



# **Land at Foxhole Lane, Bolney**

## **Noise Impact Assessment**

Report 2A73.RP.01.1 // 16 July 2026

prepared for

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## Document Details

|                  |                              |
|------------------|------------------------------|
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## 1.0 Introduction

1.1 Outline planning permission has been granted for residential development on land to the east of Foxhole Lane, Bolney (application reference: DM/25/1129). The planning permission is subject to 41 planning conditions, with number 16 relating to noise.

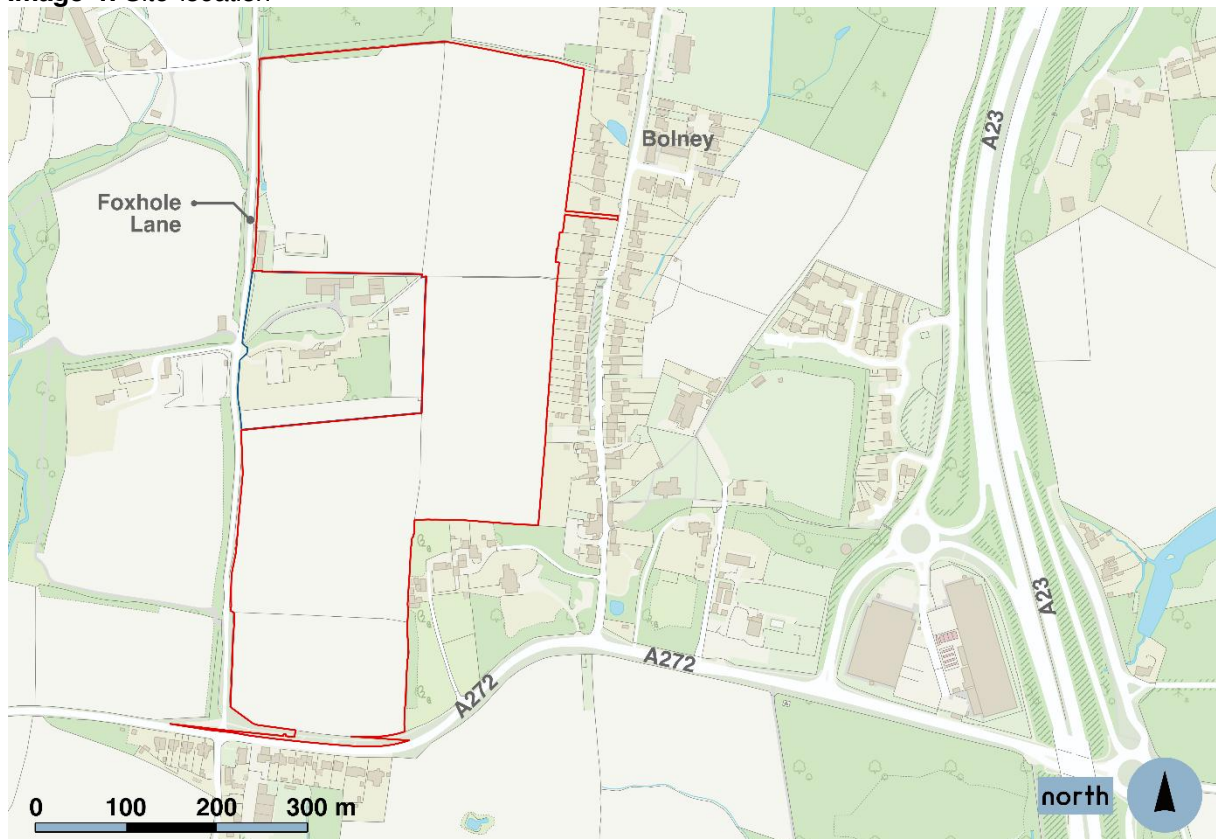
1.2 This report sets out the survey and assessment methodologies and results, demonstrating compliance with condition 16. Noise related local and national planning policy and guidance has been considered, noise conditions across the site have been quantified, good acoustic design practices are demonstrated to have been considered, and the noise control strategy for the scheme is confirmed.

## 2.0 Site Location and Description

2.1 The proposed development site is located within Bolney to the north of Cowfold Road (the A272). It currently consists of farmland and is within the jurisdiction of Mid Sussex District Council (MSDC).

2.2 To the north and west of the site consists of countryside and residential property. The A23 runs to the east beyond Bolney. The approximate extent of the site can be seen outlined in **red** on the following **Image 1**.

**Image 1.** Site location



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## 3.0 Design Criteria

### Planning Context

3.1 The site holds outline planning permission for residential development, MSDC reference DM/25/1129, with conditions. Condition 16 states:

*"No development shall commence until a scheme that addresses the issues of acoustics, ventilation and overheating (AVO) has been submitted to and agreed in writing by the Local Planning Authority.*

*Good acoustic design shall be fully integrated into the scheme. The hierarchy of good acoustic design (GAD) shall be applied in descending order and the methods utilised shall be clearly outlined in an Acoustic Design Statement (ADS).*

*The scheme shall a) outline the level of noise exposure for each property and how the noise level within any domestic living room or bedroom, with windows open for normal ventilation, shall comply with the desirable internal noise levels as outlined in Table 2.1 of BS8233:2014 and b) outline how the noise level within any domestic bedroom, with windows open, shall not normally exceed 42 dB(A) LAFmax between 23:00 and 07:00, in line with WHO NNGI 2007.*

*Where the standards in (a) or (b) above cannot be achieved following GAD and with windows open, only then shall the scheme show how those standards will be met with windows closed and how adequate ventilation and cooling will be provided.*

*and unless otherwise agreed in writing by the Local Planning Authority,*

*Where windows must remain closed to achieve acceptable internal noise levels, an overheating assessment must be undertaken in accordance with CIBSE. The cooling hierarchy shall be applied to the scheme. The methods integrated into the design to prevent overheating shall be fully outlined in the AVO scheme, and no dwelling hereby permitted shall be occupied until the approved scheme has been implemented in full for that dwelling.*

*If as a last resort mechanical ventilation is to be used, it must be demonstrated that it still complies with internal noise levels while providing sufficient ventilation.*

*Any amendments to the scheme or alterations to it must be agreed in writing with the Local Planning Authority in advance.*

*All acoustic reports submitted in relation to the scheme shall include characterisation of uncertainty and shall demonstrate the adoption of good practice to minimise uncertainty.*

*Reason: To protect the amenity of future residents and to accord with Policy DP26 of the Mid Sussex District Plan 2014-2031."*

3.2 Suono have discussed the requirements of the condition with MSDC's Environmental Health Officer (EHO) and have agreed the following noise assessment criteria as set out in **Table 1**.

3.3 These criteria form one aspect of 'Good Acoustic Design', as defined by ProPG<sup>1</sup>, with the other aspects demonstrated later in this report.

---

<sup>1</sup> Professional Practice Guidance on Planning & Noise – New Residential Development, 2017

**Table 1** Noise assessment criteria

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

3.4 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  $L_{Aeq,8hr}$  and / or 65 dB  $L_{Amax,f}$  during the night time period, it is necessary to provide a building overheating control strategy that does not necessarily rely on partially open windows to bedrooms at night. As discussed later in this report, the above approach is based upon acoustics industry guidance<sup>2</sup> on how to demonstrate compliance with the Building Regulations Approved Document O.

## 4.0 Noise Survey

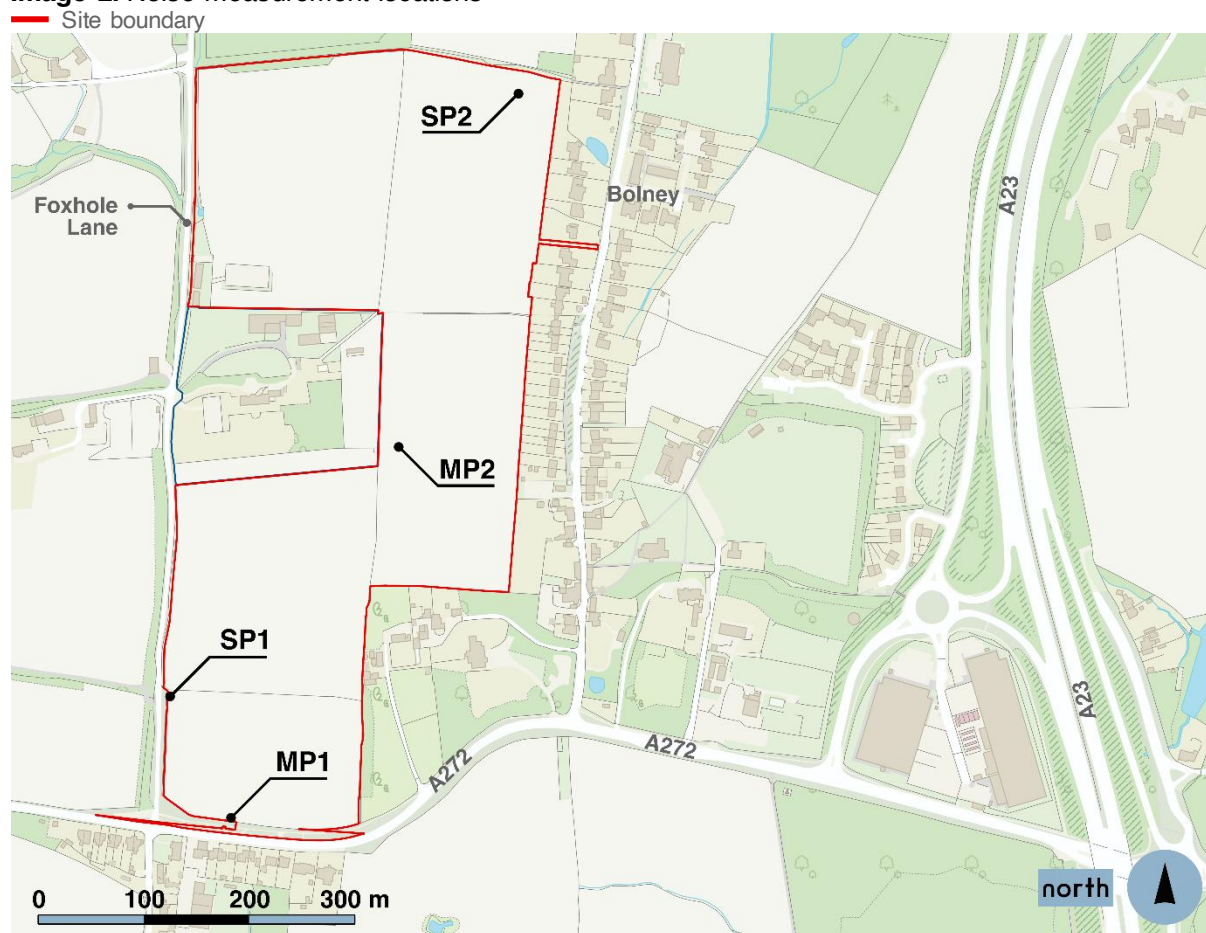
4.1 An unattended noise survey was undertaken at the site between 12:00 on Wednesday 22<sup>nd</sup> April and 12:00 on Tuesday 28<sup>th</sup> April 2026. Full details of the noise survey can be found in the attached **Appendix A**.

4.2 Noise measurements were taken at two locations. These positions are denoted as 'MP1' and 'MP2' on **Image 2** and were selected to best quantify the main sources of noise affecting the site (being the A272 to the south and the A23 to the east).

4.3 Additional attended spot-check measurements were also undertaken at the positions labelled 'SP1' and 'SP2' on the following image. The unattended noise monitors remained operational to establish the deviation of noise levels across the site.

<sup>2</sup> Approved Document O Noise Guide, Version 1.1 (IoA and ANC, November 2024)

**Image 2.** Noise measurement locations



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## Results

4.4 Time history graphs illustrating the captured results of the unattended noise monitoring are set out within **Appendix A**.

4.5 Daytime  $L_{Aeq,16hr}$  and night-time  $L_{Aeq,8hr}$  period noise levels along with the typical  $L_{Amax,f}$  event noise levels recorded over the course of the unattended noise survey are set out within **Table 2**, with the corresponding octave band spectra set out within **Appendix A**. These figures have been used for the purposes of the assessment.

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

| Measurement Position   | Daytime<br>(0700-2300) | Night-time<br>(2300-0700) |            |
|------------------------|------------------------|---------------------------|------------|
|                        | $L_{Aeq,16hour}$       | $L_{Aeq,8hour}$           | $L_{Amax}$ |
| MP1: Southern boundary | 63                     | 61                        | 76         |
| MP2: Middle of site    | 52                     | 50                        | 60         |

4.6 Ambient noise levels across the site were affected by road traffic noise from the surrounding network, particularly the A272 to the south and the A23 to the east.

## 5.0 Noise Assessment

### Computational Noise Model

5.1 A computational noise model of the site has been developed to allow for detailed predictions of noise across the site. The model has been created using digital plans of the site and wider area, and 1 m topographical contours produced by DEFRA.

5.2 The noise model has been used to predict day and night-time noise levels in terms of  $L_{Aeq,16hour}$ ,  $L_{Aeq,8hour}$  and  $L_{Amax,f}$  respectively. All calculations to determine mitigation measures have been based on the octave band noise levels previously referenced within this report and set out within **Appendix A** to ensure a robust approach.

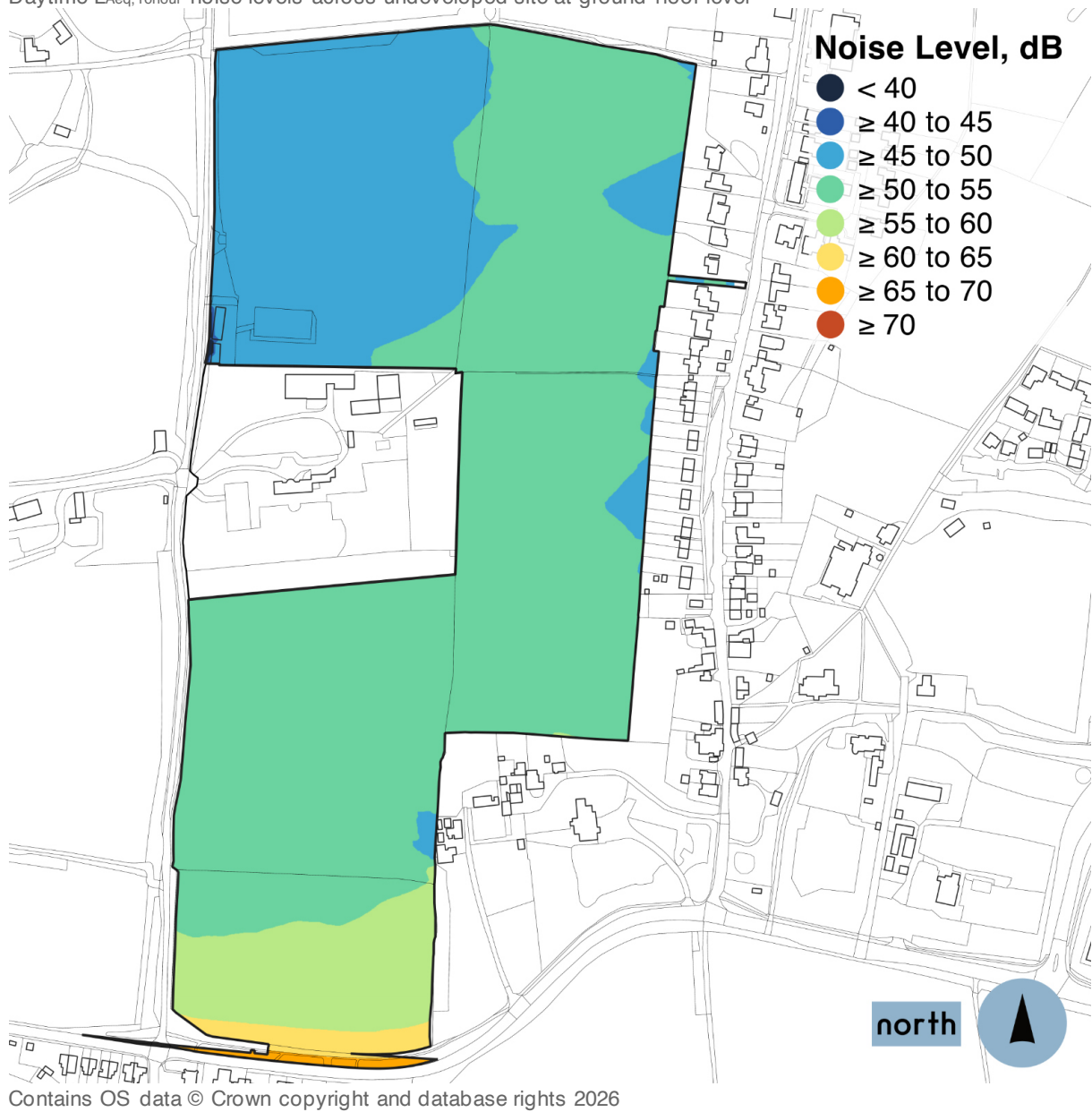
5.3 A description of the noise modelling methodology and additional noise contour results, with the development in place, are set out within **Appendix B**.

### Baseline Noise Conditions

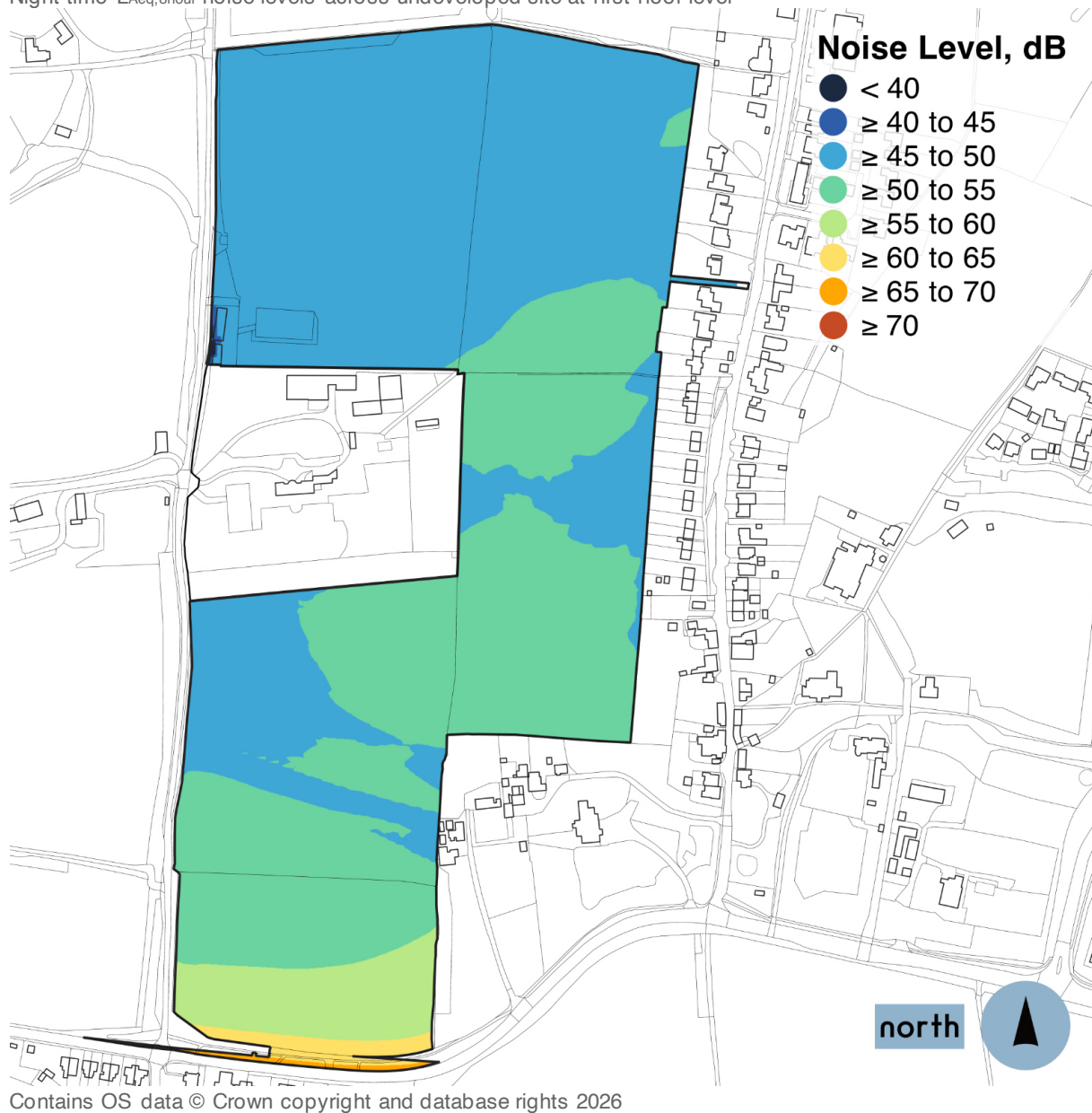
5.4 The following **Image 3** and **Image 4** show the predicted day and night-time baseline noise conditions (in terms of  $L_{Aeq,16hour}$  and  $L_{Aeq,8hour}$ ) respectively across the proposed development site, based on the results of the noise survey.

5.5 Baseline noise predictions have also been prepared for  $L_{Amax}$  event noise levels at first storey height but are not presented here for the sake of brevity (these are included within the noise contour figures set out within **Appendix B**).

**Image 3.** Daytime baseline noise contour at 1.5 m above ground level  
Daytime  $L_{Aeq,16hour}$  noise levels across undeveloped site at ground floor level



**Image 4.** Night-time baseline noise contour at 4.5 m above ground level  
Night-time  $L_{Aeq,8hour}$  noise levels across undeveloped site at first floor level



## Good Acoustic Design Principles and Layout Development

5.6 The proposed development layout has been developed to offer inherent noise mitigation. This has been achieved through incorporating good acoustic design practices as described within this section.

### Reducing Noise Levels at Source

5.7 A key principle of good acoustic design is seeking to reduce external levels of noise affecting receptors as far as is practicable. Where practicable, it is desirable to mitigate noise near to the source.

5.8 The roads with noise levels impacting on the site are all fixed noise sources and cannot be moved (as is sometimes applicable for other types of noise source). The A23 is already screened from the site through topography and existing buildings to the east of the site, which act as a barrier.

5.9 The use of large noise barriers or bunds as a primary mitigation measure to control noise from Cowfold Road to the south is not practicable and is not considered good placemaking in this instance, largely for reasons of visual impact and the presence of required drainage basins.

5.10 Dwellings have been set back as far as is reasonably practicable from Cowfold Road, with the nearest facades being approximately 36 m from the nearest kerb edge. This has been increased from approximately 30 m, as was shown on the indicative layout submitted alongside the outline planning application.

5.11 This separation distance provides an acoustic 'buffer zone', reducing noise levels incident on the facades over distance. It is not possible to increase the separation distance any further due to the topography immediately to the north of the southern parcel, as well as other non-acoustic factors.

### Layouts and Building Orientation

5.12 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.

5.13 This approach has reduced noise across the wider development site from both Cowfold Road and the A23.

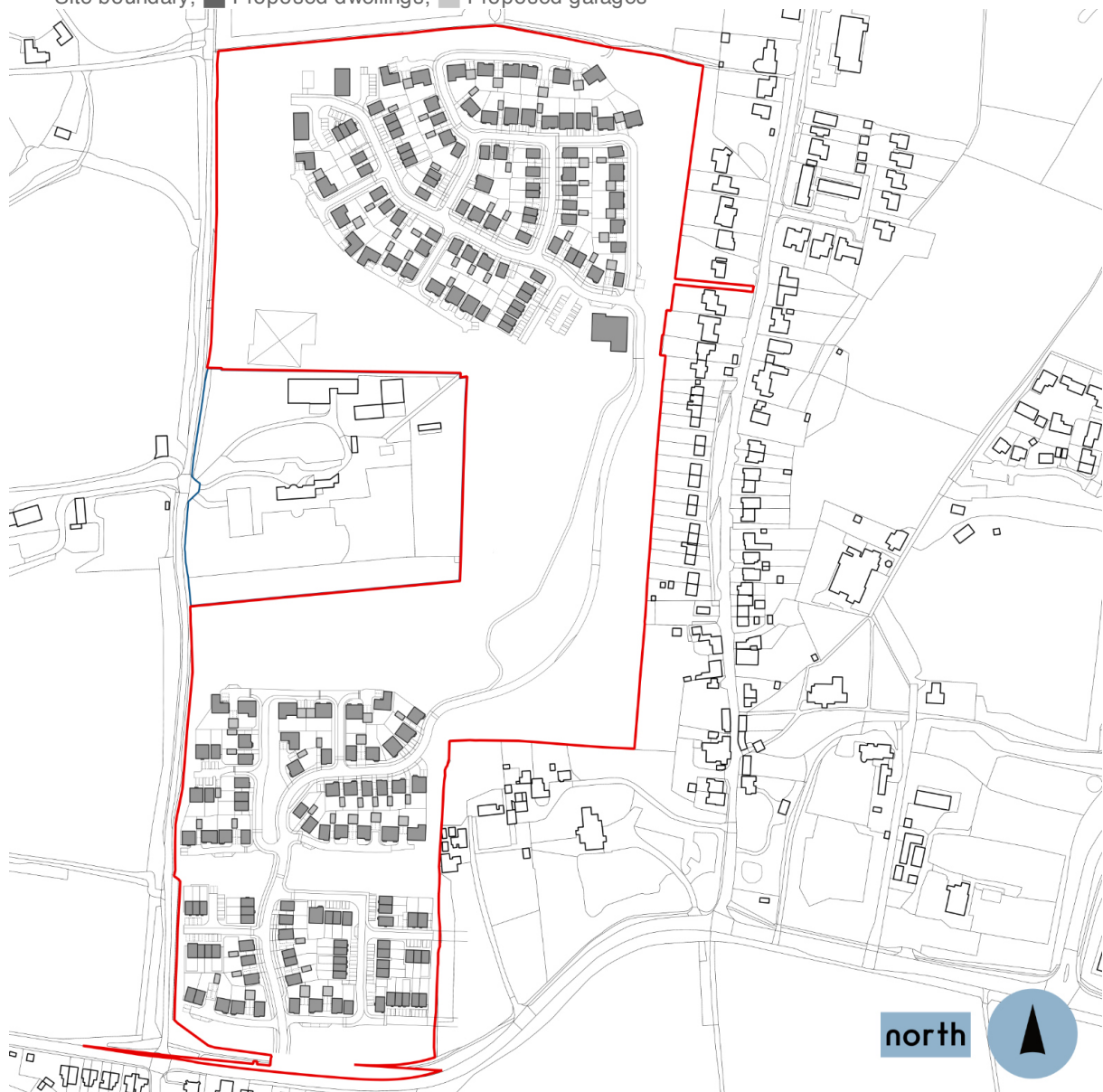
5.14 Within the northern parcel, dwellings have been grouped such that garden areas are largely screened from the A23. There are two gardens in the north eastern corner of the northern parcel that are not screened within a parcel, but are instead screened by the existing buildings immediately to the east.

5.15 Such principles have been incorporated into the layout which were not previously present in the Illustrative Layout submitted alongside the outline planning application.

5.16 The above principles can be seen to have been incorporated into the proposed development layout shown on *Thrive Architects* 'Site Layout drawing (reference: CALA250729 SL01 P19, dated: 10 October 2025) and reproduced here in **Image 5**.

**Image 5. Site Layout**

— Site boundary, ■ Proposed dwellings, ■ Proposed garages

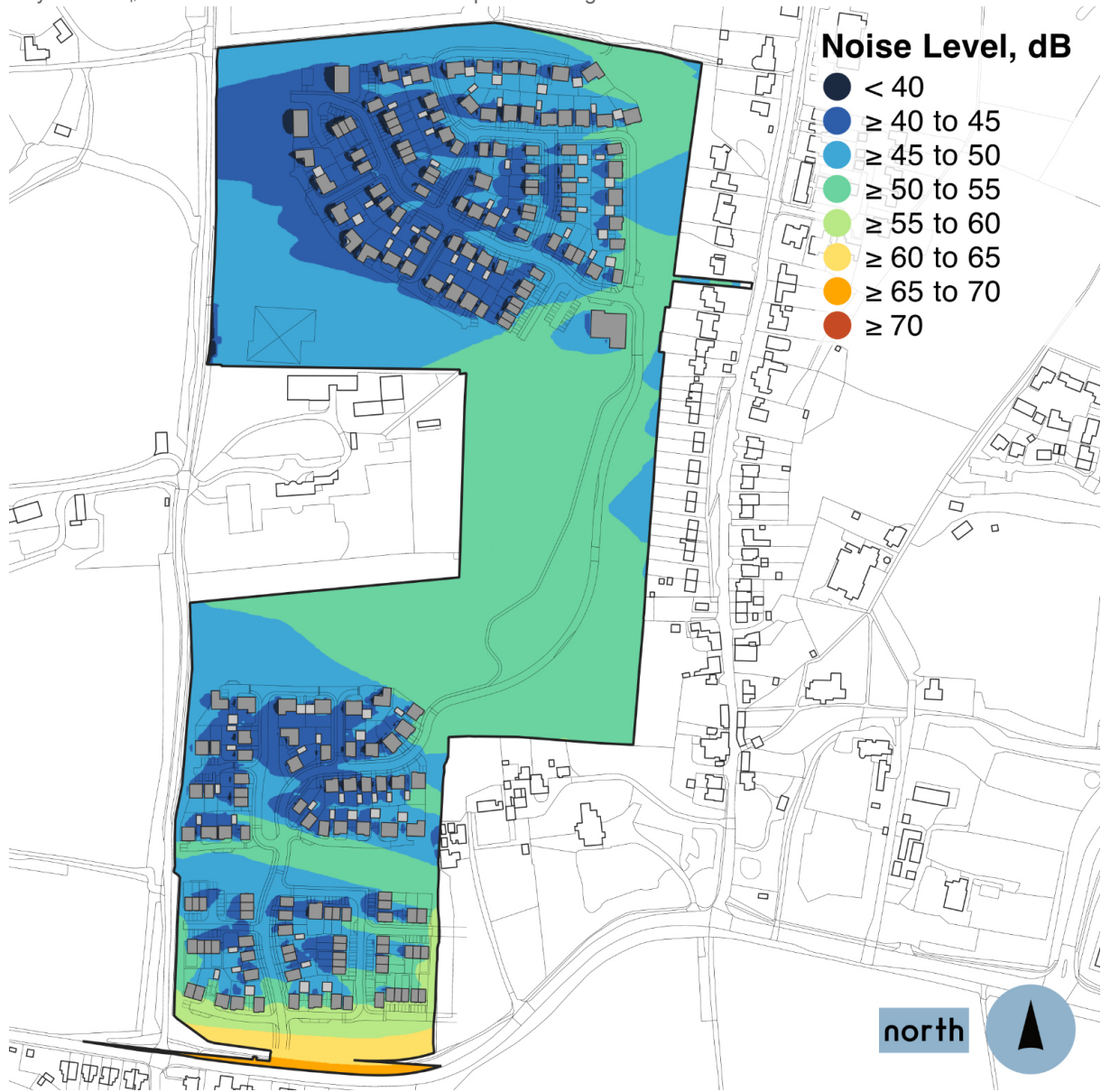


Thrive Architects drawing CALA250729 SL01 P19

## Noise Conditions Across the Developed Site

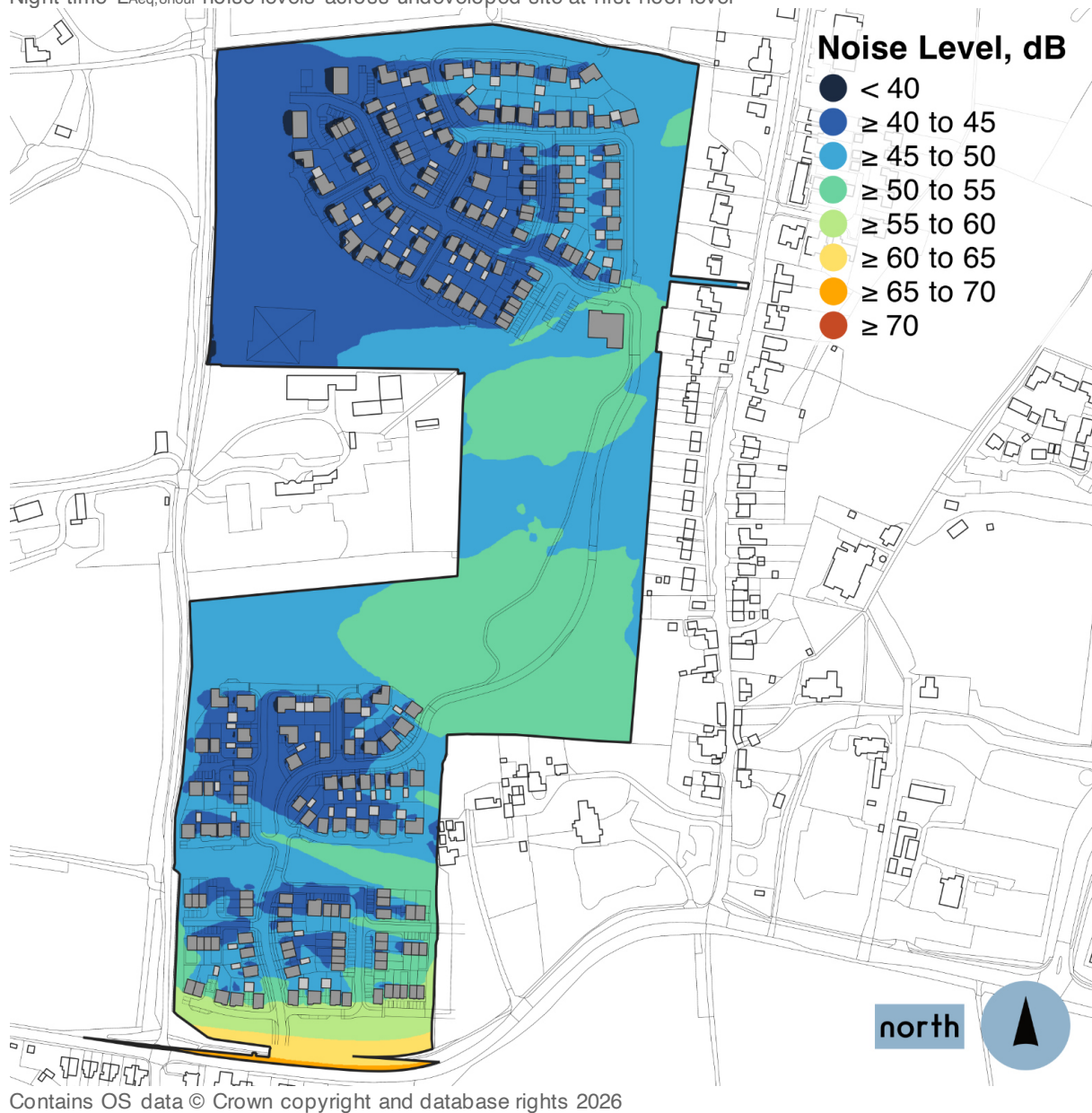
5.17 Noise conditions across the site with the proposed development in place are presented in the following **Image 6** and **Image 7**, for daytime at ground floor (1.5 m above local ground level) and night-time at first floor (4.5 m above local ground level) respectively. Note that these contours to not include the effects of garden boundary treatments, which are discussed later.

**Image 6.** Daytime noise levels at 1.5 m above ground level with proposed development in place  
Daytime  $L_{Aeq,16hr}$  noise levels across undeveloped site at ground floor level



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**Image 7.** Night-time noise levels at 4.5 m above ground level with proposed development in place  
Night-time  $L_{Aeq,8hr}$  noise levels across undeveloped site at first floor level



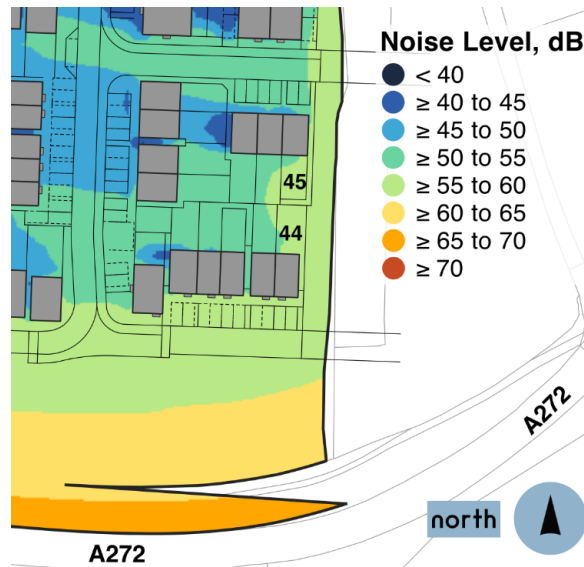
## External Amenity Areas

5.18 As can be seen on the previous **Image 6**, all gardens are calculated to observe noise levels below the aspirational target of 55 dB  $L_{Aeq,16hr}$  with the exception of plots 44 and 45 in the southeastern corner of the development.

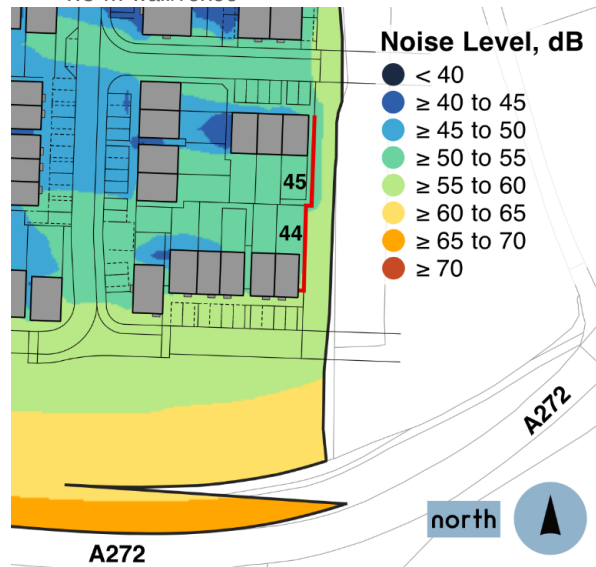
5.19 To reduce noise levels to below 55 dB  $L_{Aeq,16hour}$  within plots 44 and 45, the provision of 1.8 m (relative to local ground level) brick walls will be necessary to the boundaries of these gardens (as per the alignment show in **Image 8b**). Close boarded barriers of the same height would also be a suitable alternative if preferred for aesthetic reasons; these must feature no holes or gaps and exhibit a mass of at least 10 kg/m<sup>2</sup>.

5.20 **Image 8a** and **b** provide a comparison in calculated noise levels both with and without these barriers to plots 44 and 45 and thus demonstrating that the aspirational target of 55 dB  $L_{Aeq,16hour}$  can be achieved.

**Image 8a.** Plots 44 and 45 with no wall/fence  
Daytime LAeq,16hour noise levels



**Image 8b.** Plots 44 and 45 with 1.8 m wall/fence  
Daytime LAeq,16hour noise levels  
— 1.8 m wall/fence



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## Glazing, Ventilation and Control of Overheating

### Overview

5.21 To suitably control noise to the proposed dwellings, noise mitigation in the form of acoustically appropriate glazing has been specified. A detailed acoustic specification for the required mitigation measures is set out in **Appendix C**.

### Dwelling Parameters

5.22 The façades of the proposed dwellings are understood to comprise a cavity masonry brick / blockwork construction. This does not preclude the use of alternative masonry or 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.

5.23 Full details of the façade and roof sound insulation performances used as the basis of this assessment are set out within **Appendix C**.

5.24 Typical internal room dimensions have been taken as follows:

- 5 m x 4 m x 2.7 m for living rooms with 3 m<sup>2</sup> of glazing;
- 4 m x 3 m x 2.7 m for bedrooms with 1.8 m<sup>2</sup> of glazing.

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

### Partially Open Windows

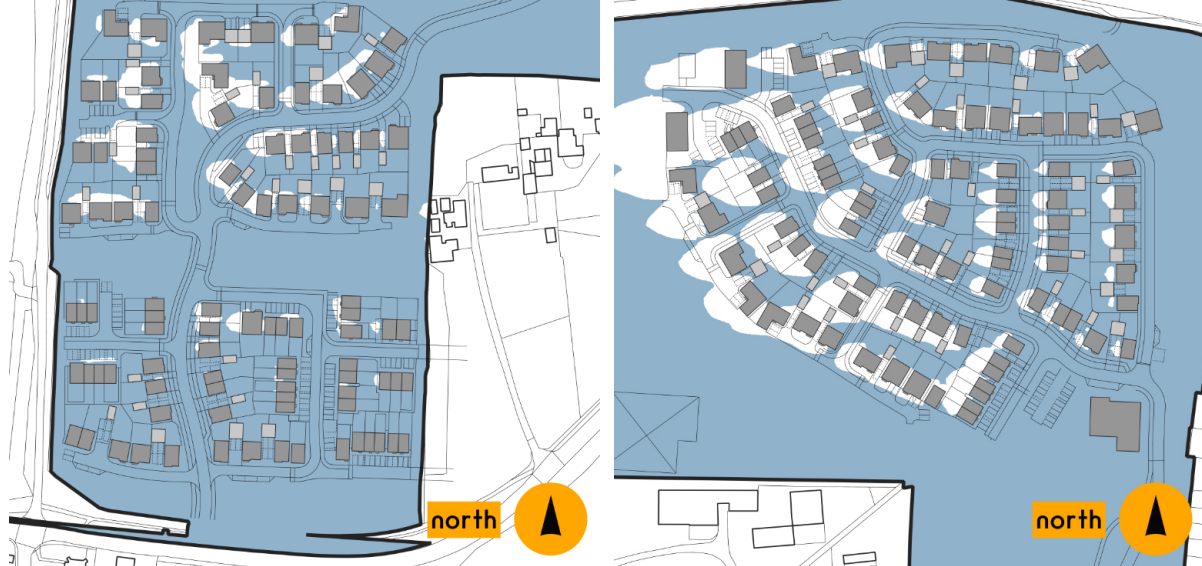
5.26 Noise levels across the site are affected by the distant A23 and the A272. As noted previously, good acoustic design principles have been adopted during the development of the proposed layout to reduce noise across the site as far as is practicable.

5.27 Taking a loss of approximately 13 dB through a partially open window, levels across the developed site are such that internal noise requirements can be achieved with partially open windows to some façades. **Image 9a** and **Image 9b** highlight the areas in blue where internal noise

requirements **cannot** be achieved with partially open windows in the south and north of the site respectively.

**Image 9a.** Open window suitability in south area    **Image 9b.** Open window suitability in north area

■ Areas where internal noise requirements are not achieved with partially open windows



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5.28 To façades where internal noise requirements cannot be achieved with partially open windows (i.e. façades within the **blue** areas highlighted in **Image 9a** and **Image 9b**), alternative means of ventilation shall be provided to achieve suitable internal noise and ventilative conditions with windows closed (noting that such vents are to be provided to all plots across the development)

5.29 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.

## Glazing

5.30 The results of the assessment indicate that it will be necessary to provide marginally enhanced acoustic glazing to select dwellings closest to the A272. These locations are illustrated in **Image 10**.

5.31 For ease of reference, we would expect the following typical configuration to achieve the performance set out within the attached **Appendix C**:

- Type G1:            6 mm glass / 12 mm air gap / 4 mm glass.

5.32 It is important to note that the above configuration is for guidance and context only and it is the performance specification set out within **Appendix C** that form the requirements.

5.33 For all other dwellings of the development which are not shown or marked on **Image 10**, it will be acceptable to use standard thermal double glazing, referred to as glazing type G2 (expected to have a single figure sound reduction performance of circa 30 dB R'<sub>w</sub>).

**Image 10.** Location of marginally enhanced acoustic glazing

■ Glazing Type G1



### Ventilation

5.34 Trickle ventilators are to be used across the proposed development in a mechanical extract ventilation (MEV) configuration to provide the required background ventilation rates. Ventilation for the purposes of overheating control is discussed later in this report.

5.35 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. The full requirements for these are set out within the attached **Appendix C**.

5.36 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 suitably qualified party, in relation to the requirements of Approved Document F<sup>3</sup> (ADF). Note that the term “trickle vents” is used to relate to both wall and window vents interchangeably for the purposes of this report.

5.37 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.

### **Overheating**

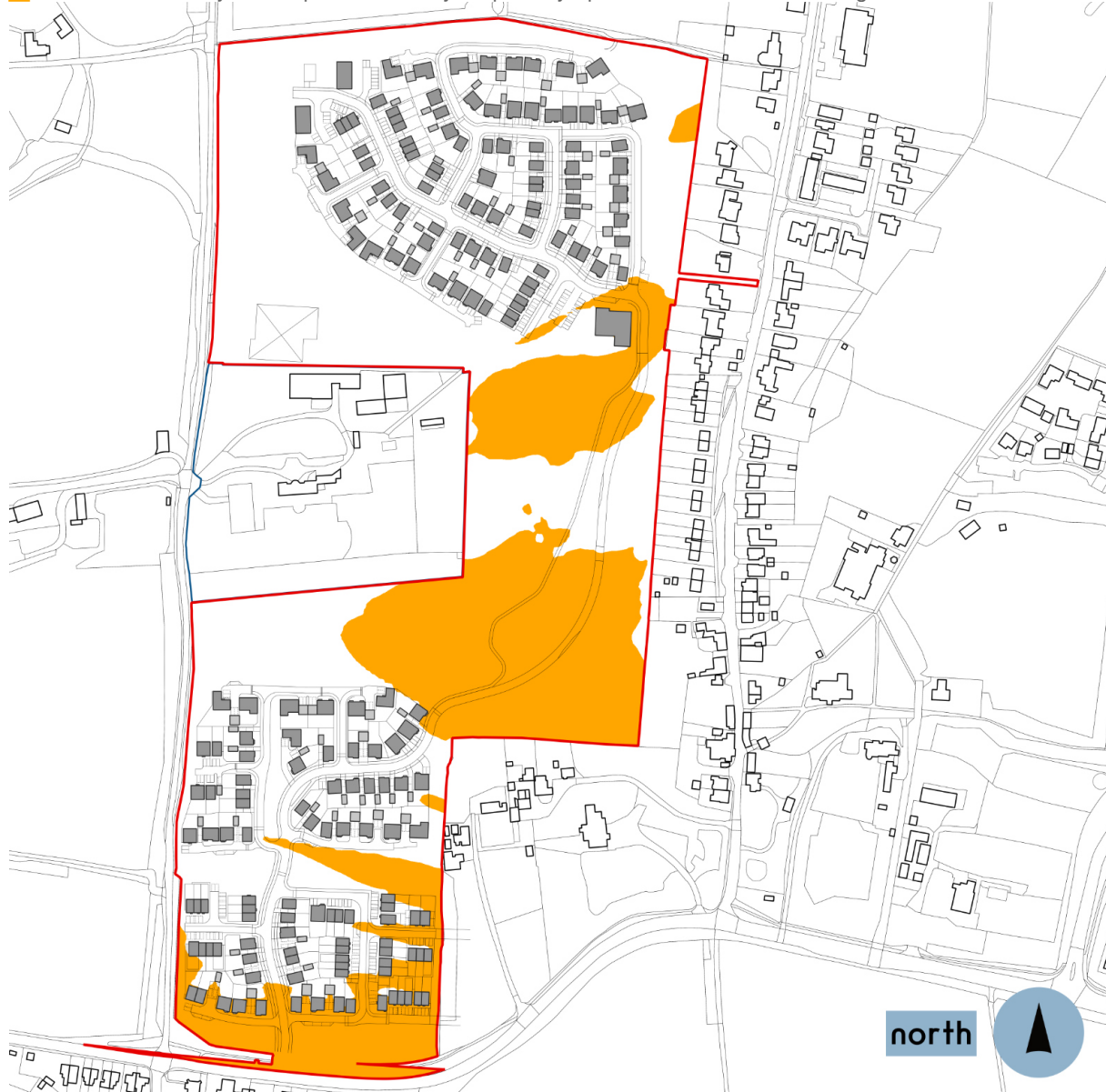
5.38 It is also necessary to consider ventilation in the context of overheating (noting this matter is for compliance with the Building Regulations, not a planning constraint).

5.39 Considering the guidance set out within **Appendix D** (and taking into account the simplified method of assessing overheating in ADO), **Image 11** shows the areas of the site where it may **not** be possible to rely on partially open windows to **bedrooms during the night-time** to provide relief from building overheating, due to the noise requirements of ADO. The constraints apply to all bedrooms with windows falling within the regions marked in **orange**.

<sup>3</sup> Building Regulations Approved Document F: Ventilation

**Image 11. Overheating assessment noise constraints**

■ Areas where it may not be possible to rely on partially open windows for overheating control to bedrooms



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5.40 For all other areas of the site (i.e. those **not** falling within the **orange** areas in **Image 11**), acceptable internal noise conditions are expected to be provided during periods of overheating when partially open windows are used to provide cooling.

5.41 The typical approach for providing additional ventilation to offer overheating control where windows must be kept shut due to noise can employ the use of simple boost fans (in addition to the background ventilation system), in combination with other measures such as (but not limited to low G-value glazing and thermally efficient building constructions). The above is not prescriptive but instead demonstrates a potential means for how overheating issues can be overcome in respect to noise constraints.

5.42 External noise emissions from any boost/mechanical ventilation systems installed in relation to the above should ideally be limited to 30 dB  $L_{A,r,T,r}$  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. It is noted that this is a best practice recommendation rather than strict requirement

## 6.0 Conclusions

6.1 The proposed development site is located to the north of the A272 and the east of the A23, which have the potential of adverse impacts on future residents.

6.2 A noise survey has been undertaken at the site to quantify the prevailing noise climate across the site. From this data, an assessment of internal and external noise levels across the development site has been undertaken.

6.3 The assessment approach and criteria have been agreed with Mid Sussex District Council as being appropriate to meet the requirements of Condition 16 attached to the outline planning permission (reference *DM/25/1129*).

6.4 Good acoustic design practices have been implemented as part of the development of the masterplan for the scheme. This has included elements such as acoustic 'buffer zones' between dwellings and the nearby noise sources and dwelling orientation to screen external amenity areas as much as possible

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

6.6 For much of the site, standard thermal double glazing and non-acoustic trickle ventilators will be sufficient to suitably control noise to the proposed dwellings. Marginally enhanced acoustic glazing has been specified for dwellings closest to the A272.

6.7 Openable windows will be sufficient to control overheating effects for much of the site (in combination with the proposed ventilation strategy). These measures have been developed in line with the local and national planning requirements as set out within **Appendix D**.

6.8 Noise levels in external areas are expected to fall below the aspirational noise criterion in all areas, with noise modelling showing that all gardens will feature areas where the criterion is met. 1.8 m noise barriers to the gardens of plots 44 and 45 will be required to control noise levels within these plots.

6.9 It has been demonstrated that it will be entirely possible to ensure a suitable noise climate internally and externally for future residents of the proposed development and a detailed noise mitigation strategy is set out herein for approval by the Local Authority. The requirements of Condition 16, the NPPF, PPG and MSDC Policy DP29 are therefore met in respect to avoidance of significant noise impacts.



## Appendix A: Noise Survey

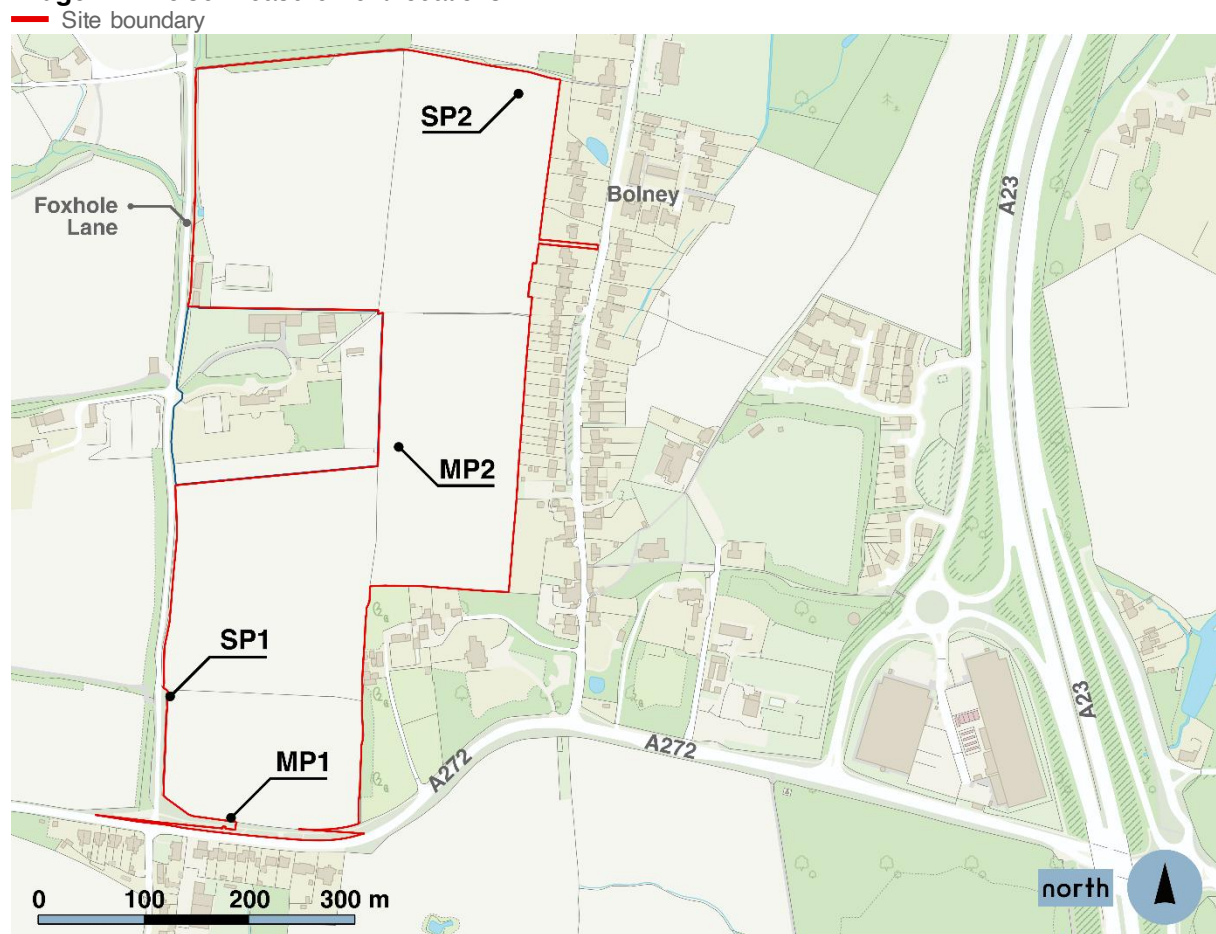
### Details and results of the environmental noise survey

#### Methodology and Instrumentation

An unattended noise survey was undertaken on site between 14:00 on Thursday 23<sup>rd</sup> April and 11:00 on Wednesday 29<sup>th</sup> April 2026. The unattended measurement positions are denoted as 'MP1' and 'MP2' on **Image A1**.

Additional attended spot-check measurements were also undertaken at the positions labelled 'SP1' and 'SP2'. In both instances, the unattended noise monitors remained operational to establish the deviation of noise levels across the site.

**Image A1.** Noise measurement locations



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Measurements of the  $L_{Aeq}$ ,  $L_{Amax}$  and  $L_{A90}$  indices were recorded over consecutive 15-minute periods for the duration of the survey. Detailed summaries of the measurement positions are set out in the following table.

#### Noise measurement locations

| Location | Detail                                                                                                                                                                                                    |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MP1      | Microphone at approximately 3.0 m above local ground level, on the site's southern boundary.<br><br>Measurements were unattended. The noise climate was controlled by the A272.                           |
| MP2      | Microphone at approximately 3.0 m above local ground level, in the middle of the site.<br><br>Measurements were unattended. The noise climate was affected by road traffic noise from the A272 and A23.   |
| SP1      | Microphone at approximately 1.5 m above local ground level, on the eastern boundary of the site.<br><br>Measurements were attended. The noise climate was controlled by road traffic noise from the A272. |
| SP2      | Microphone at approximately 1.5 m above local ground level, in the northeastern corner of the site.<br><br>Measurements were attended. The noise climate was affected by road traffic noise from the A23. |

Noise measurements were made using the equipment set out within the following table. The unattended sound level meters were fitted within weatherproof enclosures and calibration field checks were undertaken for all meters both before and after the survey periods 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   | Svantek 971      |
|             | Outdoor Microphone Kit | Svantek SA271A   |
|             | Acoustic Calibrator    | Norsonic Nor1255 |
| MP2         | Sound Level Analyser   | Rion NL52        |
|             | Outdoor Microphone Kit | Rion WS-15       |
|             | Acoustic Calibrator    | Norsonic Nor1255 |
| SP1 and SP2 | Sound Level Analyser   | Norsonic Nor140  |
|             | Acoustic Calibrator    | Norsonic Nor1255 |

The weather conditions when setting up and collecting the survey equipment were clear and warm with a light breeze from the east. Historical weather data captured at a nearby weather station<sup>4</sup> shows that no rain was present during the survey duration.

<sup>4</sup> [Weather Underground Station IHAYWA42](#)

## Results

The following tables 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<br>(0700-2300) | Night-time<br>(2300-0700) |            |
|------------------------|------------------------|---------------------------|------------|
|                        | $L_{Aeq,16hr}$         | $L_{Aeq,8hr}$             | $L_{Amax}$ |
| MP1: Southern boundary | 63                     | 61                        | 76         |
| MP2: Middle of site    | 52                     | 50                        | 60         |

The following table sets out the octave band noise level spectra pertaining to each period is set out in the table above.

Noise survey octave band results

| Measurement Position | Index          | Noise Level, dB |     |     |     |    |    |    |    |
|----------------------|----------------|-----------------|-----|-----|-----|----|----|----|----|
|                      |                | 63              | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
| MP1                  | $L_{Aeq,16hr}$ | 68              | 61  | 59  | 58  | 60 | 54 | 44 | 37 |
|                      | $L_{Aeq,8hr}$  | 63              | 56  | 55  | 56  | 59 | 53 | 42 | 34 |
|                      | $L_{Amax}$     | 83              | 74  | 74  | 73  | 72 | 66 | 61 | 57 |
| MP2                  | $L_{Aeq,16hr}$ | 53              | 46  | 48  | 48  | 50 | 40 | 31 | 22 |
|                      | $L_{Aeq,8hr}$  | 48              | 40  | 45  | 46  | 48 | 39 | 31 | 21 |
|                      | $L_{Amax}$     | 60              | 52  | 56  | 56  | 57 | 49 | 48 | 36 |

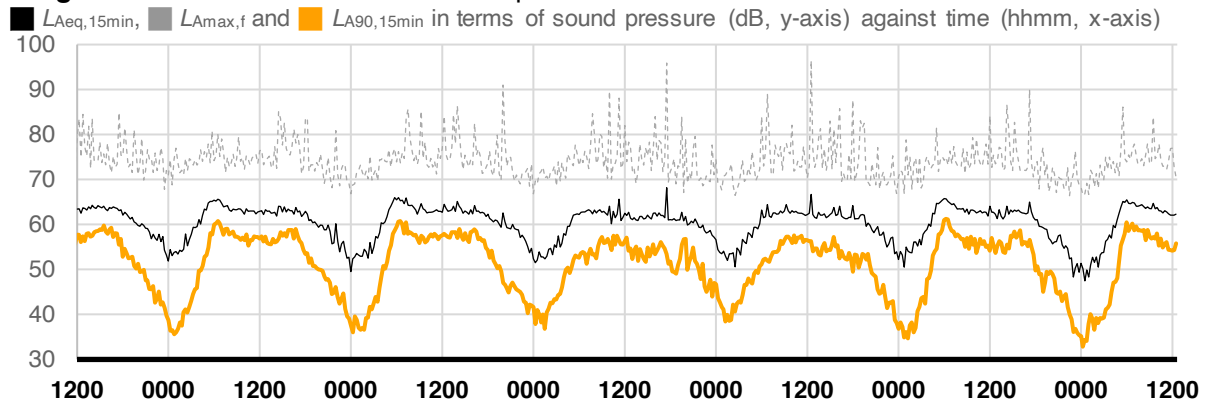
The table below sets out a summary of the results captured at the attended spot check positions, SP1 and SP2.

Summary noise levels captured at attended measurement positions

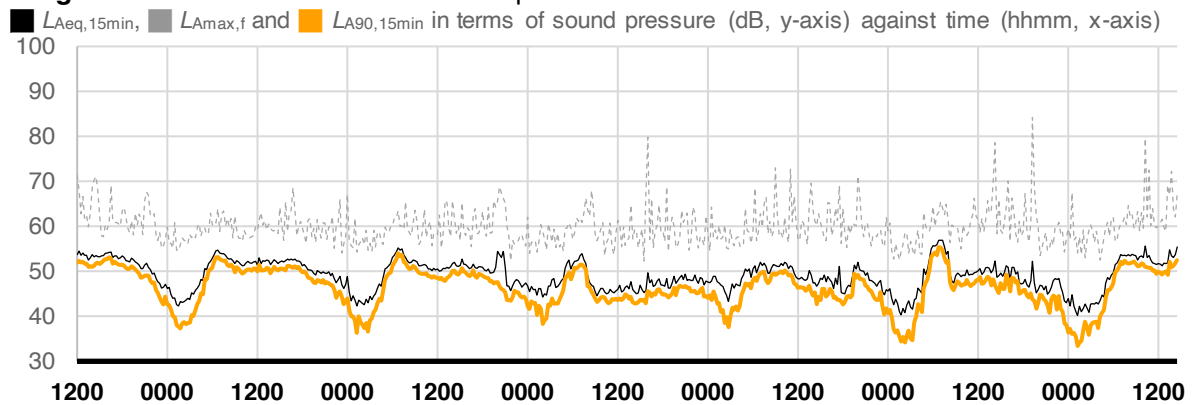
| Measurement Position | Start Time       | Duration, minutes | $L_{Aeq,T}$ | $L_{Amax}$ | $L_{A90,T}$ |
|----------------------|------------------|-------------------|-------------|------------|-------------|
| SP1                  | 28/04/2026 13:33 | 12                | 57          | 66         | 54          |
|                      | 28/04/2026 13:45 | 13                | 55          | 66         | 53          |
| SP2                  | 28/04/2026 12:52 | 8                 | 52          | 57         | 50          |
|                      | 28/04/2026 13:00 | 11                | 52          | 58         | 50          |

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

**Image A2.** Noise measurement results at position MP1



**Image A3.** Noise measurement results at position MP2



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## Appendix B: Noise Modelling

### Details of noise modelling used to inform the assessment

#### Noise Modelling Software

A computer-based noise prediction program (*Wölfel* IMMI version 24) has been used to determine the noise levels generated across the site by the various noise sources, using CRTN<sup>5</sup> and ISO9613<sup>6</sup> 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, and
- The surrounding built up area.

#### Model Input and Assumptions

The noise sources within the noise model have been calibrated as best as is reasonably practicable to the levels measured during the noise survey works that have been undertaken for the scheme.

The proposed site layout is included within the modelling, based on the Thrive Architects 'Site Layout' drawing, reference CALA250729 SL01 P19, dated: 10 October 2025.

The following building heights (measured from local ground level to the tallest point) have been used with the noise model:

- Houses: 9 m
- Garages: 3.5 m

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

- Ground floor: 1.5 m
- First floor: 4.5 m

#### Noise Contour Plots

Noise contour plots have been produced to illustrate the noise levels across the site both without and with the proposed development in place as shown on the following pages.

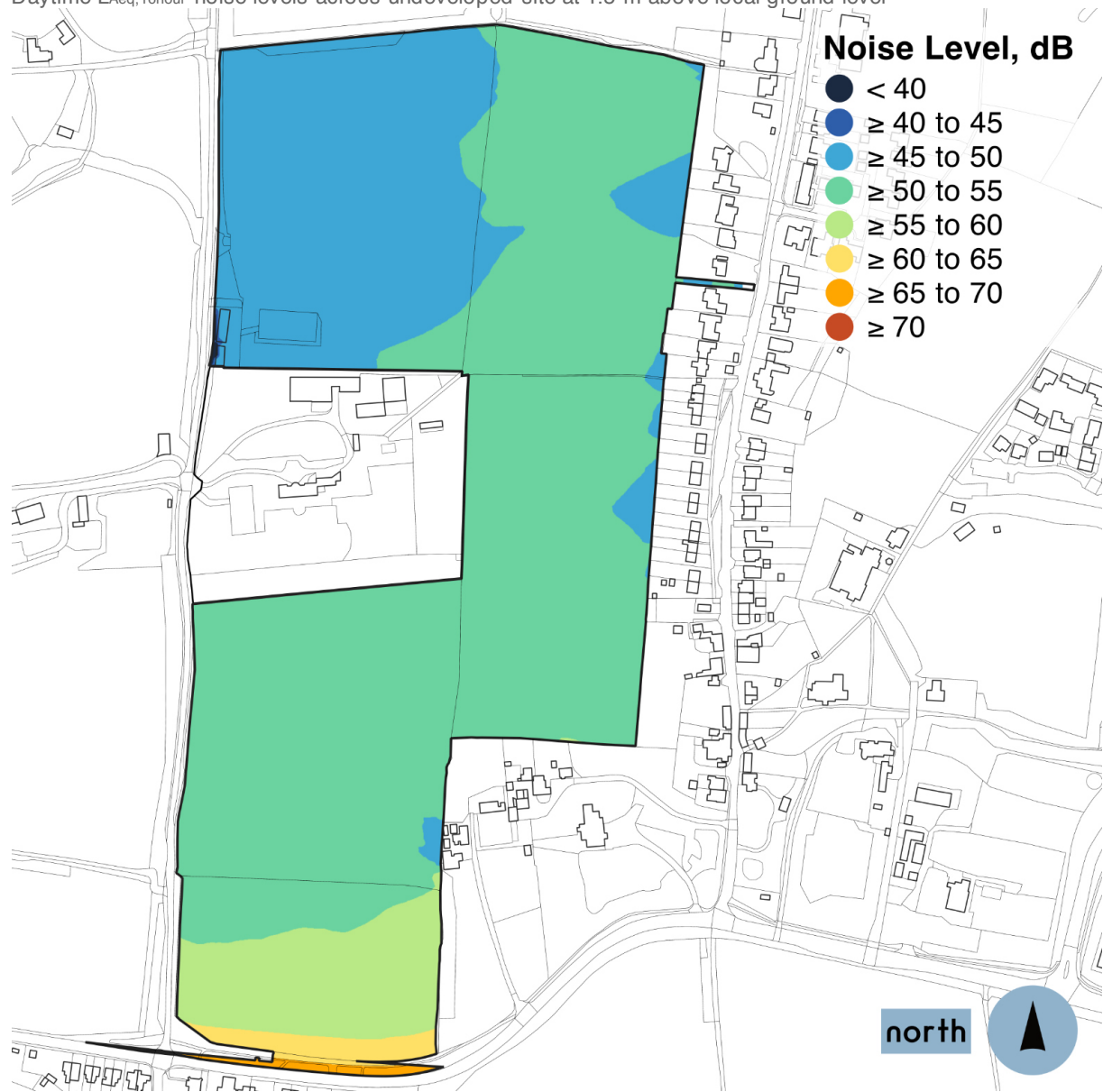
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<sup>5</sup> CRTN – Calculation of Road Traffic Noise, Department of Transport, 1988

<sup>6</sup> ISO 9613-2:2024 - Acoustics - Attenuation of sound during propagation outdoors - Part 2: Engineering method for the prediction of sound pressure levels outdoors

**Image B1.** Daytime noise contour plot at ground floor

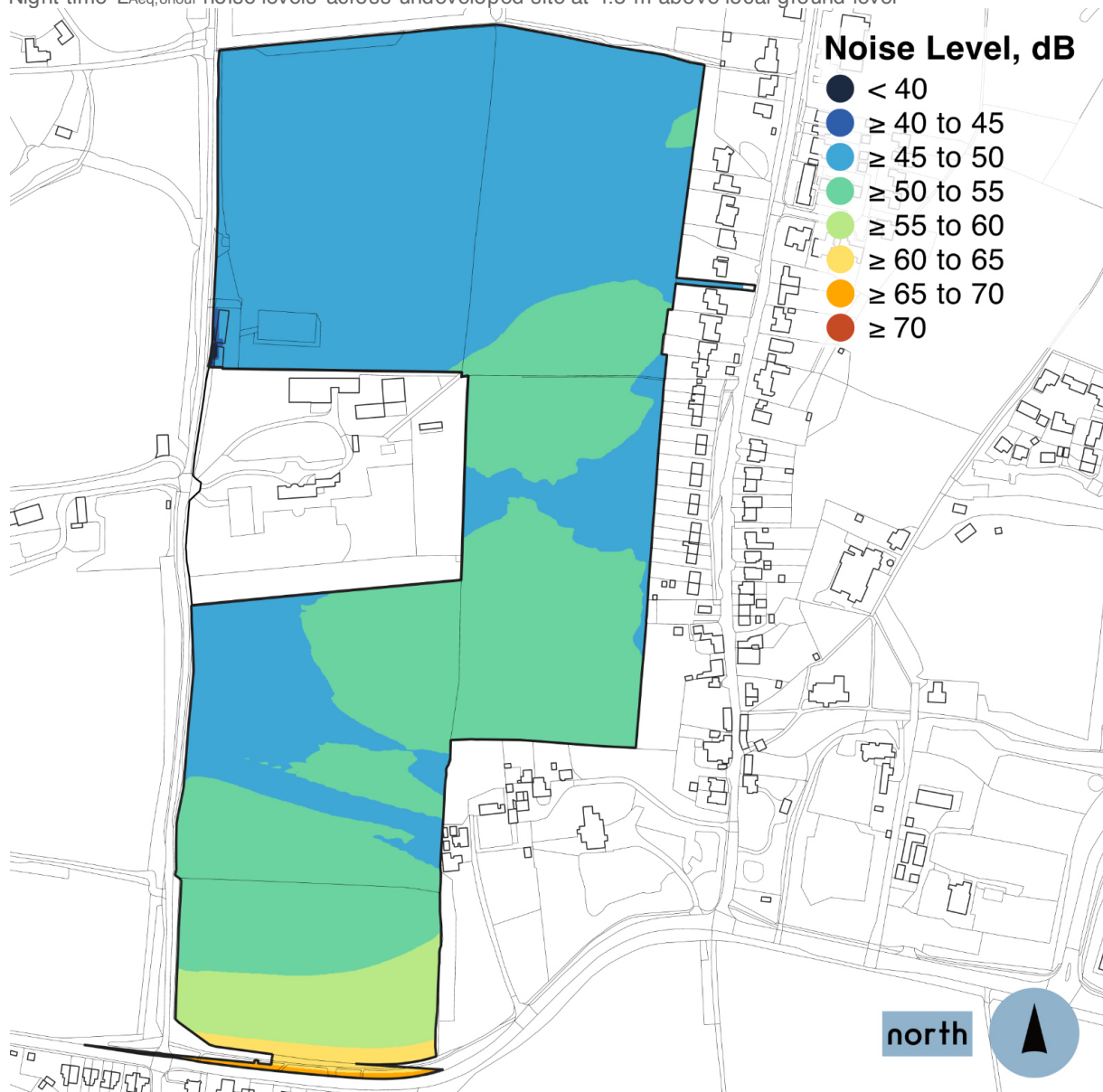
Daytime  $L_{Aeq,16hour}$  noise levels across undeveloped site at 1.5 m above local ground level



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**Image B2.** Night-time noise contour plot at first floor

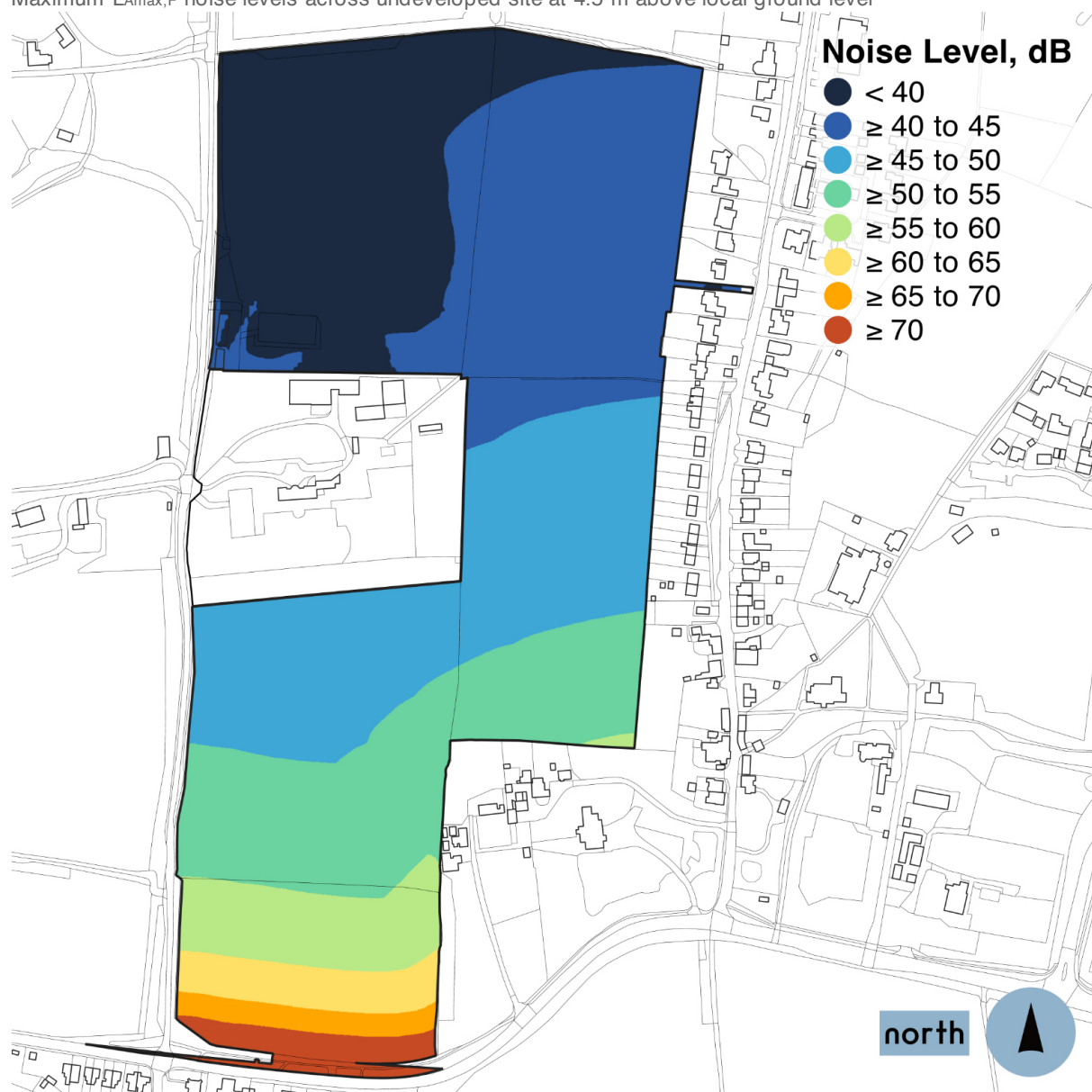
Night-time  $L_{Aeq,8hour}$  noise levels across undeveloped site at 4.5 m above local ground level



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**Image B3.** Maximum night-time noise contour plot at first floor

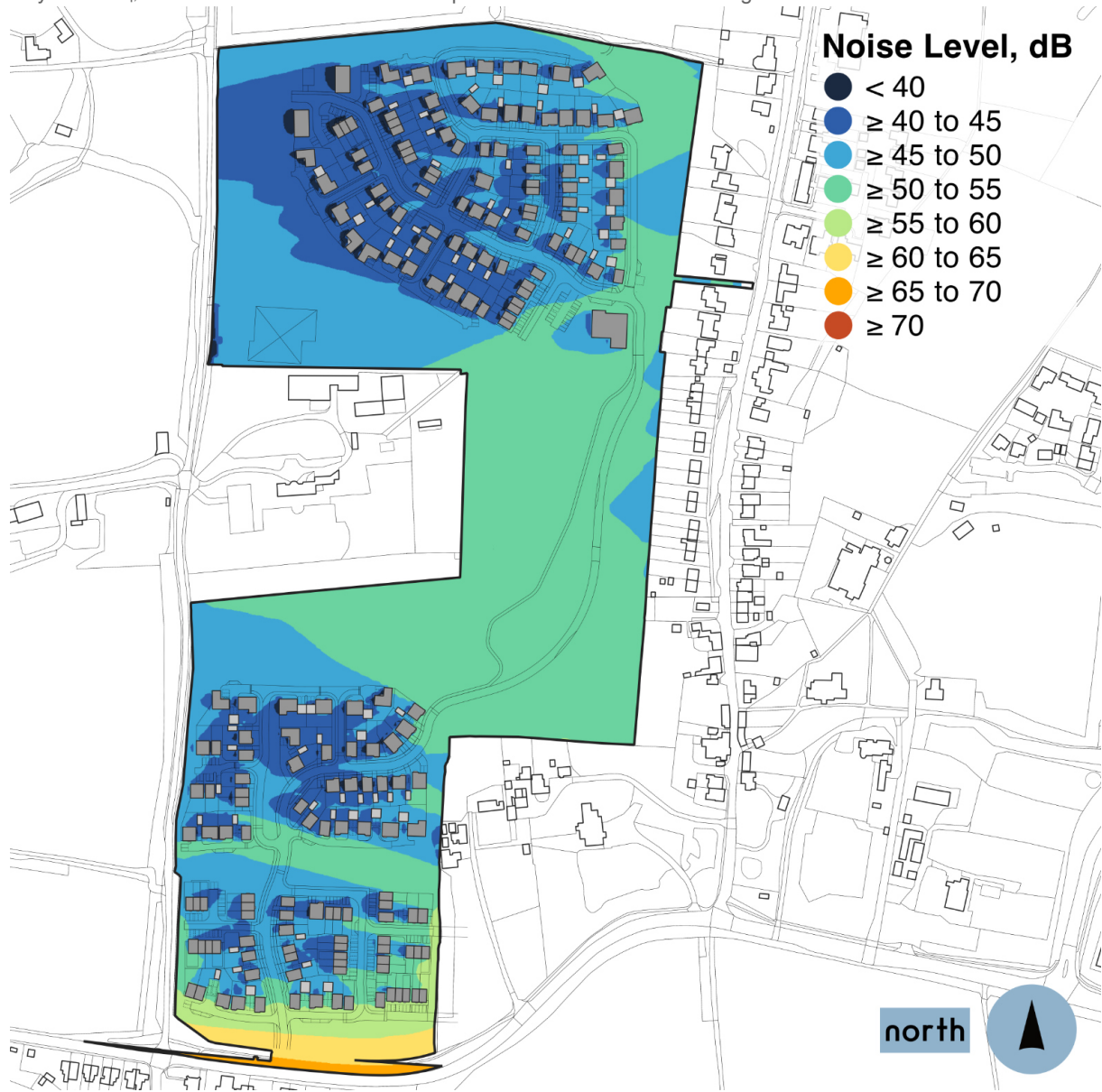
Maximum  $L_{Amax,F}$  noise levels across undeveloped site at 4.5 m above local ground level



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**Image B4.** Daytime noise contour plot at ground floor

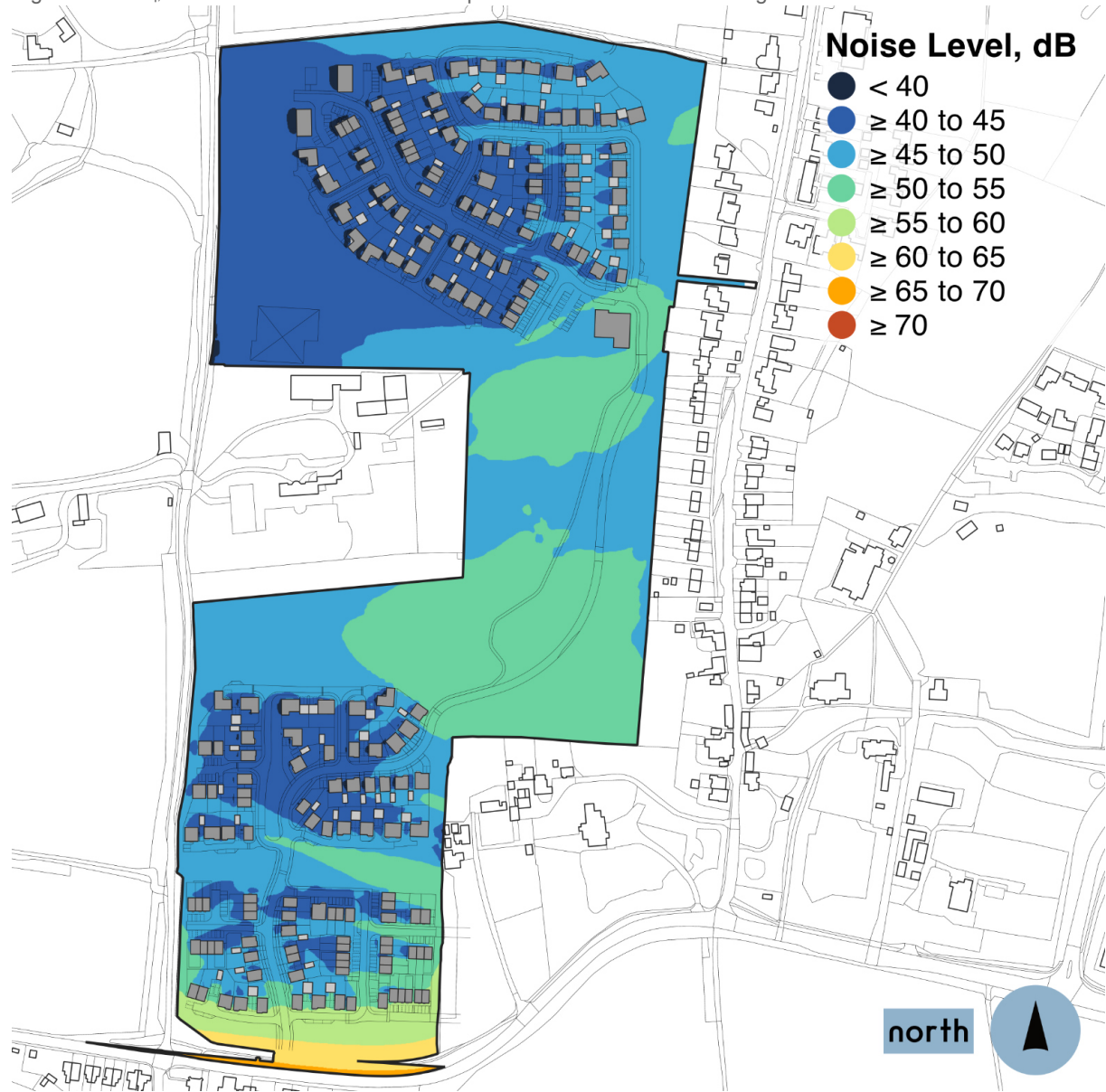
Daytime  $L_{Aeq,16hr}$  noise levels across developed site at 1.5 m above local ground level



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**Image B5.** Night-time noise contour plot at first floor

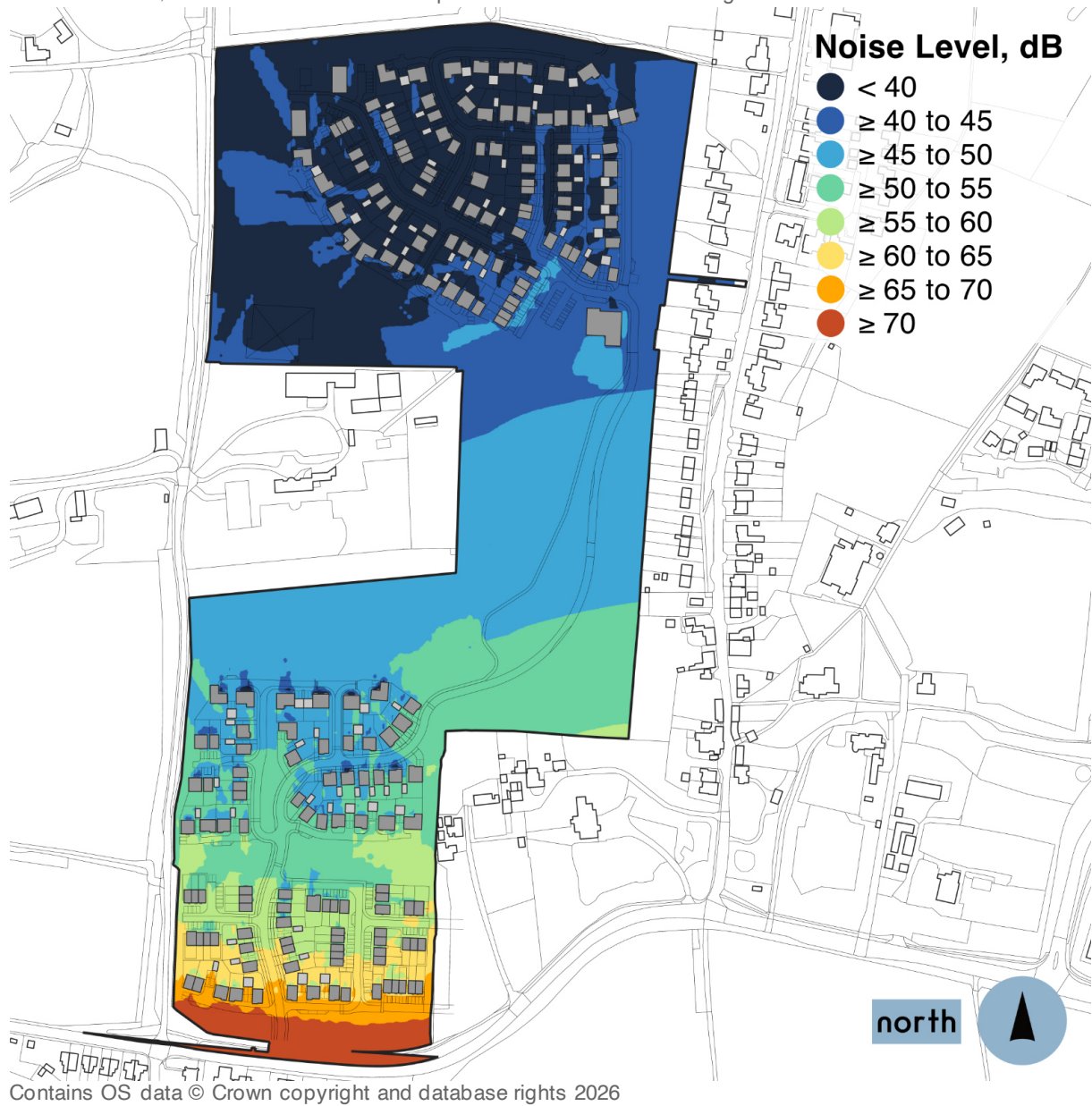
Night-time  $L_{Aeq,8hour}$  noise levels across developed site at 4.5 m above local ground level



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**Image B6.** Maximum night-time noise contour plot at first floor

Maximum  $L_{Amax,F}$  noise levels across developed site at 4.5 m above local ground level



## Appendix C: Noise Mitigation Measure Summary

### Details of required glazing and ventilation specifications

### Façade Mitigation Measures

This appendix sets out specifications for the noise mitigation measures that must be included to control noise intrusion to the dwellings across the proposed development. All numerical performance requirements set out should be treated as minimum values. The product examples and example element configurations are all indicative only; the numerical values form the requirements.

Reference is made to the Building Regulations Approved Document F, Ventilation - Volume 1: Dwellings (ADF) and Approved Document O, Overheating (ADO) which must be adhered to as appropriate. Advice provided by Suono in respect to the above pertains to the control of noise, vibration and other acoustics related matters only. Compliance with other aspects on the above regulations is the responsibility of others.

### Building Envelope

The following table sets out the minimum sound insulation requirements for key building envelope elements (except for glazing and ventilation openings, which are discussed later).

Acoustic performance of building envelope elements, dB

| Element               | Typical Construction                                                       | Index | Sound Reduction Index, $R$ dB<br>at Octave Band Centre Frequency,<br>Hz |     |     |    |    |    | Single<br>number<br>value,<br>$R'_w$ dB |
|-----------------------|----------------------------------------------------------------------------|-------|-------------------------------------------------------------------------|-----|-----|----|----|----|-----------------------------------------|
|                       |                                                                            |       | 125                                                                     | 250 | 500 | 1k | 2k | 4k |                                         |
| External Walls/Facade | Cavity masonry external wall                                               | $R'$  | 40                                                                      | 44  | 45  | 51 | 56 | 56 | 51                                      |
| Roof/Ceiling          | Tiled roof with single layer plasterboard ceiling and insulated loft space | $R'$  | 28                                                                      | 34  | 40  | 45 | 49 | 49 | 44                                      |

The typical configurations outlined in the table above are provided for guidance purposes. The octave band losses must be achieved in each octave band for the building fabric element as a whole, in that no aspect of it shall cause the values in the table to not be met.

## Glazing Requirements

The necessary glazing requirements and typical configurations expected to achieve these are set out within the following table.

Acoustic performance of glazing elements, dB

| Code | Typical Glazing Configuration                                                           | Index  | Sound Reduction Index, $R$ dB at Octave Band Centre Frequency, Hz |     |     |    |    |    | Single number value, $R'_w$ dB |
|------|-----------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------|-----|-----|----|----|----|--------------------------------|
|      |                                                                                         |        | 125                                                               | 250 | 500 | 1k | 2k | 4k |                                |
| G1   | 6 mm glass, 12 mm air/gas space, 4 mm glass                                             | $R'$   | 22                                                                | 22  | 28  | 39 | 39 | 42 | 33                             |
| G2   | Standard Thermal Double Glazing, typically: 4 mm glass, 16 mm air/gas space, 4 mm glass | $R'_w$ | N/A                                                               |     |     |    |    |    | 30                             |

The typical configurations outlined in the table above are provided for guidance purposes only. The octave band losses must be achieved in each octave band for each of the systems as a whole, in that no aspect of it shall cause the values in the table to not be met. This includes the frame, any ventilators (discussed later), and reveals/sills (all where applicable and this list is not exhaustive).

The chosen glazing system manufacturer(s) should be expected to be able to provide laboratory (or suitably representative in-situ) test data to prove the above values can be met by their product.

## Ventilator Specifications

The required acoustic performance for ventilators and example products expected to achieve these are set out within the following table.

Acoustic performance of trickle ventilator elements, dB

| Code | Example Product                                 | Index       | Element Normalised Level Difference, dB at Octave Band Centre Frequency, Hz |     |     |    |    |    | Single number value, $D_{n,e,w}$ dB |
|------|-------------------------------------------------|-------------|-----------------------------------------------------------------------------|-----|-----|----|----|----|-------------------------------------|
|      |                                                 |             | 125                                                                         | 250 | 500 | 1k | 2k | 4k |                                     |
| V1   | Non-acoustic direct air path trickle ventilator | $D_{n,e,w}$ | N/A                                                                         |     |     |    |    |    | 35                                  |

The above  $D_{n,e}$  value relates to the noise reduction provide by a single<sup>7</sup> vent, based on its area, standardised to an absorption area of 10 m<sup>2</sup>. Therefore, the figure is higher than the actual insertion loss that will be provided by the ventilator, as it is dependent on the area of the vent.

Most standard non-acoustic direct air path trickle ventilators can be expected to achieve the single number requirement set out above. The ventilation product supplier should however be expected to demonstrate that the above sound reduction figure can be achieved by the product being proposed (in an open position).

<sup>7</sup> The noise intrusion calculation allows for three vents in living rooms and two in bedrooms, however the  $D_{n,e}$  values is to be achieved by each vent. If a greater number of trickle vents is required to the areas above, the ventilator specification should be reconfirmed by Suono.

The ventilation strategy must be confirmed as acceptable by a suitably qualified party in relation to the requirements of ADF. Trickle ventilators may be used as part of a mechanical extract ventilation (MEV, formerly referred to as System 3 within the previous version of ADF) if required.

## Façade Mitigation Groups

The table and **Image C1** below display how the glazing and ventilator types set out above should be implemented across the development. This information should be read in conjunction with the commentary on overheating control in the following section.

Summary of façade mitigation measures

| Mitigation Group                                   | Glazing Code | Ventilation Code | Plot Numbers      |
|----------------------------------------------------|--------------|------------------|-------------------|
| <span style="background-color: orange;">■</span> A | G1           | V1               | 1-5, 19-22, 39-45 |
| Unmarked                                           | G2           | V1               | All other façades |

**Image C1.** Location of acoustic mitigation groups

■ Mitigation Group A



## Ventilation for Overheating Control

The Building Regulations ADO requires noise to be considered when seeking to use open windows for the purposes of ventilative cooling to bedrooms during the night-time.

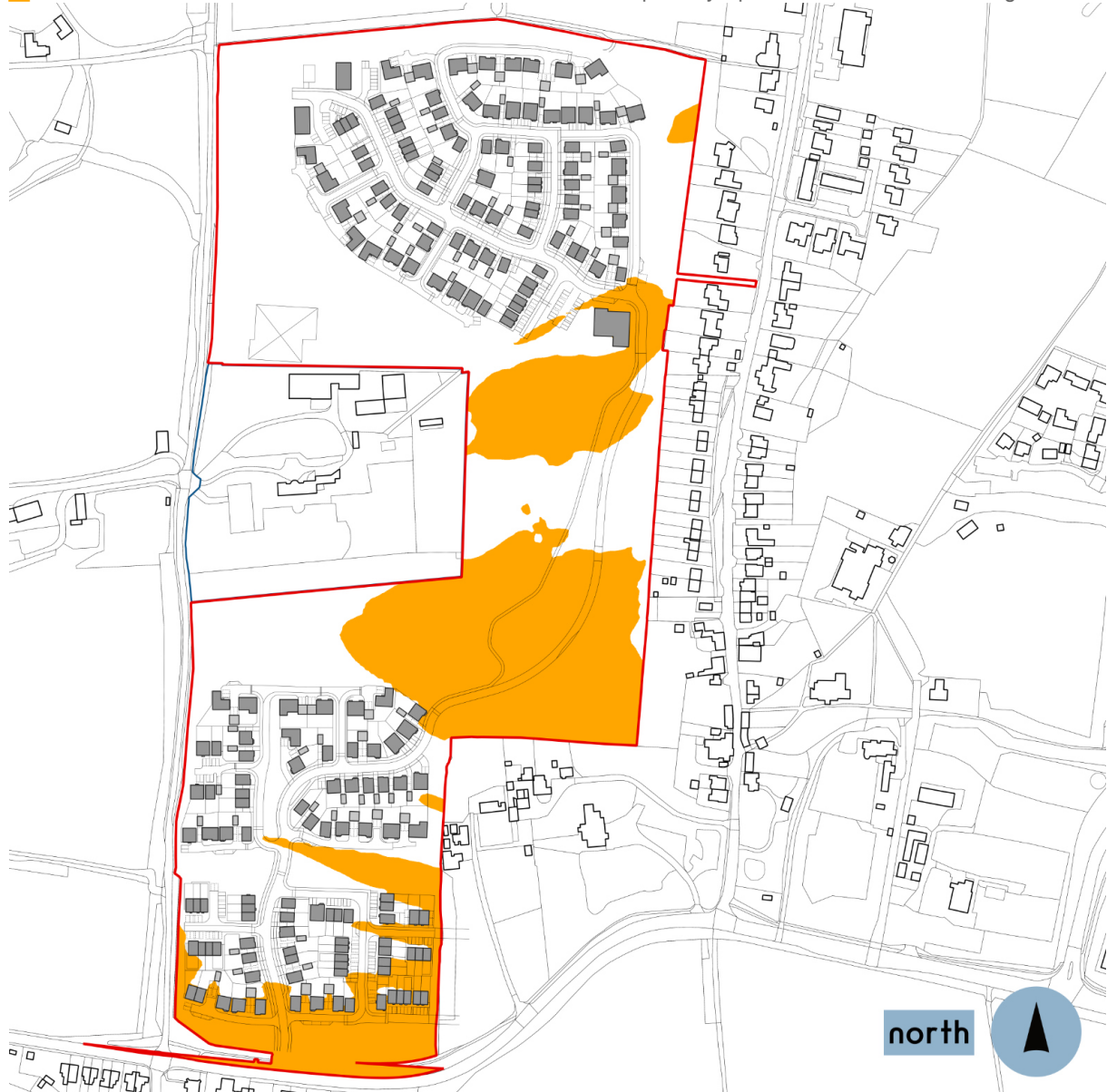
ADO suggests that internal noise levels above specific thresholds are not conducive to an occupant's 'reasonable enjoyment of the residence' on the basis that they would likely shut their windows to control noise intrusion, which would in turn exacerbate building overheating effects. Where the relevant noise thresholds are exceeded, it is necessary to consider methods of building overheating control that either makes use of limited or no window openings (see **Appendix D** for more information).

**Image C2** sets out the areas of the development where noise within the proposed dwellings may exceed the ADO internal thresholds with openable windows used for the purposes of overheating control. This information is also summarised in the table below the image.

Where **bedrooms** are located on façades subject to noise levels which may cause the ADO internal thresholds to be exceeded (areas shown in **orange** on **Image C2**) the overheating control strategy for those rooms should **not** rely on open windows during the night-time period (0700 to 2300).

**Image C2.** Proposed site layout with ADO external noise thresholds

■ Areas where there is a noise related constraint on the use of partially open windows for overheating control



#### Use of open windows to control overheating

| Bedroom Overheating Control Measure                                                                                                                           | Plot Number                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Alternative with windows closed<br>(applies to bedroom windows in sections of identified plots, in or touching <b>orange</b> regions in <b>Image C2</b> only) | 1-5, 12, 19-23, 38-47, 48-50, 52-53, 95 |
| Open windows acceptable                                                                                                                                       | All other plots                         |

It stressed that the above constraints are taken to apply to **bedrooms only** during the **night-time** period and open windows may be used as part of a dwelling's overheating strategy in other habitable rooms and to all areas during the daytime.

## Appendix D: Planning Policy and Guidance

### Local Policy

Mid Sussex District Council have policy on noise within their District Plan 2014-2031 which was adopted in March 2018. Policy DP29: Noise, Air and Light Pollution, states the following in relation to noise:

*“The environment, including ... the quality of people’s life will be protected from unacceptable levels of noise ... by only permitting development where :*

*Noise pollution:*

- *It is designed, located and controlled to minimise the impact of noise on health and quality of life, neighbouring properties and the surrounding area;*
- *If it is likely to generate significant levels of noise it incorporates appropriate noise attenuation measures.*

*Noise sensitive development, such as residential, will not be permitted in close proximity to existing or proposed development generating high levels of noise unless adequate sound insulation measures, as supported by a noise assessment are incorporated within the development.*

*In appropriate circumstances, the applicant will be required to provide:*

- *An assessment of the impact of noise generated by a proposed development; or*
- *An assessment of the effect of noise by an existing noise source upon a proposed development.”*

### 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.

The 'agent of change' principle is discussed in paragraph 200 of the NPPF. 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."*

## **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 exposure<sup>8</sup>] above which significant adverse effects on health and quality of life occur.

**Lowest Observed Adverse Effect Level (LOAEL):** This is the level [of noise exposure<sup>2</sup>] above which adverse effects on health and quality of life can be detected.

**No Observed Effect Level (NOEL):** This is the level [of noise exposure<sup>2</sup>] 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:

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<sup>8</sup> Additional text drawn from the Planning Practice Guidance Definition

*“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.

## **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    |
| <b>NOEL - No Observed Effect Level</b>                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                     |                                  |
| 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    |
| <b>LOAEL - Lowest Observed Adverse Effect Level</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                     |                                  |
| 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 |
| <b>SOAEL - Significant Observed Adverse Effect Level</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                     |                                  |
| 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<br>(0700-2300)       | Night time<br>(2300-0700)                            |
| Resting                       | Living Room        | 35 dB $L_{Aeq,16hour}$       | -                                                    |
| Dining                        | Dining room / area | 40 dB $L_{Aeq,16hour}$       | -                                                    |
| Sleeping<br>(daytime resting) | Bedroom            | 35 dB $L_{Aeq,16hour}$       | 30 dB $L_{Aeq,8hour}$<br>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.

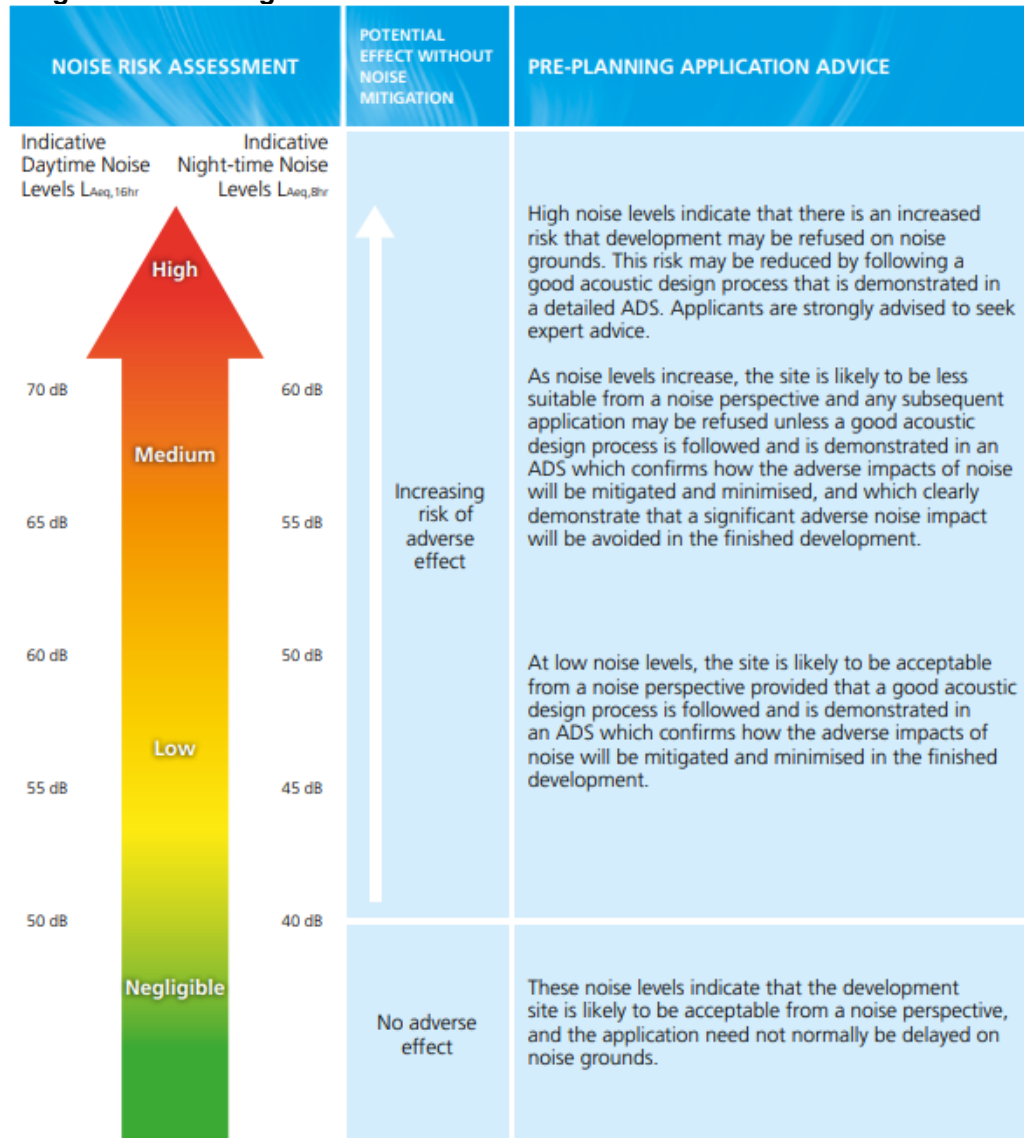
Features which may be included within an ADS comprise:

- 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**



**Figure 1 Notes:**

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

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                                                                                                                                                                                              |                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <i>Requirement</i>                                                                                                                                                                                       | <i>Limits on application</i> |
| <b>O1 Overheating mitigation</b>                                                                                                                                                                         |                              |
| (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. There is, however, guidance from the acoustics industry (discussed in the following section) that seeks to clarify the approach that should be taken.

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 this site 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 a 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 1<sup>8</sup>  $EA \text{ based on façade level difference} = V \times 10^{\left(\frac{-(D_{2m,nT} + 5)}{10}\right)}$

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

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 (±5) 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.

