



**Land Parcels adjacent to Worsell
Drive, Copthorne**
Noise Impact Assessment

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Prepared for:
Miller Homes

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Land Parcels adjacent to Worsell Drive, Copthorne

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1 Introduction

1.1 Background

- 1.1.1 Stantec UK Limited (Stantec) has been commissioned by Miller Homes to undertake a noise impact assessment to support the planning application for a proposed residential development on two parcels adjacent to Worsell Drive, Copthorne.
- 1.1.2 The two parcels of land proposed for new homes sit within the existing Heathy Wood residential scheme. Heathy Wood residential scheme benefits from outline planning permission which was granted in May 2016 for 500 new homes. Various Reserved Matters applications have been approved to bring forward the detailed design of the Heathy Wood scheme at Copthorne.
- 1.1.3 The parcels were previously considered for a school and doctors' surgery. However, after extensive review, West Sussex County Council (WSCC) has confirmed that a new primary school is not required at this location, as a new school could undermine the sustainability of existing schools. Instead, and in line with the obligations of the 2016 outline planning permission, significant financial contributions have been made towards education in the local area. The local medical group has advised it is not viable for it to bring forward a doctor's surgery. Therefore, as required by the outline planning permission, financial contributions have been made to support local healthcare facilities.
- 1.1.4 Accordingly, there are two sustainably located parcels of land at Heathy Wood that are vacant and unused. It is proposed to deliver new homes on these parcels to complement and integrate within the existing homes and wider Copthorne community.
- 1.1.5 This report is prepared to support the proposal of delivering new homes across the two parcels of land. The description of development for the application is:

"Full planning application at two parcels of land adjacent to Worsell Drive, Copthorne, each accessed from existing bell-mouth junctions at Worsell Drive and Langridge Way, for the erection of new homes (Use Class C3) including affordable homes; internal access roads, landscaping, and associated infrastructure.

For information only (to be included as a condition): Number of Homes: 69"

- 1.1.6 This report presents the relevant results of the environmental sound surveys and considers the suitability of the site for residential development, having regard to planning policy, national and international standards and guidance documents, in relation to environmental noise.
- 1.1.7 A glossary of acoustic terminology used within the report is contained in **Appendix A**.

1.2 Scope of Assessment

- 1.2.1 The scope of the noise impact assessment report is as follows:
- Identify relevant national and local planning policy and guidance relevant to noise for the proposed redevelopment.
 - Present the results of the environmental sound surveys undertaken by Stantec.
 - Consider the suitability of the site for residential development with respect to noise.
 - Undertake an assessment of the likely airborne noise ingress into habitable spaces and determine the required acoustic performance of the windows, ventilators, external walls and roofs of the building façade in order to achieve the proposed criteria with windows closed.



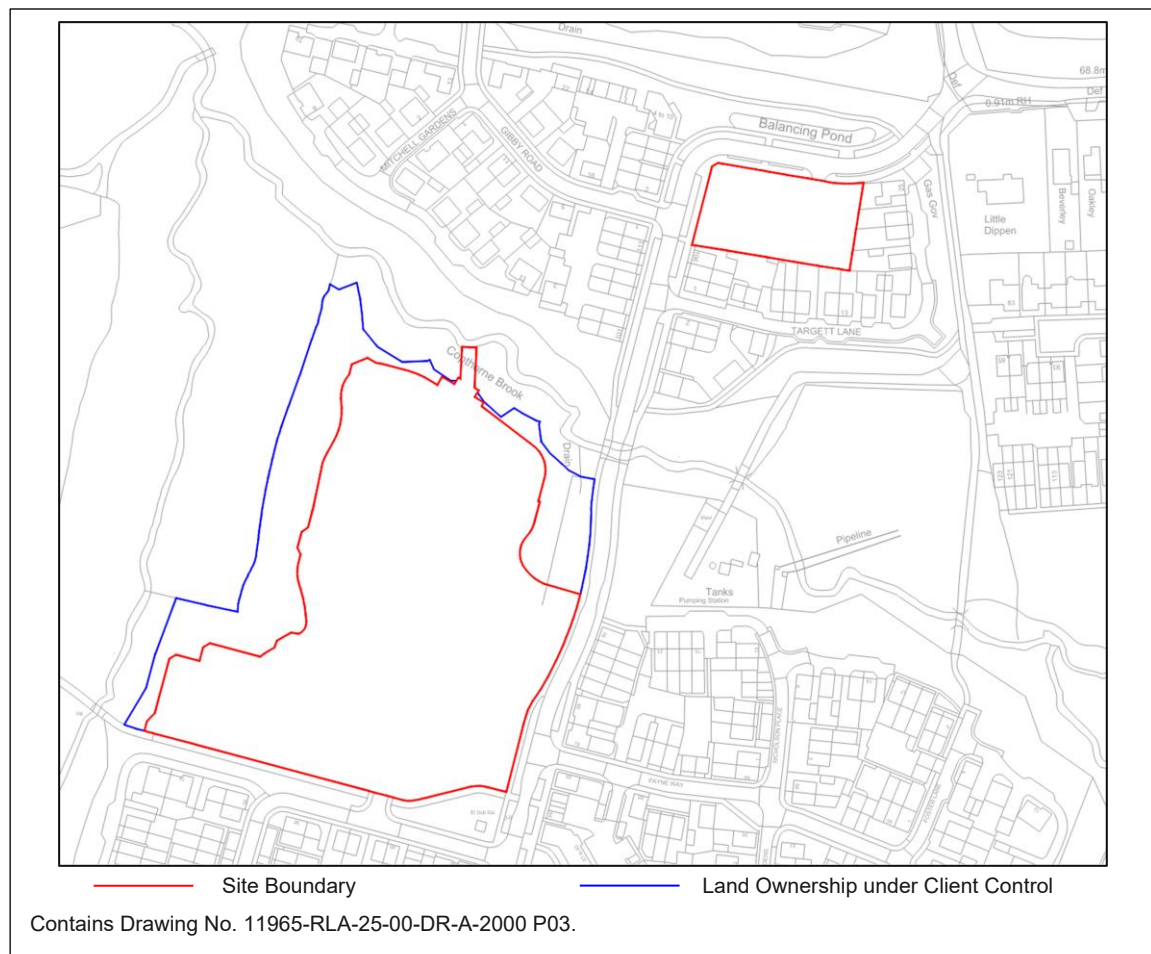
Land Parcels adjacent to Worsell Drive, Copthorne

- 1.2.2 Advice and recommendations within this report will need to be integrated, coordinated and ratified with the design by the principal designer and design team to ensure that all other design interfaces, buildability, workmanship and other requirements are considered. Any sketches or drawings provided illustrate acoustic principles only.

1.3 Site Location

- 1.3.1 The proposed development site is located on land west of Copthorne, West Sussex, approximately 2.5 km southeast of Gatwick airport and falls within the jurisdiction of Mid Sussex District Council.
- 1.3.2 The northern and southern sites are currently used as site compounds for the surrounding residential sites currently under construction.
- 1.3.3 The southern site is bound by a residential development to the north, south and east and farmland and the M32 to the west. In addition, there are Amazon and DHL distribution centres to the southwest, between the site and the motorway.
- 1.3.4 The northern site is bound by an access road to the north and farmland beyond that, and residential development currently under construction to the south and west. An existing residential development is located to the east.
- 1.3.5 A map showing the red line boundary of the two sites is provided in **Figure 1.1**.

Figure 1.1: Red Line Boundary



2 Policy, Standards, Guidance and Criteria

2.1 Local Policy

Mid Sussex District Plan

- 2.1.1 The Mid Sussex District Plan 2014 – 2031¹ (adopted in March 2018) contains policy DP29 which applies to new residential developments:

“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;...*

...The degree of the impact of noise and light pollution from new development or change of use is likely to be greater in rural locations, especially where it is in or close to specially designated areas and sites.”

Planning Noise: Advice Document Sussex

- 2.1.2 East and West Sussex's Planning Noise: Advice Document Sussex² was published in November 2023 and provides guidance specifically for residential developments. The document outlines the assessment criteria and methodology. Relevant guidance relating to assessment methodology is outlined in Section 6.4 as follows:

“...When assessing the impact of transportation noise, be that from road, rail or air, then an Acoustic Design Statement shall be provided following the principles set out in ProPG: Planning and Noise (2017) “Professional Planning Guidance on Planning and Noise – New Residential Development. A Good Acoustic Design process shall be followed to achieve appropriate internal and external acoustic conditions...”

...Where major developments impact on existing residential property, for instance where transport assessments demonstrate increased traffic flows, noise calculations should be made against future road traffic predictions, as well as current levels (see Design Manual for Roads and Bridges and Calculation of Road Traffic Noise). Additional shorter term L_{Aeq} would be appropriate to identify noisier periods when the impact from noise will be greater.

For the reasons given below, night time noise monitoring will be expected...

...Consideration should be had to the influence of individual LA max levels which should be obtained by measurement using short 5 or 1 minute periods as agreed with the LPA.”

- 2.1.3 Section 6.5 outlines the assessment criteria to be used:

“...Design control measures should aim to meet the recommended standards set out in table 4 of BS 8233:2014 and regular night time noise events such as scheduled aircraft or passing trains which can cause sleep disturbance shall be minimized and assessed as (LAFmax), as recommended in the World Health Organisation's (WHO) Night Noise Guidelines for Europe (2009), unless there are particular reasons why this is not

¹ Mid Sussex District Council (2018) District Plan 2014 - 2031

² Various (2023) Planning Noise Advice Document: Sussex



considered appropriate. In such cases, a clear explanation of the reasons should be provided.

As the standards for BS 8233:2014 and the WHO relate only to anonymous noise, e.g. distant road traffic and noise without characteristics such as impulsivity, low frequency content or tones then, if these are present, additional discussion will be required with the LPA for the purpose of establishing suitable assessment techniques and standards to be achieved e.g. BS 4142:2014 + A1: 2019 for delivery noise.

While noise mitigation measures can be used to achieve suitable internal sound levels, preference is to be given to criteria based on windows being partially open.

Where it is proposed to have windows closed, in order to meet adequate internal noise levels, or where the Local Planning Authority consider that the proposed circumstances and plans could lead to potential overheating or inadequate amenity, an overheating assessment shall be conducted in accordance with Acoustics Ventilation and Overheating (AVO) Residential Design Guide (January 2020) and / or CIBSE's Design Methodology for the Assessment of Overheating Risk in Homes (TM59: 2017).

It is considered that the assessment of overheating and the provision of adequate ventilation and noise control are inextricably linked. Noise can be a material consideration at Planning. It is not accepted that an overheating assessment should be addressed post-planning. Overheating assessment and mitigation can have material impacts on design features, orientation of facades etc. As such, it should be incorporated into the design of a development and not as an afterthought.

It shall be demonstrated that the cooling hierarchy, below, has been followed for all development where windows are required to be closed 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.*

It is considered that Good Acoustic Design, as advocated within National Policy, includes ventilation and overheating assessment and should be a fundamental consideration in the design of schemes."

2.2 National Policy

The National Planning Policy Framework (NPPF)

- 2.2.1 The revised National Planning Policy Framework (NPPF)³ was published in December 2024 and updated in February 2025. In respect of noise, paragraph 187 states that in relation to conserving and enhancing the natural environment:

"Planning policies and decisions should contribute to and enhance the natural and local environment by...

³ Ministry of Housing, Communities & Local Government (MHCLG) (2024) National Planning Policy Framework



e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of ... noise pollution...”

2.2.2 In relation to ground conditions and pollution, paragraph 198 states that:

“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 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...”

2.2.3 The NPPF indicates that the Noise Policy Statement for England (NPSE) should be used to define the “significant adverse impacts”.

2.2.4 In relation to the integration of new development with existing premises and community facilities, paragraph 200 states that:

“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.”

National Planning Practice Guidance

2.2.5 The Planning Practice Guide (PPG) was launched in 2014 (with the latest update being in 2019)⁴ and provides additional guidance and interpretation to the Government’s strategic policies outlined within the NPPF in a regularly updated, web-based resource.

2.2.6 Paragraph: 001 Reference ID: 30-001-20190722, “When is noise relevant to planning?” states:

“Noise needs to be considered when development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced). When preparing plans, or taking decisions about new development, there may also be opportunities to make improvements to the acoustic environment. Good acoustic design needs to be considered early in the planning process to ensure that the most appropriate and cost-effective solutions are identified from the outset.”

2.2.7 PPG provides advice on how noise impacts should be determined. Paragraph: 003 Reference ID: 30-003-20190722 states the plan-making and decision makes processes should 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.

⁴ Department for Levelling Up, Housing and Communities (DLUHC) (2019) Planning Practice Guidance: Noise



- 2.2.8 Paragraph 003 Reference ID: 30-003-20190722 also refers to the Noise Policy Statement for England (NPSE)⁵, in stating that the overall effect of the noise exposure (including the impact during the construction phase where applicable) should be identified against the significant observed adverse effect level (SOAEL) and the lowest observed adverse effect level (LOAEL) for the given situation.
- 2.2.9 It provides more descriptive detail for the definitions of NOEL, LOAEL and SOAEL but refrains from using numerical values. A summary of the descriptions is provided within the noise exposure hierarchy table in Paragraph: 005 Reference ID: 30-005-20190722 and reproduced in **Table 2.1**.

Table 2.1: Noise Exposure Hierarchy Table

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level (NOEL)			
Not present	No effect	No observed effect	No specific measures required
No Observed Adverse Effect Level (NOAEL)			
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
Lowest Observed Adverse Effect Level (LOAEL)			
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
Significant Observed Adverse Effect Level (SOAEL)			
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

⁵ Department for Environment and Food and Rural Affairs (Defra) (2010) Noise Policy Statement for England

2.2.10 Paragraph: 006 Reference ID: 30-006-20190722 provides guidance factors which influence noise impact. It states that *“The subjective nature of noise means there is not a simple relationship between noise levels and the impact on those affected.”*

2.2.11 It goes on to state that the impact will depend on how various factors combine in any particular situation. These factors include:

- Source and absolute level of the noise together with the time of day it occurs.
- How new noise making source relates to the existing sound environment.
- Number and pattern of noise events (for non-continuous sound).
- Frequency content (i.e. whether the noise contains particular high or low frequency content) and general character of the noise (i.e. whether or not the noise contains particular tonal characteristics or other particular features).
- The extent to which the local arrangement of buildings, surfaces and green infrastructure reflects or absorbs noise.

2.2.12 PPG provides more specific factors to consider, when relevant, including:

- The cumulative impact of multiple sources of noise.
- The provision of alternative ventilation if proposed mitigation relies on closed windows most of the time.
- In situations where noise sensitive locations are already subject to high noise levels, a development which is expected to cause even a small increase in the overall noise level may result in a significant adverse effect, even though little to no change in behaviour would be likely to occur.
- Noise Action Plans and Important Areas (as defined in the Environmental Noise Directive) should be taken into account.
- The effect of noise on wildlife. Consideration should be given to the potential effects of noisy development on international, national and locally designated sites of importance for biodiversity.
- Some commercial developments can have particular impacts in the evening and at night, when they are trading at their peak (e.g. restaurants, hot food takeaways, night clubs and public houses). This includes noise generated within the premises as well as noise that may be made by customers within the vicinity.

2.2.13 Paragraph: 009 Reference ID: 30-009-20190722 advises on how the risk of conflict between new development and existing businesses or facilities can be addressed. It states that:

“Development proposed in the vicinity of existing businesses, community facilities or other activities may need to put suitable mitigation measures in place to avoid those activities having a significant adverse effect on residents or users of the proposed scheme.

In these circumstances the applicant (or ‘agent of change’) will need to clearly identify the effects of existing businesses that may cause a nuisance (including noise, but also dust, odours, vibration and other sources of pollution) and the likelihood that they could have a significant adverse effect on new residents/users. In doing so, the agent of change will need to take into account not only the current activities that may cause a nuisance, but also those activities that businesses or other facilities are permitted to carry out, even if they are not occurring at the time of the application being made.



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

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

2.2.14 Paragraph: 010 Reference ID: 30-010-20190722 provides advice on how the adverse effects of noise can be mitigated which are dependent on the type of development being considered and the character of the proposed location. Four broad classifications of mitigation are defined as follows:

- Engineering: reducing the noise generated at source and/or containing the noise generated;
- Layout: where possible, optimising the distance between the source and noise-sensitive receptors and/or incorporating good design to minimise noise transmission through the use of screening by natural or purpose-built barriers, or other buildings;
- using planning conditions/obligations to restrict activities allowed on the site at certain times and/or specifying permissible noise levels differentiating as appropriate between different times of day, such as evenings and late at night, and
- mitigating the impact on areas likely to be affected by noise including through noise insulation when the impact is on a building.

2.2.15 Paragraph: 011 Reference ID: 30-011-20190722 advises that the impact of noise may be partially offset if the residents of those dwellings have access to one or more of the following:

- A relatively quiet façade (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.
- A relative quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within 5 minutes walking distance).

Noise Policy Statement for England

2.2.16 The Noise Policy Statement for England (NPSE)⁶ was published in March 2010 and clarifies the underlying principles and aims of existing policy documents that relate to noise. It also sets out the long-term vision of Government noise policy which is: “*to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development*”.

⁶ Department for Environment and Food and Rural Affairs (Defra) (2010) Noise Policy Statement for England

2.2.17 The NPSE states that noise should not be considered in isolation of the wider benefits of a scheme or development, and that the intention is to minimise noise and its effects as far as is reasonably practicable having regard to the underlying principles of sustainable development.

2.2.18 Paragraphs 2.20 and 2.21 define ‘significant adverse’ and ‘adverse’ impacts as applied to noise 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:

NOEL – No Observed Effect Level

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.

LOAEL – Lowest Observed Adverse Effect Level

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.

SOAEL – Significant Observed Adverse Effect Level

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

2.2.19 Paragraph 2.22 clarifies that:

“It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.”

2.2.20 The three aims of the NPSE are defined as follows:

“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.” (Note: Applies when the impact lies somewhere between the LOAEL and SOAEL and does not mean that adverse effects cannot occur).”

“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.”

2.2.21 It is necessary to define the LOAEL and SOAEL for the potential source of noise so that the potential impact can be related to the aims and requirements of the NPSE.

2.3 Building Regulations

Approved Document O - Overheating

2.3.1 Approved Document O of the Building Regulations 2010 *Overheating* was published in December 2021 and took effect in England on 15 June 2022. It applies to schemes which have not had a planning application submitted prior 15 June 2022, and to schemes which start on site after 15 June 2023.



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2.3.2 Approved Document O gives guidance on how to comply with Part O of the Building Regulations and applies to residential buildings (excluding hotels) only.

2.3.3 Requirement O1(1) states that:

“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.”

2.3.4 Requirement O1(2) states that:

“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.”

2.3.5 Compliance with Requirement O1(1) can be demonstrated by using the ‘simplified method’ or by ‘dynamic thermal modelling’, as described in Approved Document O.

2.3.6 In relation to noise, Paragraphs 3.2 and 3.3 of Approved Document O state:

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

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

a. 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).

b. 55dB L_{AFmax} , more than 10 times a night (between 11pm and 7am).”

2.3.7 Based on the above, the ‘simplified method’ cannot be relied upon if either of the internal noise criteria are exceeded.

Approved Document O Noise Guide (2024)

2.3.8 Approved Document O Noise Guide was launched in November 2024 to provide guidance to practitioners when implementing the standards within Building Regulations (2010) Approved Document O (England) relating to noise.

2.3.9 Paragraph 4.1.6 states that when using the ‘simplified method’:

“Based on research and typical assumptions (see note below Table 1 and Appendix A), the resulting outside-to-inside level difference for window openings necessary to satisfy the simplified method of AD-O are expected to be approximately 5 dB for ‘high’ risk locations and 10 dB for ‘medium’ risk locations.”

2.3.10 Based on the above and the internal noise levels given in Approved Document O, Table 1 of the Noise Guide gives the following external limits:



Table 2.2: External Noise Levels Above Which the Simplified Method Cannot Be Used

Parameter	High Risk Location	Moderate Risk Location
$L_{Aeq,8hr}$, 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

2.4 Standards

British Standard 8233: 2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’

- 2.4.1 BS 8233:2014⁷ in relation to this development, sets out guideline values in habitable rooms, such as living rooms and bedrooms which should not be exceeded.
- 2.4.2 The guideline values relate to steady external noise without a specific character, previously termed ‘anonymous noise’. According to the standard, noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate. Examples of noise with a character may include tonal/intermittent plant noise emissions, music playback, and workshop noise. Examples of external steady noise sources may include environmental noise sources such as busy road traffic.
- 2.4.3 The guideline internal ambient noise levels for dwellings are presented in **Table 2.3**.

Table 2.3: BS 8233 Guideline Internal Ambient Noise Levels for Dwellings

Activity	Location	Internal Ambient Noise Level	
		07:00 to 23:00 hours	23:00 to 07:00 hours
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$
Note 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,f}$, depending on the character and number of events per night. Sporadic noise events could require separate values.			
Note 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative source of ventilation that does not compromise the façade insulation or the resulting noise levels.			
Note 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved.			
*A selection of the available notes			

- 2.4.4 The standard also provides advice in relation to sound levels for external noise. It states that:

⁷ The British Standards Institution (BSI) (2014) British Standard 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

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

In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate.

Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation.

In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

2.5 Guidance

Professional Practice Guidance on Planning and Noise

- 2.5.1 The Professional Practice Guidance on Planning and Noise (ProPG) was jointly published in 2017 by the Institute of Acoustics (IOA), the Chartered Institute of Environmental Health (CIEH) and the Association of Noise Consultants (ANC) and provides guidance on a recommended approach to the management of noise within the planning system in England.
- 2.5.2 The scope of ProPG is limited to new residential development that will be predominantly exposed to airborne noise from transport sources.
- 2.5.3 The guidance is mostly focused on new flats and houses, although there is some relevant content in regard to other types of residential units, such as care homes and residential institutions.
- 2.5.4 Noise sources other than airborne transport (i.e. industrial, commercial, entertainment, etc.) and ground-borne noise and vibration fall outside of the scope of ProPG.
- 2.5.5 ProPG details a two-stage approach to the consideration of noise issues including:
 - Stage 1 – an initial noise risk assessment of the proposed development site.
 - Stage 2 – a systematic consideration of four key elements.
- 2.5.6 **Table 2.4** is a reproduction of Figure 1 within ProPG which summarises the noise risk categories for Stage 1 of the assessment process.

Table 2.4: Stage 1 ProPG Risk Assessment

Noise Risk Assessment		Potential Effect Without Noise Mitigation	Pre-Planning Application Advice
Indicative Daytime Noise Levels LAeq,16hr	Indicative Night-time Noise Levels LAeq,8hr		
70 dB	60 dB	Increasing Risk of adverse effect	High noise levels indicate that there is an increased risk that developments may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice.
65 dB	55 dB		As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimized and which clearly demonstrate that a significant adverse noise impact can be avoided in the finished development.
60 dB	50 dB		
55 dB	45 dB		At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimized in the finished development.
50 dB	40 dB	No adverse effect	These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.

Figure 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".
- LAeq,16hr is for daytime 0700 – 2300, LAeq,8hr is for night-time 2300 – 0700.
- An indication that there may be more than 10 noise events at night (2300 – 0700) with LAmax,F > 60 dB means the site should not be regarded as negligible risk.



2.5.7 Stage 2 comprises four key elements which are undertaken in parallel:

- **Element 1** – demonstrating a ‘Good Acoustic Design Process’;
- **Element 2** – observing internal ‘Noise Level Guidelines’;
- **Element 3** – undertaking an ‘External Amenity Area Noise Assessment’; and
- **Element 4** – consideration of ‘Other Relevant Issues’.

2.5.8 Following a good acoustic design process involves considering acoustics at an early stage in the design process; avoid ‘unreasonable’ acoustic conditions and prevent ‘unacceptable’ acoustic conditions; and achieve an integrated, optimum solution without overdesign.

2.5.9 Demonstration of good acoustic design should include:

- Checking the feasibility of relocating or reducing noise levels from relevant sources.
- Consider options for planning the site or building layout.
- Consider the orientation of proposed building(s).
- Select construction types and methods for meeting building performance requirements.
- Consider the effects of noise control measures on ventilation, fire regulation, health and safety, CDM, etc.
- Assess the viability of alternative solutions.
- Assess external amenity areas noise.

2.5.10 With respect to internal noise levels, ProPG recommends that noise levels set out in BS 8233 are used for residential development. However, an additional criterion is proposed by ProPG for night-time L_{Amax} levels as follows:

“[...] 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 45 dB $L_{Amax, F}$ 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.”

2.5.11 With respect to external noise levels, ProPG again makes reference to the guideline levels detailed in BS 8233 stating that:

“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 $L_{Aeq, 16hr}$.”

2.5.12 The final element indicates that the assessment should consider ‘Other Relevant Issues’ which may include:

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



2.6 Assessment Criteria

- 2.6.1 Based on local and national planning requirements and relevant standards, the assessment criteria in **Table 2.5** are proposed:

Table 2.5: Proposed Assessment Criteria

Level	Internal Ambient Noise Levels		Noise Levels in External Amenity Areas
	Daytime (07:00 to 23:00 hours)	Night-time (23:00 to 07:00 hours)	Daytime (07:00 to 23:00 hours)
LOAEL	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$ 45 dB L_{AFmax} 10-15 times per night	55 dB $L_{Aeq,16h}$
SOAEL	50 dB $L_{Aeq,16h}$	45 dB $L_{Aeq,8h}$	65 dB $L_{Aeq,16h}$



3 Environmental Sound Survey

3.1 Procedure

- 3.1.1 An unattended environmental sound survey was undertaken between approximately 11:30 hours on Thursday 21st November 2024 and approximately 14:45 hours on Monday 25th November 2024 to determine the existing sound climate at locations considered representative of the future facades of the development. Additional attended measurements were taken on Thursday 21st November 2024.
- 3.1.2 Measurements were logged in 15-minute intervals of the L_{Aeq} and L_{A90} at all locations. L_{AFMax} sound levels were measured in 2-minute intervals at locations LT1, LT3 and ST1 and 15-minute intervals at Location LT2.
- 3.1.3 The sound level meters were located in environmental cases. The microphones were connected to the meters via an extension cable and fitted with the manufacturer's windshield.
- 3.1.4 The instrumentation used in the survey (including calibration information) is listed in **Appendix B**
- 3.1.5 Field calibrations were performed before and after the measurements with no significant fluctuations recorded (< 0.5 dB). Calibration certificates are available upon request.

3.2 Measurement Locations

- 3.2.1 Sound measurements were undertaken at four positions at the site. The measurement positions are detailed in **Figure 3.1** and described in **Table 3.1**.



Land Parcels adjacent to Worsell Drive, Copthorne

Figure 3.1: Environmental Sound Measurement Locations

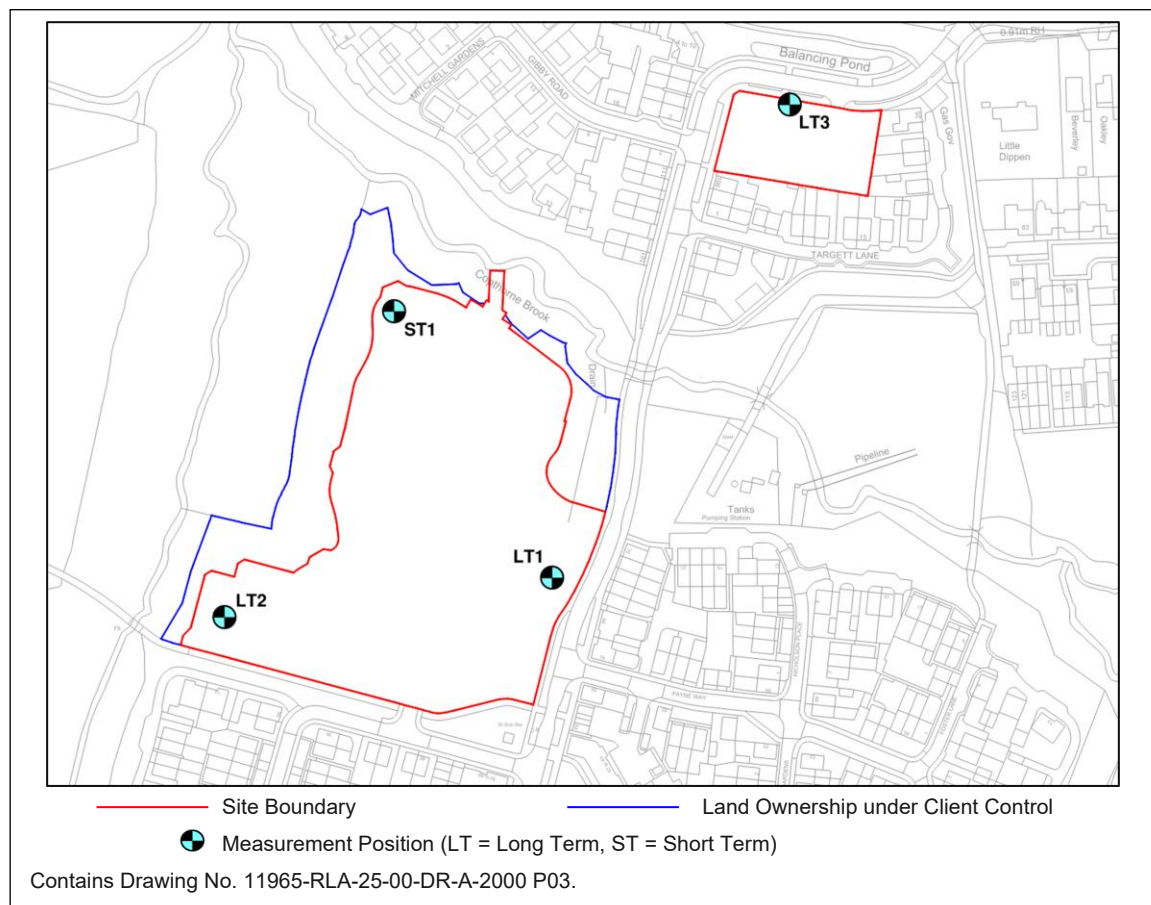


Table 3.1: Description of Measurement Locations

Positions	Description
LT1	The microphone was located in a free field position on the east boundary of the southern proposed development site. The microphone was located approximately 2.5 m above the local ground level and 5 m from the edge of Worsell Road.
LT2	The microphone was located in a free field position on the west boundary of the southern proposed development site. The microphone was located approximately 2.5 m above the local round level and 290 m from the edge of M23.
LT3	The microphone was located in a free field position on the northern boundary of the northern proposed development site. The microphone was located approximately 2.5 m above the local round level and 3 m from the edge of Worsell Road.
ST1	The microphone was located in a free field position near the northwestern boundary of the southern proposed development site. The microphone was located approximately 1.5 m above the local ground level and 270 m from the edge of M23.

3.3 Meteorological Conditions

- 3.3.1 Due to the nature of the survey (i.e. predominantly unattended), it is not possible to accurately comment on the meteorological conditions throughout the entire survey period. However, based on a review of publicly available weather forecasts and observations at the beginning and end of the survey period, the weather conditions are detailed in **Table 3.2**.

Table 3.2. Meteorological Conditions

Date	Temperature Range (°C)	Precipitation (mm)	Range of Wind Speeds (m/s)	Wind Direction
21/11/2024	-1 – 3	0	0 - 5	Various
22/11/2024	-2 – 7	0	0 - 8	SW/W
23/11/2024	-1 – 15	0	0 - 11	E/SW

- 3.3.2 Adverse weather conditions were noted to occur between the following periods, and as such have been excluded from the survey period:

- Friday 22nd November - 02:15 to 16:00
- Saturday 23rd November at 06:45 to Sunday 24th November at 17:30
- Monday 25th November – 12:45 to 14:30

3.4 Assumptions/Limitations

- 3.4.1 The engineer noticed nothing unusual in terms of the sound climate at the time of the survey. This report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections. Environmental conditions can vary. No warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

3.5 Environmental Sound Climate

- 3.5.1 Due to the nature of the survey (i.e. unattended), it is not possible to accurately comment on the dominant noise sources or specific noise events during the entire survey period. However, at the beginning and end of the survey period, it was noted that on-site sound levels were dominated by road traffic from the M32 and surrounding road network (Copthorne Way and Worsell Drive). In addition, aircraft arriving/departing Gatwick Airport were noted to increase the maximum noise levels on site.
- 3.5.2 Noise emitted from the industrial developments to the southwest of the site were inaudible during the setup and collection periods of the sound survey, therefore a separate assessment of these sources has not been undertaken as the data already contains representative operational noise from these sources.

3.6 Environmental Sound Survey Results

- 3.6.1 The results of the survey are presented in the time history graphs in **Appendix C**.
- 3.6.2 A summary of the survey results is provided in **Table 3.3**.



Land Parcels adjacent to Worsell Drive, Copthorne

Table 3.3: Summary of Measured Environmental Sound Survey Results

Ref.	Date	Period, T	$L_{Aeq,T}$	Typical $L_{AFmax,2mins}^*$
LT1	21/11/24	Daytime (07:00 – 23:00 hrs)	60	-
		Night-time (23:00 – 07:00 hrs)	51	72
	22/11/24	Daytime (07:00 – 23:00 hrs)	59	-
		Night-time (23:00 – 07:00 hrs)	52	72
	24/11/24	Daytime (07:00 – 23:00 hrs)	60	-
		Night-time (23:00 – 07:00 hrs)	54	74
	25/11/24	Daytime (07:00 – 23:00 hrs)	60	-
LT2	21/11/24	Daytime (07:00 – 23:00 hrs)	56	-
		Night-time (23:00 – 07:00 hrs)	49	60
	22/11/24	Daytime (07:00 – 23:00 hrs)	56	-
		Night-time (23:00 – 07:00 hrs)	51	59
	24/11/24	Daytime (07:00 – 23:00 hrs)	59	-
		Night-time (23:00 – 07:00 hrs)	53	60
	25/11/24	Daytime (07:00 – 23:00 hrs)	58	-
		Night-time (23:00 – 07:00 hrs)	51	71
LT3	21/11/24	Daytime (07:00 – 23:00 hrs)	59	-
		Night-time (23:00 – 07:00 hrs)	51	71
	22/11/24	Daytime (07:00 – 23:00 hrs)	58	-
		Night-time (23:00 – 07:00 hrs)	51	71
	24/11/24	Daytime (07:00 – 23:00 hrs)	58	-
		Night-time (23:00 – 07:00 hrs)	52	70
	25/11/24	Daytime (07:00 – 23:00 hrs)	64	-
ST1	21/11/24	Daytime (12:45 – 13:45 hrs)	52	-
* Based on the 10th highest measured L_{AFmax} level.				



4 Suitability of Site for Residential Development

4.1 Overview

- 4.1.1 An analysis of the results of the environmental sound survey has been undertaken to determine the suitability of the site for residential development with regards to both internal and external sound levels.
- 4.1.2 The assessment has been informed by the masterplan as shown in **Appendix D**.

4.2 Environmental Noise Model

- 4.2.1 Based on the results of the environmental sound survey and the masterplan, an environmental noise model has been developed to predict the façade incident sound levels and noise levels in external amenity areas.
- 4.2.2 An acoustic model of the site has been created using standard modelling software, SoundPLAN v9.1. SoundPLAN calculates the propagation of sound across the proposed development in accordance with *ISO 9613-2: 2024-01 Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation* and noise emitted by road traffic according to *Calculation of Road Traffic Noise 1988 (CRTN)*.
- 4.2.3 The model incorporates traffic flow numbers provided by the transport consultant including the predicted traffic generated by the development. In order to accurately predict the impact of the M32 on the development, the sound levels from the M32 have been calibrated against the measured sound levels on site.
- 4.2.4 An overview of the daytime and night-time noise levels across the site are presented in **Appendix F** It should be noted that L_{Amax} noise levels have not been modelled as they are caused by aircraft flyovers rather than road traffic.

4.3 Calculated Incident Sound Levels

- 4.3.1 **Table 4.1** details the calculated indicative incident sound levels based on the worst-case dwelling relative to the sound source. Sound levels for dwellings shielded from the sound sources are also presented to provide representative levels across the site.

Table 4.1: Calculated Incident Sound Levels

Façade / Location	Calculated Incident Sound Level (dB)		
	Daytime (07:00 – 23:00hrs)		Night-time (23:00 – 07:00hrs)
	$L_{Aeq,16h}$	$L_{Aeq,8h}$	Typical L_{AFMax}
Northern Site - Roadside	63	56	71
Northern Site - Shielded	57	50	71
Southern Site - Worsell Roadside	60	53	74
Southern Site - M23 Roadside	60	54	74
Southern Site - Shielded	55	49	74

- 4.3.2 It should be noted that vehicular movements on the M32 and Worsell Drive were the dominant noise sources at all locations within the proposed Site boundaries with aircraft flyovers dominant when occurring. Therefore, the incident sound levels outlined above should be considered to represent a worst-case scenario.



4.4 External Sound Levels

Southern Site

Daytime Sound Levels

- 4.4.1 As seen in **Figure F.1** of **Appendix F**, in areas adjacent to the M32, daytime sound levels are approximately 55-60 dB $L_{Aeq,16hours}$, and fall into the 'low noise risk' category according to ProPG.
- 4.4.2 In areas that overlook Worsell Drive, daytime sound levels are approximately 55-60 dB $L_{Aeq,16hours}$, and also fall into the 'low noise risk' category according to ProPG.
- 4.4.3 In areas not immediately adjacent to the surrounding road network, daytime sound levels across the majority of the site are less than approximately 55 dB $L_{Aeq,16hours}$, and fall into the 'negligible noise risk' category according to ProPG.

Night-time Sound Levels

- 4.4.4 As seen in **Figure F.2** of **Appendix F**, in areas adjacent to the M32, night-time sound levels are approximately 50-55 dB $L_{Aeq,8hours}$, and fall into the 'medium noise risk' category according to ProPG.
- 4.4.5 In areas that overlook Worsell Drive, night-time sound levels are approximately 50-55 dB $L_{Aeq,8hours}$, and also fall into the 'medium noise risk' category according to ProPG.
- 4.4.6 In areas not immediately adjacent to the surrounding road network, night-time sound levels across the majority of the site are less than approximately 50 dB $L_{Aeq,16hours}$, and fall into the 'low noise risk' category according to ProPG.
- 4.4.7 All areas of the development are likely to be subject to 10 or more exceedances of 60 dB $L_{Amax,F}$ and therefore this site does not fall into the 'negligible risk' category according to ProPG for this aspect.

Northern Site

Daytime Sound Levels

- 4.4.8 As seen in **Figure F.1** of **Appendix F** in areas that overlook Worsell Drive, daytime sound levels are approximately 60-65 dB $L_{Aeq,16hours}$, and fall into the 'medium noise risk' category according to ProPG.
- 4.4.9 In areas not immediately adjacent to the surrounding road network, daytime sound levels across the majority of the site are less than approximately 55 dB $L_{Aeq,16hours}$, and fall into the 'negligible' to 'low noise risk' category according to ProPG.

Night-time Sound Levels

- 4.4.10 As seen in **Figure F.2** of **Appendix F**, in areas that overlook Worsell Drive, night-time sound levels are approximately 55-60 dB $L_{Aeq,8hours}$, and fall into the 'medium noise risk' category according to ProPG.
- 4.4.11 In areas not immediately adjacent to the surrounding road network, night-time sound levels across the majority of the site are less than approximately 50 dB $L_{Aeq,16hours}$, and fall into the 'low noise risk' category according to ProPG.
- 4.4.12 All areas of the development are likely to be subject to 10 or more exceedances of 60 dB $L_{Amax,F}$ and therefore this site does not fall into the 'negligible risk' category according to ProPG for this aspect.



4.5 Discussion

4.5.1 When sites are deemed to be in the 'low noise risk' category, ProPG advises that:

"At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development."

4.5.2 When sites are deemed to be in the 'medium noise risk' category, ProPG advises that:

"The site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an Acoustic Design Statement which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development."

4.5.3 The requirements for an Acoustic Design Statement can usually be conditioned as part of a planning approval. We would highlight that the area falling into a 'medium noise risk' category is a relatively small part of the overall site and that the site as a whole is considered to be suitable for residential use.

4.5.4 The scheme demonstrates aspects of good acoustic design in line with ProPG as follows:

- The southern site is set back a considerable distance from the dominant noise source (M32), minimising the impact on the Development as far as practicable.
- The southern site is separated from Worsell Drive by a section of landscaping, which significantly reduces the façade incident noise levels generated by traffic on Worsell Drive.
- The layout of the houses on the perimeter of the development provide significant acoustic shielding to the external amenity spaces located in the centre of the development.

4.5.5 To further promote the inclusion of good acoustic design within the development and based on guidance within ProPG, we would recommend that planning consent should be granted, and that the planning consent should include a suitable noise condition. The condition should request that a noise assessment be undertaken during the detailed design stage of the development, and that mitigation elements outlined within the noise assessment are included within the finished development. Below is an example condition based on the above:

"The dwellings shall be designed and/or insulated as to provide attenuation against externally generated noise in accordance with a mitigation scheme to be submitted to and approved in writing by the Local Planning Authority before commencement of development. The approved mitigation measures to serve each dwelling shall be implemented prior to occupation."



5 External Noise Break-in Assessment (Windows Closed)

5.1 Overview

- 5.1.1 Analysis of the proposed external building fabric has been undertaken to determine the required acoustic performance of glazing and ventilation elements to achieve the criteria detailed in **Table 2.5** with windows closed. Compliance with the acoustic performance specification detailed herein is expected to result in compliance with the proposed acoustic criteria.

5.2 Ventilation

- 5.2.1 The requirements for building ventilation in new dwellings are detailed in Approved Document F (ADF) and include provision for 'whole dwelling ventilation', 'extract ventilation' and 'purge ventilation', as described below.

Whole Dwelling Ventilation

- 5.2.2 Nominally continuous ventilation of rooms or spaces at a relatively low rate to provide fresh air to the building and dilute, disperse and remove water vapour and pollutants not removed by extract ventilation.

Extract Ventilation

- 5.2.3 The extraction of air where water vapour or pollutants are likely to be released (e.g. bathrooms and kitchens). Fans may be either intermittent or continuous operation.

Purge Ventilation

- 5.2.4 Manually controlled ventilation at a relatively high rate to remove pollutants and/or water vapour (e.g. fumes from painting). Purge ventilation is typically provided by means of openable windows. Due to the temporary nature of purge ventilation, significant noise impacts are not normally expected.

Types of Ventilation System

- 5.2.5 ADF provides three 'template' systems which comply with the ventilation requirements, formed of whole dwelling ventilation and extract ventilation, and can be adopted to demonstrate compliance. These are:
- Natural ventilation (applicable to less airtight dwellings) - incorporating background ventilators and intermittent extract fans
 - Continuous mechanical extract ventilation - incorporating background ventilators and continuous extract fans
 - Mechanical ventilation with heat recovery (MVHR) - incorporating continuous ventilation fans
- 5.2.6 Each system has different noise implications, however in the context of this assessment external noise ingress via the ventilation system is the primary consideration. Generally, for natural ventilation and continuous mechanical extract ventilation, this is via the ventilators and for MVHR this is via the inlet and exhaust grilles within the dwelling associated with the MVHR system.

Selected System

5.2.7 The assessment has been undertaken on the basis that ventilation to dwellings is to be provided by natural ventilation. If an alternative ventilation option is taken forward at detailed design, then an updated assessment should be undertaken.

5.3 Internal Sound Levels (External Building Fabric Assessment)

5.3.1 The external building fabric analysis has assumed the following:

Proposed External Building Fabric

5.3.2 The assessment has been based on our assessment on a typical brick/block external wall build-up and tiled roof with at least 100mm mineral wool within the build-up. Please note that assessment of internal sound transfer falls outside the scope of this report and should be assessed in detail by the relevant specialists.

5.3.3 **Table 5.1** details typical sound reduction indices associated with the assumed external building fabric construction.

Table 5.1. Assumed External Wall Sound Reduction Performance

Construction	Sound Reduction Index (R) at Octave-band Centre Frequency (Hz)							
	63Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz	8kHz
100 mm brick / 140 mm block cavity wall	36	41	45	45	54	58	58	58
Tiled/slatted roof, 12 mm plasterboard ceiling, 100 mm mineral wool insulation in the loft cavity	19	24	34	40	45	49	50	50

5.3.4 Our calculations have been based on building and window dimensions obtained from drawings produced by Roberts Limbrick Ltd. dated 14 November 2025.

Glazing and Ventilation Acoustic Specification and Guidance on Construction

5.3.5 Glazing specifications have been consolidated so that a minimum number of different specifications are provided. Based on the masterplan and drawings produced by Roberts Limbrick Ltd., a singular glazing specification has been proposed across the site.

5.3.6 The glazing performance specifications apply to the glazing package as a whole, inclusive of glazing, louvres, spandrel panels, framing, opening lights, doors, seals, etc. The performance of the glazing system will depend on many factors such as the glazing configuration, size of windows panels, quality of framing, quality of sealing etc.

5.3.7 The proposed windows should be tested in accordance with BS EN ISO 10140-2:2021 and the quoted minimum sound reduction specifications should be met by the system as a whole, including frames, seals, etc. as appropriate, and not just the glass.

5.3.8 For guidance purposes we would suggest that a construction based around the following configurations is likely to prove commensurate with achieving the sound insulation performance specifications detailed within **Appendix E**.



Table 5.2. Glazing and Trickle Ventilator Guidance Constructions

Area	Glazing Type	Ventilation Type	Guidance Glazing and Ventilator Construction
Living Spaces / Bedrooms	G1	V1	Up-rated double glazing Up-rated trickle ventilation

- 5.3.9 The guidance constructions above are provided for costing purposes only. Selected glazing and ventilation systems should be capable of meeting the performance specifications shown in **Appendix E**, with laboratory test certificates being made available in support of the quoted performance. Glazing proposals which simply reflect the guidance constructions indicated in this report will not, in isolation, be sufficient evidence that a glazing configuration will meet the performance specification.
- 5.3.10 The acoustic specifications will need to be integrated, coordinated and ratified with the design by the principal designer and design team to ensure that all other design interfaces, buildability, workmanship and other requirements are considered.
- 5.3.11 It should be noted that the acoustic specifications are intended to demonstrate the ability of the scheme to comply with planning requirements and are not intended to be used as detailed acoustic design specifications. All acoustic specifications should be reviewed and confirmed during the detailed design stage.
- 5.3.12 Based on the results of the external building fabric assessment, the internal ambient sound levels are likely to meet the proposed criteria during daytime and night-time periods.

6 External Noise Break-in Assessment (Windows Open)

6.1 Overview

- 6.1.1 Analysis of external sound levels around the development has been undertaken to determine the likelihood of compliance with the noise requirements outlined within Approved Document O Overheating. The purpose of this section of the report is not to demonstrate compliance with the requirements, but to determine the likelihood of compliance.

6.2 Assumptions

- 6.2.1 The assessment is based on the following assumptions:
- Based on guidance provided within the ADO Noise Guide, considering the equivalent area as the geometric open area is expected to result in the same level of attenuation through an open window.
 - The noise assessment only supports the Simplified Method of Approved Document O. Additional assessment is required to support dynamic thermal modelling.
 - Bedrooms have an average height of 3 m, a reverberation time of 0.5 seconds, a simple hole in the façade of area sufficient to provide the required equivalent area and no other sound transmission other than via the opening.

6.3 Simplified Method Assessment and Results

- 6.3.1 The site is located within a moderate risk location, and therefore, based on the ADO Noise Guide, the external noise criteria which should be achieved to allow open windows to be used in bedrooms to mitigate overheating at night are:
- 50 dB $L_{Aeq,8hour}$ averaged over 8 hours between 23:00 and 07:00 hours.
 - 65 dB L_{AFmax} more than 10 times a night between 23:00 and 07:00 hours
- 6.3.2 Based on the measured survey data, external night-time sound levels are anticipated to be above 65 dB $L_{Amax,f}$ across the majority of the development indicating that with respect to Approved Document O and the Simplified Method, it is unlikely that the internal noise criteria would be achieved at night in bedrooms, by utilising open windows to mitigate overheating.
- 6.3.3 Therefore, dynamic thermal modelling will be completed at detailed design stage to determine the method of ventilation for homes to ensure compliance with Building Regulations.

7 Noise Levels in External Amenity Areas

7.1.1 An assessment of the predicted noise levels in external amenity spaces has been undertaken, based on the calibrated noise model.

7.1.2 The results of the environmental sound survey indicate that when noise mitigation is not considered, notwithstanding from the proposed housing layout, sound levels within the proposed external amenity areas would generally be below the BS 8233 guideline value of 55 dBA, with small portions below the BS 8233 desirable level of 50 dBA. There are six gardens along the western boundary of the development (Plots 14, 15, 16, 17, 18 and 49) which are predicted to exceed the 55 dBA upper guideline.

7.1.3 BS 8233:2014 advises the following in relation to sound levels in external amenity areas:

“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 high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

7.1.4 In line with BS 8233 guidance, screening has been incorporated to achieve the lowest practicable levels. To reduce the noise levels in private external amenity areas, inclusion of a 2 m acoustic fencing (garden fence) along the western perimeter of the external amenity spaces of Plots 14, 15, 16, 17, 18 and 49 is proposed. A 2 m barrier is considered to be the tallest barrier that can practically be installed in a residential development, such as this, without negatively impacting other aspects of the design.

7.1.5 With the inclusion of the barrier, the noise levels have the potential to exceed the upper guideline level by 1-2 dB in some areas of the external amenity areas. In line with the guidance provided in BS 8233 (and guidance provided in Paragraph 7.1.3), the slight exceedance of the guidance levels is likely to be acceptable and should not prohibit development.



8 Conclusions

- 8.1.1 Stantec UK Limited (Stantec) has been commissioned by Miller Homes to undertake a noise impact assessment to support a planning application for a proposed residential development at Copthorne, West Sussex.
- 8.1.2 An environmental sound survey has been undertaken by Stantec to establish the existing environmental sound levels at the Site.
- 8.1.3 The suitability of the Site for residential development has been considered based on the results of the environmental sound survey, having regard to planning policy, national and international standards and guidance documents in relation to environmental noise.
- 8.1.4 The results of the environmental sound survey have been used to establish façade incident noise levels for the proposed development which form the basis of our assessment of the acoustic requirements of the building façade.
- 8.1.5 Assessment criteria have been proposed based on applicable guidance documents.
- 8.1.6 Analysis of the proposed external building fabric has been undertaken to determine the acoustic performance of the glazed and ventilation elements. Compliance with the acoustic performance specification detailed herein is expected to result in compliance with the proposed acoustic criteria.
- 8.1.7 An outline assessment of the likelihood of compliance with the requirements of Approved Document O has been undertaken based on the simplified method. The results of the assessment indicate that it is unlikely that open windows can be used to mitigate overheating in bedrooms at night. Therefore, dynamic thermal modelling will be completed at detailed design stage to determine the method of ventilation for homes to ensure compliance with Building Regulations.
- 8.1.8 It should be noted that the acoustic specifications herein are provided to demonstrate the ability of the scheme to comply with planning requirements and are not intended to be used as detailed acoustic design specifications. All acoustic specifications should be reviewed and confirmed during the detailed design stage.
- 8.1.9 Appropriate noise levels in private external amenity areas are likely to be achievable based on the proposed building orientation and the inclusion of garden fencing around external amenity areas.
- 8.1.10 In summary, the assessment indicates that the Site is suitable for residential use provided appropriate mitigation and consideration of acoustics is included at the detailed design stage. This can be secured using a suitably worded planning condition.



Appendix A Glossary of Acoustic Terminology

Parameter	Description
Ambient Sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. Comprises of the residual sound and the specific sound when present.
Ambient Sound Level ($L_a = L_{Aeq,T}$)	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T .
A-Weighted Decibel (dBA)	A decibel level that has been corrected for the A-Weighting curve.
A-Weighting	Octave band and 1/3 octave band filters that correlate to the response of the human hearing system to sound pressure levels at different frequencies.
Background Sound	The level of sound measured in the absence of extraneous noise sources.
Background Sound Level ($L_{A90,T}$)	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T , measured using a fast time-weighting and quoted to the nearest whole number of decibels.
Decibel (dB)	A logarithmic unit used to describe the ratio between the measured level and a reference level of 0 dB. The ratio can be sound pressure, intensity or power. The reference value for sound pressure is 20 μ Pa and for sound power is 1 μ W.
Element Normalized Level Difference ($D_{n,e}$)	The ratio of the sound power incident on a reference area to the sound power transmitted through the test specimen.
Façade Level	The sound pressure level at a distance of 1 metre from the façade
Fast Time Weighted	The speed at which the instrument responds to changes in amplitude of the measured signal. The response time of a fast time-weighted instrument is 0.125 seconds.
Free-Field Level	The sound pressure level measured away from any reflective surfaces.
Frequency (f)	The number of cycles of pressure fluctuations within a given period of time. Measured in Hertz.
Hertz (Hz)	The unit of frequency or pitch of a sound. One hertz is equal to one cycle per second.
Indoor Ambient Noise	The noise level within a room or building that is composed of noise from sources inside and outside the building but excludes noise from activities of the occupants.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T . This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
L_{Amax}	The maximum A-weighted level measured during a given time period.
Octave Band	Band of frequencies where the upper limit of the band is twice the frequency of the lower limit. E.g., the 1000 Hz band contains noise energy at all frequencies from 707 to 1414 Hz.
Percentile Level ($L_{AN,T}$)	The A-Weighted Sound Pressure Level which is exceeded for N% of the specified time interval. E.g., the $L_{A90,1hour}$ is the A-weighted sound level exceeded for 90% of 1 hour/
Reverberation	The persistence of sound in an enclosure, due to its continued reflection or scattering from surfaces or objects, after the sound source has stopped.
Reverberation Time (T)	Time required for the reverberant sound pressure level within a room to decrease by 60 dB, once the sound source has stopped. Measured in seconds and calculated using Sabine's formula. Defined as: $T = \frac{0.161V}{A}$

Land Parcels adjacent to Worsell Drive, Copthorne

	The sound decay is typically measured until the sound level has decreased by 20 dB (T_{20}) or 30 dB (T_{30}) and is then corrected to obtain the reverberation time. The mean value of the reverberation time in the 500Hz, 1kHz and 2kHz octave bands is referred to as the T_{mf}.
Sound Absorption	The loss of sound energy when striking or transmitting into a boundary surface material or obstacle or when causing a volume of air to resonate.
Sound Absorption Coefficient (α)	The fraction of sound energy absorbed by a material. Expressed as a value between 1.0 (total absorption) and 0 (total reflection).
Sound Pressure	The difference between the pressure caused by a sound wave and the ambient pressure of the medium the sound wave is passing through. Measured in Pascals.
Sound Pressure Level (L_p)	The logarithm of the ratio of a given sound pressure (p) to the reference sound pressure (p_0). The reference value for sound pressure is 20 μPa. Defined as: $L_p = 20 \log \left(\frac{p}{p_0} \right)$
Sound Reduction Index (R)	Laboratory measure of the sound insulation properties of a material or building element in a stated frequency band. Defined as: $R = L_1 - L_2 + 10 \log_{10} \left(\frac{S}{A} \right)$
Weighted Sound Reduction Index (R_w)	Single-number quantity used to characterize the impact sound insulation of floors over a range of frequencies.

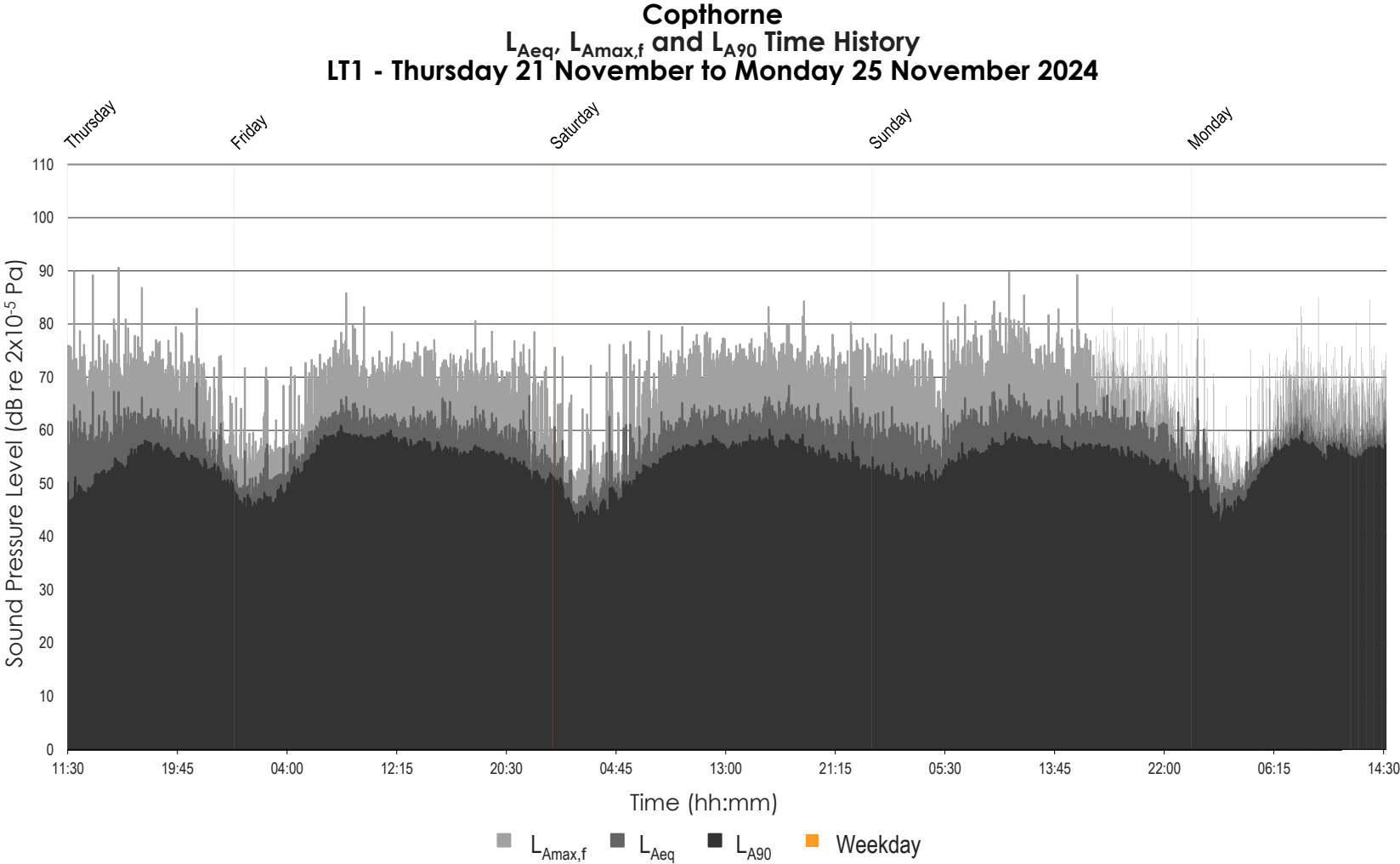
Appendix B Instrumentation

B.1.1 The instrumentation used in the environmental sound survey is listed in **Table B.1**.

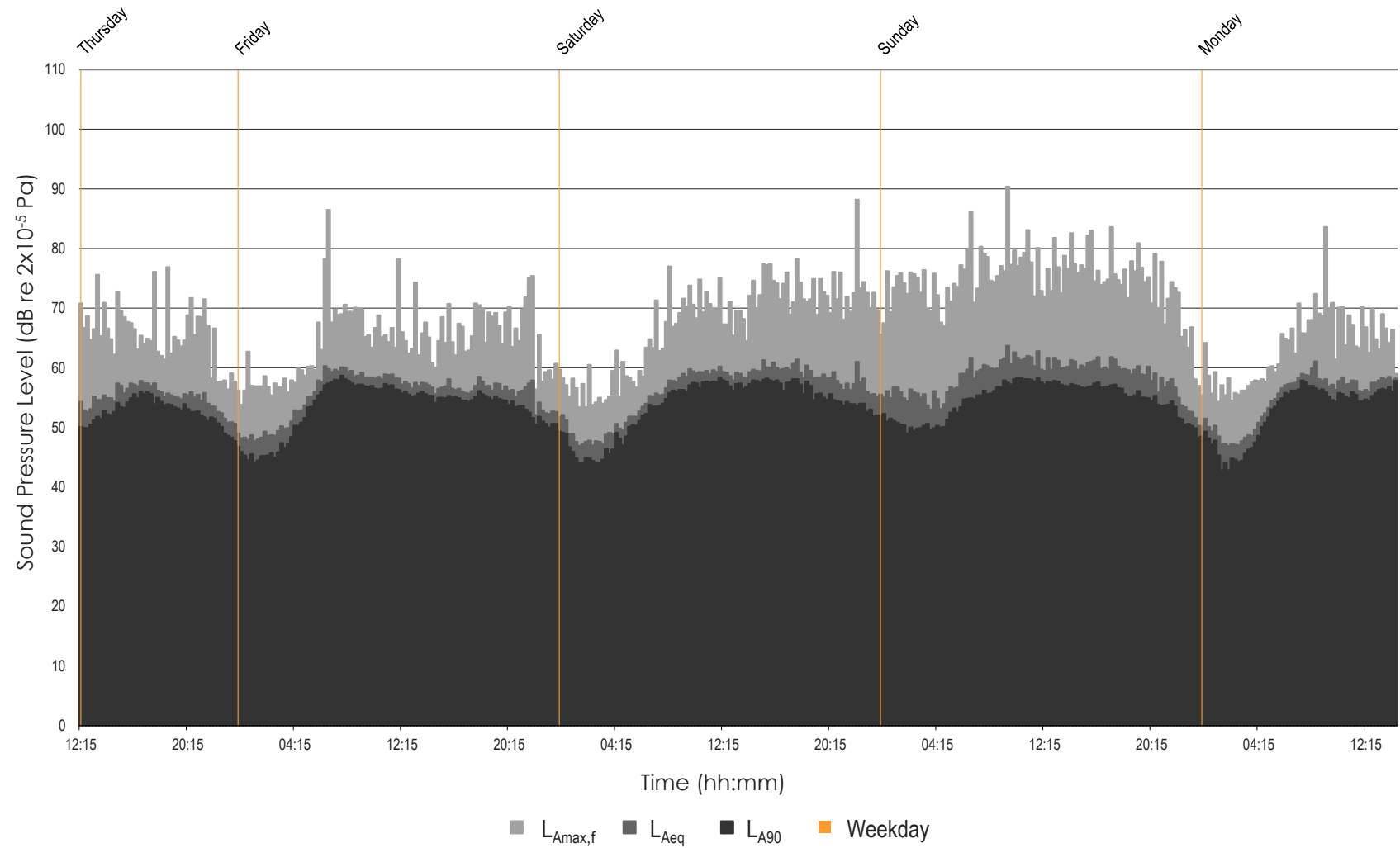
Table B.1: Environmental Sound Survey Instrumentation

Location	Description	Manufacturer	Type	Serial Number	Laboratory Calibration Due Date
LT1	Sound Level Meter	NTi	XL2-TA	A2A-20385-E0	28/07/2025
	Pre-Amplifier		MA220	10704	
	Microphone		MC230A	A22997	
	Calibrator	Cirrus Research	CR515	97639	12/02/2025
LT2	Sound Level Meter	Rion	NL-52	775959	12/04/2025
	Pre-Amplifier		NH-25	11689	
	Microphone		UC-59	76076	
	Calibrator		NC74-002	35157400	12/02/2025
LT3 & ST1	Sound Level Meter	01dB	Fusion	12242	27/06/2025
	Pre-Amplifier		Pre22	1915123	
	Microphone	G.R.A.S	40CD	367053	
	Calibrator	Larson Davis	CAL200	19824	12/04/2025

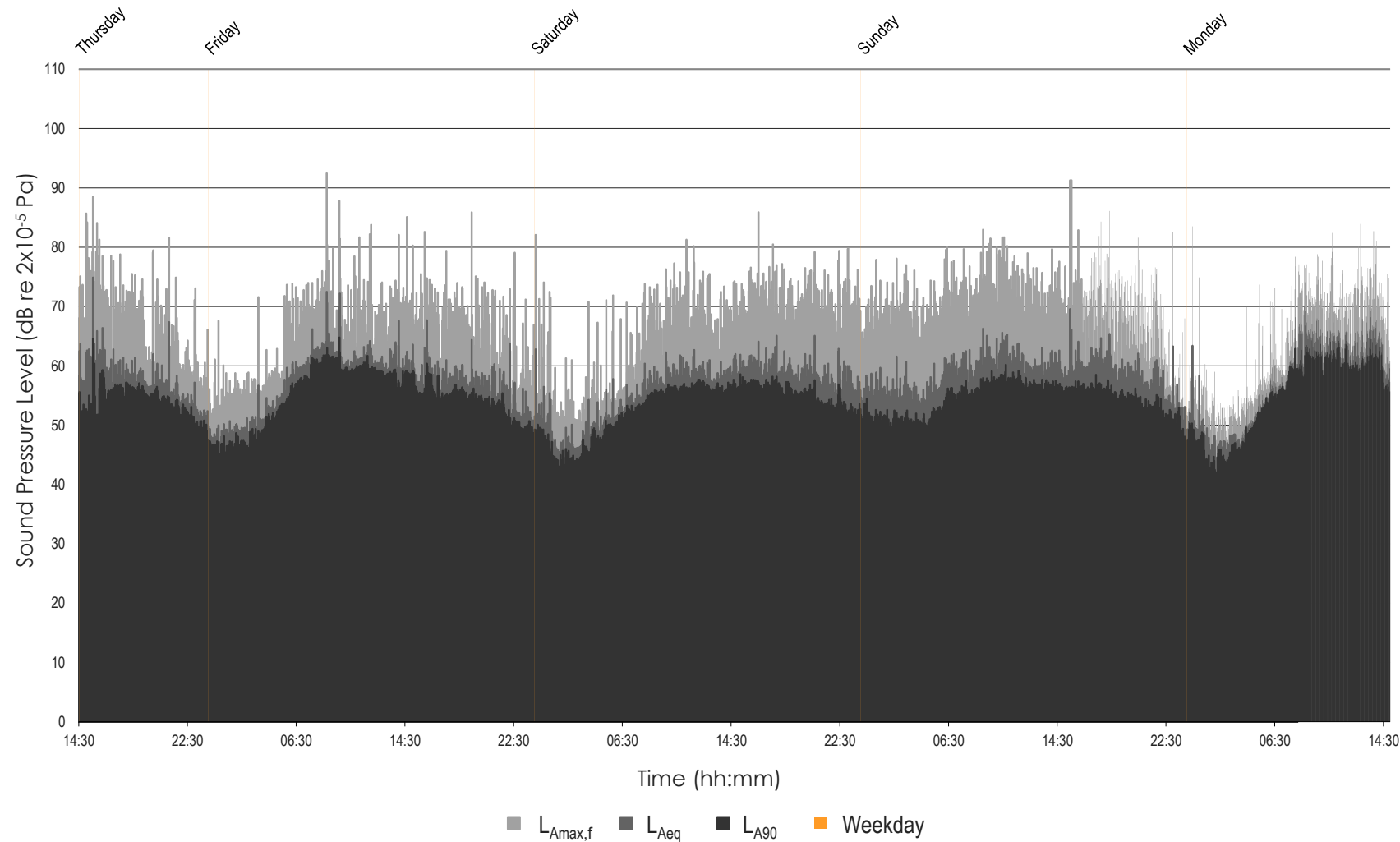
Appendix C Sound Time History Graphs



Copthorne
 L_{Aeq} , $L_{Amax,f}$ and L_{A90} Time History
LT2 - Thursday 21 November to Monday 25 November 2024



Copthorne
 L_{Aeq} , $L_{Amax,f}$ and L_{A90} Time History
LT3 - Thursday 21 November to Monday 25 November 2024



Appendix D Masterplan

Drawing No. 11965-RLA-25-00-DR-A-2200-P09 courtesy of Roberts Limbrick.



DESIGN STANDARDS CHECKLIST		
DESIGN STANDARDS	NO	YES
NDSS		
WDQR		
M4(2)		
M4(3)		



PLAN KEY 13

Legend

Application Boundary.

15m Offset from Ancient Woodland

20m Offset from Watercourse

3m Offset from Rising Main

Development Schedule									
11965-Land Parcels off Worsell Drive, Copthorne									
Based on Drawing: 11965-RLA-25-XX-DR-A-2200 P07 Proposed Site Plan									
Client: Miller Homes									
Dwelling Type		Number	Percentage	Bed	Parking Spaces*	Floor Area (GIA) Sqm	SqFt	Total Coverage Sqm	SqFt
Open Market									
1 Bed Apartments									
1 Bed APT		8	17%	1	1	51.6	555	412.5	4440
Sub-Total 2 Bed Houses		8	17%						
2 Bed Housetypes									
H283 - The Denson		6	13%	2	2	70.4	758	422.5	4548
Sub-Total 2 Bed Houses		6	13%						
3 Bed Housetypes									
H384 - The Turnley		6	13%	3	2	88.9	957	533.4	5742
H385 - The Embley		1	2%	3	2	96.2	1036	96.2	1036
H482 - The Birchgate		18	38%	3	3	113.2	1218	2036.8	21924
Sub-Total 3 Bed Houses		25	52%						
4 Bed Housetypes									
H485 - The Bramgate		4	8%	4	3	128.1	1379	512.5	5516
H486 - The Presgate		2	4%	4	3	129.1	1390	258.3	2780
H488 - The Greengate		3	6%	4	3	136.8	1473	410.5	4419
Sub-Total 4 Bed Houses		9	19%						
Sub-Total Open Market		48	70%					4270.3	45965
Affordable - Social/Affordable Rent									
Apartments									
1 Bed APT		4	19%	1	1	51.6	555	206.2	2220
Sub-Total Apartments		4	19%						
2 Bed Housetypes									
AL23 - The Clevemont		1	5%	2	2	72.2	777	72.2	777
AL24 - The Baymont		4	19%	2	2	79.0	850	315.9	3400
Sub-Total 2 Bed Houses		5	24%						
3 Bed Housetypes									
AL32 - The Lockton		3	14%	3	2	93.0	1001	279.0	3003
AL34 - The Easton		2	10%	3	2	108.5	1168	217.0	2336
Sub-Total 3 Bed Houses		5	24%						
4 Bed Housetypes									
AL41 - The Torwood		1	5%	4	3	106.2	1143	106.2	1143
Sub-Total 4 Bed Houses		1	5%						
Sub-Total Affordable Social		15	71%					1196.5	12879
Affordable - First Homes									
2 Bed Apartments									
2 Bed APT778		6	29%	2	2	72.3	778	433.7	4668
Sub-Total 2 Bed Apartments		6	29%						
Sub-Total Affordable New Homes		6	29%					433.7	4668
Sub-Total Affordable		21	30%					1630.2	17547
Totals		69	100%					5900.5	63512
* (Including Garages)									
Net Development Area									
		15760	Sqm						
		1.576	Hectares						
		3.89	Acres						
Coverage		16309	SqFt/Acres						

This line should measure 70mm when printed correctly

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Rev	Date	By	Chk	Description
P01	23.07.2025			First Issue
P02	01.08.2025			Mix adjusted to suit client feedback, numbers reduced to 64 overall to accommodate changes.
P03	07.08.2025			Plots 11, 12 & 15 adjusted to suit Arch. comments. Plots 16 & 19 pulled forward to accommodate garages.
P04	21.08.2025			Site layout update to include highway review
P05	04.09.2025			Plots 13-15 moved south by 1200mm. Redline adjusted
P06	17.09.2025			Site layout revised following client internal review. Additional units added.
P07	21.09.2025			Garage positions adjusted, plots 7-10 position adjusted, 30-31 detached and parking position revised, plot 57 changed to Bramgate. Birchgate shown as 3 Bed unit on Schedule.
P08	27.09.2025			Layout tracked and back edge of footways adjusted to suit vis splays.
P09	11.11.2025			Landscaping added to layout

rl.

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Registered Office England No. 09658029

Project Name

Residential Development Land Parcels adjacent to Worsell Drive, Copthorne

Client Name

Miller Homes

-

-

Drawing Title

Proposed Site Plan

-

Scale

1/500 • A1

Project No.

11965

Status

S1

Purpose Of Issue

Issued for co-ordination

Project

Org

Year

Level

Form

Role

11965 • RLA • 25 • 00 • DR • A

Number

2200

Revision

P09

Appendix E External Building Fabric Acoustic Performance Specification

- E.1.1 The project criteria are expressed in terms of an overall A-weighted dB sound level. Alternative frequency specific performance levels may therefore be acceptable subject to confirmation from Stantec.
- E.1.2 Fully detailed test reports from independent acoustic test authorities shall be supplied. All test reports shall be in English or, a full English translation.
- E.1.3 Test data should include the 1/3 octave band results from 100 Hz to 3150 Hz inclusive, together with the corresponding octave band results from 125 Hz to 4000 Hz inclusive.
- E.1.4 As a result of wind or other atmospheric effects, external building elements should not give rise to noise e.g. via rattling, creaking or whistling.

E.2 Glazing Sound Insulation Performance

- E.2.1 The complete glazing system (including frames, joints, seals, spandrel panels and opening lights and trickle vents (as appropriate)) shall achieve the following minimum sound reduction indices when tested in accordance with BS EN ISO 10140-2:2021.

Table E.1. Minimum Sound Reduction Indices of Glazing Systems

Glazing Type	Minimum Sound Reduction Index (<i>R</i>) value (dB) at Octave Band Frequency								<i>R_w</i> *
	63	125	250	500	1k	2k	4k	8k	
G1	21	25	25	31	34	34	36	37	33

*The overall *R_w* figure is provided for guidance purposes only. The octave-band specification should be referred to check compliance with the requirements.

E.3 Trickle Ventilator Sound Insulation Performance

- E.3.1 Trickle ventilators should achieve the following minimum element normalised level differences when tested in accordance with BS EN ISO 10140-2:2021

Table E.2. Minimum Normalised Element Difference of Ventilation Systems

Ventilator Type	Minimum Sound Reduction Index (<i>D_{n,e}</i>) value (dB) at Octave Band Frequency (Hz)								<i>D_{n,e,w}</i> *
	63	125	250	500	1k	2k	4k	8k	
V1	28	32	32	31	33	31	31	31	32

*The overall *D_{n,e,w}* figure is provided for guidance purposes only. The octave-band specification should be referred to check compliance with the requirements.

- E.3.2 It should be noted that the acoustic specification for trickle ventilators is based on a single ventilator within the room providing an equivalent area of 8000/10000 mm² for multiple/single storey dwellings. If the total equivalent area provided by the trickle ventilator/s is different to this, or the acoustic performance for a given trickle ventilator is provided based on a different equivalent area, then the specification of the ventilator/s should be correctly adjusted.



Land Parcels adjacent to Worsell Drive, Copthorne

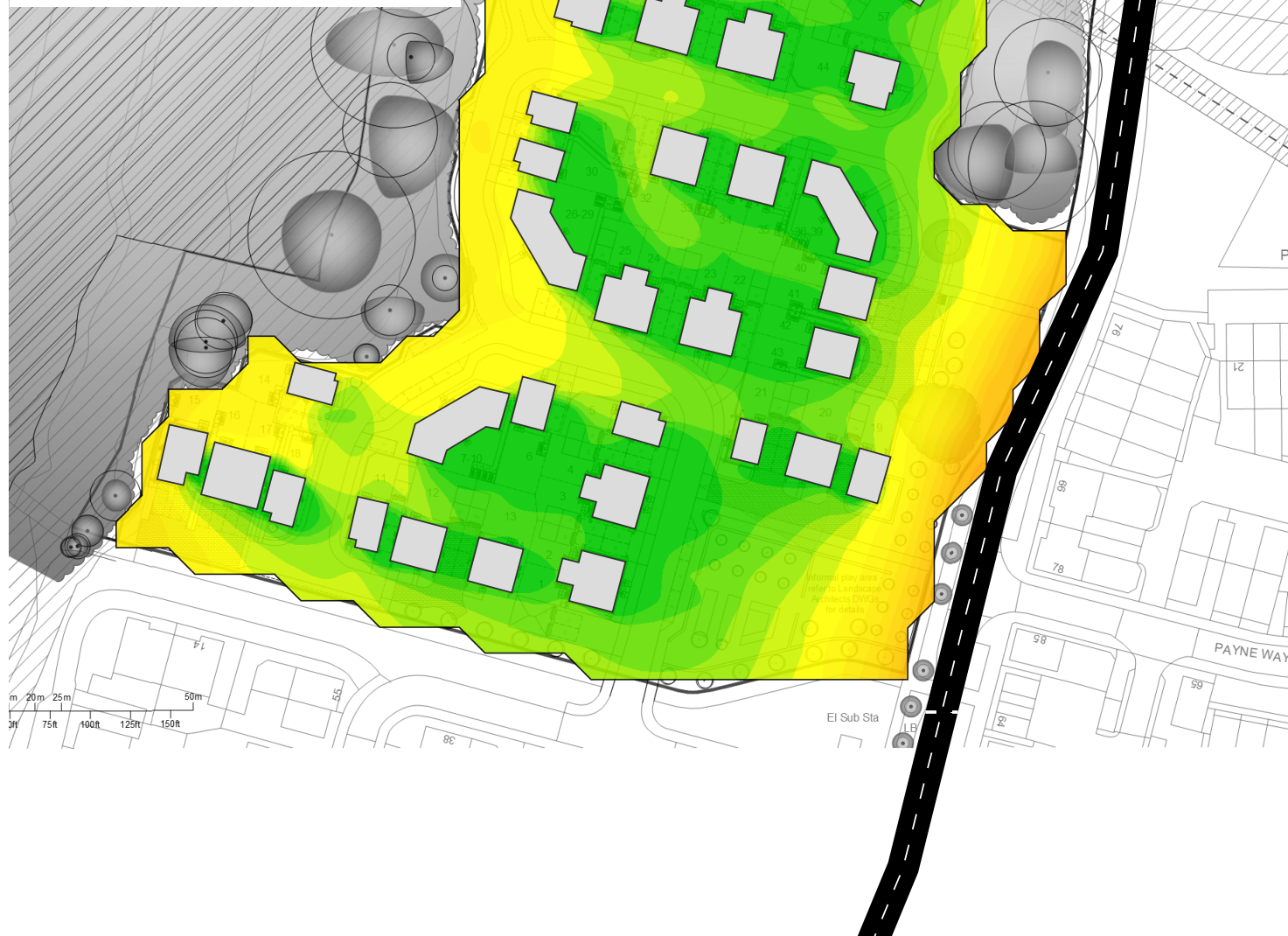
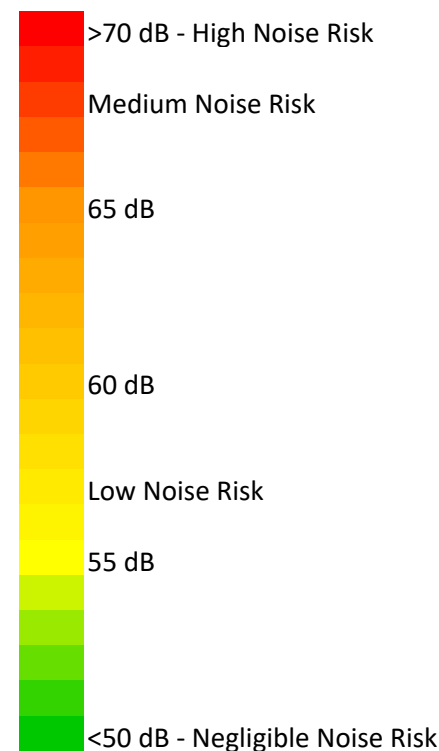
E.3.3 Please refer to a suitably qualified acoustician to determine the appropriate performance correction.



Appendix F Environmental Sound Maps – $L_{Aeq,T}$



ProPG Noise Risk & Daytime
Sound Level
L_{Aeq,16hr} dB



Development Schedule									
11965-Land Parcels off Worsell Drive, Copthorne									
Based on Drawing: 11965-RLA-25-XX-DR-A-2200 P07 Proposed Site Plan									
Client: Miller Homes									
Dwelling Type	Number	Percentage	Beds	Spaces*	Sqm	SqFt	Total Coverage	Sqm	SqFt
Open Market									
1 Bed Apartments									
1 Bed APT	8	17%	1	1	51.6	555	412.5	4440	
Sub-Total 2 Bed Houses	8	17%							
2 Bed Housetypes									
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3 Bed Housetypes									
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Sub-Total 4 Bed Houses	9	19%							
Sub-Total Open Market	48	70%					4270.3	45965	
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AL23 - The Clevefont	1	5%	2	2	72.2	777	72.2	777	
AL24 - The Baymont	4	19%	2	2	79.0	850	315.9	3400	
Sub-Total 2 Bed Houses	5	24%							
3 Bed Housetypes									
AL32 - The Lockton	3	14%	3	2	93.0	1001	279.0	3003	
AL34 - The Easton	2	10%	3	2	108.5	1168	217.0	2336	
Sub-Total 3 Bed Houses	5	24%							
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AL41 - The Torwood	1	5%	4	3	106.2	1143	106.2	1143	
Sub-Total 4 Bed Houses	1	5%							
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	1.576	Hectares							
	3.89	Acres							
Coverage									
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Registered Office (England) No. 06860220

Project Name
Residential Development
Land Parcels off Worsell Drive
Copthorne

Client Name
Miller Homes

Drawing Title
Proposed Site Plan

Scale
1/500 • A1

Status
S1

Number
2200

Project Purpose Of Issue
Issued for co-ordin

Rev
F

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Appendix F Figure 1
Predicted Daytime Sound Levels

L_{Aeq,16hr}
Client: Miller Homes
Project: Land Parcels adjacent to Worsell Drive, Copthorne
Project Number: 332612039
Project Engineer: AM
Calculation at 1.5 m above ground
Created: 24/11/2025
Processed with SoundPLAN 9.1
Update 30/10/2024

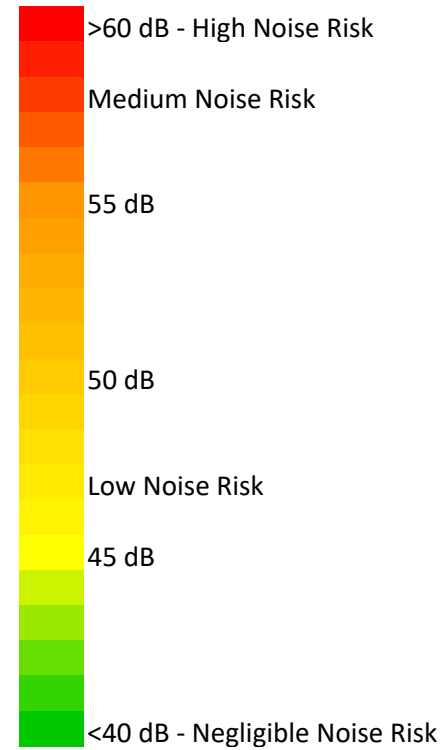
Figure not to scale. Do not scale.

<https://www.stantec.com/uk>



ProPG Noise Risk & Night-time
Sound Level

$L_{Aeq,8hr}$ dB



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Appendix F Figure 2
Predicted Night-time Sound Levels

$L_{Aeq,8hr}$
Client: Miller Homes
Project: Land parcels adjacent to Worsell Drive, Copthorne
Project Number: 332612039
Project Engineer: AM
Calculation at 1.5 m above ground
Created: 24/11/2025
Processed with SoundPLAN 9.1
Update 30/10/2024



Figure not to scale. Do not scale.

<https://www.stantec.com/uk>

