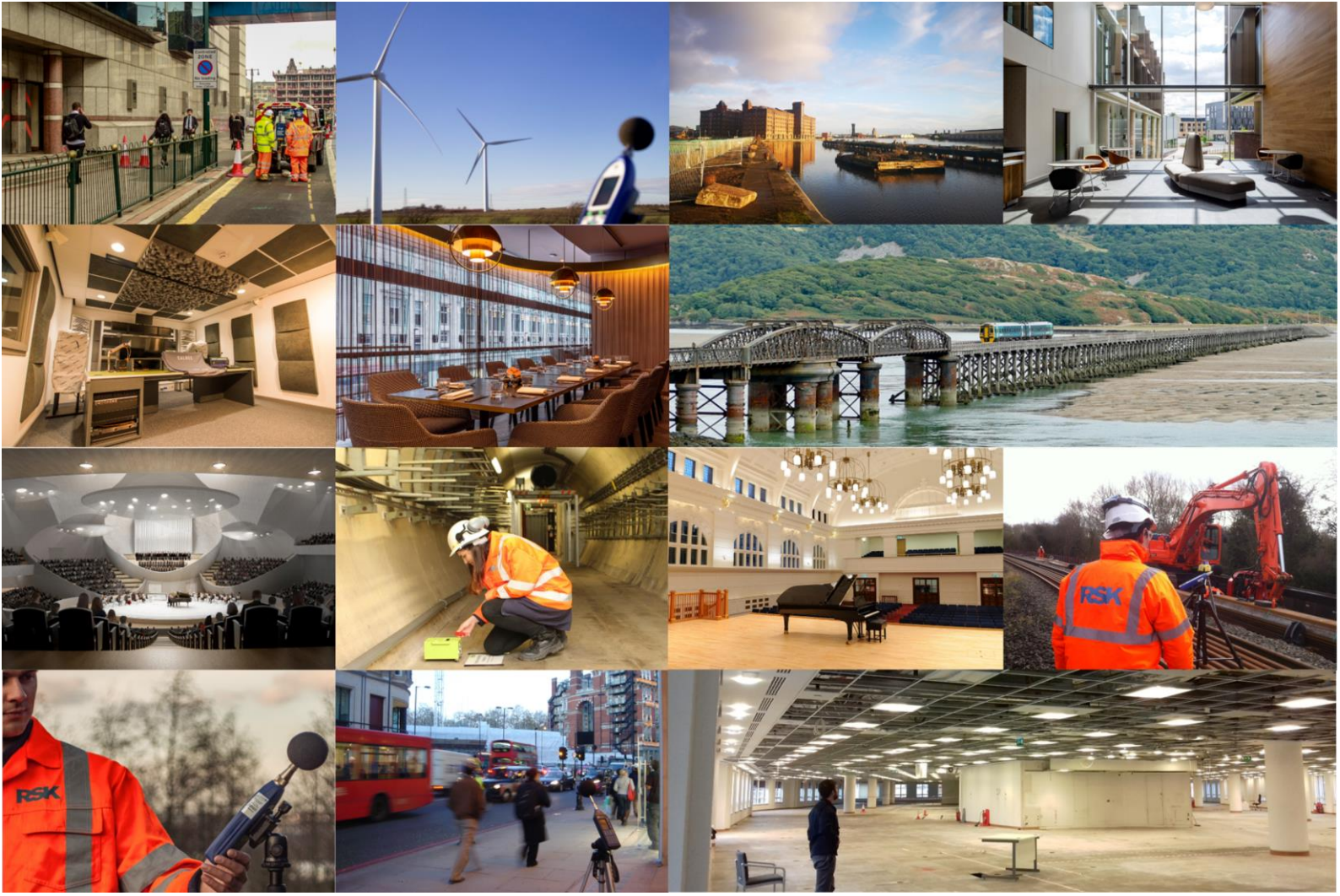

NOISE IMPACT ASSESSMENT

FOXHOLE FARM, BOLNEY

Wates Developments Limited

2062918-RSKA-RP-001-(03)

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General notes

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Contents

1 Introduction

1.1 Overview

RSK Acoustics (RSKA) has been instructed by Wates Developments Limited to undertake a noise assessment to support an Outline planning application (appearance, landscaping, layout and scale reserved), for the erection of up to 200 dwellings; a community building (use class F1) encompassing land for education provision, together with associated access, ancillary parking and landscaping; the creation of a vehicular access point from the A272 Cowfold Road, and pedestrian and cycle only access to The Street; and creation of a network of roads, footways, and cycleways through the site; together with the provision of 3.26 ha of countryside open space, children's play areas, community orchard, and allotments; sustainable drainage systems and landscape buffers.

This report describes the assessment methodology, baseline conditions currently prevailing across the application site and the effect of noise on the proposed development, so that an evaluation can be made of the suitability of the site.

Mitigation measures have been identified where necessary and practicable to achieve appropriate acoustic standards.

1.2 Objectives

The objectives of the assessment are to:

- Identify sources of noise that may impact upon the residents of the Proposed Development;
- Quantify and report the noise climate across the site to determine the suitability for residential use;
- Assess the suitability of the site against the design targets within local and national guidelines and policies; and
- Specify the level of noise mitigation that may be required to reduce the potential for disturbance of future residents of the development.

1.3 Exclusions

Levels of vibration from typical free-flowing traffic would be imperceptible at nearest proposed residential locations and therefore an assessment of traffic induced vibration has been discounted.

2 Regulatory Framework

2.1 National Planning Policy Framework (NPPF): 2024

The National Planning Policy Framework (NPPF) describes how noise is considered within the planning regime. The NPPF does not contain assessment design targets, instead providing a series of policies, giving local authorities the flexibility in meeting the needs of local communities. The NPPF states:

"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 or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."

"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 impact 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."

"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."

2.2 Noise Policy Statement for England (NPSE): 2010

The Noise Policy Statement for England is published by the Department for Environment, Food and Rural Affairs (Defra) and sets out the approach to noise within the Government's sustainable development strategy.

The significance of impacts from noise within the NPSE are defined as follows:

There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

<u>NOEL – No Observed Effect Level</u>

- This is the level 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.

<u>LOAEL – Lowest Observed Adverse Effect Level</u>

- This is the level above which adverse effects on health and quality of life can be detected.

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

<u>SOAEL – Significant Observed Adverse Effect Level</u>

- This is the level above which significant adverse effects on health and quality of life occur.

The three aims of the NPSE are stated as:

- 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.
- 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.
- 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.

2.3 Planning Practice Guidance (PPG)

The Department for Communities and Local Government 'Planning Practice Guidance' (PPG) expands upon the NPPF and NPSE. The guidance does not include any specific noise levels but sets out further principles that should underpin a noise assessment. The PPG states[1]:

"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 SOAEL, LOAEL and NOEL and presents a table[2], reproduced below. The implication of the final line of the table is that only the 'noticeable and very disruptive' outcomes are unacceptable and should be prevented. All other outcomes (i.e. all other lines in the table) can be acceptable, depending upon the specific circumstances and factors such as the practicalities of mitigation.

Response	Examples of outcomes	Increasing effect level	Action
NOEL *(No Observed Effect Level)*			
Not present	No effect	No observed effect	No specific measures required
NOAEL *(No Observed Adverse Effect Level)*			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No observed adverse effect	No specific measures required

[1] PPG Reference Paragraph: 003 Reference ID: 30-003-20190722 (Revision date: 22/07/2019)
[2] PPG Reference Paragraph: 005 Reference ID: 30-005-20190722 (Revision date: 22/07/2019)

Response	Examples of outcomes	Increasing effect level	Action
***LOAEL** (Lowest Observable Adverse Effect Level)*			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum
***SOAEL** (Significant Observed Adverse Effect Level)*			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant observed adverse effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable adverse effect	Prevent

Table 1 *Summary of noise exposure hierarchy*

2.4 British Standard 7445-1:2003 'Description and measurement of environmental noise. Guide to quantities and procedures'

The three-part standard BS 7445 provides the framework within which environmental noise should be quantified. Part 1 provides a guide to quantities and procedures and Part 2 provides a guide to the acquisition of data pertinent to land use. Part 3 provides a guide to the application of noise limits.

BS 7445 also refers to a further standard, BS EN 61672, which prescribes the equipment necessary for such measurements. Whilst BS 7445 does not prescribe the meteorological conditions under which noise measurements should or should not be taken, it does (part 2, paragraph 5.4.3.3) recommend that in order

"…to facilitate the comparison of results (measurements of noise from different sources), it may be necessary to carry out measurements under selected meteorological conditions which are reproducible and correspond to quite stable propagation conditions."

These conditions include:

- wind speed not exceeding 5 m/s (measured at a height of 3 to 11 metres above the ground);
- no strong temperature inversions near the ground;
- no heavy precipitation.

2.5 British Standard 8233:2014 'Guidance on sound insulation and noise reduction for buildings'

Guidance on the acceptable noise levels for living rooms and bedrooms within residential buildings is given in BS 8233:2014. Advice is given on the design range of internal noise levels, depending on the use of each room and the sensitivity to noise of the operations expected to be conducted in the rooms. An extract of the indoor ambient noise levels for dwellings is reproduced in **Table 2.**

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hr}$	---
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	---
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$
Note: Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or Lmax, F, depending on the character and number of events per night. Sporadic noise events could require separate values.			

Table 2 Indoor ambient noise levels for dwellngs (BS 8233 table 4)

BS 8233 also provides design criteria for external noise and Section 7.7.3.2 states:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited."

2.6 World Health Organisation – 'Guidelines for Community Noise', 1999

The World Health Organisation (WHO) Guidelines for Community Noise was published as a response to a need for action together with a generic need for improvements in legislation at a national level. Although not legislation, this document provides general guidance and guidelines which have been set for different health effects, using the lowest noise level that produces an adverse health effect in specific human environments. The guidelines levels which are relevant to this assessment are set out in **Table 3**.

Activity	Location	L_{Aeq}, dB	Time base, 'T' hours	L_{AFmax} dB
Outdoor Living Area	Serious annoyance, daytime and evening	55	16	--
	Moderate annoyance, daytime and evening	50		
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35		
Inside bedrooms	Sleep disturbance, night-time	30	8	45[1]
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45		60
[1]Should not exceed 45 dB L_{AFmax} more than 10-15 times a night				

Table 3 WHO guidelines for community noise

2.7 Professional Practice guidance on Planning and Noise (ProPG): 2017

The Professional Practice Guidance on Planning and Noise is written to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England. The CIEH, IOA and the ANC have worked together to produce the guidance which encourages better acoustic design for new residential development and aims to protect people from the harmful effects of noise. This Professional Practice Guidance is based on the best knowledge available at the time of publication. It 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.

In relation with achieving internal noise values with open windows ProPG states that:

"Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal LAeq target levels should not normally be exceeded".

Stage 1 – Initial Site Noise Risk Assessment

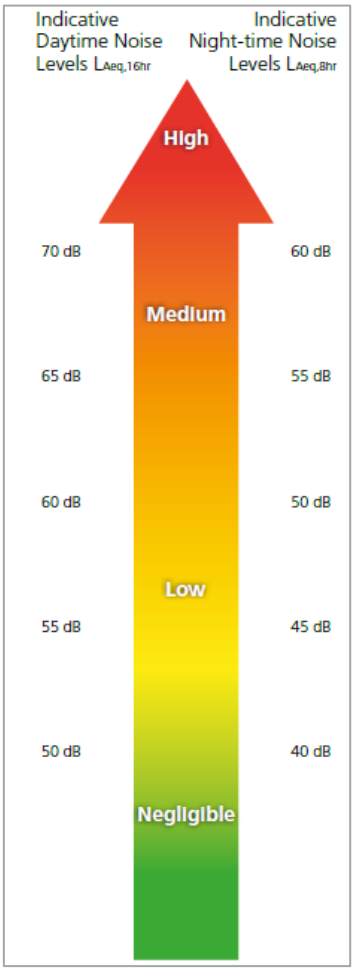


Figure 1 Stage 1 – Initial site noise risk assessment

ProPG recommends practitioners to undertake an initial noise risk assessment of the proposed development site to provide an indication of the likely risk of adverse effects from noise were no subsequent mitigation to be included as part of the development proposal. **Figure 1** summarises the Stage 1 Initial Site Noise Risk Assessment providing indicative daytime and night-time noise levels associated with four categories of risk: Negligible, Low, Medium, and High.

The figure illustrates how this initial noise risk assessment is linked with an increasing risk of adverse effect from noise. The assessment should include the acoustic effect of any existing site features that will remain (e.g., retained buildings, changes in ground level) and exclude the acoustic effect of any site features that will not remain (e.g., buildings to be demolished, fences and barriers to be removed) if development proceeds.

Acoustic Design

ProPG encourages the use of acoustic design as a means to inform the site masterplans and is key to avoiding or reducing to a minimum any adverse effects on any sensitive internal or external spaces. In considering acoustic design, consideration should be given by the developer to the management of noise through a hierarchy of potential mitigation measures which may include:

- Maximising the separation distance between source and receiver;
- Incorporate noise barriers (where applicable) to screen the development site (or individual plots) from significant sources of noise;
- Use existing features to reduce noise propagation across the site;
- Orientate the buildings in a manner which reduces the noise levels within habitable rooms (particularly bedrooms);
- Building envelope design to mitigate the noise to acceptable levels, whilst providing adequate ventilation.

2.8 Approved Document O (2021 Edition) – The Building Regulations: 2010

Approved Document O (AD-O), 2021 edition (under Building Regulations 2010) aims to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures. The document specifies internal noise limits which should be met to ensure the overheating mitigation strategy is usable.

Based on typical assumptions, the resulting outside-to-inside level difference for window openings necessary to satisfy the simplified method of AD-O are expected to be approximately 4 dB for 'high' risk locations and 9 dB for 'medium' risk locations.

A summary of the recommended levels for the most noise-sensitive spaces (bedrooms) are provided below in **Table 4** for average ambient noise levels throughout a given time period (L_{Aeq}) and maximum noise levels (L_{max}) during the night.

Period	Normal condition (as per BS 8233)	Overheating condition (ADO)
Daytime (07:00 to 23:00)	35 dB $L_{Aeq,16hr}$	--
Night-time (23:00 to 07:00)	30 dB $L_{Aeq,8hr}$	40 dB $L_{Aeq,8hr}$
	45 dB L_{AFmax}	55 dB L_{Amax}*
* L_{AFmax} *refers to the level not normally exceeded, and not the 10th highest level used within WHO guidelines*		

Table 4 AD-O overheating condition criteria

The lower ambient noise level thresholds in the overheating condition correspond to the recommendation within BS 8233:2014 for internal noise levels that would be considered "reasonable" under normal conditions.

2.9 Calculation of Road Traffic Noise, 1988

The Calculation of Road Traffic Noise (CRTN) describes the procedures for calculating noise from Road traffic. The memorandum uses traffic flows, %HGV's and Road speed, amongst other parameters to calculate the noise level in terms of the $L_{A10, 18hr}$. The 18-hour period is defined between 06:00 and 24:00.

CRTN also allows provision for a shortened measurement procedure which is equally appropriate for the calculation of road traffic noise. The procedure involves obtaining traffic noise measurements throughout a representative sample period within any three consecutive hours between 10:00 and 17:00. In order to calculate an equivalent daytime noise ($L_{Aeq, 16hr}$), the correction of $L_{A10, 3hr}$ – 3 dB would be applied.

2.10 Design Manual for Roads and Bridges, LA111 Noise and Vibration, 2020

The assessment is based on the procedure set out in the Design Manual for Roads and Bridges (DMRB). The assessment covers both the magnitude and significance of any change as a result of any new or amended highway scheme however is relevant for noise assessment of other project types. DMRB refers specifically to noise impacts and as such will be discussed in these terms for the purposes of this assessment.

A significant change is defined as an increase in the 18-hour traffic flow which is equal or greater than 25%, or a decrease which is equal or greater than 20%. Changes of this magnitude are equivalent to a change in noise level of at least 1 dB.

The magnitude of noise impact is therefore assessed by comparing the increase and decrease in noise levels between both short term and long-term scenarios. DMRB defines this impact both in the short term (immediate impact; first year of operation) and long term (future impact; +15 years from opening year).

Noise change, $L_{A10, 18hr}$		
Magnitude of change	**Short term**	**Long term**
Major	Greater than or equal 5.0	Greater than or equal to 10.0
Moderate	3.0 to 4.9	5.0 to 9.9
Minor	1.0 to 2.9	3.0 to 4.9
Negligible	Less than 1.0	Less than 3.0

Table 5 DMRB magnitude of change

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

BS 4142: 2014+A1: 2019 2019 describes the methods for rating and assessing noise from industrial or commercial sources, including manufacturing processes, fixed installations and plant equipment, loading of goods and sound from mobile plant. The standard is applicable for the purpose of assessing sound at proposed new dwellings, through the determination of a rating level of an industrial or commercial noise source.

Where certain acoustic features are present at the assessment location, a character correction should be applied to the specific sound level to give the rating level to be used in the assessment.

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of adverse impact depending on the context.
- Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact depending on the context.

BS 8233 provides good internal design threshold for new developments, including residential. This standard is derived from the WHO Guidelines for Community Noise (see above). For the use of BS 4142 in assessing new residential development applications ProPG (Paragraph 2.43) states that:

"Professional judgement will have to be exercised in addressing these sorts of issues. One possible approach may be to apply BS 4142:2014 character corrections to the noise level guideline values in order to derive suitable effect thresholds and/ or mitigation design targets and to use the same reference time periods recommended in the standard"

2.12 Local Planning Policy

2.12.1 Planning Noise Advisory Document: Sussex 2023

Section 2.5 Minimum Considerations for Noise Sensitive Development states:

"2.5.1 For a new noise sensitive development near an existing source of transport noise (road, rail, ports or aircraft) the LAeq (16hr day and 8hr night), should be measured. In addition, suitable shorter term LAeq, LA90, LA10 and LAfmax would be expected in order to give a clearer picture of the existing noise environment. LAeq 1hr may be deemed the most suitable metric if there is concern about rush hour traffic, for example. Consideration shall be given to ProPG (May 2017): Planning and Noise. New Residential Development and the Good Acoustic Design process.

2.5.2 Where the external LAfmax sound levels are likely to exceed 60 dB during the night period, overnight monitoring will be necessary. A specific LAfmax,1 minute risk assessment shall be provided for the whole night period. This could also apply to extensions/ alterations to existing development.

2.5.3 For a new noise sensitive development next to a commercial noise source, where practical, each existing potential noise source would need to be measured separately and details provided of the hours of operation, the LAeq, the tonality, character, impulsivity and/or intermittency of the noise (see BS 4142) and the hours of occurrence. The existing background noise level (LA90) will also have to be measured with and without the commercial noise sources in operation in accordance with BS 4142. This could also apply to extensions/ alterations to existing development. Once appropriately assessed, mitigation may be required in accordance with Good Acoustic Design."

2.12.2 Mid Sussex District Plan 2014 – 2031

Policy DPN7: Noise Impacts states:

"People's health and quality of life and the natural environment, including wildlife, will be protected from unacceptable levels of noise.

Areas valued for tranquillity for recreation and amenity reasons, including protected landscapes and their setting and nature conservation sites, will be protected from unacceptable levels of noise. Development will only be permitted where it:

- *avoids significant adverse impacts on health and quality of life; and*
- *mitigates and minimises adverse impacts on health and quality of life; and*
- *where possible, contributes to the improvement of health and quality of life.*

Development will be expected to be located, designed and controlled to avoid significant adverse impacts or minimise adverse impacts from noise. Development must have good acoustic design including orientating or organising buildings (including consideration of the internal layout of buildings) to locate more noise sensitive areas, such as the principal habitable rooms, away from potential sources of noise. Parking arrangements must be carefully considered to avoid noise.

In addition to good acoustic design, development should have regard to natural solutions for mitigating noise such as green infrastructure.

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

Noise generating development will be permitted where it can be demonstrated that nearby noise sensitive uses (existing or planned) will not be exposed to noise impact that will significantly adversely affect the amenity of existing and future users. If required by the local planning authority, 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.*

Development proposals will need to take into account the Council's noise guidance such as the Planning Noise Advice Document: Sussex."

Policy DP29 of the Mid Sussex District Plan states:

"The environment, including nationally designated environmental sites, nationally protected landscapes, areas of nature conservation or geological interest, wildlife habitats, and the quality of people's life will be protected from unacceptable levels of noise, light and air pollution 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;"*

2.12.3 Bolney Neighbourhood Plan 2015 - 2031

Policy BOLD1 – Design of New Development and Conservation, states:

"Planning permission for new development will ordinarily be permitted subject to the following criteria:

- *It is designed to a high quality which reflects Bolney's rural nature and responds to the heritage and distinctive character by way of;*
- *height, scale, spacing, layout, orientation, design and materials of buildings, and*
- *the scale, design and materials of the public realm (highways, footways, open space and landscape); and*
- *It does not have an unacceptable impact on the setting of any heritage asset; and*
- *It respects the natural contours of a site and protects and sensitively incorporates well-established natural features of the landscape including trees, species-rich hedgerows and ponds within the site; and*
- *It creates a safe, accessible and well-connected environment that meets the needs of its users; and*
- *It will not result in unacceptable levels of light, noise, air or water pollution, and*
- *Where possible, it provides lock-up facilities for storage of bicycles, children's pushchairs and mobility vehicles to encourage walking and cycling and to assist accessibility."*

2.13 Local Authority Consultation

The noise monitoring and assessment methodology was shared by email with the Environmental Health team at Mid Sussex District Council on 11 November 2024.

This methodology was as follows:

- Data gathered during the survey would be used with local terrain data and site plans, to generate a computer model of the proposed development site. The model will allow for a robust characterisation of dominant noise sources across the development site and highlight those areas likely to be most exposed to noise. Information from the noise model will feed into the suitability of the site for the proposed development.
- The suitability of the site for residential development will be assessed in line with the National Planning Policy Framework (NPPF) and any Mid Sussex District Council guidance (please advise). Internal and external noise levels will be assessed against the criteria within BS 8233: 2014 – '*Guidance on sound insulation and noise reduction for buildings*'. Analysis of maximum noise levels

(L_{Amax}) specifically in relation to sleep disturbance will be undertaken in line with WHO '*Guidelines for Community Noise, 1999*' and expanded in the more recently published Professional Practice guidance on '*Planning and Noise (ProPG): 2017*'.

- Should it be determined through site attendance that the baseline monitoring is affected by existing commercial / industrial sources, in accordance with the requirements of BS 4142:2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*', the character of the noise emission(s) would inform the addition of rating penalties (to account for impulsive, tonal, intermittent or other identifiable characteristics) to the baseline noise measurements. A combination of existing baseline noise levels and applied rating corrections would inform the assessment of site suitability. Appropriate mitigation measures would be recommended where necessary.

RSKA received a reply on 11 November 2024 stating satisfaction from the council with the proposed methodology and approach undertaken.

3 Development and Location

3.1 Site Location and Description

The proposed development site is located within the village of Bolney, East Sussex adjacent to the A272 which runs to the south of the site.

To the west runs Foxhole Lane with other agricultural sites and a vineyard on the opposite side of the lane.

To the north lies a wooded area and selection of residential properties To the east lie residential properties along The Street which runs through the centre of Bolney village. Beyond the centre of Bolney village is the A23. The A23 is the main arterial route between the M25 and Brighton, and is considered the primary noise source impacting the east of the site.

Land use across the site is predominantly agricultural, with a number of hedgerows dividing the site throughout.

3.2 Proposed Development

The applicant is seeking outline planning permission (appearance, landscaping, layout and scale reserved), for the erection of up to 200 dwellings; a community building (use class F1) encompassing land for education provision, together with associated access, ancillary parking and landscaping; the creation of a vehicular access point from the A272 Cowfold Road, and pedestrian and cycle only access to The Street; and creation of a network of roads, footways, and cycleways through the site; together with the provision of 3.26 ha of countryside open space, children's play areas, community orchard, and allotments; sustainable drainage systems and landscape buffers.

The proposed development site location plan (red line boundary) is presented in **Figure 2**, with the illustrative masterplan reproduced in **Appendix A**.

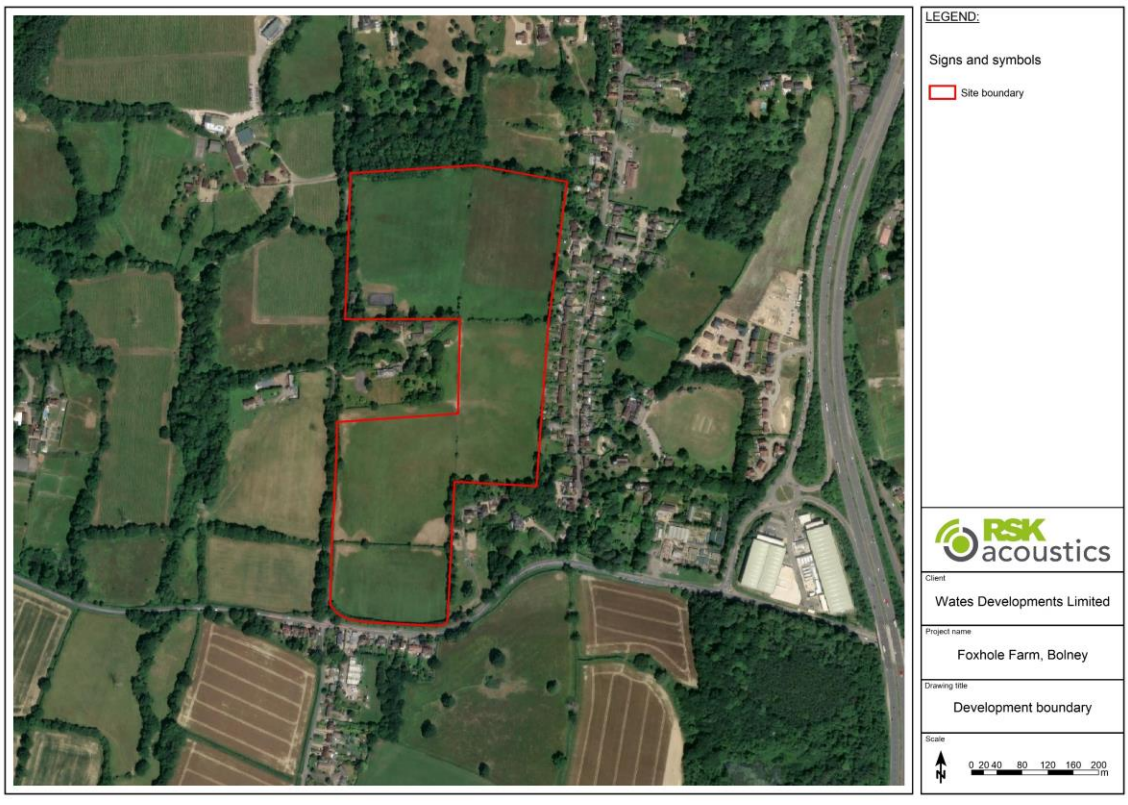


Figure 2 Proposed development boundary

4 Baseline Survey Methodology

4.1 Measurement Details

A baseline noise survey was undertaken between Thursday 10 October and Thursday 17 October 2024, with the acquisition of continuous noise data throughout daytime (07:00 – 23:00) and night-time (23:00 – 07:00) periods. Three unattended measurements (MP1 to MP3) were taken over a representative midweek and weekend period at positions along the north-east, west, and southern site boundaries to quantify the prevailing noise environment.

A weather station capable of measuring atmospheric pressure, wind speed, wind direction, rain accumulation and temperature was installed within the site boundary and utilised for the duration of the survey. A description of the noise measurement positions and rationale is provided in **Table 6** below.

Measurement Name	Location	Rationale
MP1	North-east	To quantify the noise contribution from The Street and A23 to the east and propagation of noise from the A272.
MP2	West	To quantify the noise contribution from Foxhole Lane to the west and propagation from the A272 and A23.
MP3	South	To quantify the noise contribution from the A272.

Table 6 Measurement location details

A graphical representation of the monitoring positions is presented in **Figure 3**. Photographs of the measurement positions are provided in **Appendix E**.

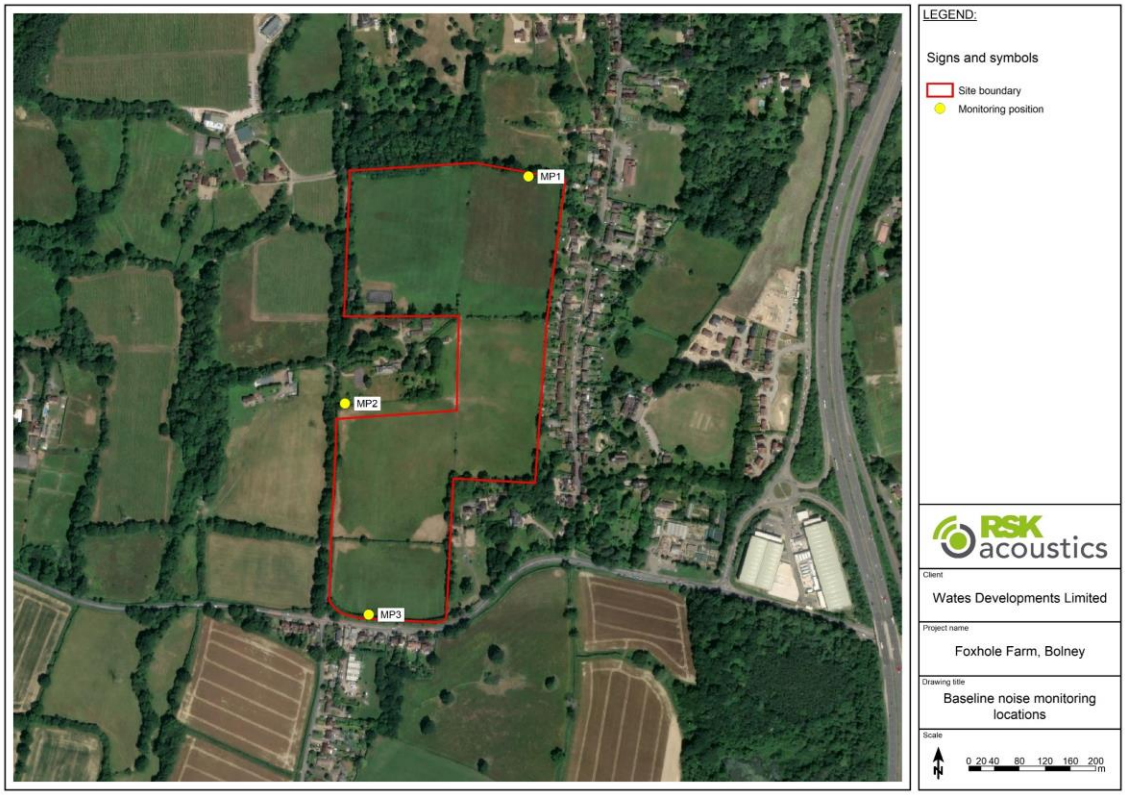


Figure 3 Baseline noise monitoring positions

4.2 Survey Equipment

Monitoring was undertaken using the following equipment:

Equipment	Type	Serial number	Calibration date
Class 1 sound level meter	Rion NL-52	01265456	26/09/2023
	Rion NL-52	00386770	23/11/2022
	Rion NL-52	01043373	11/04/2023
Acoustic calibrator	Rion NC-74	34625616	16/07/2024
Weather Station	Davies Vantage Pro2	WS-006[1]	N/A
[1]Internal reference			

Table 7 Monitoring equipment

All measurements were undertaken in free field conditions with the microphone positioned at least 3.5 metres away from reflecting surfaces and at least 1.5 metres above ground height to the requirements of BS 7445.

The calibration of each sound level meter was checked before and after the measurements, using the acoustic calibrator at 94 dB at 1 kHz; no significant calibration drift (± 0.5 dB(A)) was noted. The sound level meters used conform to the requirements of BS EN 61672-1: 2013 '*Electroacoustics. Sound level meter, Specifications*'. The calibrator used conforms to the requirements of BS EN 60942: 2018 '*Electroacoustics, Sound calibrators*'. The equipment used has a calibration history that is traceable to a certified calibration institution.

Measurements were logged in continuous 15-minute integration periods (with supplementary 100-milisecond data) and obtained using broadband indices (L_{Aeq}, L_{A10}, L_{A90} and L_{Amax}).

4.3 Noise Environment

The following site observations were noted at the measurement positions.

- MP1 – influenced by road traffic from the A23, the dominant audible noise source, local traffic on The Street not distinguishable. Occasional farm activity audible with birdsong.
- MP2 – distant road traffic noise dominate noise source with contributions from occasional cars passing on Foxhole Lane. Birdsong and foliage movement also present within the noise environment.
- MP3 – noise environment dominated by the adjacent A272, birdsong and foliage movement also present within the noise environment

4.4 Weather Conditions

Weather conditions prevalent across the site were measured with a weather station deployed approximately 3 metres from MP2. Weather data is summarised in **Table 8**.

Date	Average Temperature (°C)	Average Wind Speed ($m.s^{-1}$)	Dominant Wind Direction	Accumulative Precipitation (mm)
Thursday 10/10/2024	8.5	0.1	W	0
Friday 11/10/2024	7.1	0.2	ESE	0.2
Saturday 12/10/2024	10.4	0.2	WSW	2.3

Date	Average Temperature (°C)	Average Wind Speed ($m.s^{-1}$)	Dominant Wind Direction	Accumulative Precipitation (mm)
Sunday 13/10/2024	7.4	0.1	ESE	0.3
Monday 14/10/2024	10.6	0.1	E	24.9
Tuesday 15/10/2024	13.9	1.1	ESE	0.2
Wednesday 16/10/2024	17.5	1.2	SSE	1.5
Thursday 17/10/2024	14.8	0	SW	0.8
[1]Weather data obtained from 12:00 onwards to account for survey start time. [2]Weather data obtained until 12:45 to account for survey end time.				

Table 8 Survey weather conditions

Weather conditions were mostly calm with brief periods of precipitation noted on Friday 11th to Sunday 13th and Tuesday 15th to Thursday 17th October 2024. Periods of heavy rain were noted on Monday 14th October 2024. The following periods have been excluded from the assessment dataset:

- 23:00 13/10/2024 – 23:00 14/10/2024
- 07:00 16/10/2024 – 12:00 17/10/2024

Noise monitoring data has been analysed outside the excluded periods with no significant change in noise levels when compared against dry periods thus with minimal impact on the adopted averaged noise levels.

5 Baseline Survey Results

5.1 Long Term Measurements

A summary of measured noise levels at the long-term, continuous measurement locations MP1 to MP3 are presented in **Tables 9 to 11**. Graphical output of the survey data is provided in **Appendix B**. Analysis of the dataset accounting for the standard 16-hour daytime period (07:00 – 23:00) and 8-hour night-time period (23:00 – 07:00) is presented in accordance with BS 8233: 2014. Values are rounded to the nearest whole number.

Date	Time period, T	Measured noise levels (dB)[1]			
		$L_{Aeq, T}$	$L_{Amax, T}$	$L_{A90, T}$	$L_{A10, T}$
Thursday 10/10/2024	12:30 to 23:00	48	80	44	52
	23:00 to 07:00	46	61	41	50
Friday 11/10/2024	07:00 to 23:00	50	87	45	53
	23:00 to 07:00	48	59	45	52
Saturday 12/10/2024	07:00 to 23:00	50	88	44	52
	23:00 to 07:00	37	55	33	42
Sunday 13/10/2024	07:00 to 23:00	51	94	44	53
	23:00 to 07:00	51	77	45	53
Monday 14/10/2024	07:00 to 23:00	53	74	48	57
	23:00 to 07:00	44	65	38	47
Tuesday 15/10/2024	07:00 to 23:00	52	81	50	55
	23:00 to 07:00	47	65	42	51
Wednesday 16/10/2024	07:00 to 23:00	53	94	49	56
	23:00 to 07:00	42	66	38	47
Thursday 17/10/2024	07:00 to 12:30	44	68	40	50
Average[2]	**Daytime**	**50**	**94**	**46**	**53**
	Night-time	**44**	**65**	**40**	**48**

[1] $L_{Aeq,T}$ values are the logarithmic average of $L_{Aeq,15min}$ samples, and the $L_{A10,T}$ and $L_{A90,T}$ are the arithmetic average of $L_{A10,15min}$ and $L_{A90,15min}$ samples. L_{AFmax} accounts for the highest $L_{AFmax,15min}$ sample within the period.

[2] Arithmetic average of derived daytime 16hr and night-time 8hr values. Part-time period on 10/10/24 is also included. Periods highlighted have been excluded from the analysis due to impact from adverse weather.

Table 9 Noise monitoring data – MP1

Date	Time period, T	Measured noise levels (dB)[1]			
		$L_{Aeq, T}$	$L_{Amax, T}$	$L_{A90, T}$	$L_{A10, T}$
Thursday 10/10/2024	12:00 to 23:00	47	85	39	44
	23:00 to 07:00	47	69	42	47
Friday 11/10/2024	07:00 to 23:00	53	83	47	53

Date	Time period, T	Measured noise levels (dB)[1]			
		$L_{Aeq, T}$	$L_{Amax, T}$	$L_{A90, T}$	$L_{A10, T}$
	23:00 to 07:00	49	68	45	50
Saturday 12/10/2024	07:00 to 23:00	52	79	47	51
	23:00 to 07:00	42	73	35	43
Sunday 13/10/2024	07:00 to 23:00	51	74	46	51
	23:00 to 07:00	55	74	48	53
Monday 14/10/2024	07:00 to 23:00	55	81	50	54
	23:00 to 07:00	46	70	41	46
Tuesday 15/10/2024	07:00 to 23:00	55	80	51	56
	23:00 to 07:00	49	73	44	51
Wednesday 16/10/2024	07:00 to 23:00	55	81	49	55
	23:00 to 07:00	46	69	41	46
Thursday 17/10/2024	07:00 to 11:45	52	77	44	51
Average[2]	**Daytime**	**52**	**83**	**48**	**53**
	Night-time	**47**	**73**	**41**	**47**

[1] $L_{Aeq,T}$ values are the logarithmic average of $L_{Aeq,15min}$ samples, and the $L_{A10,T}$ and $L_{A90,T}$ are the arithmetic average of $L_{A10,15min}$ and $L_{A90,15min}$ samples. L_{AFmax} accounts for the highest $L_{AFmax,15min}$ sample within the period.

[2] Arithmetic average of derived daytime 16hr and night-time 8hr values. Part-time period on 10/10/24 is also included. Periods highlighted have been excluded from the analysis due to impact from adverse weather.

Table 10 Noise monitoring data – MP2

Date	Time period, T	Measured noise levels (dB)[1]			
		$L_{Aeq, T}$	$L_{Amax, T}$	$L_{A90, T}$	$L_{A10, T}$
Thursday 10/10/2024	13:00 to 23:00	64	89	53	67
	23:00 to 07:00	60	84	43	61
Friday 11/10/2024	07:00 to 23:00	64	85	54	67
	23:00 to 07:00	58	84	45	61
Saturday 12/10/2024	07:00 to 23:00	64	87	52	67
	23:00 to 07:00	58	81	37	61
Sunday 13/10/2024	07:00 to 23:00	64	95	52	67
	23:00 to 07:00	61	80	46	60
Monday 14/10/2024	07:00 to 23:00	65	90	54	68
	23:00 to 07:00	59	86	41	60
Tuesday 15/10/2024	07:00 to 23:00	64	92	54	67
	23:00 to 07:00	59	79	43	59

Date	Time period, T	Measured noise levels (dB)[1]			
		$L_{Aeq, T}$	$L_{Amax, T}$	$L_{A90, T}$	$L_{A10, T}$
Wednesday 16/10/2024	07:00 to 23:00	63	93	51	67
	23:00 to 07:00	59	82	38	60
Thursday 17/10/2024	07:00 to 12:30	65	88	54	68
Average[2]	**Daytime**	**64**	**95**	**53**	**67**
	Night-time	**59**	**86**	**42**	**60**

[1] $L_{Aeq,T}$ values are the logarithmic average of $L_{Aeq,15min}$ samples, and the $L_{A10,T}$ and $L_{A90,T}$ are the arithmetic average of $L_{A10,15min}$ and $L_{A90,15min}$ samples. L_{AFmax} accounts for the highest $L_{AFmax,15min}$ sample within the period.

[2] Arithmetic average of derived daytime 16hr and night-time 8hr values. Part-time period on 10/10/24 is also included. Periods highlighted have been excluded from the analysis due to impact from adverse weather.

Table 11 Noise monitoring data – MP3

5.2 Maximum Event Levels

The maximum 10-th highest night-time noise level (L_{AFmax}) has been adopted as a conservative approach for night-time assessment purposes (in accordance with the requirements of WHO guidelines). A 1-minute interval period has been used to establish the typical night-time L_{AFmax} levels (taken as the 10th highest 1-minute maximum level measured during the night-time period). Any max level occurrences attributed to birdsong and the dawn chorus have been disregarded from the analysis as they are not considered representative of environmental noise sources affecting future living conditions.

Night Period Date (23:00 – 07:00)	10th Highest $L_{AFmax,1\ min}$ (dB)		
	MP1	MP2	MP3
Thursday 10/10/2024	56	58	78
Friday 11/10/2024	56	65	78
Saturday 12/10/2024	48	66	75
Monday 14/10/2024	56	62	77
Tuesday 15/10/2024	56	66	76
Maximum 10th Highest L_{AFmax}	**56**	**66**	**78**

Table 12 Analysis of 10th Highest L_{AFmax} during night-time hours (23:00 – 07:00)

6 Assessment Methodology

6.1 Noise Prediction Model

A computer noise model of the proposed development has been constructed using SoundPLAN v9.1. Noise levels across the proposed development site have been derived from a noise prediction model which has been calibrated against the measured levels at the baseline survey locations. The model has considered the following scenarios:

- Daytime - ambient $L_{Aeq,16hr}$ (07:00 – 23:00);
- Night-time - ambient $L_{Aeq,8hr}$ (23:00 – 07:00); and
- Night-time – individual events L_{AFmax} within period 23:00 – 07:00).

An overview of the modelling parameters is given in **Table 13**. Noise contour maps for both daytime and night-time periods are provided in **Appendices C** and **D**.

Item	Setting
Algorithms	Calculation of Road Traffic Noise (CRTN)
Ground absorption	Acoustically soft (assumed 0.8 coefficient) – grass or vegetated areas.
Meteorological conditions	10 degrees Celsius. 70% humidity. Wind from source to receiver.
Receptor height	Ground Floor 1.5 m above ground First Floor 4 m above ground
Site layout	Illustrative Masterplan (document ref: 'P20074-RFT-XX-XX-DR-A-0101-P07_Illustrative Masterplan')
Source modelling	Existing buildings and intervening structures modelled as structures (heights identified on site or through 3D views). Calibration of the averaged daytime ($L_{Aeq,\ 16\ hour}$) and night ($L_{Aeq,8\ hour}$) model accounts for the road network acting as the primary source of noise impacting the site (line source). The night-time L_{AFmax} levels from road pass-by events calibrated against the representative event levels (i.e. the value typically not exceeded more than 10 times per night). Pass-by events modelled as a line source at 0.5 m height above ground level adopting a point source behaviour at the closest distance between the A272/Foxhole Lane and each receptor location.
Terrain	LiDAR DTM with a 2-metre resolution has been imported into the model.

Table 13 Noise modelling parameters

6.2 Validation of Computer Model

The propagation of maximum noise levels across the proposed development site have been derived from a computer noise prediction model assuming the influence of the surrounding road traffic network only. The model has been validated against the measured levels at the baseline survey locations.

Differences between measured and predicted levels are presented in **Table 14**.

Location	Measured Noise Level, dB			Predicted Noise Level, dB			Difference, dB		
	Day	Night		Day	Night		Day	Night	
	$L_{Aeq, T}$	$L_{Aeq, T}$	$L_{AF,max}$	$L_{Aeq, T}$	$L_{Aeq, T}$	$L_{AF,max*}$	$L_{Aeq,T}$	$L_{Aeq, T}$	$L_{AF,max*}$
MP1	50	44	56	52	45	54	+2	+1	-2
MP2	52	47	66	54	47	65	+2	0	-1
MP3	64	59	78	66	58	77	+2	-1	-1
* 10^{th} Highest $L_{AF,max}$									

Table 14 Noise model validation

Calibrated noise levels at all monitoring locations are within ±2 dB(A) from measured noise levels, providing an acceptable level of confidence to the modelling exercise.

6.3 Predicted Noise Levels

The assessment receptors have been positioned strategically along the extremities of the site and within each indicative building area to represent the likely noise levels across the proposed development site. This is the result of the outline nature of the application and is intended to provide a conservative estimation of the noise impact (in the absence of screening provided by development buildings) to assess its suitability and to inform potential mitigation measures. It is expected that the noise predictions would be refined at the detailed design stage once the final masterplan, including internal layouts, is available in order to evaluate the noise impact at individual building plots.

The adopted evaluation plots are presented in **Figure 4**.

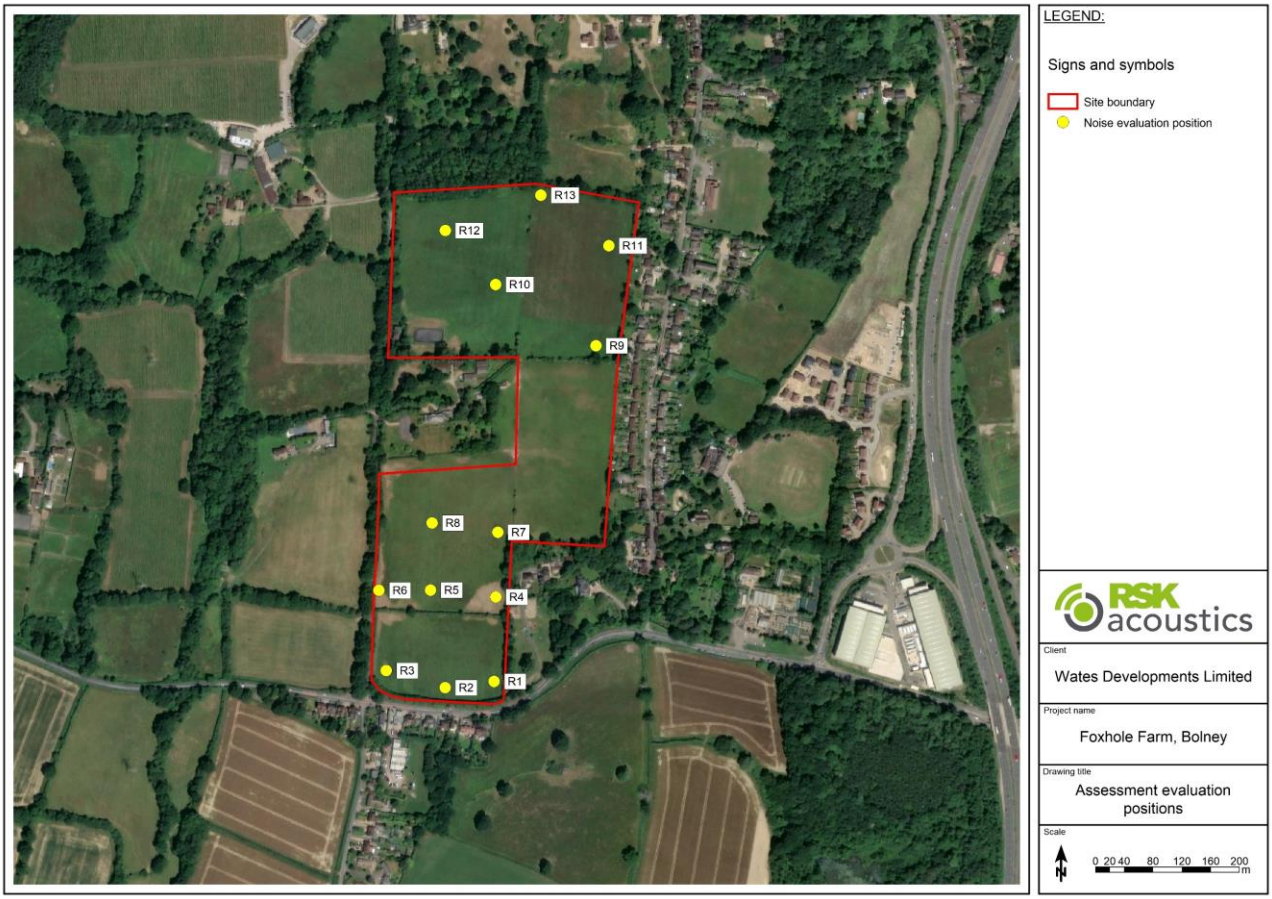


Figure 4 Noise evaluation points

6.4 Design Targets for Residential Development

For the purpose of this assessment, the acoustic design targets presented in **Table 15** below have been adopted. The design targets are based on the requirements of the appropriate guidelines for residential developments.

Condition	Criterion
Internal ambient daytime noise levels within bedroom / living room areas daytime (BS 8233)	35 dB $L_{Aeq,16hrs}$
Internal ambient noise levels within bedrooms at night (BS 8233)	30 dB $L_{Aeq,8hrs}$
Internal individual event levels within bedrooms during the night (>10 occurrences – WHO/ProPG)	45 dB $L_{AF,max}$
Noise levels within external amenity areas associated with the proposed dwellings* (BS 8233)	50 to 55 dB $L_{Aeq,16hrs}$
* 50 dB $L_{Aeq,T}$ is the desirable threshold level, 55 dB $L_{Aeq,T}$ is the upper guideline level. However, 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.	

Table 15 Noise design target for residential use

It is considered that these levels are the lowest observed adverse effect level (LOAEL) in line with the Noise Policy Statement for England (NPSE).

7 Site Suitability Assessment

7.1 Predicted Noise Levels

Predicted noise levels for the adopted evaluation points presented in **Figure 4** above are summarised in **Table 16**. The table includes detail of the predicted noise level at receptor heights of 1.5 metres (ground floor) and 4 metres above ground (first floor), for respective daytime and night-time levels. An indication of the level of mitigation required by the building envelope (to comply with the noise design targets outlined in **Table 15**) is also presented. Noise levels are rounded to the nearest whole number.

Location	Period	Predicted External Noise Level, $L_{Aeq,T}$ dB	BS 8233 Internal Ambient Noise Requirement, dB[1]	Attenuation Required by Building Envelope, dB[2]
Receiver 1	Day	62	35	27
	Night	55	30	25
		73	45 L_{AFmax}	**28**
Receiver 2	Day	63	35	28
	Night	56	30	26
		75	45 L_{AFmax}	**30**
Receiver 3	Day	61	35	26
	Night	55	30	25
		73	45 L_{AFmax}	**28**
Receiver 4	Day	57	35	22
	Night	51	30	21
		67	45 L_{AFmax}	**22**
Receiver 5	Day	56	35	21
	Night	50	30	20
		66	45 L_{AFmax}	**21**
Receiver 6	Day	57	35	22
	Night	50	30	20
		71	45 L_{AFmax}	**26**
Receiver 7	Day	56	35	**21**
	Night	49	30	19
		64	45 L_{AFmax}	19
Receiver 8	Day	55	35	**20**
	Night	48	30	18
		64	45 L_{AFmax}	19
Receiver 9	Day	54	35	**19**
	Night	48	30	18
		58	45 L_{AFmax}	13

Location	Period	Predicted External Noise Level, $L_{Aeq,T}$ dB	BS 8233 Internal Ambient Noise Requirement, dB[1]	Attenuation Required by Building Envelope, dB[2]
Receiver 10	Day	51	35	**16**
	Night	44	30	14
		57	45 L_{AFmax}	12
Receiver 11	Day	52	35	**17**
	Night	46	30	16
		56	45 L_{AFmax}	11
Receiver 12	Day	50	35	15
	Night	44	30	14
		60	45 L_{AFmax}	**15**
Receiver 13	Day	52	35	**17**
	Night	45	30	15
		56	45 L_{AFmax}	11
[1] Daytime residential criteria for resting / living rooms (ground floor). Night-time criteria for bedrooms (first floor) [2] Bold denotes highest level of attenuation required at boundary location Based on simple level difference				

Table 16 Predicted noise levels

Averaged daytime noise levels predicted at ground floor level range between 50 and 63 dB $L_{Aeq,16hr}$; night-time noise levels at first floor level range between 44 and 56 dB $L_{Aeq,8hr}$. Highest noise levels are predicted towards the southern area of the Proposed Development, this is due to the proximity to the A272.

Noise contour maps are provided in **Appendices C and D**. The maps illustrate the attenuation of noise across the site, without any form of mitigation or screening due to the proposed development.

Based on the predicted noise levels, an initial noise risk assessment (Stage 1) following ProPG guidance indicates that the site is considered to pose a negligible to medium risk of adverse effect. The indicative noise levels are intended to provide a sense of the noise challenge at the proposed residential development site before considering any mitigation measures or other factors such as the locality, project, and wider context.

ProPG encourages the use of acoustic design as a means to inform the site masterplans and is key to avoiding or reducing to a minimum any adverse effects on any sensitive internal or external spaces. In considering acoustic design, consideration should be given by the developer to the management of noise through a hierarchy of potential mitigation measures which may include:

- Maximising the separation distance between source and receiver;
- Incorporate noise barriers (where applicable) to screen the development site (or individual plots) from significant sources of noise;
- Use existing features to reduce noise propagation across the site;
- Orientate the buildings in a manner which reduces the noise levels within habitable rooms (particularly bedrooms);

- Building envelope design to mitigate the noise to acceptable levels, whilst providing adequate ventilation.

7.2 Internal Noise Levels – Façade Treatment

Noise level reduction can be provided through various façade treatment methods such as glazing and ventilation products; however, the final level of mitigation would be dependent on factors such as building positioning, room size and room volume. It has been assumed that the external wall build-up would be based on masonry cavity construction with cavity insulation infill or an alternative construction providing at least a weighted sound reduction index of 50 dB R_w. The acoustic performance of the roof construction has assumed a traditional pitched roof with concrete tiles and a 9 mm plasterboard ceiling, covered in thermal insulating material, providing at least a weighted sound reduction index of 43 dB Rw.

As a result of the predictions presented in **Table 16** and based on external levels dominated by road traffic noise, the level of mitigation required by the building envelope to adhere to the design targets in BS 8233/WHO is provided. The highest level of mitigation afforded by the glazing is 30 dB R_w+C_{tr} for properties positioned towards the southern boundary of the site. This can be achieved with standard glazing products accompanied by a suitable acoustically treated trickle ventilator ensuring the overall envelope acoustic performance do not diminish in the open position (for background ventilation purposes only). The windows would remain openable at the occupant's discretion, allowing for rapid or purge ventilation. Final calculations should be determined during the detailed design stage.

The values in **Table 16** represent the highest level of attenuation required, based on a simple difference, afforded by the building envelope at indicative positions around the site. Understandably, treatments at those façades facing away from the identified road sources or those dwellings positioned within the central portion of the site can afford a lower level of specification due to likely screening effects and increased distance from dominant noise sources.

On the basis that a partially open window typically provides in the order of 13 dB attenuation, it is likely that the predicted noise levels would result in an exceedance of the recommended internal acoustic design targets across the site. Alternative forms of ventilation should therefore be provided.

It should be noted that the above conclusions are a conservative interpretation of the predicted noise propagation across the site excluding likely screening effects from intervening buildings and structures.

7.3 Internal Noise Conditions – Overheating

7.3.1 AD-O Assessment

Based upon the night-time predicted noise levels, additional calculations have been undertaken at each evaluation point to determine the risk of exceeding Approved Document O (AD-O) noise limits. Based on the calculation method within ISO 12354, the required window opening area within a single bedroom would correspond to approximately 9 dB reduction from outside to inside; in order to meet an internal ambient level of 40 dB $L_{Aeq,8hr}$ (and 55 dB L_{AFmax} more than 10 times) in line with the requirements of the published AD-O, the external noise limit for night-time hours must not exceed 49 dB $L_{Aeq,8hr}$ and 64 dB L_{AFmax}.

Predicted external night-time levels (first floor level) are likely to range between 44 and 56 dB $L_{Aeq,8hr}$ with maximum night-time levels (10-th highest) predicted between 56 and 75 dB L_{AFmax} at first floor level. Noise levels may exceed the AD-O criteria at proposed residential plots towards the southern portion of the Proposed Development (evaluation positions 1 to 6) and as such, a suitable attenuation strategy for these areas should be developed at detailed design in conjunction with the overheating engineer to ensure suitable internal conditions can be met. This may include:

- Dynamic thermal modelling to determine if partially open windows can be used at night to control overheating. Compliance would be subject to the minimum open area required and the corresponding external to internal sound reduction, achievable alternative means of ventilation may be required for those dwellings.

- Installation of attenuated or plenum windows / louvres to affected bedrooms.
- Mechanical or comfort cooling systems. Where a mechanical solution is required, the impact of the noise generated both internally and externally should be considered to ensure BS 8233: 2014 recommended noise levels can be achieved within development dwellings.

It should be noted that the above conclusions are based on the simplified method of assessment and assume a worst-case scenario of dwellings positioned on the edge of the indicative residential areas. It is recommended during the detailed design (reserved matters) stage that input be sought from the wider design team to identify areas of overheating risk to ensure appropriate mitigation options are explored (where necessary).

Confirmation of the exact mitigation requirements and level thereof, would be provided on receipt of the masterplans during the detailed design stage of the application.

7.3.2 Cooling Hierarchy

It is recommended that as part of the ongoing design, that the cooling hierarchy, as detailed within the Sussex Planning Noise Advisory Document (page 31 - replicated below), be followed where windows are required to be closed in order to attain adequate internal sound levels:

1. Reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure;
2. Minimise internal heat generation through energy efficient design;
3. Manage the heat within the building through exposed internal thermal mass and high ceilings;
4. Provide passive ventilation;
5. Provide mechanical ventilation;
6. Provide active cooling systems.

7.4 External Amenity Noise Levels

It is expected that the proposed development includes provision for outdoor amenity areas associated with the residential buildings in the form of gardens. The indicative developable areas of the site would be subject to noise levels between 50 and 63 dB $L_{Aeq,16hr}$ without any form of mitigation (e.g., boundary barriers or building screening).

It should be noted that the predictions are based on an ‘open’ site, without the screening properties afforded by the incorporation of all development buildings and their final positioning. The likelihood is that actual noise levels would be lower than those indicated within this assessment.

Sympathetic building orientation and the use of standard garden fencing in order to cut or disrupt the line of sight between source and receiver may reduce noise levels within the amenity areas by approximately 10 dB(A). Assuming this can be incorporated within the final design, noise levels within external amenity areas are likely to comply with the upper design target of 55 dB $L_{Aeq,16hr}$ as specified within BS 8233: 2014.

8 Fixed Plant Assessment

The type and location of any fixed plant associated with the proposed retail/community use development is currently undetermined. According to BS 4142: 2014+A1: 2019, where the rating noise level ($L_{Ar,Tr}$) does not exceed the background sound level ($L_{A90,T}$), this is an indication of the specific sound source having a low impact.

Rating noise limits applicable to likely fixed plant items associated with the Proposed Development have been derived from the analysis of the background noise levels ($L_{A90,\ T}$) obtained at all three monitoring locations, considering the hourly noise levels ($L_{A90,1hr}$) for the daytime period (07:00 – 23:00) and 15-minute samples ($L_{A90,15min}$) for the night-time period (23:00 - 07:00). In accordance with the requirements of BS 4142:2014 + A1: 2019, the rated noise design limits proposed at development receptors are inclusive of any corrections deemed appropriate for acoustic characteristics such as tonality, impulsivity and intermittency of the source.

In order to provide a design target at receptor locations, it is considered that an initial target should comply with a requirement to meet +5 dB above the representative background sound level, depending on the context. It is considered that this applies the first requirement of NPSE namely, to *"avoid significant adverse impacts on health and quality of life…..[ ]"*.

Rating level noise limits, based on the positions of the baseline noise monitors have been provided. The rating noise level from installed fixed plant should not exceed the following design targets at those nearest sensitive receptors (existing and proposed) positioned to each monitoring position as summarised below

Receptor Location	Representative background sound level , L_{A90} (dB)	
	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
MP1	40	35
MP2	43	36
MP3	50	38

Table 17 Representative background sound level

Receptor Location	Proposed rating noise level limit, $L_{Ar,Tr}$ (dB)	
	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
MP1	45	40
MP2	48	41
MP3	55	43

Table 18 Proposed rating noise level limits for fixed plant

Should it be determined that the operational regime of any proposed fixed plant is likely to occur on a 24-hour basis, the lower night-time target should be used to inform the design of any fixed plant attached to the operation of this building. Assuming the noise design targets are adhered to as part of the design, the proposed fixed plant would have a low impact on existing and proposed sensitive receptors. Consideration of location and noise source output of any fixed plant items should be sought during the design stage of the commercial area to ensure noise levels meet the proposed rating noise level limits, as specified in **Table 18**.

Histograms for daytime and night-time periods from which the representative background levels are derived, are provided in **Appendix B**.

9 Road Traffic Noise Assessment

9.1 Traffic Count Data

In order to quantify the noise impact due to road traffic noise, two assessment scenarios (short term and long term) have been assessed. The traffic data for this assessment was provided by the appointed traffic consultants (iTransport).

The scenarios assessed were as follows:

- Scenario 1 – 'Do-Minimum' in the opening year (2027) against 'Do-Something' in the opening year (2027);
- Scenario 2 – 'Do-Minimum' in the opening year (2027) against 'Do-Something' scenario in the future year (2042).

The 'do-minimum' data includes the baseline traffic counts without the development and the 'do-something' data includes traffic counts with the development in place, plus committed developments. Traffic count data is provided in **Table 19**.

Road link	2027 Baseline Opening Year		2027 Opening + Development + Committed		2042 Future + Development + Committed	
	AAWT 18hr	HGV%	AAWT 18hr	HGV%	AAWT 18hr	HGV%
1	43,825	6.8	44,091	6.7	50,056	6.7
2	43,818	7.4	44,128	7.3	50,093	7.4
3	43,918	7.4	45,832	7.1	51,810	7.1
4	446	7.4	446	7.4	507	7.4
5	530	7.3	545	7.1	617	7.1
6	857	6.3	871	6.2	988	6.2
7	1,917	5.7	1,927	5.7	2,201	5.7

1. A281 - Crowfold
2. A272 – West of site Access
3. A272 – East of site access
4. Foxhole Lane
5. Bolney Chapel Road
6. The Street
7. London Road

Table 19 Development traffic counts

9.2 Noise Level Change

The change in basic noise level (in dB) is provided in **Table 20** and has been calculated in accordance with the CRTN methodology and assessed against the short-term and long term impact criteria set out in DMRB LA111 (**Table 5**).

Road link	Scenario 1 – Short term		Scenario 2 – Long term	
	Noise level increase, dB $L_{A10, 18hr}$	Impact	Noise level increase, dB $L_{A10, 18hr}$	Impact
1	0.0	No change	0.6	Negligible
2	0.0	No change	0.6	Negligible

Road link	Scenario 1 – Short term		Scenario 2 – Long term	
	Noise level increase, dB $L_{A10, 18hr}$	Impact	Noise level increase, dB $L_{A10, 18hr}$	Impact
3	0.1	Negligible	0.7	Negligible
4	0.0	No change	0.6	Negligible
5	0.1	Negligible	0.6	Negligible
6	0.0	No change	0.6	Negligible
7	0.0	No change	0.6	Negligible
1. A281 - Crowfold 2. A272 – West of site Access 3. A272 – East of site access 4. Foxhole Lane 5. Bolney Chapel Road 6. The Street 7. London Road				

Table 20 Calculated noise level change

The predictions show that the effect of the development on traffic noise in the short term would increase noise levels by a maximum of 0.1 dB $L_{A10, 18hr}$ along the A272 east of site access and along Bolney Chapel Road. An increase of this magnitude of change in the short term would be classed as negligible, with an initial appraisal of the significance of impact being 'not significant' in accordance with DMRB.

All remaining road links in the short term would result in no change.

Long term noise impacts from road traffic noise would increase existing noise levels by a maximum of 0.7 dB along the A272 east of site access, resulting in a negligible impact. All remaining road links would result in a similar negligible impact.

10 Conclusions

RSK Acoustics Limited has been instructed by Wates Developments Limited (the applicant) to undertake a noise assessment to support an outline planning application for up to 200 dwellings (including affordable housing) as well as community building (Use Class F1) and associated land for education provision; countryside open space as well as community orchard and allotments and other relevant infrastructure (all matters reserved other than access). Combined access including vehicular access point to be created from A272 Cowfold Road, and pedestrian and cycle only access from The Street.

A noise survey has been undertaken to establish the baseline noise levels across the site, comprising of unattended measurements throughout continuous daytime and night-time periods from Thursday 10 October to Thursday 17 October 2024.

A site suitability assessment, undertaken to the requirements of BS 8233: 2014 and WHO (1999), has been undertaken to determine potential internal and external noise levels at locations across the development site.

Predicted levels, in conjunction with highest maximum noise levels, are of a magnitude where a standard specification single glazed system to the building façade, providing a minimum sound reduction of 30 dB R_w+C_{tr} and accompanied by a suitable acoustically treated trickle ventilator ensuring the overall envelope acoustic performance do not diminish in the open position (for background ventilation purposes), would be required to meet the internal design targets within BS 8233: 2014/WHO, 1999 during daytime and night-time periods.

Based on the simplified method of overheating assessment within AD-O, the site would likely allow for partially open windows for ventilation purposes during a potential overheating scenario for the majority of the northern section of the site. Those dwellings towards the southern portion of the Proposed Development are likely to be at high risk of overheating. It is recommended during the detailed design (reserved matters) stage that input be sought from the wider design team to identify areas of overheating risk to ensure appropriate mitigation options are explored (where necessary) and confirmed through engagement with an overheating specialist.

It is considered that noise levels within amenity areas are likely to comply with the upper design target of 55 dB $L_{Aeq,16hr}$, as specified within BS 8233: 2014 assuming appropriate mitigation, such as sympathetic building orientation and the use of standard garden fencing is incorporated through design.

In order to provide an indicative design target at receptor locations associated with fixed plant operation associated with the community building, it is considered that an initial target should comply with a requirement to meet +5 dB above the representative background sound level, depending on the context. It is considered that this applies the first requirement of NPSE namely, to *“avoid significant adverse impacts on health and quality of life…..[ ]”*.

Noise predictions indicate that the effect of the development on traffic noise would increase noise levels by a maximum of 0.1 dB $L_{A10,18hr}$ in the short term and by a maximum of 0.7 dB $L_{A10,18hr}$ in the long term; the magnitude of change would be of negligible impact in the short term and of negligible impact in the long term in accordance with DMRB. Predicted noise levels as a result of the marginal increase in road traffic noise are not considered significant.

In summary, predicted noise levels across the site are within the relevant noise design targets and of a magnitude suitable for the proposed development. Given that the development site is currently within the outline stage, it is recommended that the principles of good acoustic design be adopted within the final masterplan. Those design considerations should include the positioning of buildings to maximise the distance attenuation to main road sources, the screening effects to those adjacent properties, orientation of façades and considerate internal layout design.

References

1. Approved Document O: ‘Overheating mitigation’ 2021 Edition – The Building Regulations 2021
2. British Standard 7445-1:2003, Description and measurement of environmental noise – Part 1: Guide to quantities and procedures. British Standards Institution, 2003
3. British Standard 8233: 2014, Sound insulation and noise reduction in buildings – code of practice. British Standards Institution, 2014
4. Calculation of Road Traffic Noise. Department of Transport, Welsh Office HMSO
5. Design Manual for Roads and Bridges, LA111 Noise and Vibration, 2020
6. National Planning Policy Framework – Department for Levelling Up, Housing and Communities. December 2024
7. National Planning Practice Guidance (NPPG): 2019
8. Noise Policy Statement for England (NPSE). DEFRA, 2010
9. Professional Practice guidance on Planning and Noise (ProPG), 2017
10. WHO Guidelines for Community Noise, 1999
11. BS 4142: 2014 + A1: 2019 ‘Methods for rating and assessing industrial and commercial sound’
12. Planning Noise Advisory Document: Sussex 2023
13. Mid Sussex District Plan 2014 – 2031
14. Bolney Neighbourhood Plan 2015 - 2031

Glossary

Term	Definition
Ambient sound	The total sound at a given place, usually a composite of sounds from many sources near and far.
Background sound, $L_{A90,T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval.
dB	Decibel. Scale for expressing sound pressure level. It is defined as 20 times the logarithm of the ratio between the root mean square pressure of the sound field and a reference pressure i.e. $2x10^{-5}$ Pascal.
dB(A)	A-weighted decibel. This provides a measure of the overall level of sound across the audible spectrum with a frequency weighting to compensate for the varying sensitivity of the human ear to sound at different frequencies. Example sound levels include: 140 dB(A) Threshold of pain 120 dB(A) Threshold of feeling 100 dB(A) Loud nightclub 80 dB(A) Traffic at busy roadside 60 dB(A) Normal speech level at 1m 40 dB(A) Quiet office 20 dB(A) Broadcasting studio 0 dB(A) Median hearing threshold (1000 Hz)
Frequency	The repetition rate of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the Hertz (Hz), which is identical to cycles per second. A thousand hertz is often denoted as kHz, e.g. 2 kHz = 2000 Hz. Human hearing ranges approximately from 20 Hz to 20kHz.
$L_{Aeq,T}$	This is defined as the notional steady sound level over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
Sound absorption	Process whereby sound energy is converted in to heat. Sound absorption properties is expressed as the sound absorption coefficient α or the sound absorption class (A-E).
Sound insulation	The reduction or attenuation of airborne sound by a solid element between source and receiver.
Time Weighting	Sound level meters use various averaging times for the measurement of RMS sound pressure level. The most commonly used are fast (0.125 s averaging time), slow (1 s averaging time) and impulse (0.035 s averaging time). Variables that are measures with time weightings are expressed as L_{AFmax} etc.
Frequency Weighting Networks	Frequency weighting networks, which are generally built into sound level meters, attenuate the signal at some frequencies and amplify it at others. The A-weighting network approximately corresponds to human frequency response to sound. Sound levels measured with the A-weighting network are expressed in dB(A). Other weighting networks also exist, such as C-weighting which is nearly linear (i.e., unweighted) and other more specialised weighting networks. Variables such as Lp and Leq that can be measured using such weightings are expressed as L_{pA} / L_{pC}, L_{Aeq} / L_{Ceq} etc.
L_N - Percentile or Statistical Levels	If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time, and the L_{90} is the level exceeded for 90% of the time,

Term	Definition
Pre-existing ambient noise	Pre-existing ambient noise means the level of ambient noise, expressed as a level of L_{Aeq} determined with respect to the relevant time period and the relevant L_{Aeq} averaging time, prevailing one metre in front of relevant windows or doors in a façade of a dwelling, immediately before the placing of a contract for the construction.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Façade Level	A sound field determined at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
R_w – Weighted Sound Reduction Index	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. Value, in decibels, of the reference curve at 500 Hz after shifting it in accordance with the method specified in this part of ISO 717.
C; C_{tr} – Spectrum Adaptation Terms	Value, in decibels, to be added to the single-number rating (e.g., Rw) to take account of the characteristics of a particular sound spectra.

Glossary of terms

Appendix A – Illustrative Masterplan

Figure A.1 Illustrative Masterplan (document ref: 'P20074-RFT-XX-XX-DR-A-0101-P07_Illustrative Masterplan')

Appendix B – Noise Monitoring Results

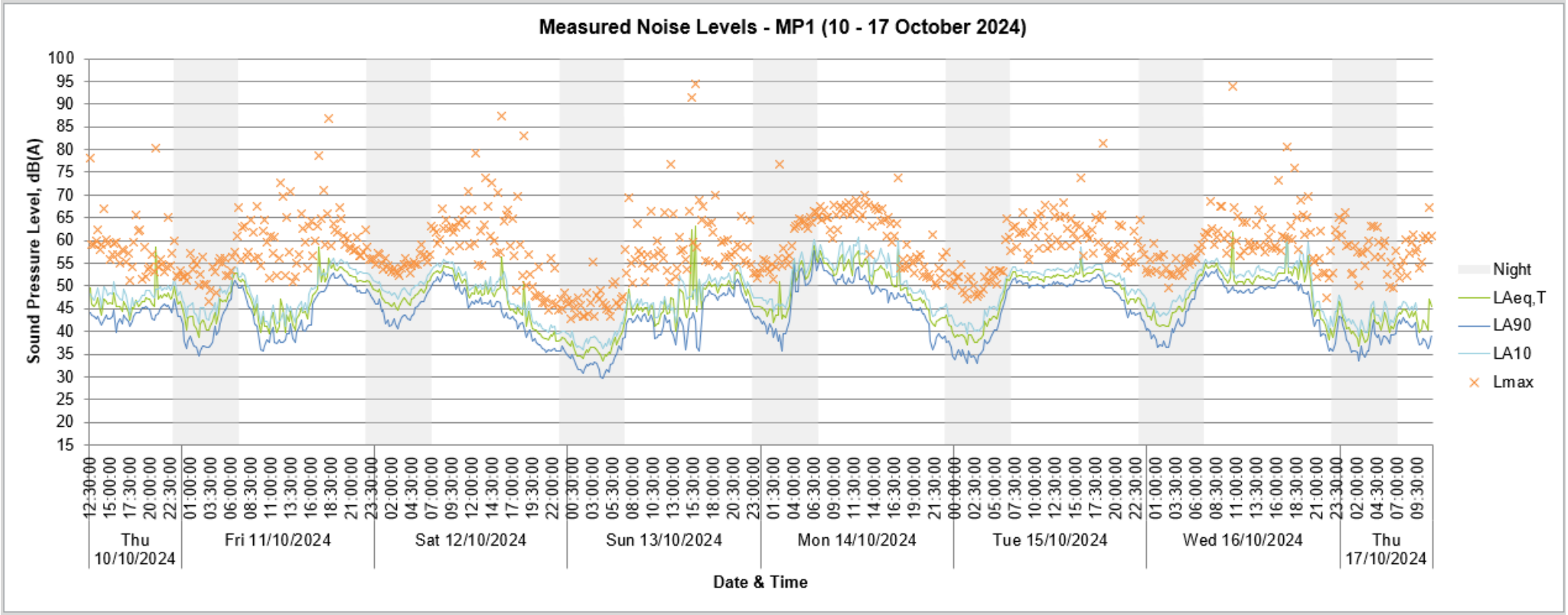


Figure B.1 Hourly noise evolution, north boundary (MP1)

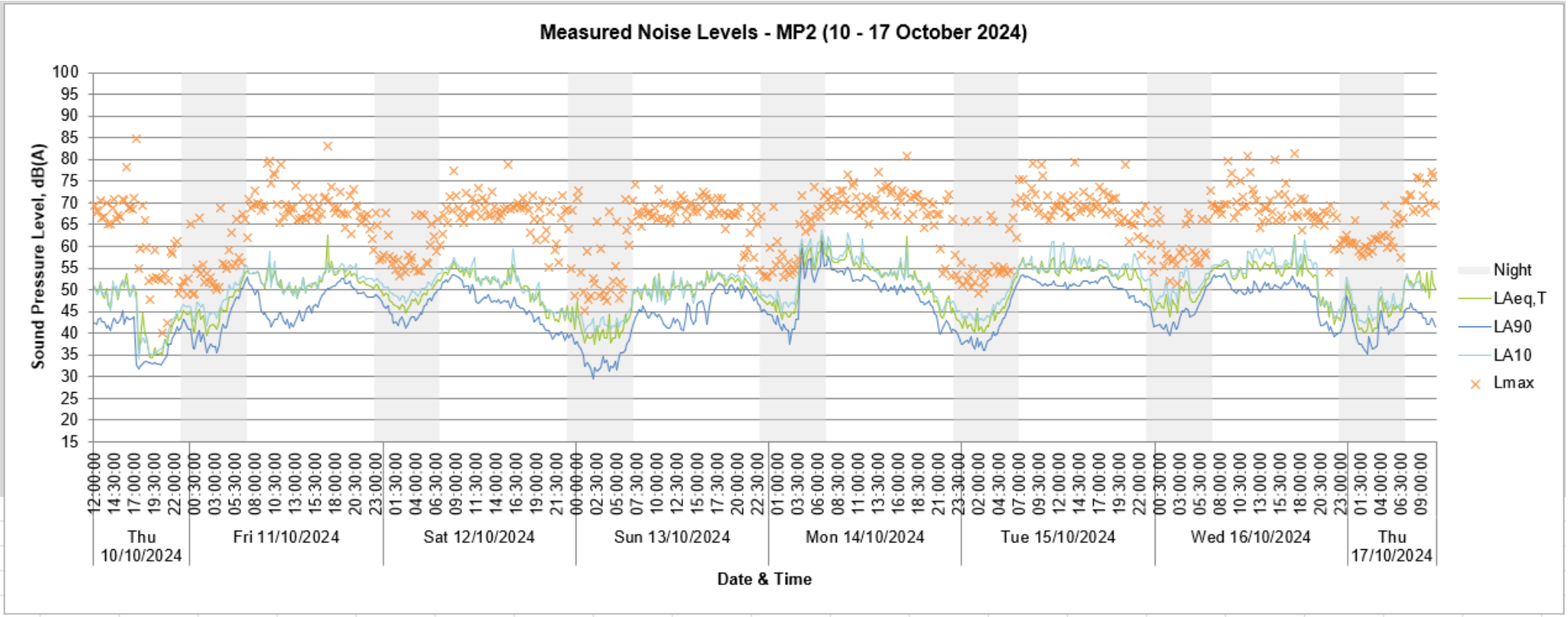


Figure B.2 Hourly noise evolution, west boundary (MP2)

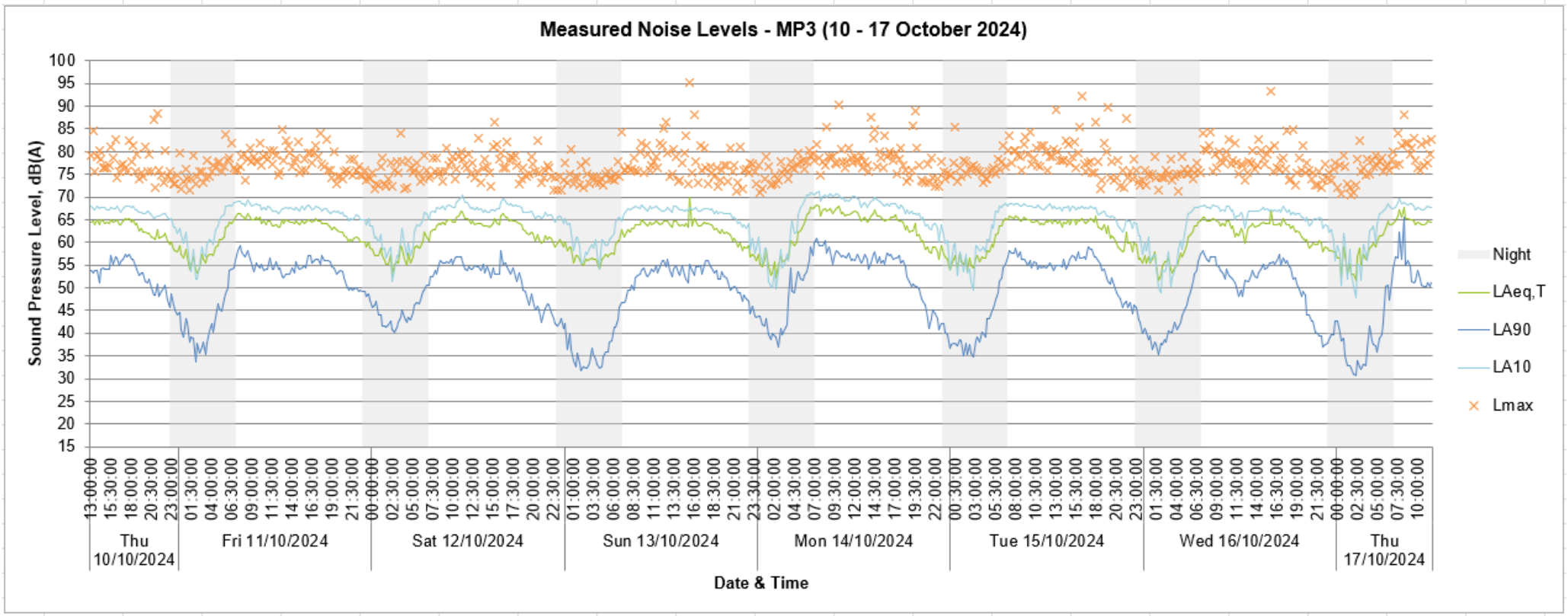
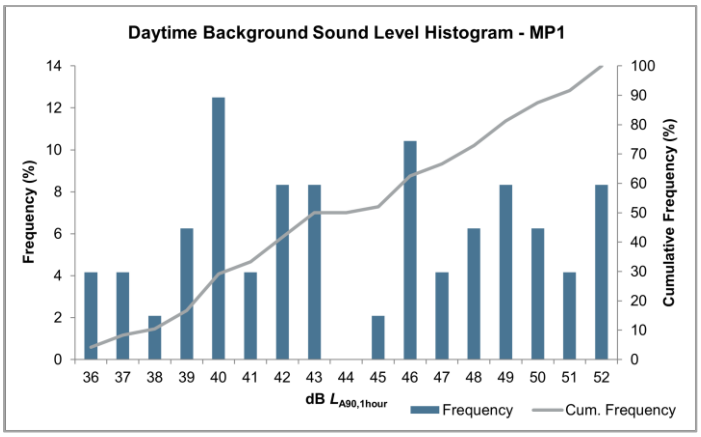


Figure B.3 Hourly noise evolution, south boundary (MP3)



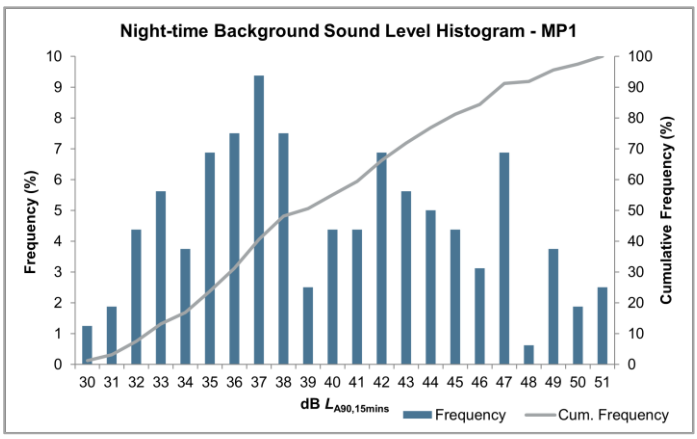
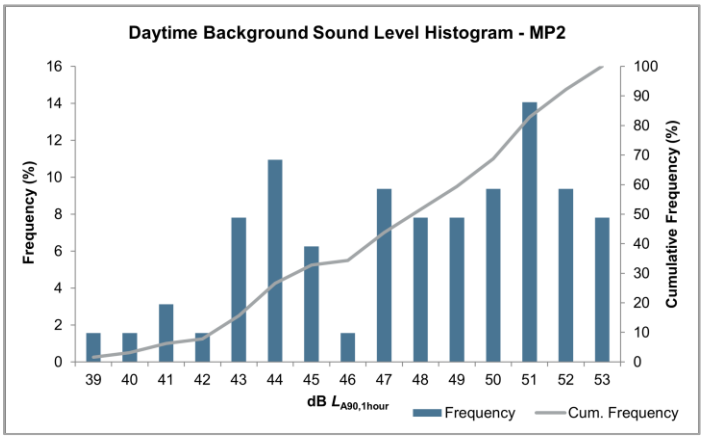


Figure B.4 Daytime and night background sound level histograms – MP1



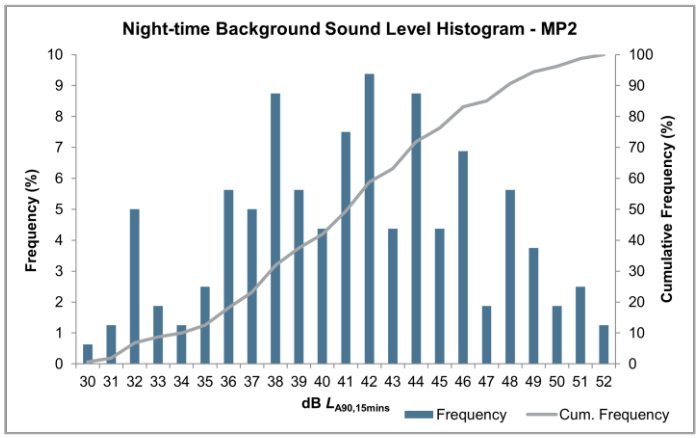
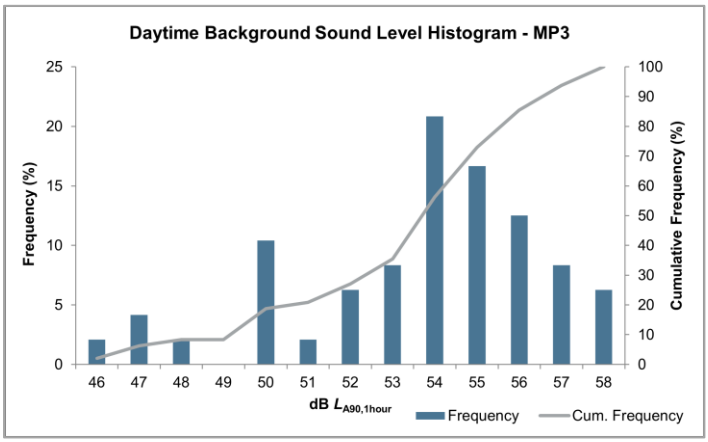


Figure B.5 Daytime and night background sound level histograms – MP2



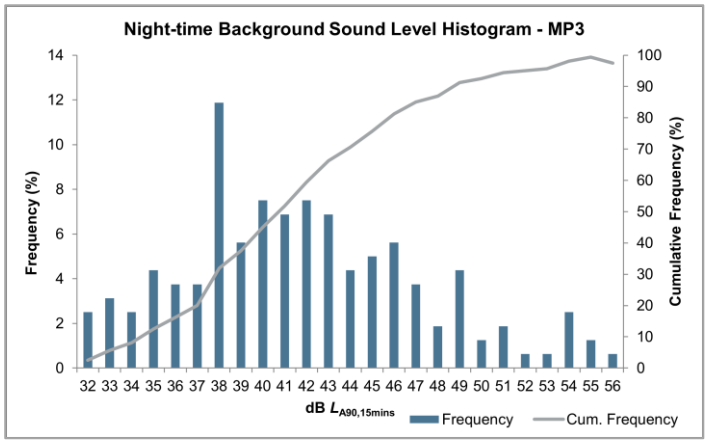


Figure B.6 Daytime and night background sound level histograms – MP3

Appendix C – Daytime Noise Contour Map (1.5 m Height)

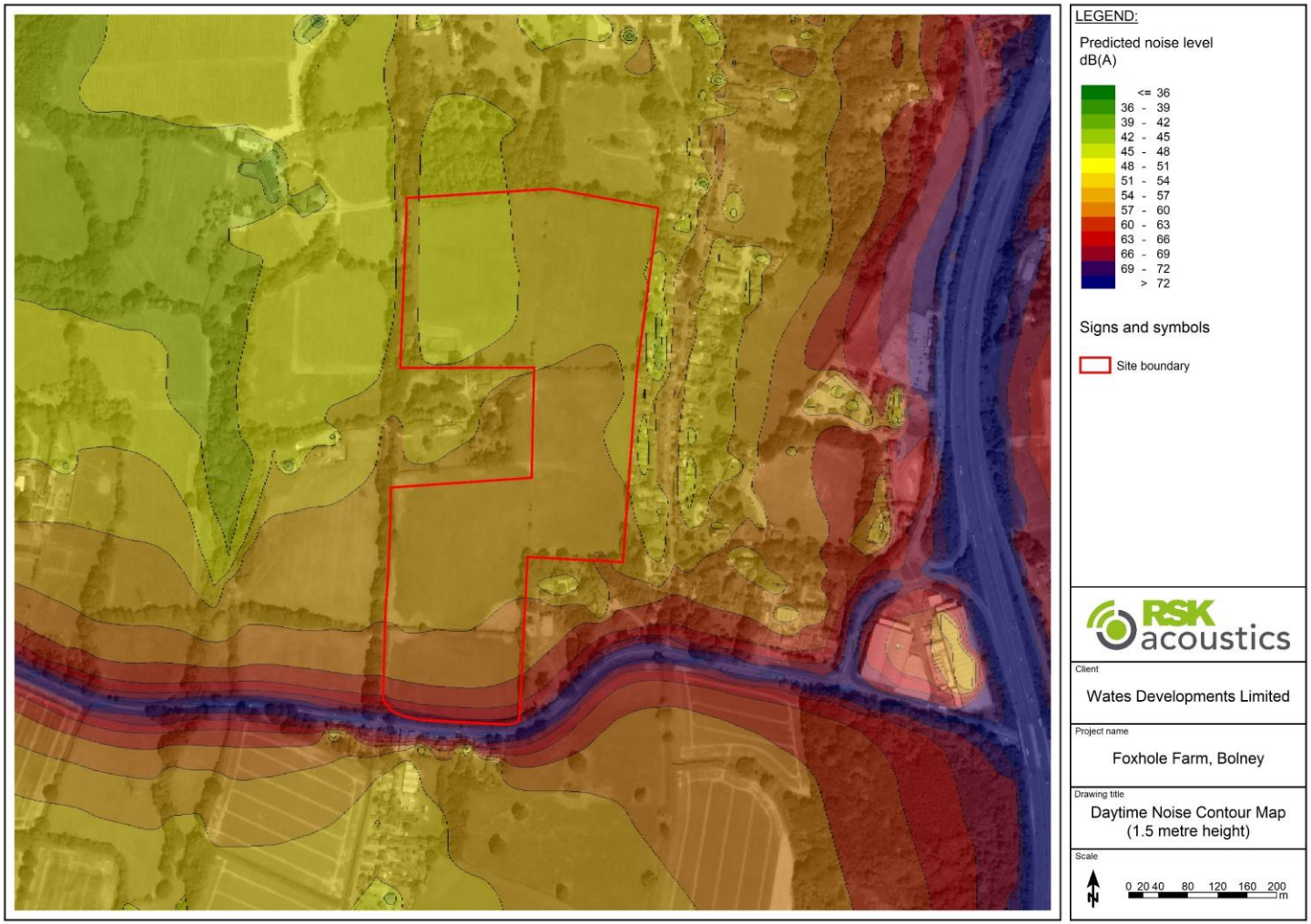


Figure C.1 Daytime noise contour map (1.5 metre height)

Appendix D – Night-time Noise Contour Map (4 m Height)

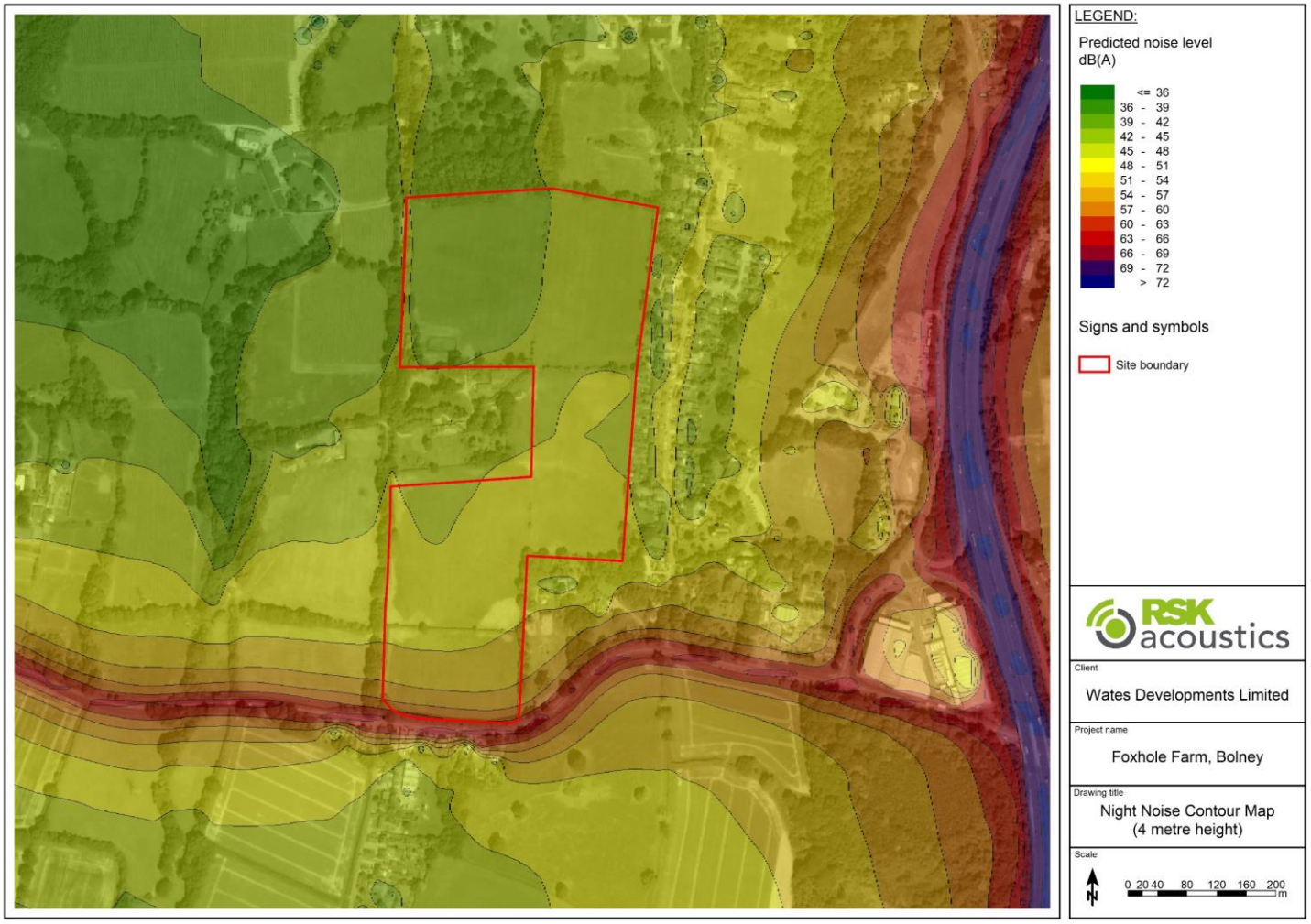


Figure D.1 Night-time noise contour map (4 metre height)

Appendix E – Photographic Report

Figure E.1 Noise monitoring location MP1

Figure E.2 Noise monitoring location MP2

Figure E.3 Noise monitoring location MP3

Figure E.4 Weather station (adjacent to MP2)

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