

ENVIRONMENT

Richborough Estates Limited

Spencer's Wood, Wokingham,
Shinfield

Noise Impact Assessment

Project reference number: 233424

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Spencer's Wood, Wokingham,
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EXECUTIVE SUMMARY

BWB Consulting Ltd (BWB) was instructed by Richborough Estates Limited ('the Client') to undertake a Noise Impact Assessment to support an outline planning application with all matters reserved for future determination, save for the means of access via Basingstoke Road, for: up to 430 dwellings (Use Class C3), an 80 bed care home (Use Class C2), 1ha of employment land (Use Class E(g), primary school (Use Class F1), local centre (Use Classes E(a), (b), (c)), GP Surgery (Use Class E(e), 3G sports pitch and changing facility, public open space, SANG provision and associated infrastructure ('the Proposed Development') located on a parcel of land to the east of Basingstoke Road (B3349), Spencers Wood, Wokingham (collectively known as "the Site").

This assessment considers the impact of road traffic on the Proposed Development and its future residents and where necessary, consideration has been given to mitigation measures.

A baseline noise survey was undertaken at the Site in February 2024 to inform the assessment. The results of the survey and subsequent assessment work have been assessed in accordance with current standards and guidance, following consultation with Wokingham Borough Council.

As the exact location of the dwellings is unknown at this time, mitigation has been suggested in outline terms only. Consideration will need to be given to the site layout and orientation of buildings as the development evolves. It is considered that the internal and external noise levels could meet the requirements of BS 8233 with appropriate mitigation in place.

Noise level limits have been derived for fixed plant items associated with the proposed development based on the results of the baseline noise survey. The proposed limits have been derived in accordance BS 4142:2014+A1:2019.

Given the distance between the proposed¹ football pitch and proposed sensitive receptors, noise from the proposed sports pitch is unlikely to result in significant adverse impacts at proposed receptors.

The development generated road traffic noise has been assessed and is predicted to have a negligible, adverse impact at worst on existing noise sensitive receptors in both the short-term and long-term.

Based on the results of the assessment, it has been demonstrated that the site is suitable for residential development.

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1. INTRODUCTION

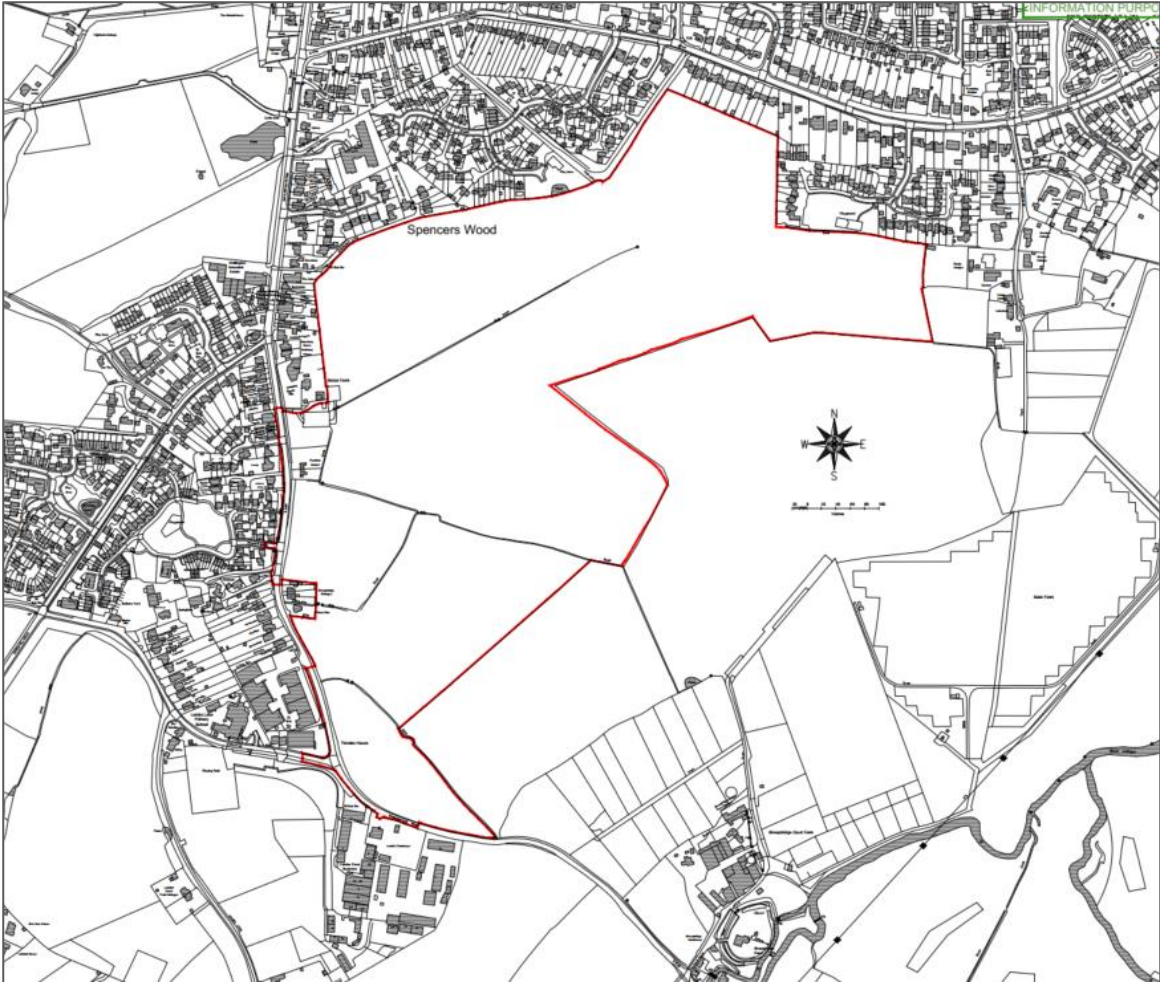
Appointment and Background

- 1.1 BWB Consulting Ltd was appointed by Richborough ("the Client") to undertake a Noise Impact Assessment to support an outline planning application for a proposed development at Spencer's Wood, Wokingham.
- 1.2 This assessment has been undertaken based on the results of a baseline noise survey on the Site. The results of the survey have been assessed in accordance with current standards and guidance, following consultation with Wokingham Borough Council (WBC).
- 1.3 Where appropriate, consideration has been given to noise mitigation measures to demonstrate how an appropriate level of protection could be afforded to future noise sensitive receptors on the Site.
- 1.4 This report is necessarily technical in nature, so to assist the reader, a glossary of acoustic terminology can be found in **Appendix A**.

Site Setting

- 1.5 The Site is located to the east of Basingstoke Road (B3349), within the administrative area of (WBC) and currently comprises arable / agricultural land with hedgerows, trees and shrub vegetation. The Site bound to the north and north-east by residential dwellings, with Hyde End Road (B3349) located beyond to the north. To the east of the Site lies arable land, with a solar farm and the River Loddon located beyond. To the south and west of the Site lies Basingstoke Road (B3349) with existing commercial premises situated beyond to the south and existing dwellings situated to the west.
- 1.6 **Figure 1.1** shows the Site location.

Figure 1.1: Site Location Plan



Proposed Development

- 1.7 Outline planning permission is sought with all matters reserved for future determination, save for the means of access via Basingstoke Road, for: up to 420 dwellings (Use Class C3), an 80 bed care home (Use Class C2), 1ha of employment land (Use Class E(g), primary school (Use Class F1), local centre (Use Classes E(a), (b), (c), (f)), GP Surgery (Use Class E(e)), sports pitch and changing facility, public open space, SANG provision and associated infrastructure. The Development Framework Plan is shown below in **Figure 1.2**.

Figure 1.2: Development Framework Plan



2. POLICY, STANDARDS AND GUIDANCE

National Planning Policy Framework (NPPF)

- 2.1 Most recently revised in December 2024, this document sets out the Government's planning policies for England and supersedes the previous NPPF published in 2023. It makes the following reference to noise in the section entitled Conserving and enhancing the natural environment:

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

[...]

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."

- 2.2 It also makes the following references to noise in the Section entitled Ground conditions and pollution:

"198. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life⁶⁹;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

⁶⁹ See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010)."

BS 8233:2014: Guidance on Sound Insulation and Noise Reduction for Buildings

- 2.3 This standard provides guidance for the control of noise in and around buildings. The guidance provided within the document is applicable to the design of new buildings, or refurbished buildings undergoing a change of use, but does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building.
- 2.4 The guidance provided includes appropriate internal and external noise level criteria which are applicable to dwellings and office for steady external noise sources. It is

stated that it is desirable that the internal ambient noise level does not exceed the following criteria set out in **Table 2.1** below:

Table 2.1: Summary of Internal Ambient Noise Levels to be Achieved in Habitable Rooms

Activity	Location	Internal noise level criteria ($L_{Aeq,T}$, dB)	
		Daytime (07:00 - 23:00hrs)	Night-time (23:00 - 07:00hrs)
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30

- 2.5 Whilst BS 8233:2014 recognises that a guideline value may be set in terms of sound exposure level (SEL) or L_{AFmax} for the assessment of regular individual noise events that can cause sleep disturbance during the night-time, a specific criterion is not stipulated. Accordingly, reference has been made in this assessment to the World Health Organisation (WHO) 1999: Guidelines for Community Noise.
- 2.6 With respect to external amenity space such as gardens and patios it is stated that it is desirable that the noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. It is then confirmed that higher external noise criteria may be appropriate under certain circumstances such as within city centres urban areas, and locations adjoining the strategic transportation network, where it may be necessary to compromise between elevated noise levels and other factors such as convenience of living, and efficient use of land resource.

World Health Organisation (WHO) 1999: Guidelines for Community Noise

- 2.7 The World Health Organisation (WHO) guidance: 1999: Guidelines for community noise includes guidance for individual maximum noise events during the night-time. This document draws upon guidance from Vallet and Vernay, which states:

"For good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10-15 times per night"

BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial; and Commercial Sound

- 2.8 The BS 4142 Standard describes methods for rating and assessing the following:
- Sound from industrial and manufacturing processes;
 - Sound from fixed installation which comprise mechanical and electrical plant and equipment;
 - Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and

- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train movements on or around an industrial and/or commercial site.

- 2.9 The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. The Standard advises the purpose of the methodology includes the assessment of sound from any plant and activities associated with existing industrial and/or commercial uses at proposed residential dwellings.
- 2.10 If appropriate, the specific sound level of the source ($L_{Aeq,T}$) is corrected, by the application of one or more corrections for acoustic features such as tonal qualities and/or distinct impulses, to give a 'rating' level ($L_{Ar,Tr}$). The Standard effectively compares and rates the difference between the rating level of the specific sound and the typical background sound level ($L_{A90,T}$) in the absence of the specific sound.
- 2.11 The Standard advises that the time interval ('T') of the background sound measurement should be sufficient to obtain a representative or typical value of the background sound level at the time(s) the source in question operates or is proposed to operate in the future.
- 2.12 Comparing the rating level with the background sound level, BS 4142 states:

"Typically, the greater this difference, the greater the magnitude of impact.

A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significantly adverse impact. 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."

Sport England Design Guidance Note – Artificial Grass Pitch (AGP) Acoustics – Planning Implications, 2015

- 2.13 The above guidance document expands on the general technical advice already available from Sport England. It provides details of acoustic implications associated with such facilities and follows on from an acoustic research programme involving detailed analysis of relevant noise guidance documents and site testing in a range of locations.
- 2.14 It proposes appropriate noise criteria and assessment methods and outlines practical measures that can be applied to reduce noise in particularly sensitive areas.
- 2.15 It refers to the World Health Organisation (WHO) document Guidelines for Community Noise (1999) which provides guidance for outdoor living areas that states that to avoid 'moderate annoyance' during the daytime and evening the noise level should not

exceed 50dB $L_{Aeq,T}$. WHO guidelines for residential development are typically calculated over a 16-hour daytime period. For an artificial grass pitch, a 16-hour assessment period may not truly reflect the noise impact as it considers times of use and non-use. It is suggested an appropriate assessment period is for one hour, $L_{Aeq,1h}$ as this is typically the period for a community sports session on an AGP.

- 2.16 The document identifies that, from measurement data, a typical free-field noise level of 58dB $L_{Aeq,1h}$ at a distance of 10 metres (m) from the side-line halfway marking has been determined as representative for noise from an AGP. The document goes on to state that, when a site is in an open location, noise levels of 50dB $L_{Aeq,1h}$ can be achieved at a distance of 40m at 1.5m above local ground height.

The Design Manual for Roads and Bridges (DMRB): LA111 Noise and Vibration (Revision 2)

- 2.17 This document sets out procedures for undertaking the environmental assessment of new road schemes, including the assessment of noise impacts from road traffic. In particular, it describes a method for assessing the severity of a noise impact, in terms of the number of people who will be bothered by any noise increases/decreases due to a new road scheme. When undertaking a DMRB assessment, the methodology contained within the Department for Transport 1988 document Calculation of Road Traffic Noise (CRTN) should be used to calculate levels of road traffic noise.
- 2.18 The DMRB assessment methodology suggests that the magnitude of noise changes from a project should be classified into levels of impact. LA111 considers how the magnitude of change can be affected by whether a noise level change occurs in the short term (e.g., as a result of a sudden opening of a scheme), or in the long term (e.g., gradually over time, such as that associated with natural traffic growth).
- 2.19 The example classification scale for short term changes, which is the most stringent, is presented below:

Table 2.2 Classification of Magnitude of Noise Impacts in the Short Term and Long Term

Short Term		Long Term	
Noise Change, dB $L_{A10, 18h}$	Magnitude of Impact	Noise Change, dB $L_{A10, 18h}$	Magnitude of Impact
0	No Change	0	No Change
0.1 to 0.9	Negligible	0.1 to 2.9	Negligible
1.0 to 2.9	Minor	3.0 to 4.9	Minor
3.0 to 4.9	Moderate	5.0 to 5.9	Moderate
5.0+	Major	10.0+	Major

- 2.20 DMRB LA 111 states that the initial assessment of likely significant effects on noise sensitive buildings shall be determined using **Table 2.3** below, which is reproduced from Table 3.58 of DMRB LA 111.

Table 2.3: Initial Assessment of Operational Noise Significance

Significance	Short term magnitude of change
Significant	Major
Significant	Moderate
Not Significant	Minor
Not Significant	Negligible

- 2.21 DMRB LA 111 states that the Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Levels (SOAEL) shall be set for all noise sensitive receptors within the Study Area, for time periods when they are in use. LOAEL and SOAEL considered in this assessment are defined in **Table 2.4** below, which is reproduced from Table 3.49.1 of DMRB LA 111. These LOAEL and SOAEL values are considered to apply to both dwellings and other noise sensitive receptors for the purpose of this assessment.

Table 2.4: Operational Noise LOAEL and SOAEL for all Receptors

Time Period	LOAEL	SOAEL
Day (06:00 – 24:00)	55 dB LA10,18hr (façade)	68 dB LA10,18hr (façade)
Night (23:00-07:00)*	40 dB L _{night} , outside (free-field)	55 dB L _{night} , outside (free-field)

- 2.22 It is considered that a potentially significant noise change occurs when there is:

- A 1 dB change in noise level in either the short-term or long-term when the resulting noise level exceeds the SOAEL. In the long-term, the noise level must also change by at least 1 dB when comparing the Do Minimum 2017 and Do Something 2032 scenarios to ensure the change is as a result of the proposed scheme as opposed to a change that would happen even if the proposed scheme did not go ahead;
- A 3 dB change in the short-term or 5 dB change in the long-term (i.e. “moderate” change from DMRB LA 111) where the resulting noise level is between the LOAEL and SOAEL; and,
- Where noise levels are below the LOAEL, significant effects are not expected.

Consultation Response with Wokingham Borough Council

- 2.23 Consultation was undertaken with the Environmental Health Department at Wokingham Borough Council via email correspondence in January 2024. The following was proposed:

The assessment will be undertaken in line with best practice guidance documents to inform the approach and impact assessment. Those documents which will be used to inform the assessment are listed below:

- National Planning Policy Framework (NPPF);

- Noise Policy Statement for England (NPSE);
- Planning Practice Guidance (PPG);
- WHO 1999 Guidelines for Community Noise; and
- BS8233:2014 Guidance of Sound Insulation and Noise Reduction for Buildings

In summary, we propose to undertake the following:

- Undertake a baseline noise survey to determine the existing noise levels at locations considered representative of the proposed noise sensitive receptors.
- Assess the existing noise levels at proposed noise sensitive receptors, in accordance with the above guidance, namely road traffic on Basingstoke Road and Hyde End Road.
- Where appropriate, mitigation measures will be considered to afford protection to future occupiers.

- 2.24 A response was received from a Senior Environmental Protection Officer stating the following:

'Thank you for your email, I don't have the planning number to hand so just some general advice, for a site this large I would prefer more measurement points and that BS4142 methodology is used, otherwise it seems fine.'

The Heron Industrial site will be a factor for sure as will the nearby roads. It is a big site and distance to potential noise sources will be a key factor as will any plant such as ASHP'.

- 2.25 BWB provided a further response via email correspondence stating that the proposed measurement location ML3 was to be adjusted to be more representative of proposed dwellings to the south of Hyde End Road, and that the proposed monitoring locations covered all the necessary sources which are likely to impact onto the proposed site. It was requested that further information be provided by the EHO should additional measurement locations still be required.
- 2.26 It was also stated that an assessment of the existing industrial estate would be undertaken which will utilise data captured at proposed measurement location ML1 for any potential noise associated with these premises in line with appropriate guidance, including BS 4142 where appropriate.
- 2.27 A response was received from the Environmental Health Department at Wokingham Borough Council stating that our subsequent proposals were agreeable.

3. BASELINE NOISE MEASUREMENTS

- 3.1 A baseline noise survey has been undertaken to determine noise levels incident on the proposed development site due to the passage of traffic on Basingstoke Road to the west and south, and Hyde End Road to the north. Baseline noise measurements have been undertaken at the measurement locations identified in **Figure 3.1**.

Figure 3.1: Noise Measurement Locations



Measurement Location 1 (ML1)

- 3.2 Noise measurements were undertaken at Measurement Location 1 (ML1) over a 24-hour period commencing at 14:30 hours on Monday 12th February 2024.
- 3.3 The microphone was positioned at free-field conditions being at a height of 1.5 m above local ground level and approximately 2.5 m from the nearside kerb edge of Basingstoke Road. During periods of attendance, the noise climate was noted to be dominated by road traffic. There was no audible noise emanating from the commercial premises on the opposite side of Basingstoke Road during site attendance.

Measurement Location 2 (ML2)

- 3.4 Noise measurements were undertaken at Measurement Location 2 (ML2) over a 24-hour period commencing at 14:00 hours on Monday 12th February 2024.
- 3.5 The microphone was positioned at free-field conditions being at a height of 1.5 m above local ground level and approximately 6 m from the nearside kerb edge of Basingstoke Road. During periods of attendance on-site the noise climate was noted to be dominated by road traffic.

Measurement Location 3 (ML3)

- 3.6 Noise measurements were undertaken at Measurement Location 3 (ML3) over a 24-hour period commencing at 12:45 hours on Monday 12th February 2024.
- 3.7 The microphone was positioned at free-field conditions being at a height of 1.5 m above local ground level and approximately 65 m south of the nearside kerb edge of Hyde End Road. During periods of attendance on-site, noise from road traffic on Hyde End Road was perceptible.

Measurement Equipment

- 3.8 The baseline noise survey was undertaken using the Class 1 specification noise measurement equipment detailed in **Table 3.1**. The equipment's sensitivity was checked using a portable calibrator immediately before and after the measurements with no significant drift observed. The sound level meters, pre-amplifiers and microphones were calibrated to traceable standards at an accredited laboratory within the 24 months prior to the measurements. The portable calibrator was calibrated within the 12 months preceding the date of the survey.

Table 3.1: Noise Measurement Equipment

Location	Equipment	Make & Model	Serial Number
ML1	Sound Level Meter	01 dB Fusion	11327
	Microphone	Grass 40CE	259479
	Preamp	01 dB PRE 22	1605201
ML2	Sound Level Meter	SVAN 971	60745
	Microphone	ACO 7052E	64535
	Preamp	SV18	66815

Location	Equipment	Make & Model	Serial Number
ML3	Sound Level Meter	SVAN 971	80344
	Microphone	ACO 7052E	69566
	Preamp	SV18	71577
All	Calibrator	Svantek SV33A	90275

Meteorological Conditions

- 3.9 The weather during the survey was understood to be conducive to environmental noise measurement, it being dry with wind speeds generally lower than 5 ms^{-1} during all survey periods.

Measurement Results

- 3.10 A summary of the measured levels to be used within the assessment are provided below. Full measurement results for the whole period are presented in **Appendix B**.

Table 3.2: Summary of Measured Sound Pressure Levels at ML1

Period	Start Time and Date	dB LAeq,T	dB LA90,T ²	dB LAfmax ³
Daytime ¹	12/02/2024 14:30	70	47	-
Night Time	12/02/2024 23:00	60	33	84

¹ includes periods between 14:30 – 23:00 hours on 12/02/2024 and between 07:00 – 14:30 hours on 13/02/2024
² arithmetic average LA90,15mins during measurement period.
³ 90th Percentile LAfmax noise level during measurement period.

Table 3.3: Summary of Measured Octave Band Sound Pressure Levels at ML1

Period	Sound Pressure Level (dB Leq) per octave band centre frequency (Hz)								dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
Daytime	66	62	61	63	68	63	53	41	70
Night Time	55	48	49	52	58	52	43	37	60

Table 3.4: Summary of Measured Sound Pressure Levels at ML2

Period	Start Time and Date	dB LAeq,T	dB LA90,T ²	dB LAfmax ³
Daytime ¹	23/10/2023 14:00	63	45	-
Night Time	23/10/2023 23:00	53	32	75

¹ includes periods between 14:00 – 23:00 hours on 12/02/2024 and between 07:00 – 14:00 hours on 13/02/2024
² arithmetic average LA90,15mins during measurement period.
³ 90th Percentile LAfmax noise level during measurement period.

Table 3.5: Summary of Measured Octave Band Sound Pressure Levels at ML2

Period	Sound Pressure Level (dB Leq) per octave band centre frequency (Hz)								dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
Daytime	64	58	57	58	61	55	43	38	63
Night Time	53	46	46	48	52	45	32	22	53

Table 3.6: Summary of Measured Sound Pressure Levels at ML3

Period	Start Time and Date	dB L _{Aeq,T}	dB L _{A90,T} ²	dB L _{AFmax} ³
Daytime ¹	23/10/2023 12:45	48	42	-
Night Time	23/10/2023 23:00	41	34	55

¹ includes periods between 12:45 – 23:00 hours on 12/02/2024 and between 07:00 – 12:45 hours on 13/02/2024
² arithmetic average L_{A90,15mins} during measurement period.
³ 90th Percentile L_{AFmax} noise level during measurement period.

Table 3.7: Summary of Measured Octave Band Sound Pressure Levels at ML3

Period	Sound Pressure Level (dB Leq) per octave band centre frequency (Hz)								dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
Daytime	55	52	45	44	43	37	39	37	48
Night Time	47	40	35	38	37	27	32	26	41

4. ASSESSMENT

- 4.1 The results of the baseline noise survey have been used as a basis for the noise assessment. This assessment considers noise from road traffic on Basingstoke Road and Hyde End Road, development generated road traffic and proposed noise sources associated with the Proposed Development.
- 4.2 As the application is in outline, and the masterplan has not been fixed, the following assessment is based on a notional receptor located 10 m from the site boundary.

Noise from Existing Employment Uses

- 4.3 During the baseline noise survey, noise from Heron Industrial Estate and Lambs Farm Business Park was not noted. A review has been undertaken of both premises to determine the likely noise impact at proposed sensitive dwellings.
- 4.4 The businesses associated with Heron Industrial estate operate during the daytime periods only, with no night-time working. Most of the site is screened from the Proposed Development by the buildings themselves, with the exception of the northern and southern most units. The northern most unit is set back into the estate and is located approximately 65 m from the site boundary. There are also existing sensitive receptors located much closer to the unit, than is being proposed, with no specific boundary mitigation in place. This indicates that noise associated with the northern most unit is unlikely to be significant.
- 4.5 The southern most unit is used to manufacture industrial routers, modems and cellular equipment. The external area is mainly used for carparking and although they may be deliveries associated with the use, this is likely to be made up of LGVs, given the space available. There are two existing residential receptors located immediately adjacent to the western facade of the unit, which indicates that noise generated within the building is unlikely to be significant, and is controlled to an acceptable level.
- 4.6 The businesses associated with Lambs Farm Business Park operate during the daytime periods only, with no night-time working. The site is orientated so that any service yard areas and/or roller shutter doors are screened from the Proposed Development by the buildings themselves.
- 4.7 Based on the above, it is considered that noise from Heron Industrial Estate and Lambs Farm Business Park is unlikely to result in significant adverse impacts at proposed sensitive receptors, and has not been considered further within this assessment.

Noise from Existing Transport Sources

External Daytime Noise Levels

- 4.8 Correcting the noise levels measured at ML1 and ML2 for distance results in predicted noise levels of 65dB $L_{Aeq,16h}$ and 60dB $L_{Aeq,16h}$ respectively, which are above the lower and upper guideline values of 50 dB $L_{Aeq,16h}$ and 55dB $L_{Aeq,16h}$ respectively, recommended in BS8233. Therefore, mitigation will be required to reduce noise levels in outdoor living areas, located closest to and with a direct line of sight to Basingstoke Road.

- 4.9 The daytime noise levels measured at ML3, which are considered representative of the noise levels in northern area of the site, were 48dB $L_{Aeq,16h}$, which is below the lower guideline value of 50dB $L_{Aeq,16h}$ recommended in BS8233. Therefore, mitigation is not considered warranted in the northern area of the site.

Internal Noise Levels

Basingstoke Road

- 4.10 The results of the baseline noise survey indicate that the noise level at 10m from Basingstoke Road is 65 dB $L_{Aeq,16h}$ as a worst-case and 55dB $L_{Aeq,8h}$ for daytime and night-time periods, respectively. Correcting the measured L_{AFmax} level of 84 dB measured at ML1, assuming a simple point source correction, results in a L_{AFmax} level of 69 dB.
- 4.11 Assuming a 15 dB loss through a partially opened window, this would result in internal levels of 50dB $L_{Aeq,16h}$ and 40dB $L_{Aeq,8h}$ for the daytime and night-time, respectively. A partially opened window would also result in an internal level of 54 dB L_{AFmax} during the night-time. Therefore, the criteria of 35 dB $L_{Aeq,16h}$ for the daytime and night time criteria of 30 dB $L_{Aeq,8h}$ and 45 dB L_{AFmax} , are likely to be exceeded, assuming partially opened windows. Consideration is given to mitigation in **Section 5**.

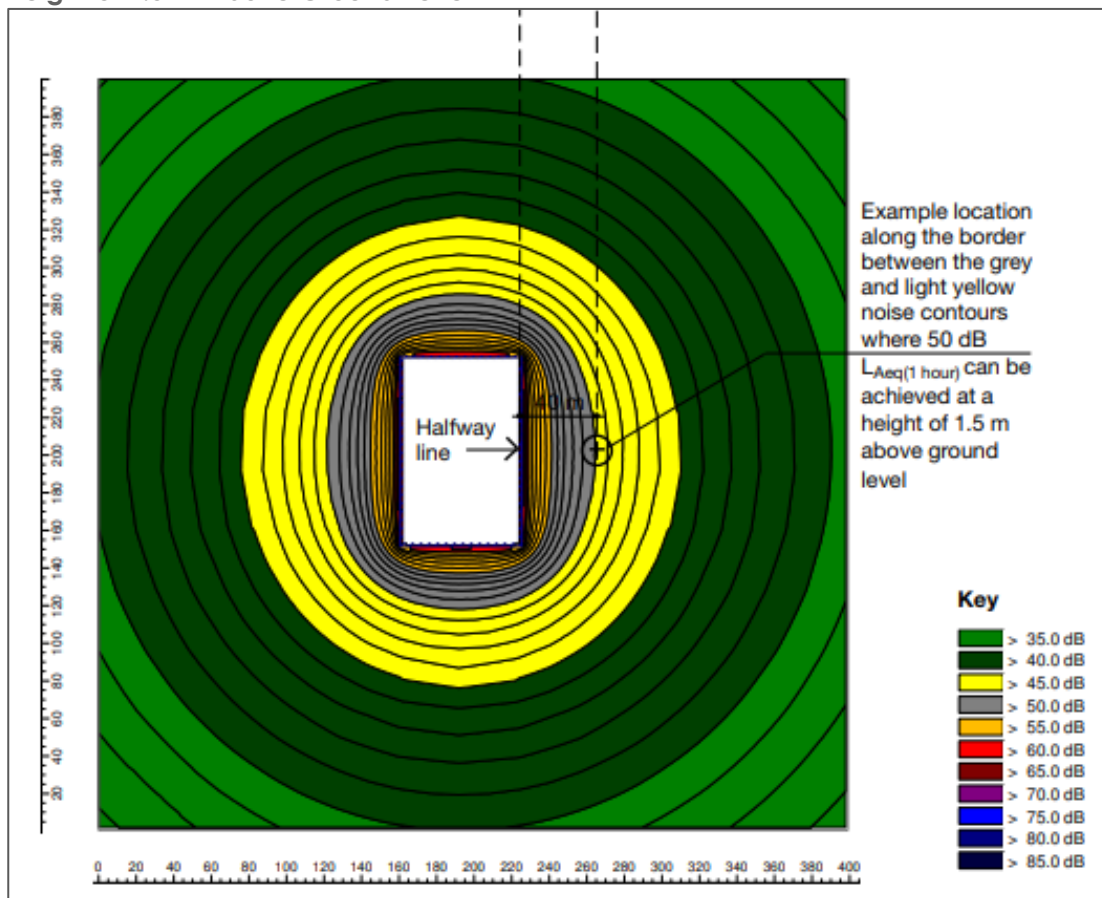
Hyde End Road

- 4.12 The results of the baseline noise survey indicate that the noise level in the northern area of the site, nearest to Hyde End Road are 48 dB $L_{Aeq,16h}$ and 41 dB $L_{Aeq,8h}$ for daytime and night-time, respectively. An L_{AFmax} level of 55 dB has been measured at ML3 and has been adopted for this assessment.
- 4.13 Assuming a 15 dB loss through a partially opened window, this would result in internal levels of 33 dB $L_{Aeq,16h}$ and 26 dB $L_{Aeq,8h}$ for the daytime and night-time, respectively. A partially opened window would also result in an internal level of 40 dB L_{AFmax} during the night-time. Therefore, the criteria of 35 dB $L_{Aeq,16h}$ for the daytime and night time criteria of 30 dB $L_{Aeq,8h}$ and 45 dB L_{AFmax} , are likely to be achieved, assuming partially opened windows.

Noise from the Proposed Sports Pitches

- 4.14 The framework plan indicates that a 3G football pitch is proposed in the middle of the site, adjacent to the school and local centre. Although the pitch is not located near to any proposed residential dwellings, a high-level assessment has been undertaken to determine the potential noise levels generated by the sports pitch at given distances.
- 4.15 Sport England Guidance provides a typical free-field noise level of 58 dB $L_{Aeq,1h}$ derived from measurements undertaken 10 m from the side-line halfway marking at a number of sporting activities taking place on AGPs. The document also states that noise levels of 50 dB $L_{Aeq,1h}$ can be achieved at a distance of 40 m at 1.5 m above local ground height.
- 4.16 A noise contour is shown below in **Figure 4.1**, showing the resultant noise level in relation to distance.

Figure 4.1: Plan of Typical Noise Contours for an AGP in an Open Area Measured at a Height of 1.5 m Above Ground Level



- 4.17 Given the distance to the proposed residential receptors, noise from the football pitch is unlikely to result in adverse impacts, with the lower guideline value of 50 dB $L_{Aeq,16h}$ achieved in external garden areas at a distance of 40 m and above.

Operational Noise from Proposed Employment Uses and Learning Institutions

- 4.18 It is anticipated that there may be fixed plant and equipment associated with the Proposed Development that may have the potential to generate noise, predominantly associated with the proposed commercial/industrial land uses proposed in the southern area of the site, with proposed residential uses situated adjacent. Therefore, it is considered that the nearest Noise Sensitive Receptors (NSRs) will be those situated within the Proposed Development site.
- 4.19 The rating level of fixed plant noise sources should not exceed the prevailing background sound level when measured at the nearest NSRs. The cumulative effect of all external plant should be specified so that the rating level is less than or equal to the prevailing background sound level.

- 4.20 The noise levels recorded at ML1 are considered to be the most representative of the noise climate outside the nearest proposed receptors to the commercial/industrial elements of the Proposed Development. Therefore, the L_{A90} levels measured during the daytime and night-time periods have been used to set plant noise limits for the Proposed Development.
- 4.21 The Institute of Acoustics have issued a briefing note entitled 'Heat Pumps Professional Advice Note' which recommends that the sound rating level from Air Source Heat Pumps should not exceed 35 dB $L_{Aeq,15m}$, where practicable. Therefore, this sound rating level has been adopted for the night-time where the measured L_{A90} value is considered to be low.
- 4.22 Noise from external plant on the development site shall therefore comply with the following noise rating levels:
- Daytime (07:00 to 23:00): 47 dB $L_{A,Tr}$;
 - Night-time (23:00 to 07:00): 35 dB $L_{A,Tr}$.
- 4.23 The above rating level limits apply at least 3.5 metres from the façade of any residential property i.e. in free-field conditions.
- 4.24 In accordance with BS4142, the assessment of plant noise emissions should include appropriate rating corrections for tonal, irregular or intermittent plant where applicable, before comparison with the above limits.
- 4.25 Once the detailed nature of such future uses is confirmed, noise from any fixed plant can be considered to ensure that the above limits can be met.
- 4.26 It should be noted that the derived rating level limits would be applicable to the total noise from the simultaneous operation of all external plant serving the Proposed Development. As such, noise emissions from individual items of plant will need to be lower than the proposed limits, although the exact limit for each individual item of plant will be dependent upon its type, noise characteristics, location etc. This issue is best addressed during the detailed design stage.

Noise from Development Generated Road Traffic

- 4.27 The proposed development has the potential to impact on existing nearby existing NSRs. There may be a change in road traffic noise levels at existing noise sensitive receptors due to development generated road traffic.
- 4.28 The results of a transport assessment were used as the basis for determining the change in road traffic noise levels that would result from development generated road traffic.
- 4.29 Traffic data for the Opening Year (with and without development) and the Future Year (with and without development) have been used to inform the assessment of road traffic noise level change over the short-term and long-term scenarios. The study area includes the roads closest to the proposed development site, on the basis that as distance increases from the site, the traffic will dissipate. Therefore, if no significant impacts are predicted on the roads closest to the site, then there is unlikely to be impacts further away from the site.

- 4.30 The Basic Noise Level (BNL), as referenced in Calculation Road Traffic Noise (CRTN), has been calculated for the study area, to predict the change in noise level between the Opening Year without Development, and the Opening Year with Development (i.e. the short-term road traffic noise level change). Calculations have also been undertaken to predict the change in noise level between the Future Year with Development, and the Future Year without Development (i.e. the long-term road traffic noise level change).
- 4.31 In accordance with DMRB, the magnitude of impact is assessed against the criteria found in **Table 2.2** for change in the short-term and long-term.
- 4.32 The predicted changes in road traffic noise are shown in **Table 4.1** which shows the increase in road traffic noise for the following scenarios:
- The 'with' and 'without' development scenarios in 2026 (short term change), i.e. by how much traffic noise levels are likely to be different with the development than without, with any predicted changes being solely due to the traffic generated by the proposed development; and
 - The 'with' and 'without' development scenarios in 2038 (long term change), i.e. by how much traffic noise levels are likely to be different with the development than without, with any predicted changes being solely due to the traffic generated by the proposed development.

Table 4.1: Predicted Changes in Road Traffic Noise

Road/Link	2026 BNL, dB		2026 (with dev.) Vs. 2026 (without dev.)	2038 BNL, dB		2038 (with dev.) Vs. 2038 (without dev.)
	Without Dev.	With Dev.		Without Dev.	With Dev.	
Hyde End Road	64.8	64.8	+0.0	64.9	65.0	+0.1
B3349 Basingstoke Road	72.0	72.1	+0.1	72.1	72.2	+0.1
Beech Hill Road	63.8	64.1	+0.3	64.3	64.7	+0.4
B3349 Basingstoke Road	68.5	69.0	+0.5	68.5	68.9	+0.4

- 4.33 The results of the assessment of generated road traffic indicates a permanent, negligible adverse impact in both the short-term and long-term scenarios, which is not significant. Therefore, mitigation is not considered warranted at this time.

5. MITIGATION

- 5.1 In **Section 4**, it has been determined that consideration should be given to mitigation measures to protect the amenity of sensitive receptors associated with the proposed development.

Proposed Noise Sensitive Uses

External Noise Levels

- 5.2 To reduce the noise impact at proposed dwellings and gardens nearest to Basingstoke Road to within acceptable levels, it is recommended that gardens are located on the screened side of dwellings in the first instance. Should gardens face onto Basingstoke Road, then localised acoustics barriers will likely be required around garden areas. It is widely accepted that an acoustic barrier which removes line of sight to the road will provide a reduction of 5 to 10 dB.
- 5.3 Localised barriers should have a minimum surface density of 15 kg/m² and form a continuous unbroken barrier with no gaps at the bottom. This could be achieved with a suitably designed close boarded timber fence meeting this minimum specification.
- 5.4 The exact height, location and extent of any barriers required can be determined once plans reach a more detailed stage.

Internal Noise Levels

- 5.5 In order to assess the noise mitigation required to ensure an adequate level of protection against noise, it is appropriate to explore in the first instance the protection that could be afforded by the sound insulation performance of the external building fabric, and in particular the glazing elements.
- 5.6 Detailed noise break-in calculations have been undertaken in accordance with the rigorous method from section G.2 from BS 8233 based on the frequency spectra measured on Site and the following assumed dimensions and assumptions;
- Room dimensions of 3 m (width) x 2.5 m (depth) x 2.5 m (height);
 - Double glazed window dimensions of 1.0 m (width) x 2.5 m (height);
 - External building fabric elements shall achieve a sound reduction performance of at least $R_w + C_{tr}$ 48 dB;
 - A reverberation time of 0.5 seconds; and
 - Two ventilators per habitable room with a 2000mm² free area each.
- 5.7 To achieve the daytime internal noise criterion of 35 dB $L_{Aeq,16h}$ adopted for this assessment, based on the façade closest to Basingstoke Road experiencing 65 dB $L_{Aeq,16h}$ free-field at the facade, a reduction of 30 dB(A) would be required for habitable rooms. To achieve the internal criteria of 30 dB $L_{Aeq,8h}$ and 45 dB L_{AFmax} during the night-time, adopted for this assessment, a reduction of up to 25 dB(A) would be required for habitable rooms.

- 5.8 For dwellings located closest to Basingstoke Road, all internal criteria would be achieved with double glazing (example configuration: 10mm glass /16fmm airgap/6mm glass), which would need to provide a minimum $R_w + C_{tr}$ of 31 dB. Acoustic trickle ventilators, which achieve a minimum performance of $D_{n,e,w} + C_{tr}$ 40 dB, such as the Greenwood 2500EA + 1 Acoustic Set, would also be required.
- 5.9 For dwellings that are located further back into the site that benefit from screening provided by the development itself, it is likely that standard double glazing and hit and miss ventilators will be sufficient to mitigate noise to acceptable levels during whole house ventilation.
- 5.10 The above assessment presents solutions to offer compliance with the desirable noise levels in BS8233 within habitable rooms during whole house background ventilation provisions. It is unknown at this stage, whether some of the proposed dwellings will overheat. Worst case affected dwellings that may overheat will not be able to utilise opening windows to control overheating due to noise constraints as per Approved Document E. For such dwellings, alternative mitigation measures to combat overheating should be developed during the detailed design stage, and such measures ideally should be passive rather than active (i.e. air conditioning).
- 5.11 **Table 5.1** shows the resultant internal noise levels at the notional receptor, with mitigation in place.

Table 5.1: Predicted External and Internal Noise Levels with Mitigation, dB

Source	Predicted External Noise Level, Free-Field, dB			Resultant Internal Noise Level, dB		
	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax}
Road traffic along Basingstoke Road	65	55	69	34	24	38

- 5.12 It should be noted that the minimum sound insulation performance requirement for trickle ventilators outlined above assume a free area of 5000mm² in each room to meet the whole dwelling ventilation rates from ADF of the Building Regulations. Should additional ventilators be required, the minimum sound insulation performance of each ventilator is required to increase as per the values in **Table 5.2**.
- 5.13 The specification of the required number of ventilators to achieve compliance with ADF requirements is beyond the scope of this report and should be confirmed by the project's Mechanical Engineers.

Table 5.2: Correction to Ventilator Performance Depending on Number of Ventilators

Number of Ventilators Required per Room	Additional Performance Required per Ventilator (dB)
3	+2
4	+3

- 5.14 The final glazing and ventilation design should be finalised on a plot-by-plot basis at the appropriate design stage by a qualified acoustician, once the final internal layouts and glazing areas for each room are known.

6. CONCLUSION

- 6.1 BWB Consulting Ltd (BWB) was instructed by Richborough Estates Limited ('the Client') to undertake an environmental noise assessment to support an outline planning application with all matters reserved for future determination, save for the means of access via Basingstoke Road, for: up to 430 dwellings (Use Class C3), an 80 bed care home (Use Class C2), 1ha of employment land (Use Class E(g), primary school (Use Class F1), local centre (Use Classes E(a), (b), (c)), GP Surgery (Use Class E(e), 3G sports pitch and changing facility, public open space, SANG provision and associated infrastructure ('the Proposed Development') located on a parcel of land to the east of Basingstoke Road (B3349), Spencers Wood, Wokingham (collectively known as "the Site").
- 6.2 This assessment considers the impact of road traffic on the Proposed Development and its future residents and where necessary, consideration has been given to mitigation measures.
- 6.3 A baseline noise survey was undertaken at the Site in February 2024 to inform the assessment. The results of the survey and subsequent assessment work have been assessed in accordance with current standards and guidance, following consultation with Wokingham Borough Council.
- 6.4 As the exact location of the dwellings is unknown at this time, mitigation has been suggested in outline terms only. Consideration will need to be given to the site layout and orientation of buildings as the development evolves. It is considered that the internal and external noise levels could meet the desirable noise levels of BS 8233 with appropriate mitigation in place.
- 6.5 Noise level limits have been derived for fixed plant items associated with the proposed development based on the results of the baseline noise survey. The proposed limits have been derived in accordance BS 4142:2014+A1:2019.
- 6.6 Given the distance between the proposed 3G football pitch and proposed sensitive receptors, noise from the proposed sports pitch is unlikely to result in significant adverse impacts at proposed receptors.
- 6.7 The development generated road traffic noise has been assessed and is predicted to have a negligible, adverse impact at worst on existing noise sensitive receptors in both the short-term and long-term.
- 6.8 Based on the results of the assessment, it has been demonstrated that the site is suitable for residential development.

APPENDICES

APPENDIX A: Glossary of Terms

Noise

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

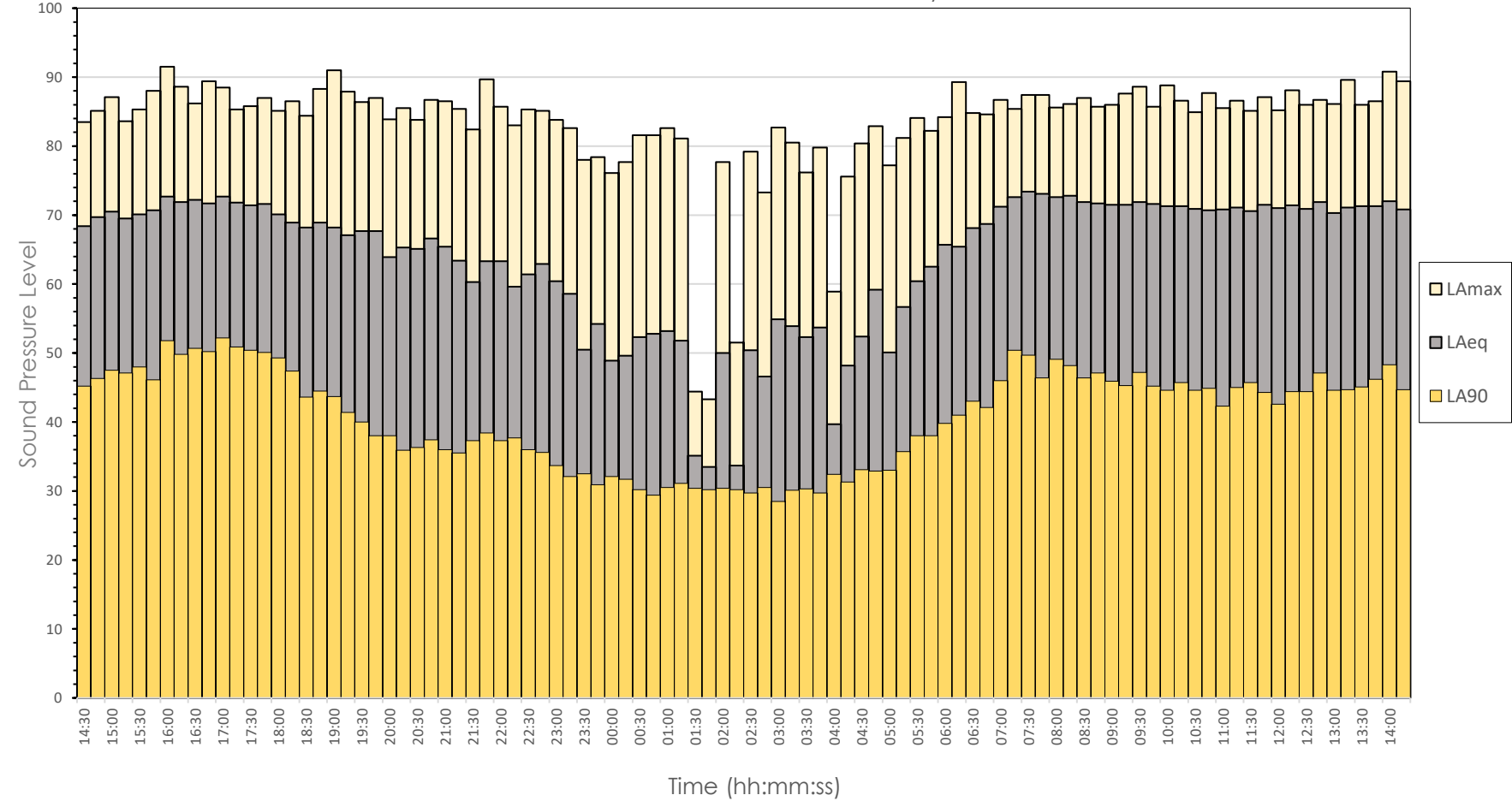
Acoustic Terminology

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10 ⁻⁵ Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
L _{Aeq,T}	L _{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L _{Amax}	L _{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L _{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L _{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L ₁₀ and L ₉₀	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L _n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L ₁₀ is the level exceeded for 10% of the time, and the L ₉₀ is the level exceeded for 90% of the time.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Façade Level	A sound field determined at a distance of 1m in front of a large sound reflecting object such as a building façade.

APPENDIX B: Full Survey Results

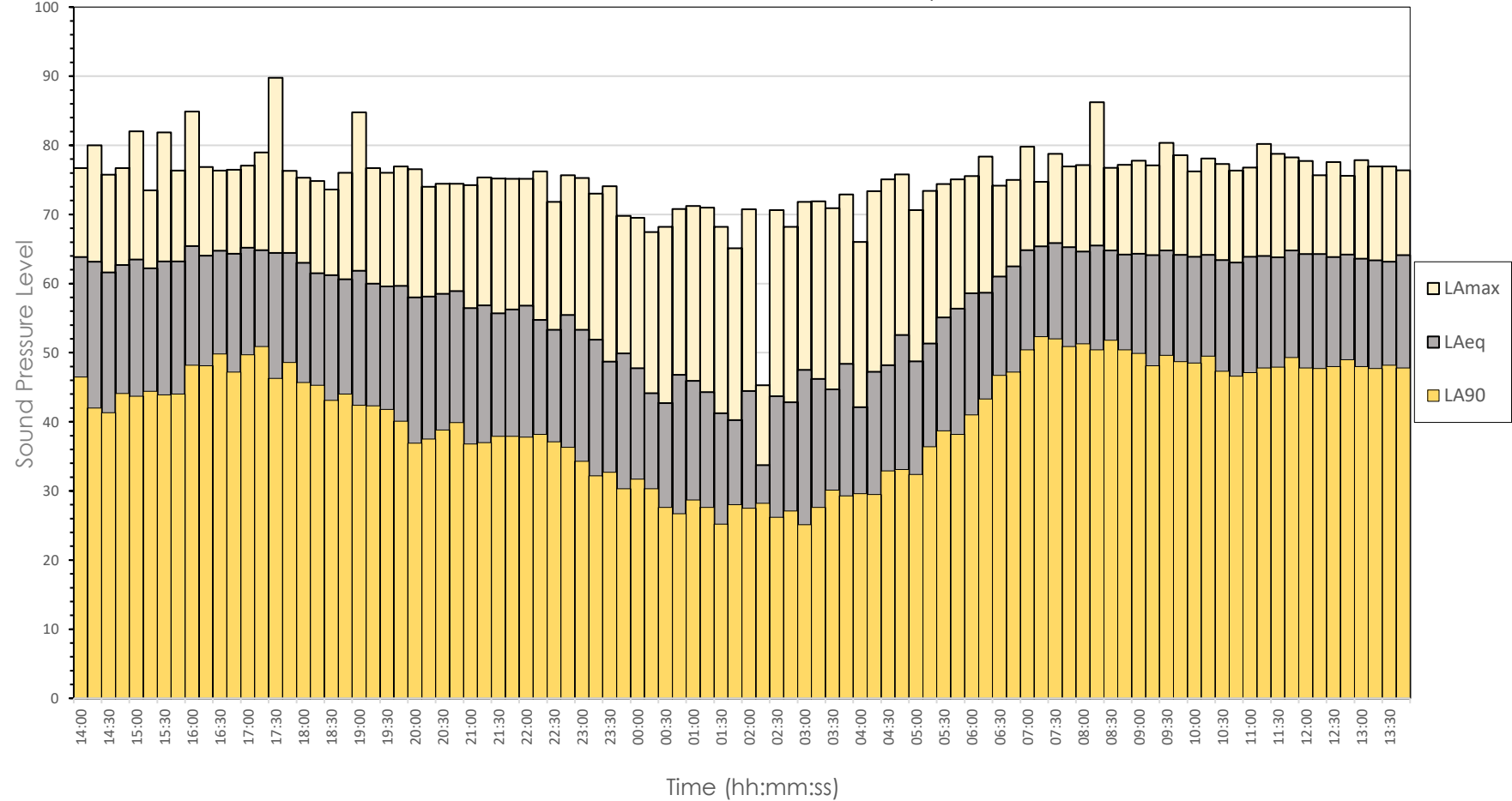


Spencers Wood, Shinfield - Noise Impact Assessment
Measurement Location 1 - Time History Graph
12th - 13th February 2024





Spencers Wood, Shinfield - Noise Impact Assessment
Measurement Location 2 - Time History Graph
12th - 13th February 2024





Spencers Wood, Shinfield - Noise Impact Assessment
Measurement Location 3 - Time History Graph
12th - 13th February 2024

