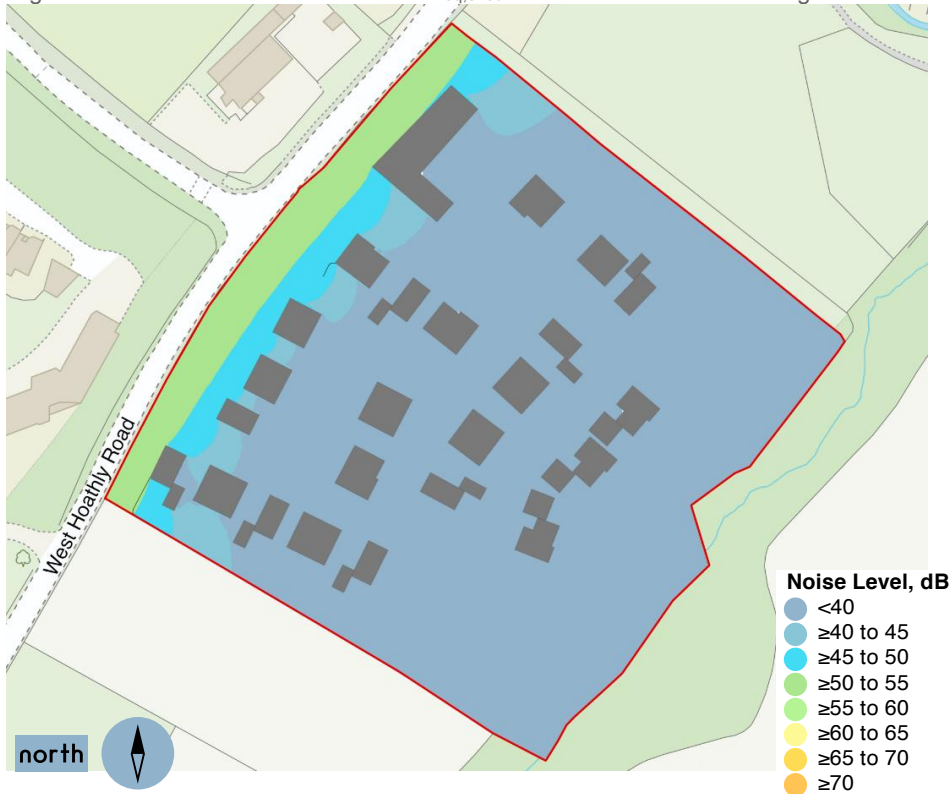


Image 5. Night-time noise contour plot with development

Night-time noise levels in terms of dB $L_{Aeq,8hour}$ at 4.5 metres above local ground level



External Amenity Areas

5.11 As can be seen on the previous **Image 4**, all gardens are calculated to observe noise levels below the aspirational target of 55 dB $L_{Aeq,16hour}$. This is achieved through good acoustic design being incorporated within the layout and providing screening through building placement and the use of screening with appropriate boundary treatments. This can be seen as evidenced within the following **Image 6** which shows the most exposed external amenity areas on the west side of the site.

Image 6. Most exposed external amenity areas (ringed)

Daytime noise levels in terms of dB $L_{Aeq,16hour}$ at 1.5 metres above local ground level



5.12 Brick walls of a height of 1.8 m have been modelled as part of the development layout as indicated on the provided Site Layout drawing. Close boarded barriers of the same height would also be suitable alternative if preferred for aesthetic reasons; these must feature no holes or gaps and exhibit a mass of at least 10 kg/m².

Glazing, Ventilation and Control of Overheating

Dwelling Parameters

5.13 The façades of the proposed dwellings are understood to comprise of a cavity masonry brick / blockwork construction. This does not preclude the use of alternative lightweight constructions if there is a subsequent preference to do so, but Suono must be consulted to verify that any such proposed construction offers the required sound insulation performance.

5.14 Similarly, the proposed roofs are understood to be of a typical tiled construction, plasterboard ceilings to the rooms below and thermal insulation to the loft spaces.

5.15 Typical internal room dimensions have been taken as follows (understood to be suitably representative of the proposed dwellings):

- 5 m x 4 m x 2.7 m for living rooms with 3 m² of glazing;
- 4 m x 3 m x 2.7 m for bedrooms with 1.8 m² of glazing.

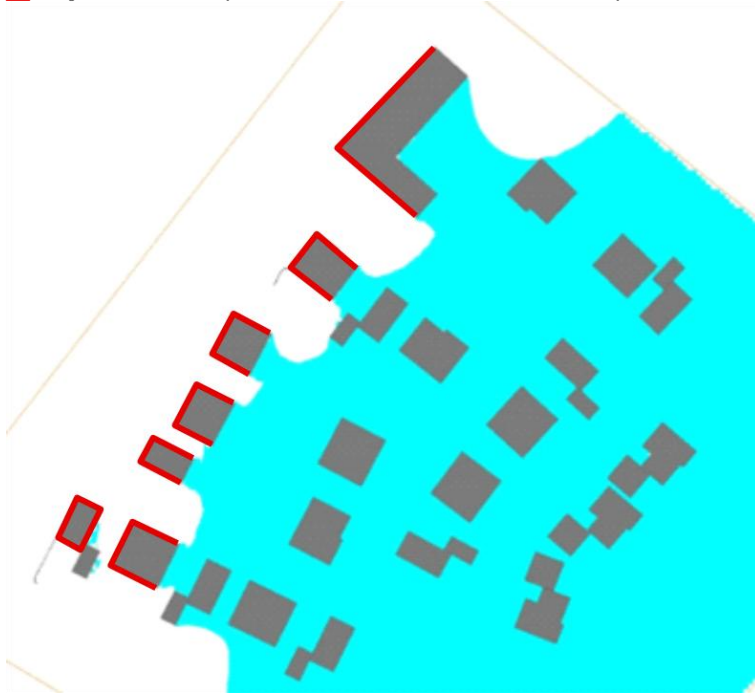
5.16 These dimensions should not be taken as limitations, but rather reasonable figures used for the purposes of the assessment.

Partially Open Windows

5.17 As shown on **Image 7**, it is expected that it will not be practicable to achieve the internal noise thresholds with windows open along the façades in closest proximity to West Hoathly Road. These impacts have been minimised as far as practicable through incorporation of good acoustic design measures as discussed above. The results presented on the figure assume an indicative loss through a partially open window of 13 dB(A) from free field external level to reverberant internal level.

Image 7. Noise assessment openable window constraints

- Areas where openable windows can be relied upon to meet internal noise criteria
- Façades where openable windows cannot be relied upon to meet internal noise criteria



5.18 Windows should still be openable as desired by the occupants of all the proposed dwellings and, as discussed in the following sections, noise intrusion can be expected to be comfortably controlled when windows are closed. This approach is in line with the relevant guidance set out within **section 3 (Design Criteria)** and the attached **Appendix C**.

5.19 We note that the commentary in this section relates to standard thermal conditions. The control of overheating and consideration to noise in respect to Approved Document O is discussed later in this report.

Glazing

5.20 The results of the noise modelling indicate that standard thermal double glazing (expected to provide a single figure sound reduction performance of circa 30 dB R'_w) will be sufficient for all habitable rooms across the development.

5.21 It is again noteworthy that windows do not need to be sealed shut in any part of the development and should be openable for times when purge ventilation is required or for thermal comfort (taking due regard of the commentary later in this section).

Ventilation

5.22 Trickle ventilators are expected to be used across the proposed development in a mechanical extract ventilation (MEV) configuration to provide the required background ventilation rates as is required to meet the requirements of the Building Regulations Approved Document F (ADF). Ventilation for the purposes of overheating control is discussed later in this report.

5.23 Noise intrusion calculations have included the effects of up to three trickle ventilators in living rooms and two within bedroom areas (noting that fewer would be acoustically acceptable).

The ventilation strategy should be confirmed as acceptable by a suitable qualified party, in relation to the requirements of Approved Document F³.

5.24 It has been assumed that all residences will be of a standard layout, with living rooms on ground floor level, and bedrooms at first floor.

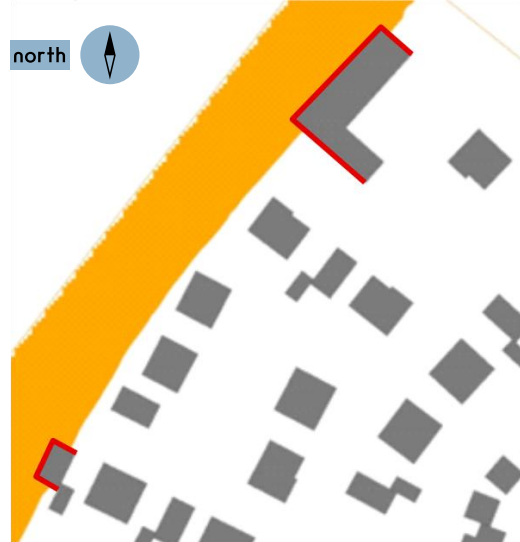
5.25 Based on the assessed development layout, non-acoustic trickle ventilators (through wall or frame) meeting a sound reduction performance of 35 dB $D_{n,e,w}$ will be sufficient for all habitable rooms across the development site.

Overheating

5.26 It is also necessary to consider ventilation in the context of overheating. Based on the guidance set out in **Appendix C** and the proposed layout, it has been determined that it will not be possible to rely on partially open windows for overheating control for façades within the area shaded in orange on the following **Image 8**. In all other areas and for all other façades, openable windows would be acceptable for overheating control.

Image 8. Overheating assessment noise constraints

- Areas where partially open windows to bedrooms at night cannot be relied upon for overheating control
- Façades where partially open window to bedrooms at night cannot be relied upon for overheating control



5.27 The above constraint applies to bedroom windows at night only. For all other areas and façades of the site, acceptable internal noise conditions are expected to be provided during periods of overheating, with windows partially open.

5.28 One approach which is expected to be feasible for adoption here is to provide appropriately specified boost fans/boosted MEV systems to provide the additional ventilation rates required by ADO to provide relief from overheating where noise levels are such that open windows cannot be used for this purpose (discussed below). This must be confirmed by an overheating specialist and details of the final mitigation strategy to the affected plots could be secured by planning condition.

5.29 External noise emissions from any mechanical ventilation systems should ideally be limited to 30 dB $L_{A,T}$ at 3 m (when running at normal operating duty) from each termination to avoid disturbance to the properties they are serving and to immediate neighbours.

³ Building Regulations Approved Document F: Ventilation

6.0 Conclusions

6.1 This report supports a planning application for 44 dwellings on land off of West Hoathly Road, East Grinstead. Through pre-application discussions, a Mid Sussex District Council have indicated that a Noise Impact Assessment should be submitted to accompany the planning application.

6.2 A noise survey has been undertaken at the site to quantify the prevailing noise climate. From this data, a 3D computational noise model of the site has been prepared to allow for a detailed appraisal of site conditions.

6.3 Overall, the layout is considered to represent good acoustic design taking into account other site constraints and the need to achieve good placemaking/urban design. This is demonstrated in the setting back of dwellings from the road to provide an acoustic 'buffer zone' together with the layout which orientates the majority of dwellings such that garden areas are screened from noise and ensure that the frontage of built form acts as a barrier to reduce noise levels across the wider site.

6.4 A noise mitigation strategy has been developed to ensure suitable noise conditions are achieved for future residents, taking into account noise effects and building overheating control measures where appropriate.

6.5 For the entirety of the site, standard thermal double glazing and non-acoustic trickle ventilators will be sufficient to control overheating effects to the majority of dwellings (in combination with the proposed ventilation strategy). For a small number of façades, it will not be possible to rely upon partially open windows to control overheating in bedrooms at night-time only. For these rooms, appropriate MEV will be required in accordance with the ADO to avoid overheating. This can be secured by condition.

6.6 Noise levels in external amenity areas are expected to meet the aspirational noise target, taking into account localised 1.8 m tall acoustic screening (acoustic fence or brick wall) to a small number of gardens as per the proposed development layout.

6.7 The report therefore demonstrates that it will be entirely possible to achieve a suitable noise environment internally and externally for future residents of the proposed development, and a detailed noise mitigation strategy is set out herein for approval by the Council. Implementation of the strategy can be secured by condition.



Appendix A: Environmental Noise Survey

Details and results of noise survey undertaken on site

Methodology and Instrumentation

An unattended noise survey was undertaken at one position between Monday 29th September and Thursday 2nd October 2025. The unattended measurement position is labelled as 'MP1' on the following image showing where it was installed.

A 'spot-check' measurement was undertaken at one additional location further set back from the road simultaneously with MP1.

Image A1. Aerial Noise measurement positions

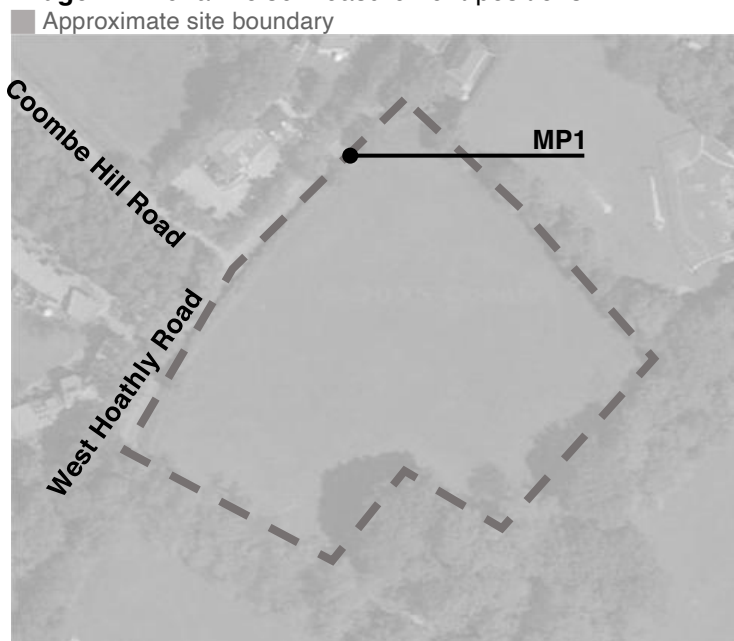


Image courtesy of Google Maps

Measurements of the L_{Aeq} , L_{Amax} and L_{A90} indices were recorded over consecutive 15-minute periods for the duration of the survey.

MP1 was located at a height of approximately 3.0 m above local ground level on the western boundary adjacent to the West Hoathly Road. Measurements were undertaken in free-field conditions.

The noise climate is dominated by traffic noise from subjectively low flow of vehicles passing the site. Noise is also audible from children playing in the external area of the nursery opposite.

Noise measurements were made using the equipment set out within the following table. The sound level meter was fitted within a weatherproof enclosure and was calibrated both before and after the survey to confirm an acceptable level of accuracy. No significant drift was noted to have occurred.

Noise measurement equipment

Location	Item	Detail
MP1	Sound Level Analyser	Norsonic Nor118
	Outdoor Microphone Kit	Norsonic Nor1251
	Acoustic Calibrator	Norsonic Nor1217

The weather conditions when setting up the survey equipment were warm and sunny with a small amount of cloud cover and a very light breeze. When collecting the equipment, the conditions were hot and calm with no cloud cover. Historical weather data captured at a nearby weather station shows that no material rain was present and wind levels were generally low during the survey duration.

Results

The following table set out the period noise levels captured across the duration of the unattended noise survey.

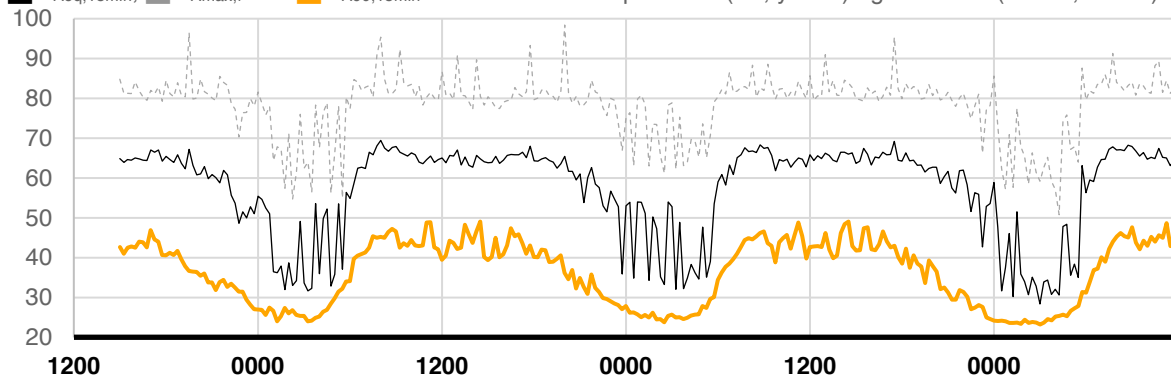
Summary period noise levels measured during the unattended noise survey, dB

Measurement Position	Daytime (0700-2300)	Night-time (2300-0700)	
	$L_{Aeq,16hour}$	$L_{Aeq,8hour}$	L_{Amax}
MP1	65	54	80

The following time history graphs present the measured noise levels captured at both assessment positions throughout the survey duration.

Image A2. Noise measurement results at position MP1

■ $L_{Aeq,15min}$, ■ $L_{Amax,f}$ and ■ $L_{A90,15min}$ in terms of sound pressure (dB, y-axis) against time (hhmm, x-axis)



Appendix B: Noise Modelling

Details of computational noise model

Noise Modelling Software

A computer-based noise prediction program (*Wölfel* IMMI 2024) has been used to determine the road traffic noise levels generated across the site by this noise source, using CRTN⁴ and ISO 9613⁵ as a basis to determine noise propagation paths throughout the model.

This software allows for the calculation of noise levels at specific points around a model, from a series of noise sources simultaneously, or produce noise contour plots. The noise model used has taken account of the following effects:

- Distance
- Screening
- Surface reflections
- Topography.

Model Input and Calibration

The modelled development layout is based on the *ECE Architecture* 'Site Layout' drawing (reference PL-01, dated 5th September 2025).

Building heights across the scheme are modelled as per the heights provided by Devine Homes, these being circa 8.5 m to 9.2 m high for residences and circa 5.2 m high for garages.

Topographical data has been based on LIDAR information publicly available through DEFRA.

The model used CRTN to define traffic noise propagation from West Hoathly Road in terms of daytime $L_{Aeq,16hour}$ and night-time $L_{Aeq,8hour}$ period noise levels, and ISO 9613 to define maximum noise levels in terms of $L_{Amax,F}$ from traffic on West Hoathly Road.

Noise Modelling Assumptions and Limitations

Assumptions have been made to allow for effective noise modelling to be undertaken.

Window heights (to centre of windows) are taken as 1.5 m for ground floor and 4.5 m for first floor.

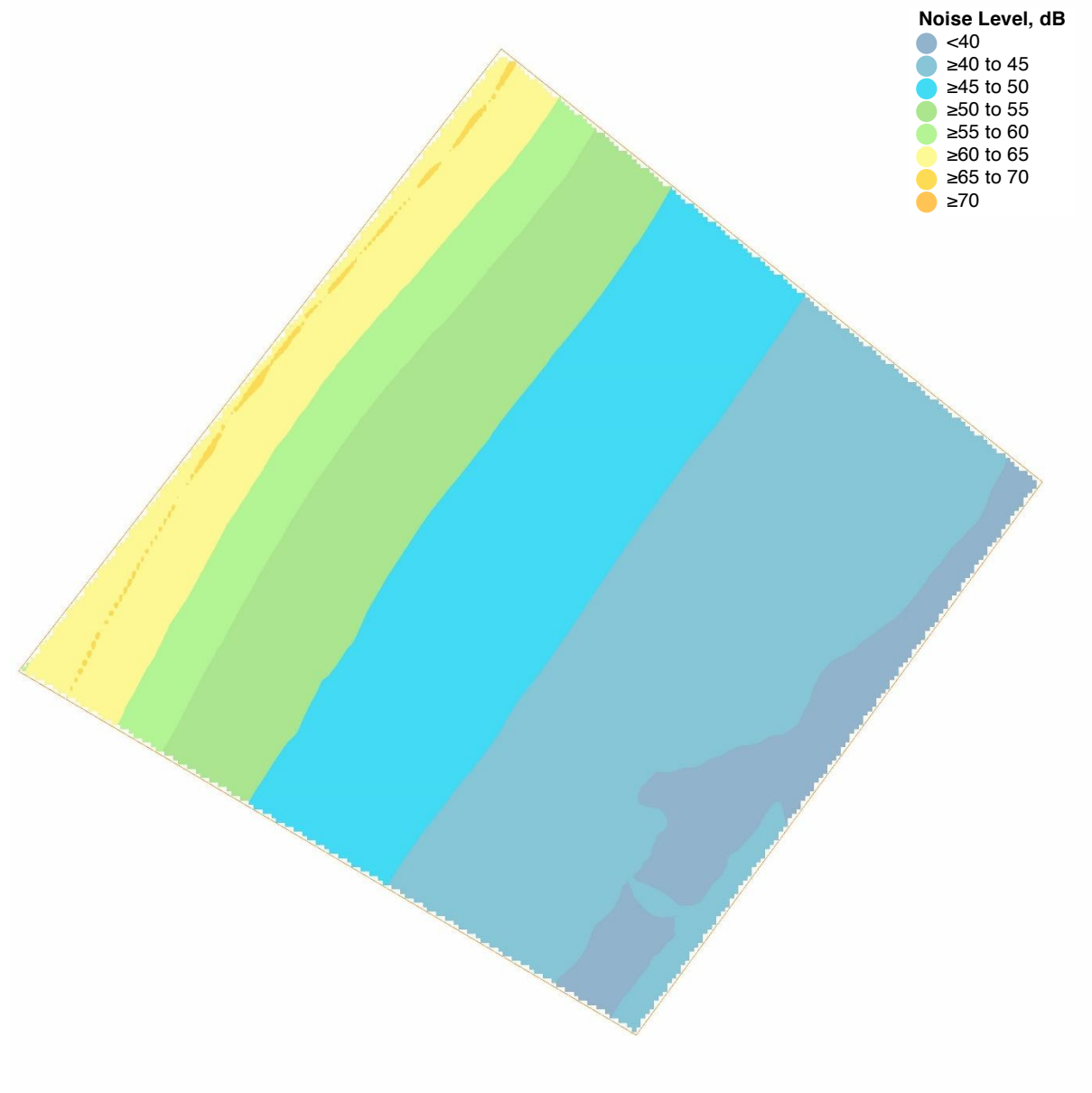
⁴ Calculation of Road Traffic Noise, Department of Transport, 1988

⁵ ISO 9613-1:1993 – Acoustics – Attenuation of sound during propagation outdoors — Part 1: Calculation of the absorption of sound by the atmosphere

Baseline daytime ($L_{Aeq,16\text{hour}}$) noise contour plots

Image B1

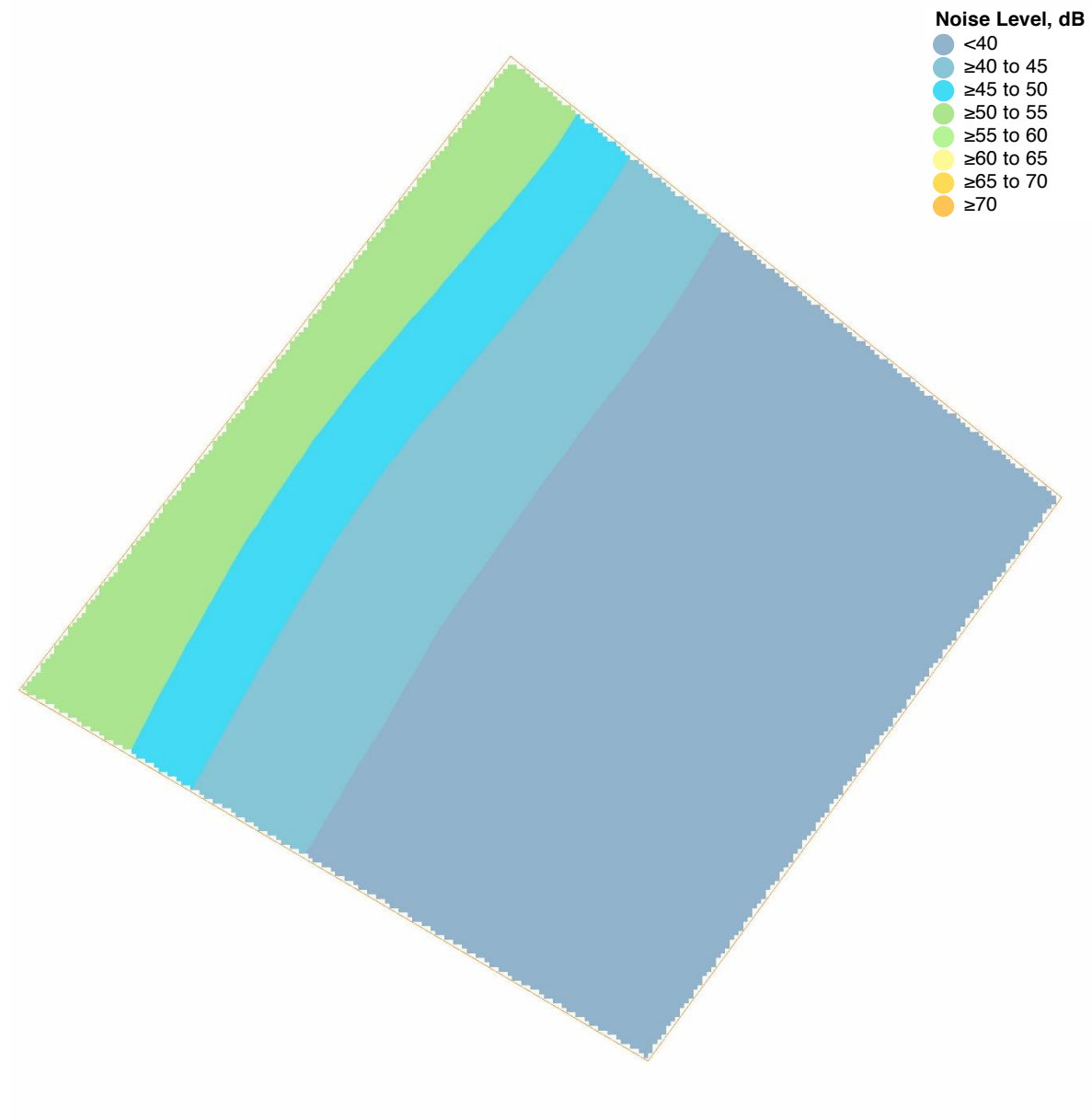
Contour at 1.5 m above ground level



Baseline night-time ($L_{Aeq,8hour}$) noise contour plots

Image B2

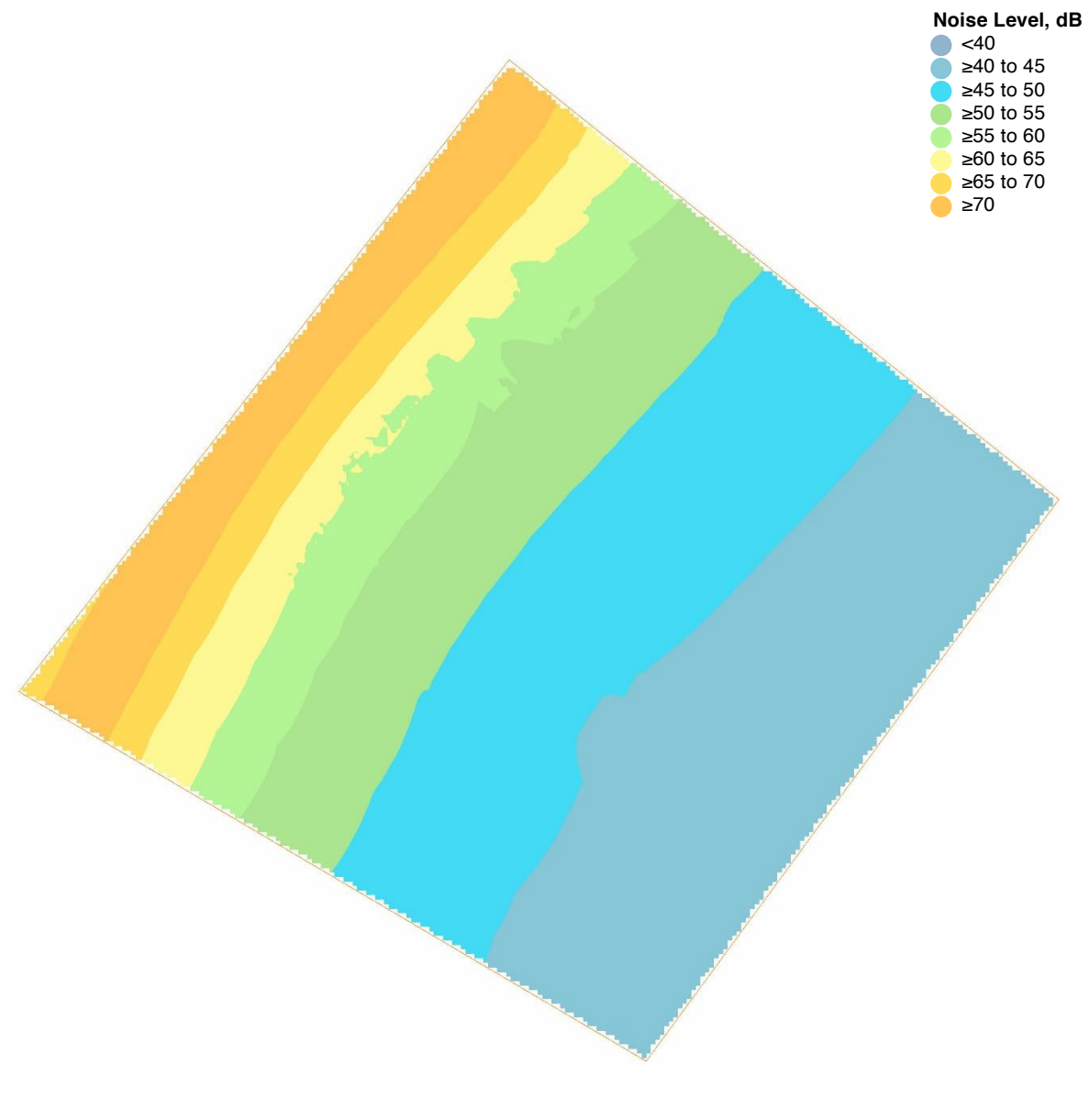
Contour 4.5 m above ground level



Baseline night-time max (L_{Amax}) noise contour plots

Image B3

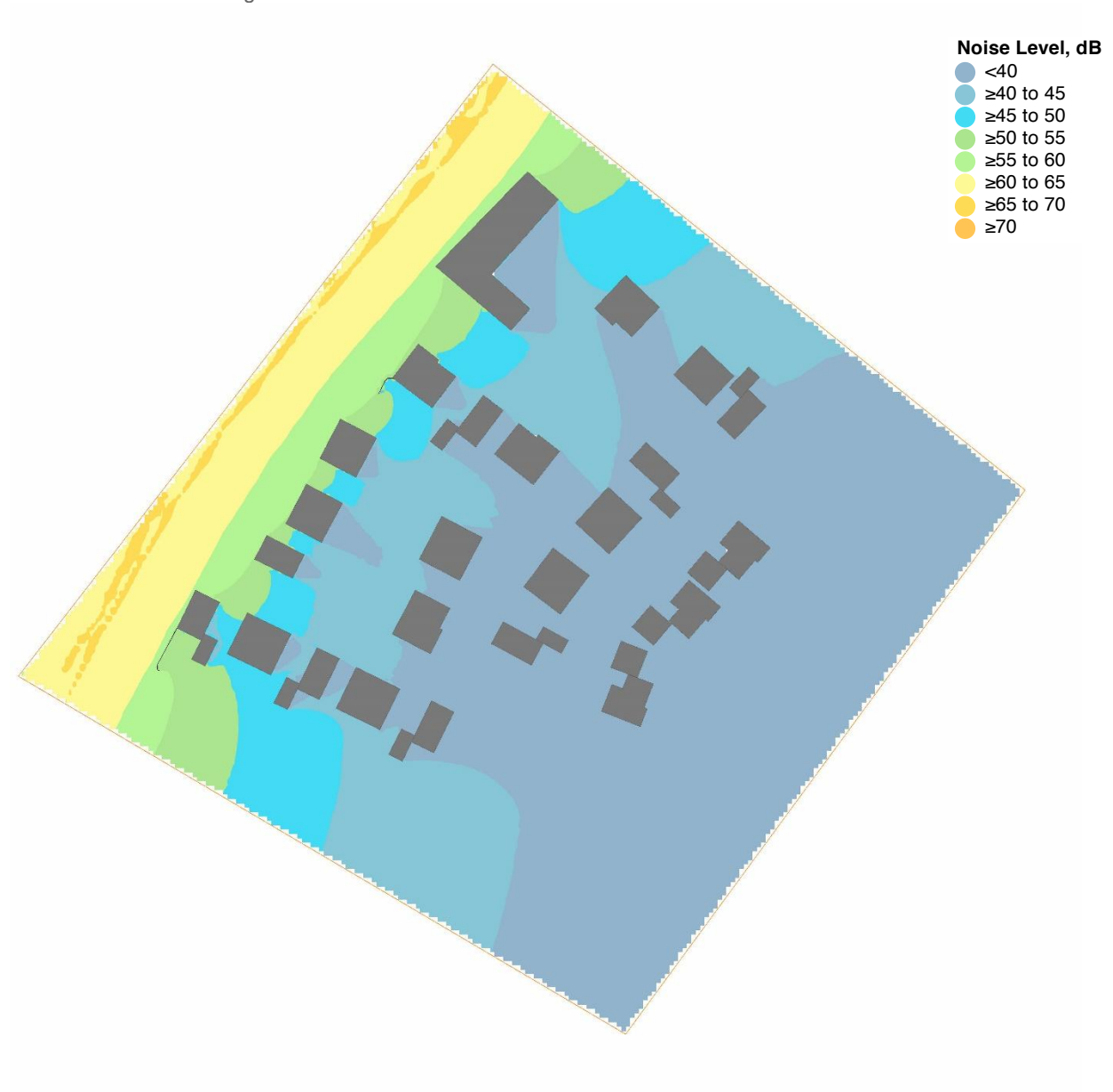
Contour 4.5 m above ground level



Daytime ($L_{Aeq,16\text{hour}}$) noise contour plots with development

Image B4

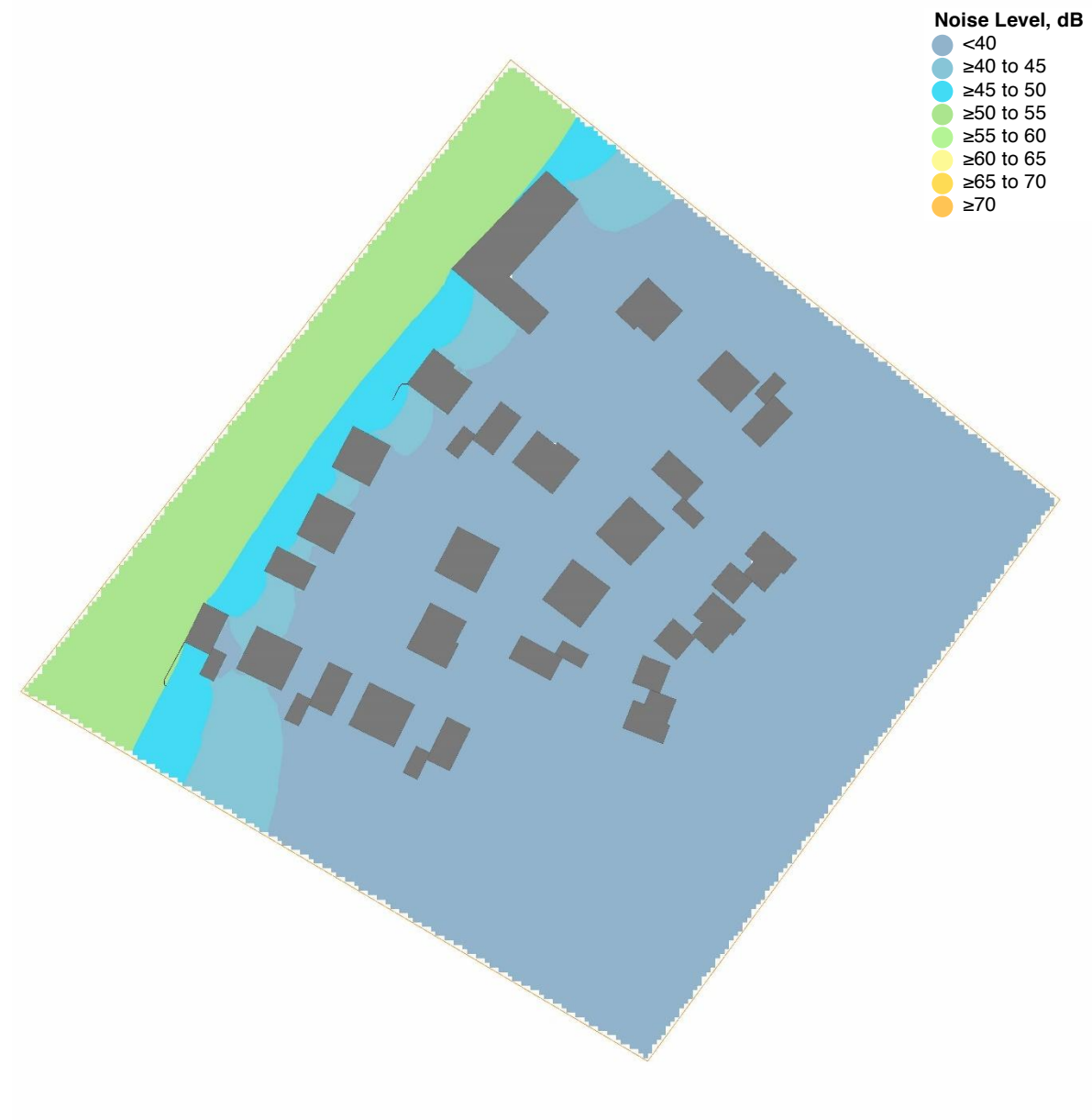
Contour at 1.5 m above ground level



Night-time ($L_{Aeq,8hour}$) noise contour plots with development

Image B5

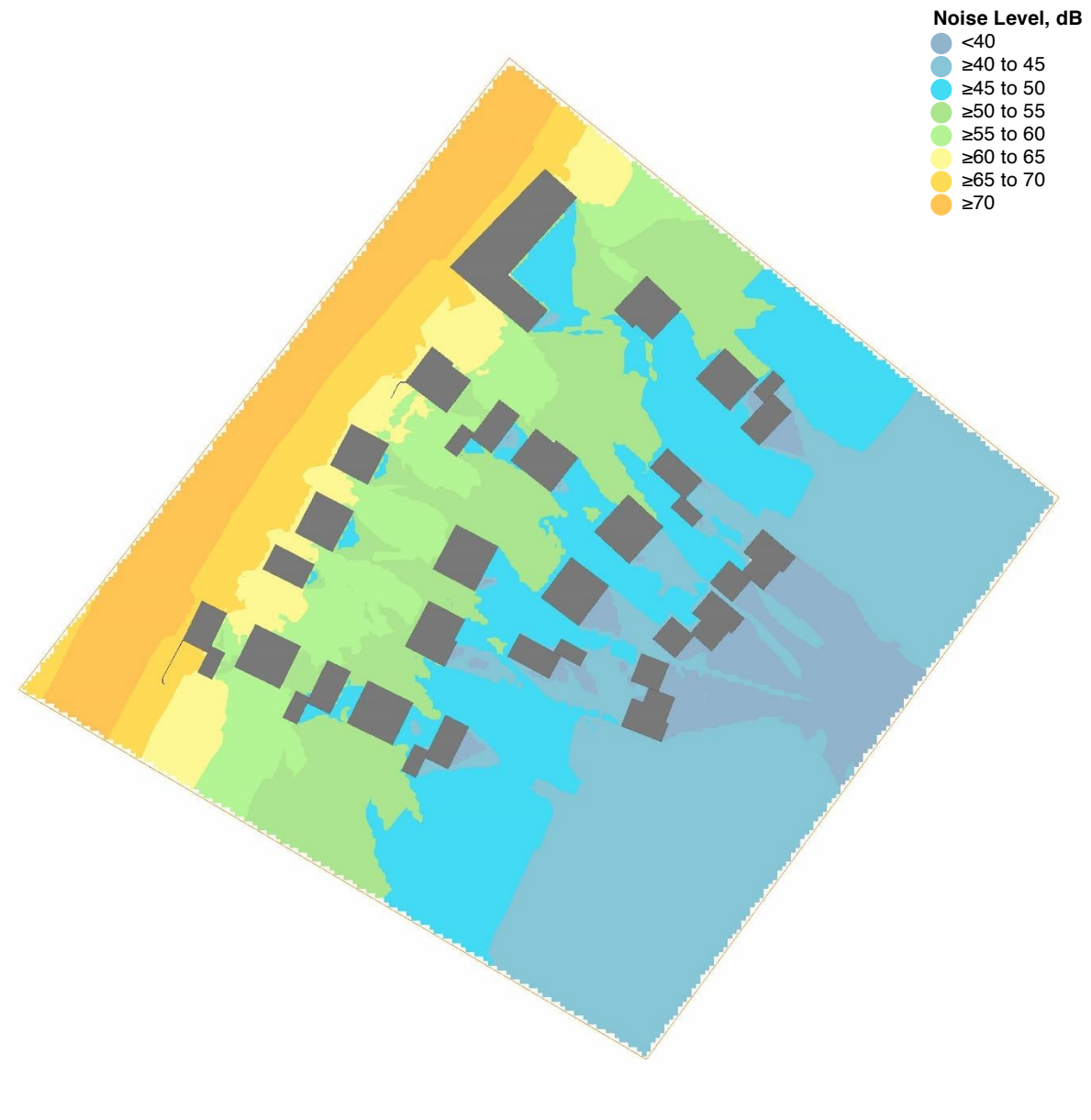
Contour 4.5 m above ground level



Night-time max (L_{Amax}) noise contour plots with development

Image B6

Contour 4.5 m above ground level



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Appendix C: Policy and Guidance

National Policy

National Planning Policy Framework

The NPPF is the relevant document for defining the national policy toward noise sensitive development. The document was originally published in March 2012 and most recently updated in December 2024.

Paragraph 135 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...”

Further to this and on the subject of noise, paragraph 187 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”

Paragraph 198 of the 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;”*

Clause “a)” in paragraph 198 makes reference the Noise Policy Statement for England which is discussed in the following section.

Noise Policy Statement for England

The NPSE (March 2010) also 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 which determine whether noise sensitive development is suitable and, if so, whether mitigation factors need to be considered.

Instead, the NPSE sets out the principle of “SOAEL, LOAEL and NOEL” which are defined as follows:

Significant Observed Adverse Effect Level (SOAEL): This is the level [of noise exposure⁶] above which significant adverse effects on health and quality of life occur.

Lowest Observed Adverse Effect Level (LOAEL): This is the level [of noise exposure²] above which adverse effects on health and quality of life can be detected.

No Observed Effect Level (NOEL): This is the level [of noise exposure²] below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

Given the overall thrust of the NPSE, the SOAEL is an important assessment threshold although the NPSE also comments in section 2.22 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.”

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 again in respect of the NPPF that the overall objective is to avoid or minimise significant adverse impacts; some degree of impact is acceptable, and it is not necessary or reasonable to seek to achieve no impact at all.

In addition to the principles set out above, the NPSE sets out three key 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.”

Paragraph 2.24 of the NPSE 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.

Each development site must be judged on its ability to deliver on each of these aims, and while rating the prevailing noise against predefined thresholds is no longer necessary, defining the prevailing noise levels is an essential first step in assessing a given site under the current regime.

⁶ Additional text drawn from the Planning Practice Guidance Definition

Planning Practice Guidance (PPG)

In March 2014 the Department for Communities and Local Government (DCLG) launched the national Planning Practice Guidance (PPG) web-based resource. The PPG on Noise (last updated in July 2019) 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. The PPG includes a section on noise, paragraph 003 of the 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.”*

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 the relevant SOAEL, LOAEL and, by inference, the NOEL. Definitions for these thresholds are provided again with the PPG, which differ very slightly in wording to the NPSE, but are taken to be identical in their meaning.

In relation to the SOAEL, LOAEL and NOEL, the PPG makes the following important statement:

“Although the word ‘level’ is used here, this does not mean that the effects can only be defined in terms of a single value of noise exposure. In some circumstances adverse effects are defined in terms of a combination of more than one factor such as noise exposure, the number of occurrences of the noise in a given time period, the duration of the noise and the time of day the noise occurs.”

The guidance then presents a table, which is reproduced in the following table. The implication of the final line of the table is that only the 'present 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.

On that basis, noise levels deemed to be below the SOAEL can be considered acceptable providing noise has been mitigated and reduced to a minimum.

Table 1.1. Planning Practice Guidance summary of noise exposure hierarchy.

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect	No specific measures required
NOEL - No Observed 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 Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
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

It is noteworthy that the PPG states that:

"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).

Guidance Documents

The ProPG and BS 8233:2014

The Professional Practice Guidance on Planning & Noise – New Residential Development, 2017 (ProPG) was prepared by the Institute of Acoustics, the Chartered Institute of Environmental Health and the Association of Noise Consultants.

In relation to residential development, the ProPG builds on the principles and criteria set out BS 8233:2014 – Guidance on sound insulation and noise reduction for buildings (BS 8233).

While the ProPG it is helpful in many ways, it must be noted that the guidance and supplementary documents “does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy on which users should take their own advice as appropriate”.

Section 2.27 of the ProPG states:

“It is considered that suitable guidance on internal noise levels can be found in “BS8233:2014: Guidance on sound insulation and noise reduction for buildings”. Table 4 in Section 7.7.2 of the standard suggests indoor ambient noise levels for dwellings (when unoccupied) and states that “in general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values”. The standard states (Section 7.7.1) that “occupants are usually more tolerant of noise without a specific character” and only noise without such character is considered in Table 4 of the standard.”

Indeed, ProPG expands on the advice and notes of BS 8233 Table 4, with relevant sections presented below:

Table 1.2. BS8233/ProPG internal noise criteria

Activity	Location	Internal Ambient Noise Level	
		Daytime (0700-2300)	Night time (2300-0700)
Resting	Living Room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$ 45 dB $L_{Amax,f}$ (Note 4)

Note 4

“... 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”

Note 5

“... Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the “open” position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded subject to the further advice in Note 7.”

Note 7

“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.”

With respect to external amenity spaces, ProPG again points to BS 8233 that 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 $L_{Aeq,16hr}$...”

“...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.”

The above thresholds (adjust as necessary taking into account the relevant notes) are taken to correspond to LOAELs, when considered in relation to the PPG and NPSE.

The ProPG sets out the principle of the “Acoustic Design Statement” (ADS) in which noise is quantified and assessed, and mitigation measures determined in line with the methodology set out therein. The preparation of an ADS is not relevant or appropriate for all sites, however many of the principles are those which would typically be adopted when preparing noise assessment for planning submissions etc.

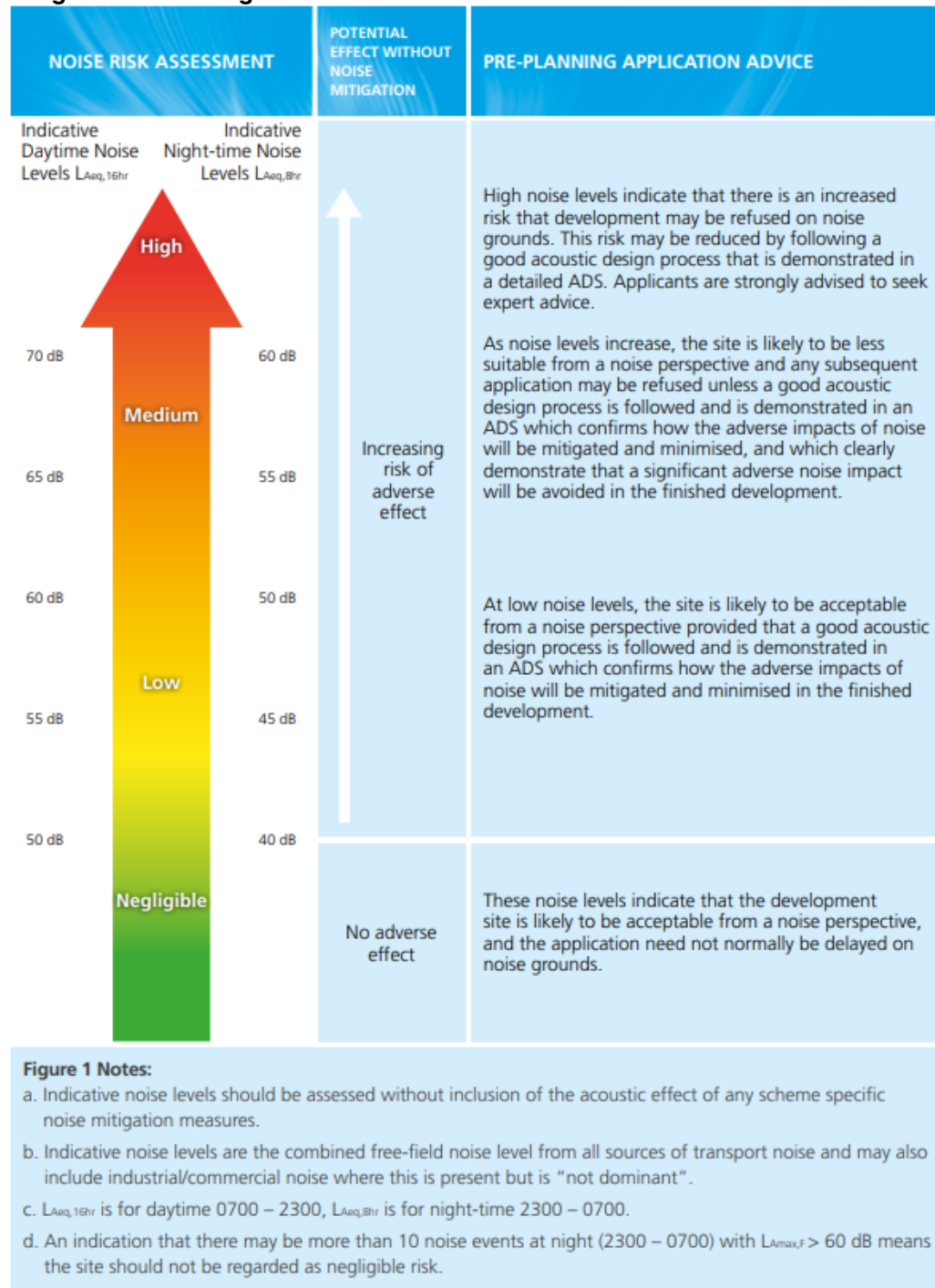
Features which may be included within an ADS comprise:

- An initial site noise risk assessment;
- A description of external site noise levels before and after mitigation measures;
- Demonstrations of good acoustic design principles;

- Details of how internal noise guidelines will be achieved;
- Assessment of the impact of $L_{Amax,F}$ noise levels where guidelines values are exceeded;
- An aim to achieve internal noise guidelines with windows open where practical, noting this approach will not necessarily be possible. Due consideration should be given to ventilation and thermal comfort with windows closed;
- Acoustic design to achieve good living conditions where internal noise guidelines can only be achieved with windows closed (noting the guidelines are not applicable when windows are open to provide purge ventilation);
- Information regarding the steps taken to minimise overheating where this is relevant to noise;
- A consideration of noise to external amenity areas;
- A presentation of the findings of the assessment, resulting noise impacts and any mitigation measures that may be required.

With regard to the initial site noise risk assessment, the ProPG sets out the following table. It is important to understand that a site with external noise levels categories as high risk does not mean that site is necessary unsuitable for development. Instead, it means that a good acoustic design process must be followed to ensure suitable conditions are provided to future occupants.

Image 1: ProPG Stage 1 Initial Site Risk Assessment



As neither the ProPG of BS 8233 form statutory guidance or regulations, it falls to the acoustics practitioner (or other similar party) to determine how the documents should be interpreted and how their contents are applied to any given scheme.

Building Regulations Approved Document O: Overheating

The Building Regulations Approved Document O (ADO) on overheating was published In December 2021. It sets out requirements to ensure that overheating (and related effects) within new residential buildings are suitably controlled.

ADO took effect on 15 June 2022 in England but does not apply to work subject to a building notice, full plans application or initial notice submitted before that date, provided the work for each building was started before 15 June 2023.

The statutory, legal requirements of ADO are replicated below, with particular attention drawn to part O1(2)(a):

Requirement O1(2)(a)

This section deals with requirement O1(2)(a) of Schedule 1 to the Building Regulations 2010.

Requirement	
Requirement	Limits on application
O1 Overheating mitigation	
(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.	

Intention

In the Secretary of State's view, requirement O1(2)(a) is met in a new residential building if the building's overheating mitigation strategy for use by occupants takes account of all of the following.

- Noise at night – paragraphs 3.2 to 3.4.
- Pollution – paragraph 3.5.
- Security – paragraphs 3.6 and 3.7.
- Protection from falling – paragraphs 3.8 to 3.10.
- Protection from entrapment – paragraph 3.11.

It can be seen that accounting for potential noise effects at night is an important consideration when addressing the requirements of part O1(2)(a), in relation to ensuring the "reasonable enjoyment of the residence".

Section 3.2-3.4 of ADO sets out the following guidance with respect to noise. This does not form part of the statutory requirement but serves as guidance for how, in the Secretary of State's view, noise should be addressed when considering overheating:

Noise

- 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.
- 40dB $L_{Aeq,T}$ averaged over 8 hours (between 11pm and 7am).
 - 55dB L_{AFmax} more than 10 times a night (between 11pm and 7am).
- 3.4** Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants' *Measurement of Sound Levels in Buildings* with the overheating mitigation strategy in use.

NOTE: Guidance on reducing the passage of external noise into buildings can be found in the *National Model Design Code: Part 2 – Guidance Notes* (MHCLG, 2021) and the Association of Noise Consultants' *Acoustics, Ventilation and Overheating: Residential Design Guide* (2020).

The language of the text preceding the “limits” in section 3.3 suggest that these could be taken as guideline figures to assist the designer in identifying where noise issues may arise. The guidance does not state that noise levels must not exceed the “limits”, or that windows would always be shut where the above thresholds are exceeded, only that “windows are likely to be closed during sleeping hours” under such noise conditions.

It is important to note that in the context of ADO, the use of mechanical ventilation (e.g. MVHR) is considered a “passive means” of cooling a building. As per the requirements of ADO, “mechanical cooling” such as air conditioning may only be considered where all other passive methods of cooling are found to be insufficient.

Approved Document O Noise Guide, November 2024

The above-titled guide provides guidance for practitioners when implementing the requirements of Approved Document. It is designed to assist the acoustics industry in the understanding of what is published in the regulation and provides an agreed interpretation of the content.

The following external noise thresholds are set out in table 1 of the guidance. These thresholds apply when using the Simplified Method set out within ADO and relate to high and moderate overheating risk areas (again, as described within ADO):

Table 1 External Noise Levels Above Which the Simplified Method Cannot Be Used

Parameter	High Risk Location	Moderate Risk Location
$L_{Aeq,8h}$ averaged over 8 hours (between 11pm and 7am)	45 dB	50 dB
L_{AFmax} more than 10 times a night (between 11pm and 7am)	60 dB	65 dB

Note: Several assumptions have been used to determine the outside-to-inside level difference. These are: 2.4m bedroom height, 0.5s bedroom RT, simple hole in the façade of area sufficient to provide the required Equivalent Area, no sound transmission other than via the opening. Calculation according to Equation G.1 of BS 8233:2014 [Ref. 7].

The table sets external noise thresholds based on achieving the 40 dB $L_{Aeq,8hour}$ and 55 dB $L_{Amax,f}$ thresholds set out in the ADO, but a 5 dB reduction in noise offered by a façade opening in high overheating risk areas or a 10 dB reduction in moderate overheating risk locations. These losses

are linked to the areas of opening that related to the ventilation provision requirements of the ADO Simplified Method.

As East Grinstead falls outside of London (and the other areas identified in Appendix C of the ADO), it is classed as a having a “moderate” overheating risk when considered in accordance with the simplified method set out within the ADO. Therefore, external levels of 50 dB $L_{Aeq,8hour}$ and 65 dB L_{AFmax} can be taken as thresholds to identify where open windows could not be used to control overheating effects.

Where the Simplified Method cannot be used, or where the developer decides they want to use an alternative approach to the Simplified Method, dynamic thermal modelling is required. The ADO noise guide provides a means for acoustic consultant to provide guidance to the dynamic thermal modelling consultant (DTMC) to support this more detailed approach.

The ADO Noise Guide sets out a means to calculate the permitted Equivalent Area of facade opening that can be considered during dynamic thermal modelling, based on the noise constraints of a given site. This essentially limits the amount of window (or other ventilation) opening than can be considered by the DTMC, based on the noise level difference that is required through the façade to achieve the relevant ADO noise thresholds. When considering façade incident external noise levels, the following formula applies:

Equation 1⁸

$$EA \text{ based on façade level difference} = V \times 10^{\left(\frac{-(D_{2m,nT} + 5)}{10}\right)}$$

Where

$D_{2m,nT}$ is the is the façade level difference between the A-weighted level 2m in front of the façade ($L_{1,2m}$), and the standardised internal A-weighted level ($L_{eq,2,nT}$). In the absence of any better alternative method, the same principle can be applied to L_{AFmax} .

V is the room volume (m^3)

EA is the Equivalent Area of the open window (m^2)

When considering free field external noise levels, the following formula applies:

Equation 2⁸

$$EA \text{ based on freefield level difference} = V \times 10^{\left(\frac{-(D_{nT} + 8)}{10}\right)}$$

Further guidance is provided in the guide with respect to ventilation louvres. This is not replicated here for the same of brevity but shall be considered when necessary and appropriate.

Where it is necessary to either totally or partially restrict the use of open windows due to external noise constraints and provide additional ventilation or cooling through mechanical means, the following suggested internal noise thresholds are set out within the ADO noise guide:

Parameter	Bedrooms
Mechanical ventilation or mechanical cooling system noise	$L_{Aeq,T} 30 (\pm 5) \text{ dB}$

Further to the above, the following is noted:

“Higher noise levels than those in Table 2, e.g. by up to 10 dBA, may be appropriate in some operating scenarios, where rapid changes to the cooling or ventilation rates quickly improve the thermal comfort of the occupant. Equally, lower noise levels may be appropriate for some types of residential development”

The guide also provides information regarding assessment uncertainty, post-completion noise measurements (not recommended to be undertaken), reporting and other factors. These elements are not set out here for the sake of brevity but are considered where necessary and appropriate.

