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Environmental Noise Survey

Prepared: 2nd June 2026

Report No	23573-1
Client	Bellway Homes Ltd (Thames Valley)
Site	Old Forest Road Wokingham

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1. Quality Management

Report Number	23573 - 1
Issue	Issue 1
Prepared	2nd June 2026
Prepared By	[redacted] Baden Fitzmaurice MSc, MIOA
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3. Executive Summary

3.1.1. An environmental noise assessment has been carried out using survey data and transport data provided by Stuart Michael Associates for a proposed residential development at Old Forest Road, Wokingham ("Proposed Development").

3.2. Scope

3.2.1. This report covers the following aspects of the noise assessment, including:

- the identification of acoustic design criteria;
- analysis of the data provided by others; and,
- the design of any mitigation to meet the required internal noise criteria.

3.3. Conclusions Summary

Air Source Heat Pumps

3.3.1. In the absence of more specific guidance in this situation, the assessment procedure from BS4142 has been applied. The predictions also show sound pressure levels at the façade which are also compliant with criteria for an MCS0020 assessment.

3.3.2. The situation being assessed is solely within a domestic residential setting, rather than commercial or industrial. The perception of sound can change depending on the associated environment and context. In this situation, the specific sound sources are being introduced as part of the development at the same time as the new residential receivers. This is likely to be the same as a situation where residents are being introduced to an area with existing commercial sources, therefore the impact of the sound is likely to be significantly reduced compared to the situation where new sound sources are being introduced close to existing residential receivers.

3.3.3. Generally, the lower the rating level is relative to the background sound level, the less likely it is that the specific source will have an adverse impact. The numerical indication of impact represents a worst-case situation at the worst-affected dwelling.

3.3.4. Mitigation treatment for the new receivers is within the scope of the developer to allow reasonable internal ambient sound pressure level criteria to be achieved in habitable rooms, i.e. bedrooms and living rooms.

Required Mitigation

3.3.5. In this case measurements and predictions demonstrate that road traffic noise is the dominant source of noise across the site. The mitigation specified is suitable to reduce internal noise from all sources.

3.3.6. The facade sound insulation required to meet the guideline values from BS8233:2014 are summarised in Table 1. The glazing performance has been specified in terms of the road traffic corrected weighted sound reduction index, $R_w + C_{tr}$, and the ventilator performance has been specified in terms of the road traffic corrected element normalised level difference $D_{ne,w} + C_{tr}$.

	Living rooms	Bedrooms
	Specification 1	
Glazing Performance	27dB $R_w + C_{tr}$	27dB $R_w + C_{tr}$
Ventilator Performance	33dB $D_{ne,w} + C_{tr}$	33dB $D_{ne,w} + C_{tr}$
	Specification 2	
Glazing Performance	30dB $R_w + C_{tr}$	30dB $R_w + C_{tr}$
Ventilator Performance	36dB $D_{ne,w} + C_{tr}$	36dB $D_{ne,w} + C_{tr}$
	Specification 3	
Glazing Performance	32dB $R_w + C_{tr}$	32dB $R_w + C_{tr}$
Ventilator Performance	38dB $D_{ne,w} + C_{tr}$	38dB $D_{ne,w} + C_{tr}$

Table 1 – Required facade sound insulation (glazing and ventilator)

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6. Background

6.1. Noise Policy Statement for England

6.1.1. The Noise Policy Statement for England (NPSE), published in March 2010, states the long-term vision of Government noise policy 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"*.

6.1.2. This long-term vision is supported by the following aims; through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life;
- Where possible, contribute to the improvement of health and quality of life.

6.1.3. The intention is that the NPSE should apply to all types of noise apart from noise in the workplace (occupational noise).

6.2. National Planning Policy Framework

6.2.1. The National Planning Policy Framework (NPPF) was published on the 27th of March 2012 and is regularly updated; it sets out the Government's planning policies for England and how these are expected to be applied. The framework states that the planning system should contribute to and enhance the natural and local environment by:

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

6.2.2. The NPPF requires that new developments be appropriate to their locations such that the effects of pollution on health have been taken into account. Planning policies and decisions should aim to:

1. avoid noise giving rise to significant adverse impacts on health and the quality of life;
2. mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development; and,
3. identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value.

6.2.3. Existing businesses near to proposed development 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.

6.3. National Planning Practice Guidance

6.3.1. The National Planning Practice Guidance (PPG) is a web-based resource, launched by the Department for Communities and Local Government (DCLG) which was published on the 29th November 2016 and is regularly updated to reflect the changes made to the NPPF and make it more accessible.[1]

[1] http://planningguidance.communities.gov.uk/

6.3.2. There are a number of factors that determine whether a noise could be a concern to a receptor. These include: the absolute level of the noise and when it occurs, whether it is existing or new to the area, temporal characteristics, spectral content and the acoustic absorption in the area.

Perception	Examples of outcomes	Effect level	Action
Not noticeable	No effect	No observed effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect (NOAEL)	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, 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 perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, 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
Noticeable and very intrusive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Table 2 – Noise exposure hierarchy

6.3.3. It is emphasised in the PPG that the planning process should be used to mitigate and minimise the impact of noise. This could include: engineering the noise sources to be quiet, minimising the impact of noise through layout, using conditions/obligations to restrict activities, mitigating the impact in places where noise is likely to be experienced (e.g. using facade sound insulation).

7. Introduction

7.1.1. An environmental noise assessment has been carried out for a proposed residential development at Old Forest Road, Wokingham.

7.1.2. The environmental noise survey was carried out by Stuart Michael Associates[2].

7.2. Proposed Development

7.2.1. An image showing the proposed location and illustrative layout of the Proposed Development is given in Figure 1.

Figure 1 - Plan showing the location and layout of the Proposed Development

[2] Noise Assessment, Land at Old Forest Road Winnersh – Stuart Michael Associates Ltd; June 2025

7.3. Specific Sound Sources

7.3.1. It is proposed to install air source heat pumps for the proposed dwellings on the development. The proposed units are summarised in Table 3.

Proposed Source	Illustration	Specifc Sound Source
Diakin Altherma 9kW EBLA09D3V3ULT		Air Source Heat Pump Manufacturer Data Supplied **L_W = 62.0 dB(A)**

Table 3 – Description of proposed specific sound sources associated with the proposed development

7.4. Nearest Sensitive Receiver

7.4.1. In this case the proposed specific sources are being installed as part of the development. For the purposes of the assessment, the nearest sensitive receiver location has been taken as 1m from the window of the nearest neighbouring dwelling in each case.

8. Assessment Criteria

8.1. Guideline Values

BS8233:2014 Internal Ambient Noise Criteria

8.1.1. BS8233:2014 draws on the results of research and experience to provide information on the design of buildings that have internal acoustic environments appropriate to their function. The standard provides guideline internal values for dwellings for steady external noise sources. These have been summarised in Table 4.

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

Table 4 – BS8233:2014 guideline values for internal ambient noise levels from steady external noise sources

8.1.2. The guideline values are issued by the World Health Organisation (WHO) and assume normal diurnal fluctuations in external noise. They are expected to be achieved based on normal annual data and not in all circumstances. For example, it is normal to exclude occasional events such as fireworks night or New Year's Eve.

BS8233:2014 Garden Criteria

8.1.3. 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 50dB $L_{Aeq,T}$ with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In such cases, the lowest practicable levels should be achieved in external amenity areas but the development should not be prohibited.

8.2. Approved Document O

8.2.1. Approved Document O[3] (ADO) was published in 15th December 2021 and was most recently updated on June 2022. The intention of this Approved Document is to assess the overheating risk of new residential dwellings.

Noise Related Requirements

8.2.2. ADO does not provide specific internal noise criteria but does provide sound pressure levels that, if exceeded the windows are likely to be kept closed by the occupant. These values are given below.

> *'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).'*

Institute of Acoustics Guidance

8.2.3. Guidance[4] for acousticians to demonstrate compliance with the noise requirements of ADO was updated in November 2024.

8.2.4. This guidance document identifies the scope of the assessment and proposes that it be limited to bedrooms at night with reference to paragraphs 3.2 and 3.3 of ADO. The guidance document also proposes that the scope of the assessment be limited to 'non-natural' sources, i.e. not including sound from water (rainfall/flowing water) or non-domestic animals (birdsong) etc.

8.2.5. The guidance document provides external levels, above which the simplified method for determining overheating risk should not be used and dynamic thermal modelling should be used to demonstrate compliance, or a ventilation system installed in the identified properties to deal with overheating. These values are given in Table 5.

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

Table 5 - Table 1 from IOA Guidance Document - External Noise Levels Above Which the Simplified Method Cannot Be Used

8.2.6. High risk locations are identified in ADO as parts of London and Manchester. A list of postcodes for these high risk locations are given in Appendix C of ADO. All areas that are not considered high risk are considered moderate risk locations.

[3] The Building Regulations 2010 – Overheating - Approved Document O – HM Government – 15th June 2022
[4] Approved Document O Noise Guide – Institute of Acoustics & ANC – November 2024

Removing Excess Heat Using Mechanical Means

8.2.7. The document provides specific guidance on noise from mechanical systems used for removing excess and the recommended noise levels are presented in Table 2 of the AVO Guide[5]. These values are given in Table 6.

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

Table 6 - Table 2 of the AVO Guide - Recommended Noise Levels for Mechanical Ventilation or Mechanical Cooling Systems

8.2.8. In paragraph 5.4.5 the guidance document acknowledges that in some operating scenarios where rapid changes to the cooling or ventilation rates improve the thermal comfort of the occupant then higher noise levels up to 10 dBA may be appropriate.

8.3. BS4142:2014

8.3.1. BS4142 provides methods for rating and assessing ***specific sound sources*** of an industrial and/or commercial nature, which includes: industrial and manufacturing processes, fixed services plant, sound generated by the loading/unloading of goods and sound from mobile plant/vehicles associated with industrial/commercial premises (e.g. fork-lift trucks). The ***assessment location*** is outside a residential receptor.

8.3.2. The standard is specifically precluded from being used to assess the likely impact inside a building or from the assessment of various sound sources for which other (more relevant) guidance exists, including: music/entertainment noise, noise from people and construction noise.

8.3.3. The foundation of the assessment is to establish the following quantities, either by measurement or prediction:

- ***Ambient sound***: The overall sound at the assessment location
- ***Residual sound***: The ambient sound without the specific sound source operating
- ***Specific sound****:* The ambient sound with the specific sound source operating, corrected for residual sound
- ***Background sound***: Residual sound present for 90% of the time

8.3.4. How these quantities relate to the sound that would be measured during a survey has been illustrated in Figure 2.

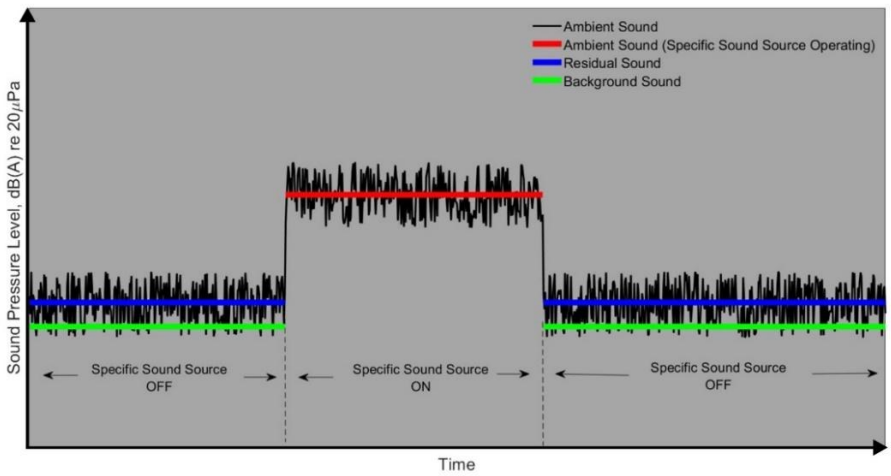


Figure 2 – Diagrammatic illustration of the definitions of ambient, residual, specific and background sound

[5] Acoustics Ventilation and Overheating – Residential Design Guide, January 2020

8.3.5. Once the specific sound level has been determined, this must be corrected for the presence of acoustic features that are audible at the assessment location to determine the ***rating level***:

Rating Level = Specific Sound Level + Character Corrections

8.3.6. Normally it is possible to carry out a subjective assessment of characteristics, based on the following correction guidelines:

- Tonality: +2dB for a 'just perceptible' tone, +4dB for 'clearly perceptible', and rising to +6dB for 'highly perceptible' tones.
- Impulsivity (rapidity of change and overall chance in level): +3 dB for 'just perceptible' impulsivity, +6dB for 'clearly perceptible', rising to +9 dB for 'highly perceptible' impulsivity.
- Intermittency: if the on/off-time of the specific sound is readily distinctive at the noise- sensitive receivers, +3dB.

8.3.7. It should be noted that. where one feature is clearly perceived as dominant, it may be appropriate to apply a single correction. Where multiple features are likely to affect perception and response, each should be added arithmetically.

8.3.8. An estimate of the magnitude of the impact is evaluated by subtracting the measured background sound level at the assessment location from the rating level

Assessment Level = Rating Level – Background Sound Level

8.3.9. Typically, the greater the difference between the background and rating level, the greater the magnitude of impact, although BS 4142 emphasises that this is highly context-specific. As an initial estimate, BS4142 states that:

- A difference (between the background and rating level) of around +10 dB or more is likely to be indicative of significant adverse impact, depending on context
- A difference (between the background and rating level) of around +5 dB or more is likely to be indicative of adverse impact, depending on context
- Where the rating level does not exceed the background level, this is an indication that the specific sound will have a low impact, depending on context

8.3.10. Where the initial estimate of the impact needs to be modified due to the context, other factor should be considered, including: absolute sound levels, the character and level of the residual sound and the sensitivity of the receiver, which includes the effect of building façade sound insulation.

8.4. Local Planning Authority Criteria

8.4.1. The local planning authority has provided specific noise-related planning requirements for the Proposed Development. The noise-related requirements have been reproduced in Figure 3.

> 23. Compliance with Noise Assessment
>
> The development shall be carried out in accordance with the noise mitigation measures detailed in the Document: Noise Assessment Land at Old Forest Road, Winnersh, prepared by Stuart Micheal Associates dated June 2025 SMA Ref: 7365/NA Issue Status: 01 and these measures shall be implemented prior to first occupation of the dwellings and maintained thereafter.
> *Reason: In the interests of future and existing neighbouring amenity. Relevant policy, CP1 and CP3 of the Core Strategy.*

Figure 3 – Noise related planning requirements provided by the local planning authority

8.4.2. In relation to the above condition the environmental noise survey was carried out by out by Stuart Michael Associates[6]. The traffic flows used in the referenced report have been provided in the appendix, and have been used to inform the road traffic noise calculations and the relevant mitigation measured specified in this report.

[6] Noise Assessment, Land at Old Forest Road Winnersh – Stuart Michael Associates Ltd; June 2025

9. 3D Noise Model

9.1.1. A 3D noise model has been constructed using SoundPLAN™ in order to predict the propagation of sound across the site of the Proposed Development. The calculation procedures have been used from CRTN[7] and ISO9613-2:2024[8] to predict the propagation of sound from source to receiver, taking into account distance, screening, and atmospheric and ground conditions.

9.1.2. Data from Google maps has been used to create the existing roads and buildings. Terrain data has been taken the Department for Environment, Food & Rural Affairs (DEFRA) data services platform.

9.2. Road Traffic Noise

9.2.1. Traffic flow data '2025+Development Traffic' has been applied to the roads in the model. AAWT figures have been provided without hourly distribution information, therefore, the hourly distribution given in TRA0307[9] has been applied. The calibration of the model was checked against the survey measurements from the Stuart Michael Associates noise assessment and was within ±3dB during both daytime and night-time periods. The traffic flow data used is provided in the appendix.

9.2.2. The results of the model have been illustrated in noise contour maps in Figure 4 and Figure 5.

Figure 4 – Noise contour plot showing the propagations of sound across the site during the daytime

[7] Calculation of Road Traffic Noise, Department for Transport, HMSO, 1988
[8] ISO9613-2:2024 "Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: Engineering method for the prediction of sound pressure levels outdoor"
[9] Department for Transport TRA0307: Traffic distribution on all roads by time of day and day of the week in Great Britain

Figure 5 – Noise contour plot showing the propagation of sound across the site during the night-time

Worst Case Façade	Daytime dB, $L_{Aeq,16hr}$	Night-time dB, $L_{Aeq,8hr}$
Overlooking Toutley Road & M4	66.3	60.3

Table 7 - Summary of the worst case predicted external sound pressure levels

9.3. Air Source Heat Pumps

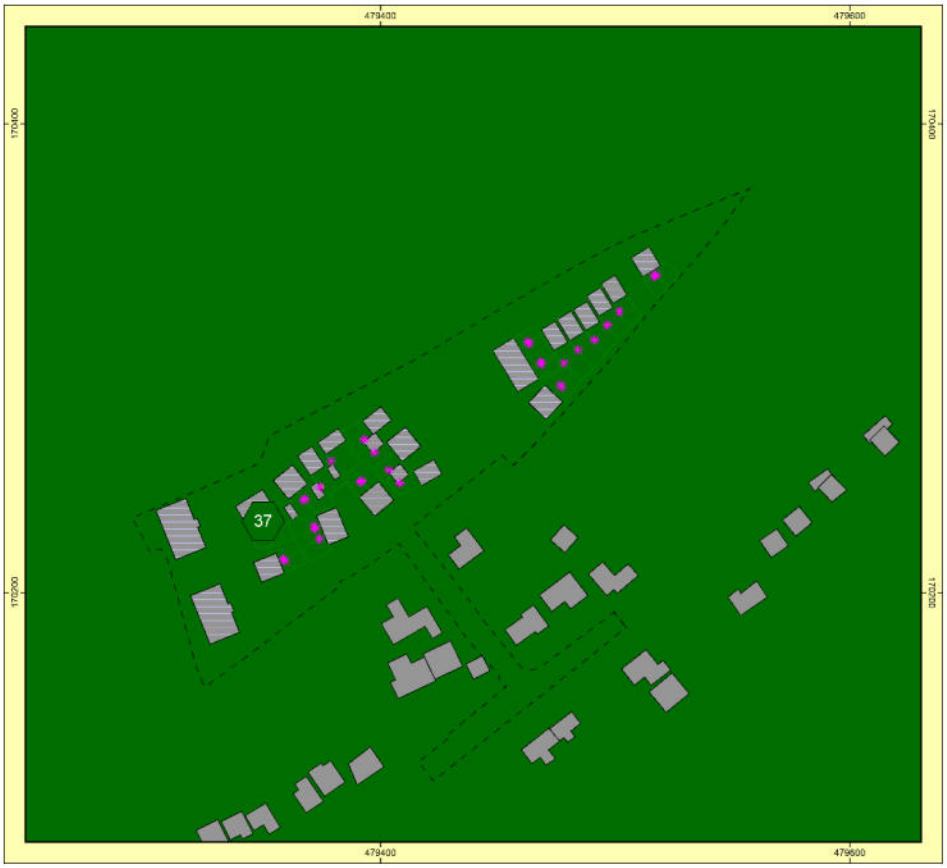
9.3.1. Air source heat pumps are proposed for dwellings across the site. The 3D noise model has been used to predict the impact of neighbouring air source heat pumps on the worst-affected proposed dwelling.

9.3.2. The ASHPs have been modelled as point sources. The manufacturer's sound data has been applied to the sources and is given in the appendix. The acoustic characteristics of the source are not considered in the model and are discussed in Section 10.2.

9.3.3. This situation indicates the impact at the worst-affected dwelling and assumes that all heat pumps are running simultaneously and continuously to provide a worst-case assessment. This is unlikely to occur in reality as the on/off conditions will vary by demand of individual users. An additional façade map identifying the worst-affected façade with all heat pumps running is also provided in the appendix.

9.3.4. The ASHP unit associated with the dwelling is not included for the purpose of this assessment.

9.3.5. The results of the model are given in Figure 6.



Levels
in dB(A)

< 50
50 - 55
55 - 60
60 - 65
65 - 70
>= 70

Figure 6 – Noise contour plot showing the propagations of sound across the site during the daytime

9.3.6. The predicted specific source level at the worst-affected receiver is 37dB(A).

9.3.7. It should be noted that, separately from the BS4142 assessment in Section 10.3, the predicted results show compliance with a typical MCS0020 a) assessment which assumes that a background sound level of 37dB(A) should not be exceeded at neighbouring dwellings.

10. BS4142 Assessment

10.1. Background Sound Levels

10.1.1. A noise survey was carried out by Stuart Michael Associates[10] between the 29th and 30th April 2025.

10.1.2. The background sound levels ($L_{A90,T}$) reported have been rounded to the nearest whole decibel and are summarised in Table 8. It has been assumed that these are typical of levels likely to experienced by future residents on site and are suitable for use in the following BS4142 numerical assessment.

	Daytime dB, $L_{A90,T}$	Night-time dB, $L_{A90,T}$
Background Sound Levels	55	50

Table 8 – Summary of background sound levels reported by Stuart Michael Associates (rounded to the nearest whole decibel)

10.2. Acoustic Character of the Source

10.2.1. The proposed air source heat pumps have been specified but not yet installed, it is therefore not possible to make objective or subjective judgment of the sound based on the character of the sound at the boundary with the receivers. Character corrections for the sources have been based on experience of similar items of plant. The adjustment to the specific sound level for acoustic features are discussed in the following sections

Tonality

10.2.2. Based on experience of a range of domestic air source heat pump models, the sound is continuous when operating and is generally broadband in nature. However, tones can be produced during certain modes of high duty operation. Such tones are likely to be just perceptible in this situation given the relatively short distances involved between the source and boundary with the nearest receiver.

10.2.3. A +2dB penalty for tonality has been applied.

Impulsivity

10.2.4. The sudden onset of a sound is defined as an impulse and occurs when the rate of increase in sound exceeds 10dB/s (e.g. metal hammering). It is not expected that the proposed sources will generate impulsive sound under normal operating conditions.

10.2.5. No correction for impulsivity has been applied.

Intermittency

10.2.6. Heat pumps typically go through a ramp up/ramp down process, opposed to instant on/off conditions. This leads to a slower rate of change in sound as equipment approaches it's intended operating conditions, which draws less attention than a short, sudden change in sound level. It is expected that operation is typically continuous within a typical reference period.[11]

[10] Noise Assessment, Land at Old Forest Road Winnersh – Stuart Michael Associates Ltd; June 2025

[11] Reference time interval (T), defined in BS4142:2014 as typically 1h 07:00-23:00 / 15min 23:00-07:00

10.3. Assessment

Initial Estimate (numerical assessment)

10.3.1. The numerical BS4142 assessment is detailed in Table 9.

	Level, dB	
	Daytime (07:00-23:00)	**Night-time (23:00-07:00)**
Background sound level, dB $L_{A90,15min}$	55	50
Specific sound level, dB(A)	37	37
Acoustic feature corrections		
Tonality	+2	+2
Impulsivity	0	0
Intermittency	0	0
Rating level		
Specific sound level + corrections	39	39
Assessment Level		
Rating level – Background sound level	-16	-11
"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"		

Table 9 - The assessment procedure from BS4142

10.3.2. The Assessment Level provides an initial estimate which considers the impact on the reported background sound levels and is not always representative of the impact of the receivers directly. Where the initial estimate of impact needs to be modified due to context, other factors should be considered, including: absolute sound levels, any barrier or acoustic screening, the character and level of the residual sound and the sensitivity of the receiver, which includes the effect of building façade sound insulation.

10.3.3. BS4142 states *"not all adverse impacts will lead to complaints and not every complaint is proof of adverse impact"*.

Full Assessment (Accounting for Context)

10.3.4. In the absence of more specific guidance in this situation, the assessment procedure from BS4142 has been applied. Although the type of sound produced is the same as sound typically associated with commercial/industrial fixed mechanical plant, the situation being assessed is solely within a domestic residential setting, rather than commercial or industrial. The perception of sound can change depending on the associated environment and context. For example, the specific sound is as a result of fixed plant directly serving the development to provide heating for dwellings. This can be viewed as similar to noise produced by internal central heating boilers and is less likely to attract negative attention compared to the equivalent sound in a more commercial setting.

10.3.5. In this situation, the specific sound sources are being introduced as part of the development at the same time as the new residential receivers. This is likely to be the same as a situation where residents are being introduced to an area with existing commercial sources, therefore the impact of the sound is likely to be significantly reduced compared to the situation where new sound sources are being introduced close to existing residential receivers.

10.3.6. The results of the 3D noise modelling show that road traffic noise is the dominant source of noise on site, by a margin which is likely to effectively mask the specific sound.

10.3.7. Most dwellings are expected to experience a lower level of impact than is predicted by the initial numerical assessment which represents an absolute worst-case situation assuming all heat pumps are running simultaneously.

10.3.8. Mitigation treatment for the new receivers is within the scope of the developer to allow reasonable internal ambient sound pressure level criteria to be achieved in habitable rooms, i.e. bedrooms and living rooms.

11. Mitigation

11.1. Methodology

11.1.1. The following specification is provided for mitigation against all sources.

11.1.2. Based on the predicted free-field sound pressure levels at the worst affected facades, the simple calculation method from BS8233:2014 has been used to determine the necessary sound reduction to meet the guideline values. Standard forms of construction are assumed such that the glazing is likely to be the lowest performing facade element.

11.2. Required Mitigation

11.2.1. The single figure glazing and ventilator performance requirements in order to achieve the internal design criteria are summarised in Table 10.

11.2.2. The glazing performance has been specified in terms of the road traffic corrected weighted sound reduction index, $R_w + C_{tr}$, and the ventilator performance has been specified in terms of the road traffic corrected element normalised level difference $D_{ne,w} + C_{tr}$.

11.2.3. Should penetrations be required for ventilation purposes our ventilator performance ($D_{ne,w} + C_{tr}$) has been calculated to work in conjunction with the glazing specifications. It should be checked by a suitably qualified person the ventilator specification meets the requirements of Approved Document F. It should be noted that any vent or total combination of vents should be specified to achieve the ventilator performances given in Table 10.

11.2.4. In this case the bedroom specification is dictated by the daytime criteria.

	Living rooms	Bedrooms
	Specification 1	
Glazing Performance	27dB $R_w + C_{tr}$	27dB $R_w + C_{tr}$
Ventilator Performance	33dB $D_{ne,w} + C_{tr}$	33dB $D_{ne,w} + C_{tr}$
	Specification 2	
Glazing Performance	30dB $R_w + C_{tr}$	30dB $R_w + C_{tr}$
Ventilator Performance	36dB $D_{ne,w} + C_{tr}$	36dB $D_{ne,w} + C_{tr}$
	Specification 3	
Glazing Performance	32dB $R_w + C_{tr}$	32dB $R_w + C_{tr}$
Ventilator Performance	38dB $D_{ne,w} + C_{tr}$	38dB $D_{ne,w} + C_{tr}$

Table 10 – Required facade sound insulation (glazing and ventilator)

11.2.5. It is generally expected that most standard thermal double glazing units can achieve sound reduction performance around 27dB $R_w + C_{tr}$.

11.2.6. A markup plan showing where these specifications apply has been provided in the appendix.

11.3. Glazing Specifications

11.3.1. The glazing performance has been specified based on the performance data provided by Saint-Gobain. These are example configurations and any other glazing can be used provided it achieves the minimum performance levels given in Table 10. The recommended glazing specification is given in Table 11.

Living room	Bedrooms
Specification 1	
Saint Gobain 4 (12) 4	Saint Gobain 4 (12) 4
Specification 2	
Saint Gobain 4 (6) 6	Saint Gobain 4 (6) 6
Specification 3	
Saint Gobain 4 (6) 10	Saint Gobain 4 (6) 10

Table 11 - Our recommended glazing configurations

11.3.2. Given the assumptions in this method the information in this section should be treated as general guidance only. The acoustic performance of third party products cannot be guaranteed by noise.co.uk.

11.3.3. It should be noted that in order to meet the internal ambient noise criteria in these area, the windows may need to remain closed. This does not mean that windows should be fixed shut and should be openable at the discretion of the occupant.

Open Windows (ADO assessment for removal of excess heat)

11.3.4. As the dominant environmental noise on this site is continuous road traffic, the appropriate measurand for design of mitigation is the $L_{Aeq,T}$ value.

11.3.5. The noise model has been used to highlight the facades that are predicted to exceed the sound pressure level values given in Table 1 of the IOA Guidance for 'moderate risk' locations (Table 5).

11.3.6. The facades marked in blue are predicted to exceed these values and facades marked in green are predicted to meet, or fall below, these values. It should be noted that this assessment is intended only for bedrooms, so where there are no bedrooms located on a façade marked in blue, this can be considered the same as a façade marked in green. The results of the 3D noise model are given in Figure 7.

Figure 7 - Façade noise map showing where facades are predicted to achieve internal noise criteria with open windows, in bedrooms during the night-time ($L_{Aeq,T}$)

11.4. External Amenity Area Noise Assessment

11.4.1. BS8223 states that it is desirable that the external noise level for amenity spaces, such as gardens and patios, does not exceed 50dB $L_{Aeq,T}$ with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments.

11.4.2. However, the standard acknowledges that there may be areas where development is desirable where these guideline values are not achievable. This will be true for higher noise areas such as city centres or urban areas adjoining the strategic transport network, such as the M4. In these situations, a compromise between elevated noise levels and other factors might be warranted, such as:

- the convenience of living in these locations; and/or,
- making efficient use of land resources to ensure development needs can be met.

11.4.3. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

11.4.4. The results of the 3D noise model in Figure 4 Section 9.2 illustrates that most garden areas are placed behind their respective dwellings to optimise screening provided, and most garden areas expected to achieve sound pressure levels below 55dB $L_{Aeq,16hour}$.

11.4.5. However, a number of the gardens (plots 35, 43-46) are placed 'side on' to the road sources, and are therefore afforded less screening from their associated dwellings. It is understood that these gardens will be bordered by a 1.8m solid brick wall between the road sources and the garden to provide screening.

11.4.6. Figure 8 illustrates the sound pressure levels with the addition of solid 1.8m barriers. These can be solid brick walls as proposed for Plots 35 and 43, or close-boarded fences[12].

Figure 8 – Noise contour plot showing sound pressure levels in external amenity areas with 1.8m fences

[12] Any fences that border residential private gardens can be basic, wooden, standard close boarded fences with no gaps between the panels and the ground or panels and the posts and have a minimum wooden panel mass of 10Kg/m^2 to optimise their barrier performance:, for example the 10Kg/m^2 mass can simply be achieved by a fence constructed of 19mm thick treated pine (based on the density of treated pine at 550Kg/m^3)

12. Conclusions

12.1.1. An environmental noise assessment has been carried out at the site of a proposed residential development at Old Forest Road, Wokingham using data provided from the noise assessment and transport assessment by Stuart Michael Associates. The predicted sound levels have been used to calculate the required facade sound insulation to meet the guideline internal levels from BS8233:2014.

12.1.2. Table 10 in section 11 gives the required facade sound reduction to mitigate against all sources by any glazing and ventilator combination to be compliant with the guideline values

12.1.3. A BS4142 assessment of the proposed air source heat pumps to be installed as part of the development indicate that the specific sound will have a low impact on the proposed residents. Generally, the lower the rating level is relative to the background sound level, the less likely it is that the specific source will have an adverse impact. It is also noted that the predicted sound pressure levels show compliance with criteria for an MCS0020 assessment.

12.1.4. We strongly recommend that this report be passed to the local planning authority for approval prior to any works being carried out.

13. Appendix

APPENDIX A: Summary Information

Required ISO Test Report Information (cross referenced where required)			
		Measurements carried out to:	Analysed to:
A	Standards	BS 7445-1: 2003 BS 7445-2: 1991	BS 8233:2014
B	Organisation performed the measurements	Stuart Michael Assocaites	
C	Name of Client	Bellway Homes Ltd (Thames Valley)	
D	Full site address	Old Forest Road Wokingham	
E	Date of surveys	Survey Dates: 29th April 2025 – 30th April 2025 ***See Stuart Michael Associates noise assessment, dated June 2025.***	
F	Description & identification of Proposed Development	It is proposed to develop the site for residential use.	
G	Brief Description of details of Procedure & equipment	See Section 5 of this report.	

APPENDIX B: Manufacturer's Data

DAIKIN

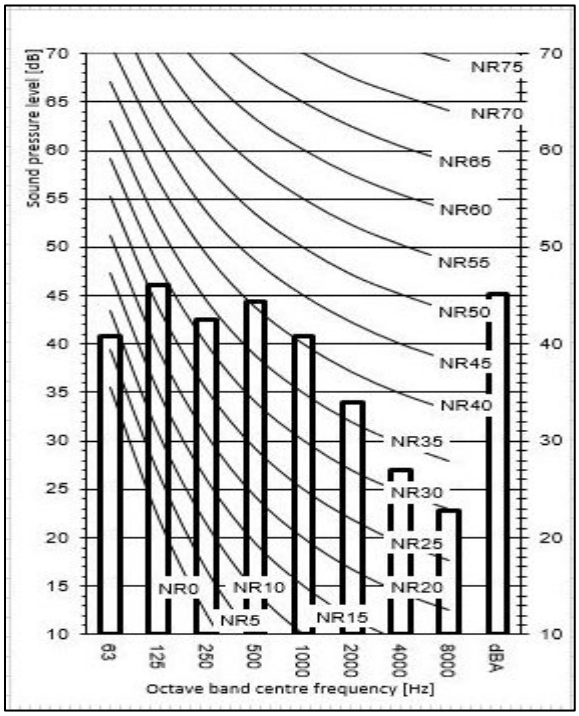
Daikin Altherma low temperature monobloc •

2 Specifications

2 - 1 Specifications

2

Technical specifications				EBLA09D3V3	EBLA11D3V3	EBLA14D3V3
Expansion vessel	Volume		l	8		
	Max. water pressure		bar	4		
	Pre pressure		bar	1		
	Heater		W	65		
Water filter	Diameter perforations		mm	0.8		
	Material			Stainless steel		
Water circuit	Piping connections diameter		Inch	G 1" (male)		
	Piping		Inch	1-1/4"		
	Piping length	Max. OU - Tank	m	10		
	Level difference	Max.	m	5		
	Safety valve		bar	3		
	Drain valve / fill valve			Yes		
	Shut off valve			Yes		
	Air purge valve			Yes		
	Minimum water volume in the system		l	20 (7)		
	Heater		W	66.0		
General	Supplier/ Manufacturer details	Name and address		Daikin Europe N.V. - Zandvoordestraat 300, 8400 Oostende, Belgium		
		Name or trademark		Daikin Europe N.V.		
	Product description	Air-to-water heat pump		Yes		
		Brine-to-water heat pump		No		
		Heat pump combination heater		No		
		Low-temperature heat pump		No		
		Supplementary heater integrated		Yes		
General	Product description	Water-to-water heat pump		No		
LW(A) Sound power level (according to EN14825)			dB(A)	62.0		
Sound condition Ecodesign and energy label				Sound power in heating mode, measured according to the EN12102 under conditions of the EN14825		
Space heating general	Air to water unit	Rated airflow (outdoor)	m³/h	2,880	3,350	4,220



APPENDIX C: Data Provided by Others

Stuart Michael Assosicates noise assessment survey data

Land at Old Forest Road, Winnersh; June 2025
SMA Reference: 7365/NA Issue 01

Equipment Used

4.4 The equipment used during the field measurements on site are listed in **Table 4.1**. The SLM and acoustic calibrator have been calibrated at an UKAS accredited centre (certificates available on request).

Table 4.1: Equipment Used During the Field Measurements

Equipment	Type	Serial Number
Sound Level Meter	Brüel and Kjær Type 2250 Light	3004648
Microphone	Brüel and Kjær Type 4950	2913913
Calibrator	Brüel and Kjær Type 4321	2388830
Anemometer/thermometer	Kestrel 2000	449331
Tripod	Star 62 – 1.5 metre	

Results from the Monitoring

4.5 The SLM was setup at 16:00 on Tuesday 29th April 2025. The survey ended at 16:00 on Wednesday 30th April 2025. Presented in **Table 4.2** is a summary of the results from the measurements. Refer to **Appendix 2** for an illustration of the noise levels on a graph.

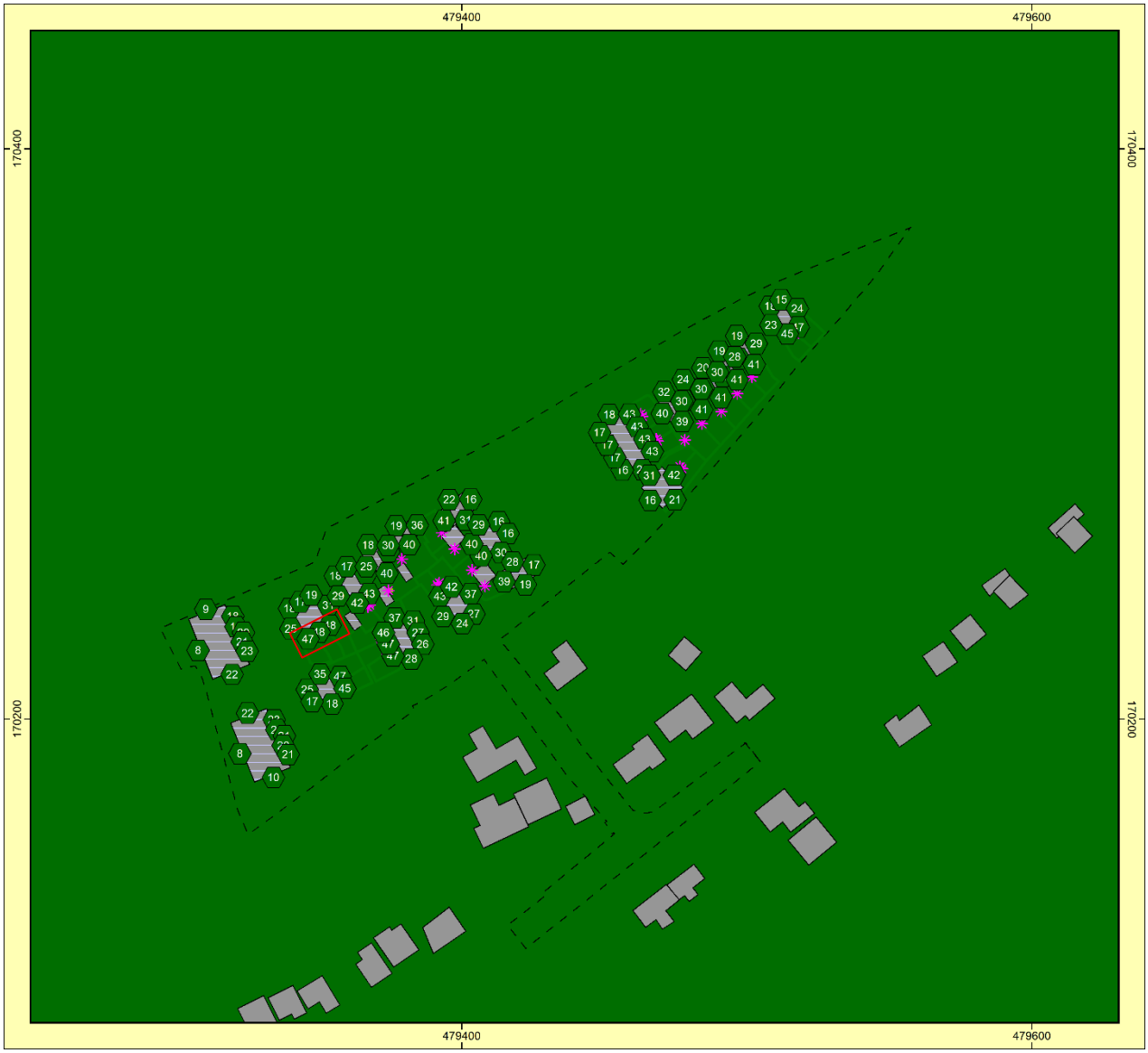
Table 4.2: Summary of Recorded Noise Levels at SLM1 (April 2025)

Measurement Location	Time	Ambient Noise Level ($L_{Aeq,T}$)	Maximum Noise Level ($L_{Amax,T}$)	10th Percentile Noise Level ($L_{A10,T}$)	Background Noise Level ($L_{A90,T}$)
SLM1	Tuesday 29th April 2025				
	Day	61.6	83.5	64.5	54.5
	Night	58.1	78.1	NA	49.8

Stuart Michael Assosicates transport assessment traffic flow data

Link	Speed (kph)	2025		Develo-pment Traffic	2025 + Development Traffic	
		AAWT	%HGV		AAWT	%HGV
Toutley Link Road	64	8133	5.1%	194	8326	5.1%
Old Forest Road (S of Lenham Cl)	32	1850	3.7%	186	2036	3.4%
Old Forest Road (S of Lowther Rd)	48	1679	5.9%	186	1865	5.3%
Old Forest Road (S of Commons Rd)	48	892	11.2%	186	1078	9.3%
Old Forest Road (S of Commons Rd)	48	892	11.2%	194	1086	9.2%
Old Forest Road (S of Ashton Rd)	48	630	3.1%	194	824	2.3%
Old Forest Road (N of Ashton Rd)	48	794	2.5%	194	987	2.0%
Lowther Road	48	924	0.0%	0	924	0.0%
Commons Road	48	845	14.2%	0	845	14.2%
Toutley Road (S of C1)	48	2971	1.9%	48	3019	1.9%
Toutley Road (N of C1)	48	8267	2.6%	97	8364	2.6%
Embrook Road (N of Commons Rd)	32	5864	2.4%	24	5888	2.4%
Embrook Road (S of Commens Rd)	32	4940	0.8%	24	4964	0.8%
Toutley Depot	32	3544	3.0%	0	3544	3.0%
A329 Reading Road (N of Old Forest Rd)	64	25893	2.0%	93	25986	2.0%
A329 Reading Road (S of Old Foret Rd)	64	19220	1.2%	93	19313	1.2%
A329 Reading Road (S of Simons Ln)	64	20151	1.3%	93	20244	1.3%
A329 Reading Road (N of Old Woosehill Ln)	64	20185	1.1%	93	20278	1.1%
A329 Reading Road (S of Old Woosehill Ln)	64	20582	1.0%	93	20675	1.0%
M4 (South of J10)	100	110248	11.0%	0	110248	11.0%
M4 S (NB off slip)	80	18033	8.5%	0	18033	8.5%
M4 S (between NB off slip and SB on slip)	100	110248	11.0%	0	110248	11.0%
M4 S (between SB on slip and NB on slip)	100	110248	11.0%	0	110248	11.0%
M4 (between NB on slip and SB on slip)	100	110248	11.0%	0	110248	11.0%
M4 N (between SB on slip and NB on slip)	100	112150	11.2%	0	112150	11.2%
A329(M) East	100	88742	2.4%	0	88742	2.4%
A329(M) E (between EB on slip and WB off slip)	100	63863	2.3%	0	63863	2.3%
A329(M) E (between WB off slip and EB off slip)	100	42984	2.1%	0	42984	2.1%
A329(M) (between WB off slip and WB on slip)	100	42984	2.1%	0	42984	2.1%
A329(M) W (after WB on slip)	100	42984	2.1%	0	42984	2.1%
A329(M) E off slip to M4 S	80	15431	10.8%	0	15431	10.8%
A329(M) E on slip from M4 N	80	25670	2.6%	0	25670	2.6%

APPENDIX D: Glazing Markup

	Living rooms	Bedrooms
	Specification 1	
Glazing Performance	27dB $R_w + C_{tr}$	27dB $R_w + C_{tr}$
Ventilator Performance	33dB $D_{ne,w} + C_{tr}$	33dB $D_{ne,w} + C_{tr}$
	Specification 2	
Glazing Performance	30dB $R_w + C_{tr}$	30dB $R_w + C_{tr}$
Ventilator Performance	36dB $D_{ne,w} + C_{tr}$	36dB $D_{ne,w} + C_{tr}$
	Specification 3	
Glazing Performance	32dB $R_w + C_{tr}$	32dB $R_w + C_{tr}$
Ventilator Performance	38dB $D_{ne,w} + C_{tr}$	38dB $D_{ne,w} + C_{tr}$

APPENDIX E: Façade Map showing worst affected façade for BS4142 assessment (all heat pumps 'on')