

noise.co.uk Ltd

T+44(0)2476 545 397

F+44(0)2476 545 010

The Haybarn

Newnham Grounds

Kings Newnham Lane

Bretford

Warwickshire

CV23 0JU

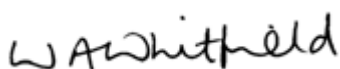
Noise Risk Assessment & Acoustic Design Statement

Prepared: 24th August 2026

Report No	23255-1-R1
Client	Crest Nicholson Operations Ltd
Site	Arborfield Studios (Parcels W, Y and Z) Langley Common Road Arborfield Berkshire RG40 4TS

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1. Quality Management

Report Number	23255 – 1-R1
Issue	Revision 1
Prepared	24 th August 2026
Prepared By	 Jonathan Seiffert BSc, MIOA
Authorised By	 Bill Whitfield PhD, MSc, MIOA

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3. Executive Summary

3.1.1. An environmental noise assessment has been carried out for a proposed residential development at Arborfield Studios (Parcels W, Y and Z), Langley Common Road, Arborfield, Berkshire, RG40 4TS (“Proposed Development”).

3.2. Measurement, Assessment and Evaluation

3.2.1. The survey was carried out to BS7445-1:2003¹ and BS7445-2:1991².

3.3. Scope

- 3.3.1. This report covers all aspects of the noise survey, including:
- the identification of acoustic design criteria;
 - the identification of specific sound sources;
 - an objective sound pressure level survey of the existing site;
 - analysis of the data;
 - assessment of the specific sound sources based on guidance contained in BS4142:2014; and
 - the design of any mitigation to meet the required internal noise criteria.

3.4. Summary

3.4.1. 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	28dB $R_w + C_{tr}$	28dB $R_w + C_{tr}$
Ventilator Performance	34dB $D_{ne,w} + C_{tr}$	34dB $D_{ne,w} + C_{tr}$
Specification 2		
Glazing Performance	26dB $R_w + C_{tr}$	26dB $R_w + C_{tr}$
Ventilator Performance	32dB $D_{ne,w} + C_{tr}$	32dB $D_{ne,w} + C_{tr}$

Table 1 – Required facade sound insulation (Glazing/Ventilator)

Commercial Sound

3.4.2. A BS4142 assessment has been carried at the location of the nearest proposed dwelling to the existing commercial premises. The numerical assessment shows that the specific sound could have a significant adverse impact at the site boundary.

3.4.3. In this context the new residential receivers are being introduced close to existing commercial businesses. This is likely to result in reduced impact when compared to the situation where new sources are being introduced close to existing residential receivers. Other factors have been discussed which support significant downward modification of the initial numerical assessment, such as the relatively insignificant contribution of the commercial sound to the overall predicted levels on site, particularly further from the site boundary as road traffic noise is dominant.

¹ BS7445-1:2003 “Description and measurement of environmental noise – Part 1: Description of quantities and procedures”

² BS7445-2:1991 “Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use”

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5. Background

5.1. Noise Policy Statement for England

- 5.1.1. The Noise Policy Statement for England (NPSE) 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”*.
- 5.1.2. 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.
- 5.1.3. The intention is that the NPSE should apply to all types of noise apart from noise in the workplace (occupational noise).

5.2. National Planning Policy Framework

- 5.2.1. The National Planning Policy Framework (NPPF) 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”*.
- 5.2.2. 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.
- 5.2.3. 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.

5.3. National Planning Practice Guidance

- 5.3.1. The National Planning Practice Guidance (PPG) is a web-based resource, launched by the Department for Communities and Local Government (DCLG).
- 5.3.2. 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

- 5.3.3. 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).

PPG and Agent of Change

- 5.3.4. Where residential development is proposed close to existing commercial premises. Suitable mitigation measures may need to be put in place to avoid those activities having a significant adverse effect on future residents.
- 5.3.5. Where this is the case, the developer (or 'agent of change') would need to identify commercial premises that could cause a noise nuisance. This should include potential future noise sources that may not be present at the time a planning application is made. The agent of change will also need to mitigate and minimise noise to avoid potential significant adverse effects.

"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)."

NPPG 009 Reference ID: 30-009-20190722 - Revision date: 22nd July 2019

- 5.3.6. What constitutes noise, as opposed to sound, is subjective and there is not a simple relationship between the level of a sound and the impact on those affected but could be dependent on:
- the source and absolute level of the noise;
 - the time of day it occurs;
 - how a new noise source and/or receiver relates to the existing sound environment; and,
 - the time and frequency characteristics of the noise
- 5.3.7. 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; and,
 - mitigating the impact in places where noise is likely to be experienced (e.g. using facade sound insulation).

"More specific factors to consider when relevant include:"

"whether any adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time (and the effect this may have on living conditions). In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations."

Paragraph: 006 Reference ID: 30-006-20190722 Revision date: 22nd July 2019

- 5.3.8. Care should be taken when considering mitigation to ensure the envisaged measures do not make for an unsatisfactory development.
- 5.3.9. It is possible that noise effects may be counteracted by providing: quiet facades containing habitable rooms, quiet private gardens or balconies, or quiet public amenity space within 5-minute walking distance.

6. Introduction

6.1.1. An environmental noise survey has been carried out for a proposed residential development at Arborfield Studios (Parcels W, Y and Z), Langley Common Road, Arborfield, Berkshire, RG40 4TS.

6.2. Proposed Development

6.2.1. An image showing the proposed location of the Proposed Development is given in Figure 1.

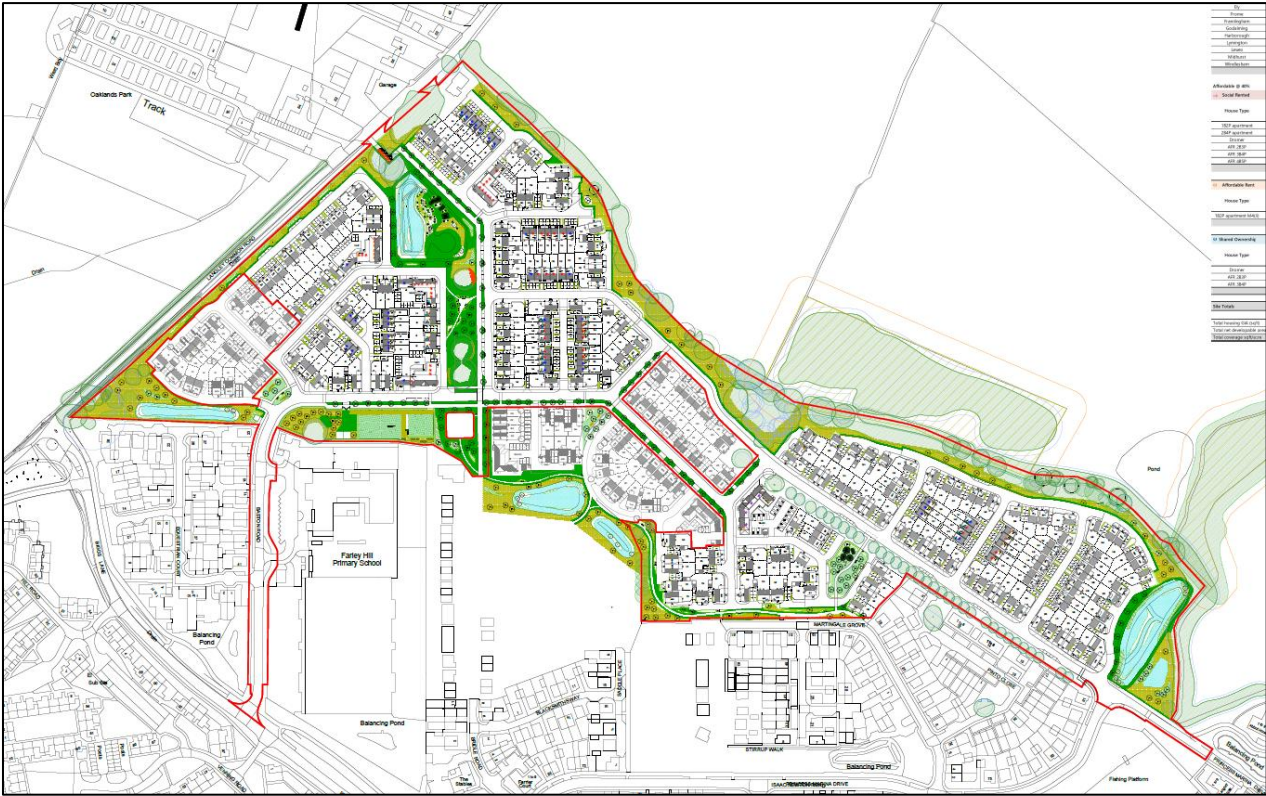


Figure 1 - Plan showing the location of the Proposed Development

6.3. Specific Sound Sources

6.3.1. During the survey visits, commercial business operations local to the Proposed Development were noted by the survey engineer. The dominant noise-generating businesses and commercial activities in the area noted at the time of the surveys are listed in Table 3.

Business	Hours of Operation	Activity
StaySure Tyre and Auto Centre	Monday – Friday 08:00 – 17:00 Saturday 08:00 – 13:00	Frequent unscheduled vehicle movement, use of small power tools

Table 3 – Local potential sources of existing commercial noise

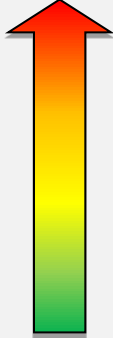
7. Assessment Criteria

7.1. Noise From Existing Transportation Sources

7.1.1. The Professional Practice Guidance (ProPG) refers specifically for the consideration of new residential developments that will be exposed predominantly to airborne noise from transport sources. The ProPG advocates a two stage risk based approach to noise when planning new residential developments:

- Stage 1 – an initial noise risk assessment of the site; and
- Stage 2 – a systematic consideration of the acoustic design.

7.1.2. An initial noise risk assessment is required to determine the prevailing sound pressure levels at the location of the Proposed Development to indicate whether the proposed site is at a negligible, low, medium or high risk from noise caused by transportation sources. The assessment is based on free-field levels on the existing site and, therefore, does not take into account any new treatment (such as bunds or fences) that will be introduced as part of the development. The guidance on negligible, low, medium and high risk levels has been summarised in Figure 2.

Risk	Day		Night	
High	≈ 70dB(A)		≈ 60 dB(A)	High noise levels indicate that there is a risk of refusal. High risk may be mitigated and minimised by following a good acoustic design process that is demonstrated in an ADS.
Medium	≈ 65dB(A)		≈ 55dB(A)	As noise levels increase the site is less suitable, from a noise perspective. Any application may be refused unless a good acoustic design process is illustrated in an ADS.
Low	≈ 55dB(A)		≈ 45dB(A)	At low noise levels the site is likely to be acceptable, from a noise perspective.
Negligible	<50dB(A)		<40dB(A)	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.

A. Indicative noise levels should be assessed without inclusion of the acoustic effect of any schem specific noise mitigation measures

B. 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”.

C. $L_{Aeq,16hr}$ is for daytime 0700-2300, $L_{Aeq,8hr}$ is for night-time 2300-0700

D. An indication that there may be more than 10 noise events at night (2300-0700) with $L_{AFMAX} > 60dB$ means the site should not be regarded as negligible risk.

Figure 2 – Stage 1 – Initial site noise risk assessment

7.1.3. The ProPG stresses that the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker.

Element 1 – Good Acoustic Design Process

7.1.4. Good acoustic design should avoid ‘unreasonable’ acoustic conditions and prevent ‘unacceptable’ acoustic conditions. ProPG notes that good acoustic design does not mean over-engineering or ‘gold plating’ all new developments but instead should aim to provide an optimum acoustic outcome for a particular site.

Element 2 - Internal Noise Level Guidelines

7.1.5. The guideline values proposed are the same as those provided in BS 8233:2014 and WHO, including the recommendation that maximum noise levels should not exceed 45dB L_{Amax} more than 10 times per night.

Element 3 - External Amenity Area Noise Assessment

- 7.1.6. Sound pressure levels of 50 – 55 dB $L_{Aeq,16hr}$ in gardens and external amenity areas, where such areas are an intrinsic part of the overall design. If these values cannot be achieved in all areas, the development should be designed to achieve the lowest practicable noise levels. The provision of relatively quiet alternative publically accessible external amenity space may help to offset the noise impact in high noise areas.

Element 4 - Assessment of Other Relevant Issues

- 7.1.7. It is acknowledged that there may be other local issues affecting the ability to achieve the required acoustic design criteria

7.2. Guideline Values

- 7.2.1. 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 5.

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

- 7.2.2. 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.
- 7.2.3. 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.

7.3. BS4142:2014

- 7.3.1. 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.
- 7.3.2. 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.
- 7.3.3. 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
- 7.3.4. How these quantities relate to the sound that would be measured during a survey has been illustrated in Figure 3.

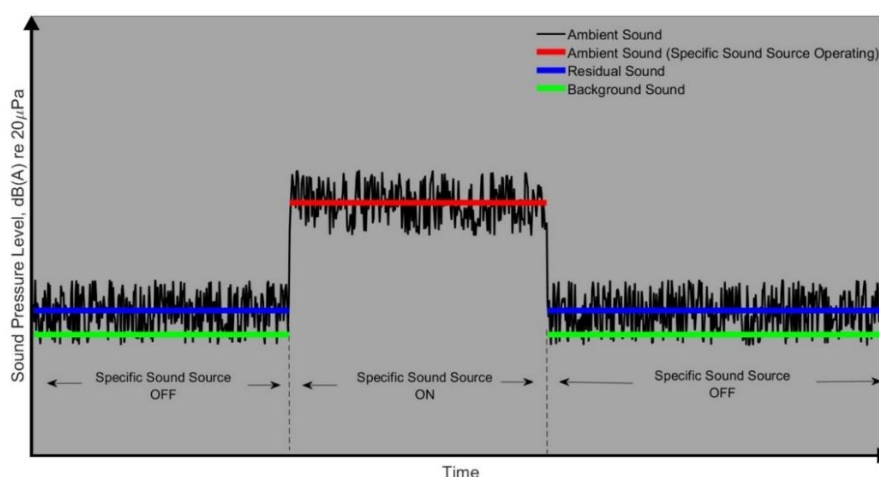


Figure 3 –
Diagrammatic
illustration of the
definitions of ambient,
residual, specific and
background sound

- 7.3.5. 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**:

$$\text{Rating Level} = \text{Specific Sound Level} + \text{Character Corrections}$$

- 7.3.6. 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 change 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.

- 7.3.7. 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.
- 7.3.8. 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

$$\text{Assessment Level} = \text{Rating Level} - \text{Background Sound Level}$$

- 7.3.9. 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
- 7.3.10. 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.

7.4. Guideline Internal Sound Levels

- 7.4.1. 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 $L_{Aeq,16\text{hour}}$	-
Dining	Dining Room	40dB $L_{Aeq,16\text{hour}}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16\text{hour}}$	30dB $L_{Aeq,8\text{hour}}$

Table 5 – BS8233:2014 guideline values for internal ambient noise levels from steady external noise sources

- 7.4.2. 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.
- 7.4.3. 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. Survey

8.1. Measurement Locations

8.1.1. Fixed position monitoring took place at four positions to account for the likely dominant noise sources. The monitoring equipment was located 1.5m from the ground and at least 3m from the next nearest reflecting surface. The monitoring positions are shown in Figure 4.

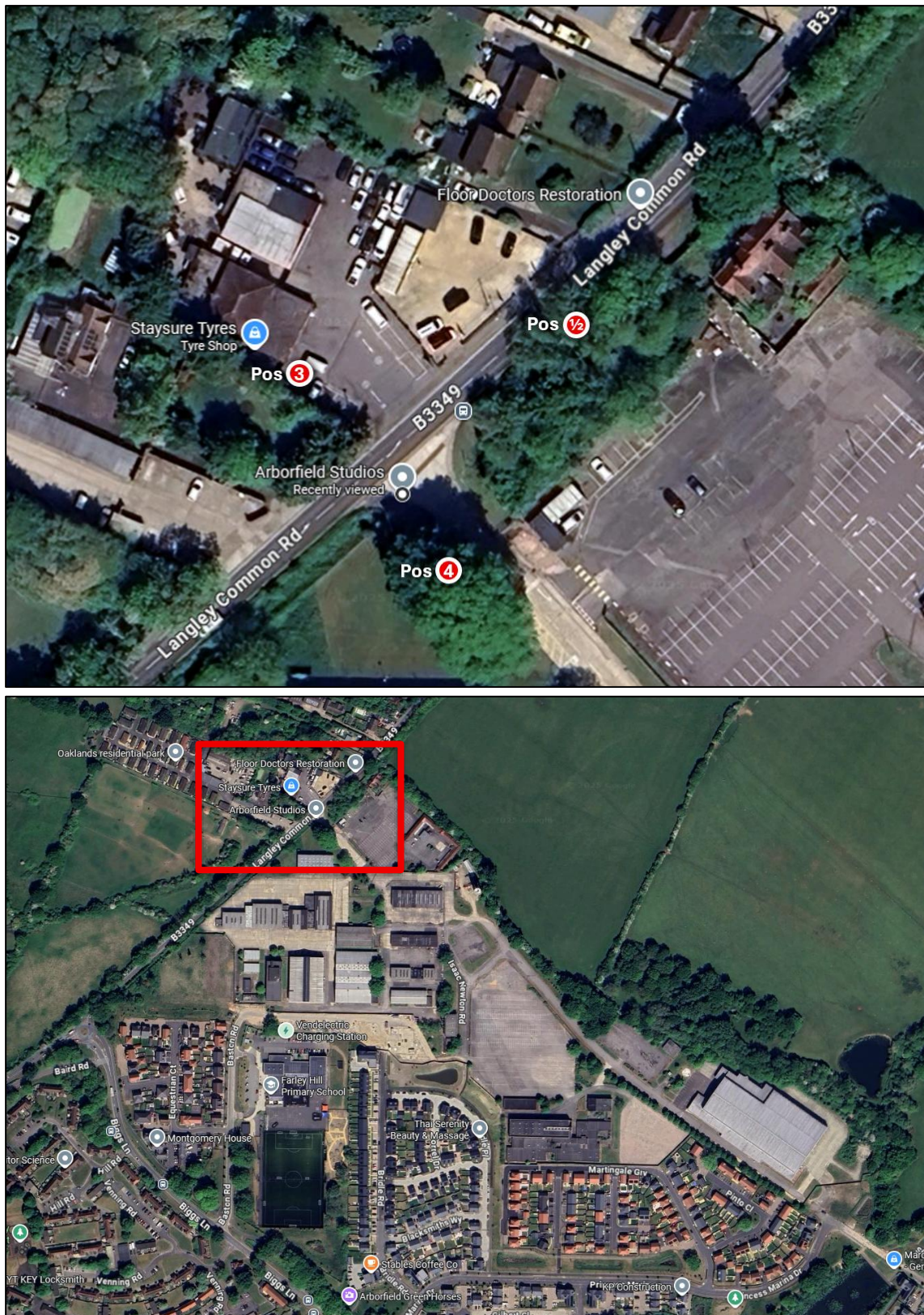


Figure 4 - Noise monitoring locations on site, survey area highlighted in red

- 8.1.2. The measurement instrumentation used during the survey is detailed in the appendix. The acoustic equipment was calibrated to comply with Section 4.2 of BS7445-1:2003³ before and after the surveys. The calibration details are also detailed in the appendix.

8.2. Noise Climate

- 8.2.1. During the survey visits, it was noted by the survey engineer that the noise climate was dominated by transient road traffic noise from the B3349 Langley Common Road, with some commercial noise contribution from vehicle movements and the use of small power tools from StaySure Tyre and Auto Centre closer to the northwestern site boundary. At the time of the survey visits, the middle and eastern areas of the site were mostly characterised by birdsong and other natural sounds with minimal contribution from any road traffic or other noise sources.

8.3. Meteorology

- 8.3.1. During the survey the weather information was noted. This is summarised in Table 6.

	18 th August 2025	21 st August 2025
Roads(Wet/Dry)	Dry	Dry
Wind Speed (ms ⁻¹)/Direction	5 / E	4 / NE

Table 6 - Meteorological data noted during the survey

8.4. Measurement and Timescale

- 8.4.1. Unattended monitoring was carried out between 18th August 2025 and 21st August 2025. Attended monitoring was carried out on 18th August 2025. The measurements that have been made are summarised in Table 7.

Monitoring position	Date	Type	Quantity
1	18 th August 2025 – 21 st August 2025	Fixed/unattended	L _{Aeq,15min} / L _{A90,15min}
2	18 th August 2025 – 21 st August 2025	Fixed/unattended	L _{Aeq,5min}
3	18 th August 2025 – 21 st August 2025	Fixed/unattended	L _{Aeq,1min} / Audio
3	18 th August 2025	Attended	L _{Aeq,25ms} / Audio
4	18 th August 2025	Attended	L _{Aeq,25ms} / Audio

Table 7 – Measurements made at the site of the Proposed Development

³ BS7445-1:2003 “Description and measurement of environmental noise – Part 1: Guide to quantities and procedures”

8.4.2. Sound pressure measurements were subsequently averaged into hourly, daytime and night-time periods. The acoustic measurements and their interpretation have been in accordance with BS 7445: Parts 1, and 2⁴. All sound pressure levels are in dB (re 20μPa).

8.5. Results Summary

8.5.1. The unattended fixed position external measurement results are summarised in Table 8.

Measurement location	Daytime dB, $L_{Aeq,16hr}$	Night-time dB, $L_{Aeq,8hr}$
1	67.5	59.4
2	67.3	59.0
3	61.2	52.1

Table 8 - Summary of the external sound pressure levels measured

Background Sound Levels

8.5.2. Figure 5 shows the results of the data analysis in terms of the frequency of occurrence of each data value during the daytime and the night-time respectively.

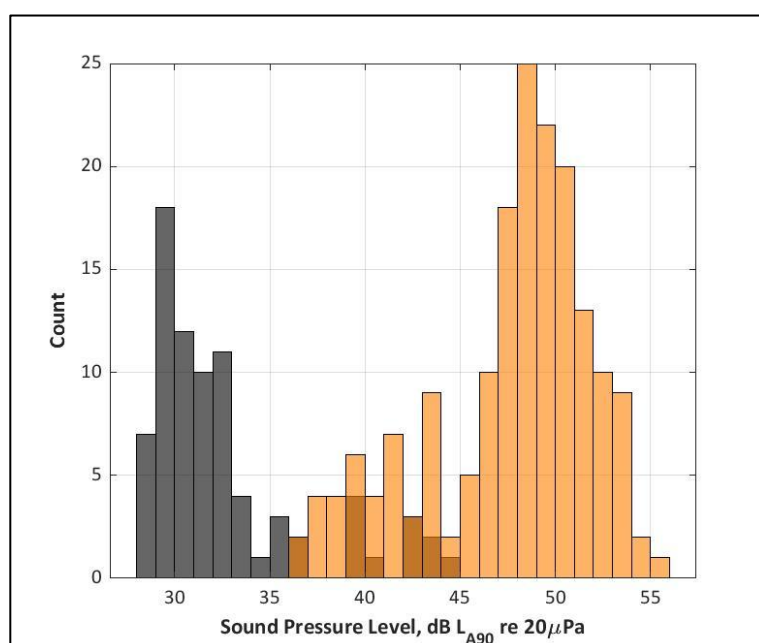


Figure 5 – Distribution of background sound levels during the daytime (07:00-23:00) and during the night-time (23:00-07:00).

8.5.3. As can be seen in Figure 5 the background sound levels ranged between 36dB $L_{A90,15min}$ and 56dB $L_{A90,15min}$ during the daytime period, and the background sound levels ranged between 28dB $L_{A90,15min}$ and 45dB $L_{A90,15min}$ during the night-time period.

8.5.4. The typical background sound level has been taken to be 48dB $L_{A90,15min}$ during the daytime and 29dB $L_{A90,15min}$ for the night-time.

⁴ BS7445-2:1991 "Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use"

Specific Sound Levels

- 8.5.5. Short term L_{Aeq} measurements (25ms) were made during the attended surveys for the duration of the reference time interval. The specific events associated with StaySure Tyre and Auto Centre were noted, including:
- time of event;
 - duration of event; and
 - description of event.
- 8.5.6. The specific sound levels for the individual events and the overall monitoring period have been summarised in Table 9. The specific sound levels have been corrected for the presence of residual sound by considering the periods where there was no activity.

Description	Ambient Sound Level, L_a dB(A)	Residual Sound Level, L_r dB(A)	Specific Sound Level, L_s dB(A)
Typical tyre ratchet power tool use <i>On-time = 15s</i>	75.5	61.8	75.3

Table 9 – Summary of the specific sound level measurements

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 procedure has been used from ISO9613-2:1996⁵ to predict the propagation of sound from source to receiver, taking into account distance, screening, and atmospheric and ground conditions.
- 9.1.2. Google Maps data has been used to create the existing roads and buildings. Terrain data has been taken from the Department for Environment, Food & Rural Affairs (DEFRA).

Transportation Sources

- 9.1.3. Langley Common Road has been modelled as a line source and calibrated to the survey data.
- 9.1.4. The results of the model have been illustrated in noise contour maps in Figure 6 and Figure 7.

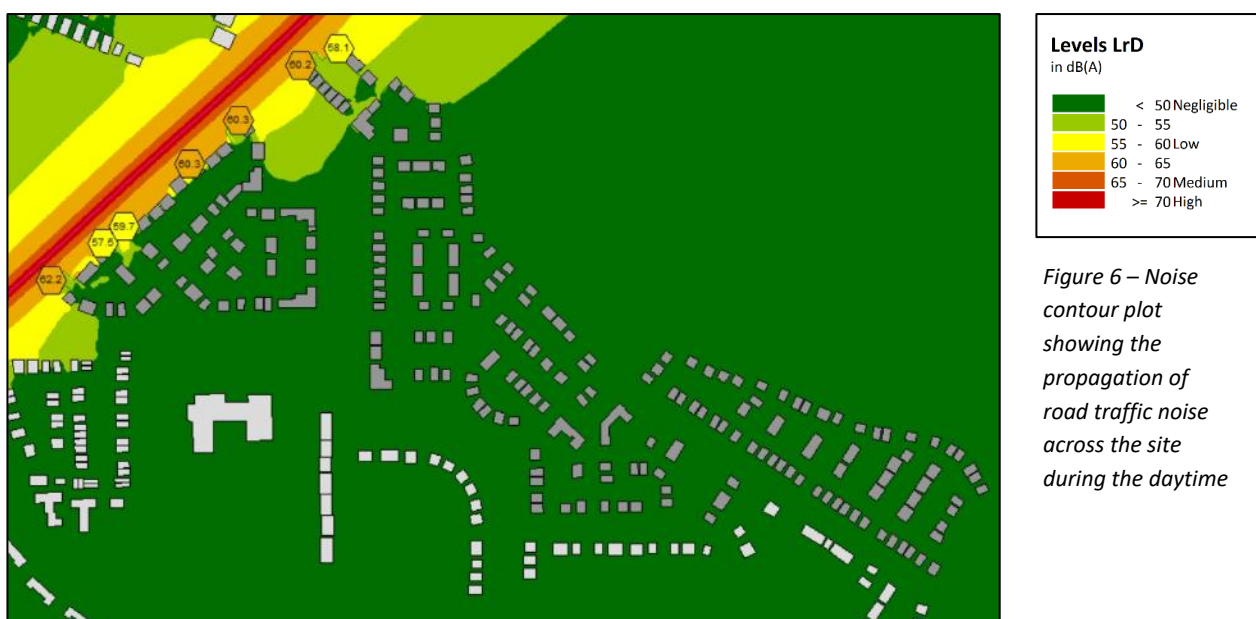


Figure 6 – Noise contour plot showing the propagation of road traffic noise across the site during the daytime

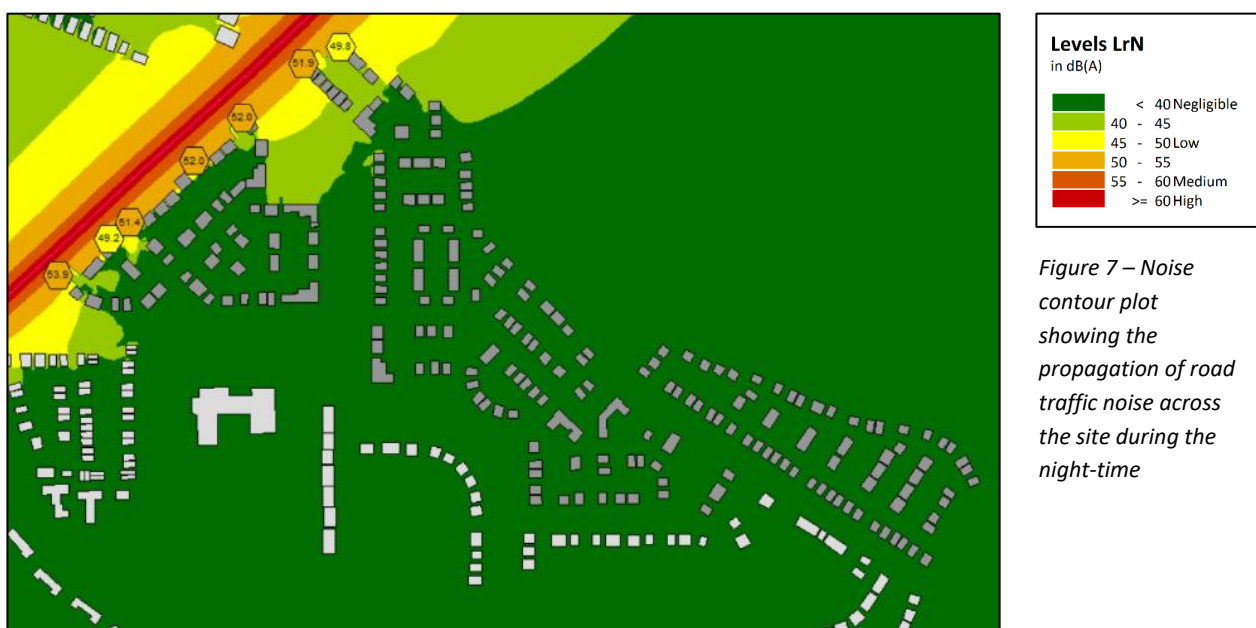
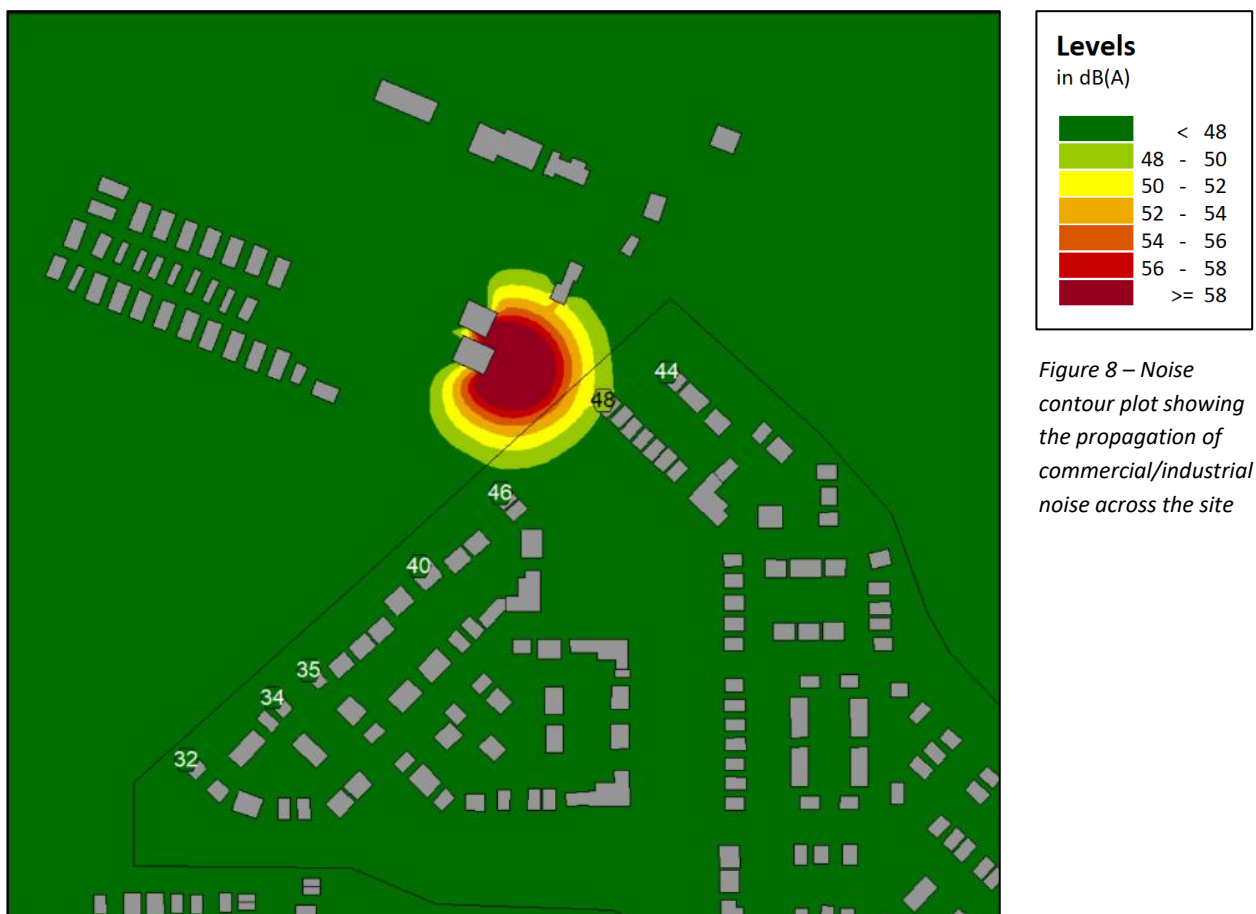


Figure 7 – Noise contour plot showing the propagation of road traffic noise across the site during the night-time

⁵ ISO9613-2:1996 "Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation"

Noise from Commercial/Industrial Sources

- 9.1.5. StaySure Tyre and Auto Centre has been included as an area source covering the approximate outdoor area of activities as observed during the survey, and is calibrated to the specific sound level from the attended survey data. The source did not run continuously during the attended measurements, as the power tools were used sporadically at irregular intervals. The typical on-time was recorded to be approximately 15s, occurring not more than once per minute throughout the survey period. As a conservative estimate, the on-time for the source in the model has been set to 15 minutes for every hour during operational hours.
- 9.1.6. The acoustic character of the source is not considered in the model and is discussed in Section 11.
- 9.1.7. The results of the model are illustrated in Figure 8.



- 9.1.8. The results of the 3D noise model show the predicted worst case sound pressure level at the nearest sensitive receiver (ground floor level, site boundary) due to the commercial/industrial sources is 48dB $L_{Aeq,T}$ for the reference period, during operational time of the business. A BS4142 assessment is carried out in Section 11.

10. Noise Risk Assessment

10.1. Site Risk Assessment

- 10.1.1. The noise risk assessment should not be seen as the basis for the recommendation to the decision maker. The aim is that higher risk sites will be recognised at the earliest possible stage and the increasing importance of good acoustic design can be emphasised. The risk assessment for the site is summarised in Table 10.

Risk assessment	Comment
Low	<i>"At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design 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."</i>
Medium	<i>"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 minimised, and which clearly demonstrate that a significant adverse impact will be avoided in the finished development."</i>

Table 10 – Noise risk assessment for the Proposed Development site

- 10.1.2. The noise risk assessment indicates that a good acoustic design process, documented in an acoustic design statement, is required to ensure that the impacts of noise will be mitigated and minimised.

11. BS4142 Assessment

- 11.1.1. The assessment location has taken at worst case floor level of the nearest proposed dwelling, providing a worst case assessment.

11.2. Rating Level

- 11.2.1. The existing commercial sound sources were operating at the time of the attended survey. The sources have been assessed collectively, subjectively based on the character of the sound at the boundary with the proposed residential development. The adjustments to the specific sound levels for acoustic features have been discussed in the following sections.
- 11.2.2. BS4142:2014+A1:2019 gives the following advice on situations where multiple characteristics are applicable to a specific sound:

“If characteristics likely to affect perception and response are present in the specific sound, within the same reference period, then the applicable corrections ought normally to be added arithmetically. However, if any single feature is dominant to the exclusion of the others then it might be appropriate to apply a reduced or even zero correction for the minor characteristics.”

Tonality

- 11.2.3. Clearly perceptible tones associated with the power tools used at the tyre fitting unit were noted during the attended survey. The tones produced by the power tools were less prominent overall than the impulsive character, therefore no penalty for tonality has been applied.

Impulsivity

- 11.2.4. The specific source was noted to be impulsive during the attended survey. The attended survey was carried out at the site boundary, where the impulsivity was clearly perceptible. It is expected that as distance increases onto the site, the most prominent acoustic feature of the sound will be the impulsivity. Therefore a +6dB penalty for impulsivity has been applied.

Intermittency

- 11.2.5. It was noted that the specific sources were operated with short on-times at sporadic times and irregular intervals periods during the reference period⁶, and was readily distinctive against the residual acoustic environment during periods of activity. A +3dB penalty for intermittency has been applied.

⁶ Reference time interval T, defined in BS4142:2014; 1hour during the daytime (07:00 to 23:00) / 15min during the night-time (23:00 to 07:00).

11.3. Initial Estimate Assessment

11.3.1. The BS4142 assessment is detailed in Table 11.

	Daytime Level, dB (07:00-23:00)
Background sound level, dB $L_{A90,15min}$	48
Specific sound level, dB(A)	48
Acoustic feature corrections	
Tonality	0
Impulsivity	+6
Intermittency	+3
Rating level	
Specific sound level + corrections	57
Initial Estimate	
Rating level – Background sound level	+9
<i>“A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context”</i>	

Table 11 - The assessment procedure from BS4142

11.3.2. BS4142 states “Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact”.

11.3.3. The initial estimate considers the impact on existing background sound levels and is not always representative of the impact on the receiver directly. Where the initial estimate of the impact needs to be modified due to context, other factors should be considered, including: absolute sound levels, any barriers 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.

11.4. Context

11.4.1. In this situation, the new residential receivers are being introduced close to existing specific sound sources. The impact of the industrial/commercial sound is likely to be significantly reduced compared to the situation where new sound sources are being introduced close to existing residential receivers. This would support a downward modification of the initial estimate.

11.4.2. In this case the results indicate that the noise associated with the road traffic is $\approx 65\text{dB } L_{Aeq,T}$ at the site boundary, and the associated sound pressure level of the commercial sound sources is $48\text{dB } L_{Aeq,T}$ at the same position, demonstrating that in absolute terms the specific source has a much less significant contribution to overall noise climate at the site boundary than road traffic. Since the road traffic noise is dominant, it is expected to provide a masking effect of the commercial/industrial sound, and supports a downward modification of the initial estimate.

11.4.3. 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.

12. Mitigation

12.1. Methodology

- 12.1.1. Based on the measured and 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.
- 12.1.2. The following specifications considers noise from all sources.

12.2. Internal Noise Level Guidelines

- 12.2.1. Based on the measured and 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.
- 12.2.2. 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 $D_{ne,w} + C_{tr}$.
- 12.2.3. Should penetrations be required for ventilation purposes, our recommended configurations have been calculated to work in conjunction with the glazing specifications. We recommend that a suitably qualified person should check the chosen ventilator specification meets the requirements in Approved Document F⁷. It is critical to note that any vent or total combination of vents should be specified to achieve the ventilator performance given in Table 12.

	Living rooms	Bedrooms
Specification 1		
Glazing Performance	28dB $R_w + C_{tr}$	28dB $R_w + C_{tr}$
Ventilator Performance	34dB $D_{ne,w} + C_{tr}$	34dB $D_{ne,w} + C_{tr}$
Specification 2		
Glazing Performance	26dB $R_w + C_{tr}$	26dB $R_w + C_{tr}$
Ventilator Performance	32dB $D_{ne,w} + C_{tr}$	32dB $D_{ne,w} + C_{tr}$

Table 12 – Required facade sound insulation (Glazing/Ventilator)

- 12.2.4. It is generally expected that most standard thermal double glazing units can achieve 26dB $R_w + C_{tr}$ and is therefore expected to provide sufficient mitigation for the majority of the proposed development.

⁷ Approved Document F: Means of Ventilation (2021 Edition)

12.3. Glazing Specification

- 12.3.1. The glazing performance has been specified based on the performance data provided by Saint-Gobain. These are suggested configurations and any other glazing and vent combination can be used provided it achieves the minimum performance levels given in Table 12. The recommended glazing specification is given in Table 13.

Living rooms	Bedrooms
Specification 1	
Saint Gobain 4(12)6	Saint Gobain 4(12)6
Specification 2	
Saint Gobain 4(12)4	Saint Gobain 4(12)4

Table 13 - Our recommended glazing configurations

- 12.3.2. 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.
- 12.3.3. It should be noted that, in order to meet the internal ambient noise criteria in these areas, the windows may need to remain closed. This does not mean that windows should be fixed shut, and they should be openable at the discretion of the occupant.

12.4. External Amenity Area Noise Assessment

- 12.4.1. 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.
- 12.4.2. 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. 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.
- 12.4.3. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.
- 12.4.4. Figure 6 illustrates that, in this situation, all garden areas are predicted to meet the 55dB $L_{Aeq,16hour}$ upper guideline value with 1.8m close boarded garden fences.
- 12.4.5. Where fences are required as a barrier to noise for residential private gardens these can be basic, wooden, standard close-boarded fences with no gaps between the panels and the ground, or panels and the posts. They should have a minimum wooden panel mass of 10kg/m² to optimise their *barrier performance*; for example the 10kg/m² mass can simply be achieved by a fence constructed of 19mm thick treated pine⁸.

⁸ Based on the density of treated pine at 550Kg/m³

12.5. Assessment of Other Relevant Issues

- 12.5.1. Approved Document O is a building regulation intended to assess the overheating risk of new residential dwellings and contains noise related requirements for internal noise in bedrooms at night. Although it is not necessary to demonstrate compliance with building regulations at such an early stage, the risk of exceeding the noise requirements in Approved Document O can be minimised by orienting buildings such that bedrooms are located on the quietest façades furthest from the road.
- 12.5.2. It should be noted that some potential solutions to comply with removal of excess heat in Approved Document O require façade penetrations which may in turn compromise the façade sound insulation performance required to meet reasonable internal noise levels. This is of particular importance in areas which require an upgraded glazing and ventilator specification.
- 12.5.3. To the best of our knowledge, at this current time, the design advice in this acoustic design statement does not conflict with any other local guidance.

13. Conclusions

- 13.1.1. An environmental noise survey has been carried out at the site of a proposed residential development at Arborfield Studios (Parcels W, Y and Z), Langley Common Road, Arborfield, Berkshire, RG40 4TS to determine typical ambient sound levels. The sound levels have been used to calculate the required facade sound insulation to meet the guideline internal levels from BS8233:2014.
- 13.1.2. A noise risk assessment has been carried out, indicating that the site falls into the medium to low risk category. The noise risk assessment should not be seen as the basis for the recommendation to the decision maker.
- 13.1.3. A BS4142 assessment has been carried out based the nearest proposed dwelling or indication. The numerical assessment shows that the specific sound could have a significant adverse impact at the nearest sensitive receiver.
- 13.1.4. In this context however, the new residential receivers are being introduced close to existing commercial businesses. This is likely to result in reduced impact when compared to the situation where new sources are being introduced close to existing residential receivers. Other factors have been discussed which support significant downward modification of the numerical assessment, such as the relatively insignificant contribution of the commercial sound to the overall predicted levels on site, particularly further from the site boundary.
- 13.1.5. The measured and predicted sound levels have been used to calculate the required facade sound insulation to meet the guideline internal levels from BS8233:2014. Table 12 in section 7.1 gives the required facade sound reduction by any glazing and ventilator combination to be compliant with the guideline values.
- 13.1.6. We strongly recommend that this report be passed to the local planning authority for approval prior to any works being carried out.

14. 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 BS4142:2014
B	Organisation performed the measurements	noise.co.uk Ltd, The Haybarn, Newnham Grounds, Kings Newnham Lane, Bretford, Coventry, CV23 0JU.	
C	Name of Client	Crest Nicholson Operations Ltd	
D	Full site address	Arborfield Studios (Parcels W, Y and Z) Langley Common Road Arborfield, Berkshire, RG40 4TS	
E	Date of surveys	Survey Date: 18th August 2025 - 21st August 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: Technical Appendix

14.1.1. Measurements were made using the following equipment:

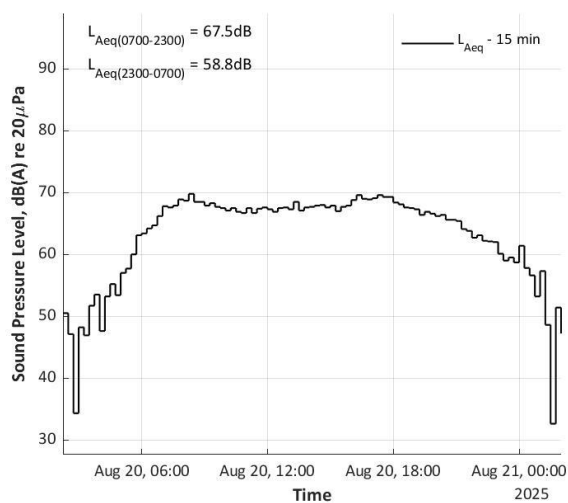
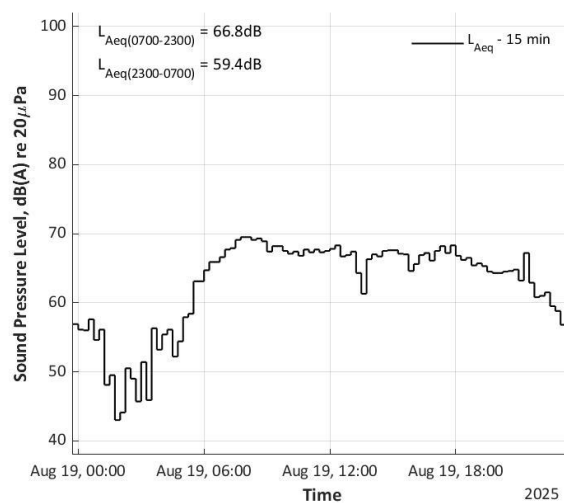
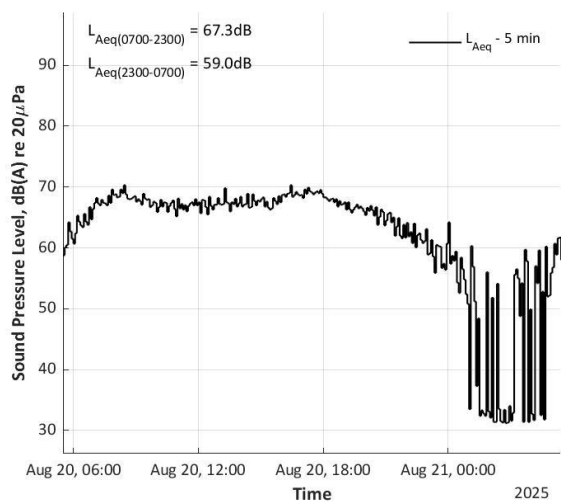
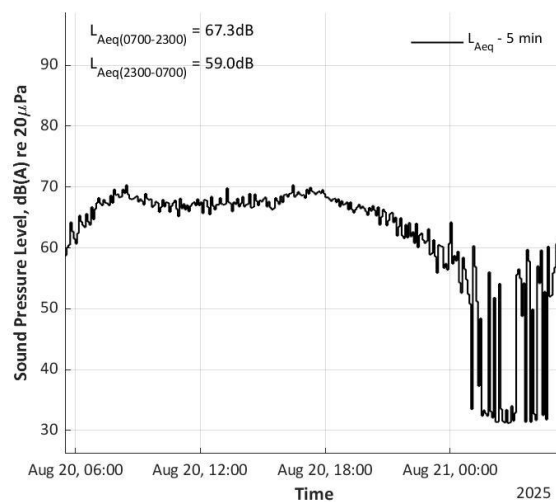
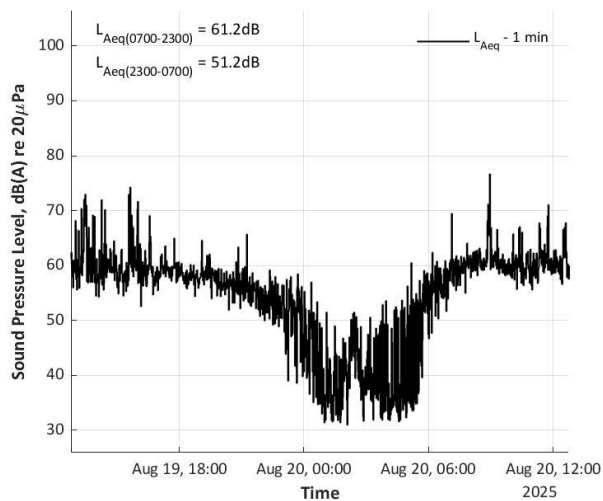
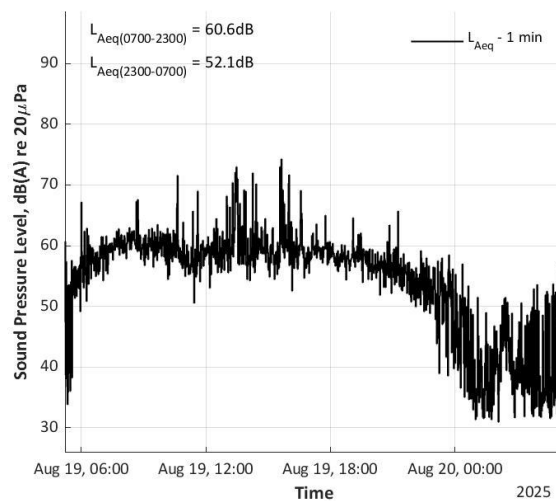
Monitoring Position	Sound Level Meter (Serial Number)	Calibrator (Serial Number)
1	SoftdB Piccolo 2 (PO221070105)	BSWA CA114 (590010)
2	SoftdB Piccolo 2 (PO221070104)	BSWA CA114 (590010)
3	SoftdB Piccolo 2 (PO221070106)	BSWA CA114 (590010)
3 & 4	Norsonic140 (1407664)	Norsonic1251 (33767)

14.1.2. The equipment has traceable calibration. The sound level meter was calibrated immediately prior to and immediately after the measurements were carried out.

Sound Level Meter	Before	After
SoftdB Piccolo 2 (PO221070105)	94.0 dB	94.0 dB
SoftdB Piccolo 2 (PO221070104)	94.0 dB	94.2 dB
SoftdB Piccolo 2 (PO221070106)	94.0 dB	94.2 dB
Norsonic140 (1407664)	114.0 dB	114.0 dB

14.1.3. There was no adverse deviation.

APPENDIX C: Raw Data

Pos 1 DaytimePos 1 Night-timePos 2 DaytimePos 2 Night-timePos 3 DaytimePos 3 Night-time

APPENDIX D: Glazing Markup Plan



	Living rooms	Bedrooms
Specification 1		
Glazing Performance	28dB $R_w + C_{tr}$	28dB $R_w + C_{tr}$
Ventilator Performance	34dB $D_{ne,w} + C_{tr}$	34dB $D_{ne,w} + C_{tr}$
Specification 2		
Glazing Performance	26dB $R_w + C_{tr}$	26dB $R_w + C_{tr}$
Ventilator Performance	32dB $D_{ne,w} + C_{tr}$	32dB $D_{ne,w} + C_{tr}$