



Land at Alderholt, Fordingbridge, Dorset

Planning Noise Assessment

December 2022

Waterman Infrastructure & Environment Limited

6th Floor, Trinity Court, 16 Dalton Street, Manchester, M2 6HY
www.watermangroup.com



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This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS EN ISO 45001:2018)

Issue	Date	Prepared by	Checked by	Approved by
1	9 Dec 2022	Innes Urbanski Associate Director	Mark Maclagan Technical Director	Mark Maclagan Technical Director



Comments

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1. Introduction

Waterman Infrastructure & Environment Ltd (Waterman) has been appointed by Dudsbury Homes (Southern) Ltd (the applicant) to undertake a noise assessment to determine the suitability of land referred to as Land at Alderholt, Fordingbridge, Dorset, (the Site) for residential development.

This report presents the results of the baseline survey and potential constraints to the proposed residential and school development in terms of glazing and ventilation and has regard to the Masterplan.

The change in road traffic noise as a result of the proposed development and therefore future baseline noise levels is not addressed, neither is the rerouting of Ringwood Road. The potential conflict with use of opening windows to combat overheating is also not addressed.

The Site is located within the administrative boundary of Dorset Council.

A glossary of the acoustic terminology used within this report is presented as **Appendix A**.

1.1 Noise & Vibration Considerations

The main consideration to residential and school development is road traffic noise from Hillbury Road to the east of the Site and Ringwood Road, which dissects the Site roughly north-west to south-east.

Localised noise from Warren Park Farm immediately south of the Site and Cemex Hamer Warren Quarry and Landfill located approximately 410 metres south from the south-eastern boundary are also considerations to development.

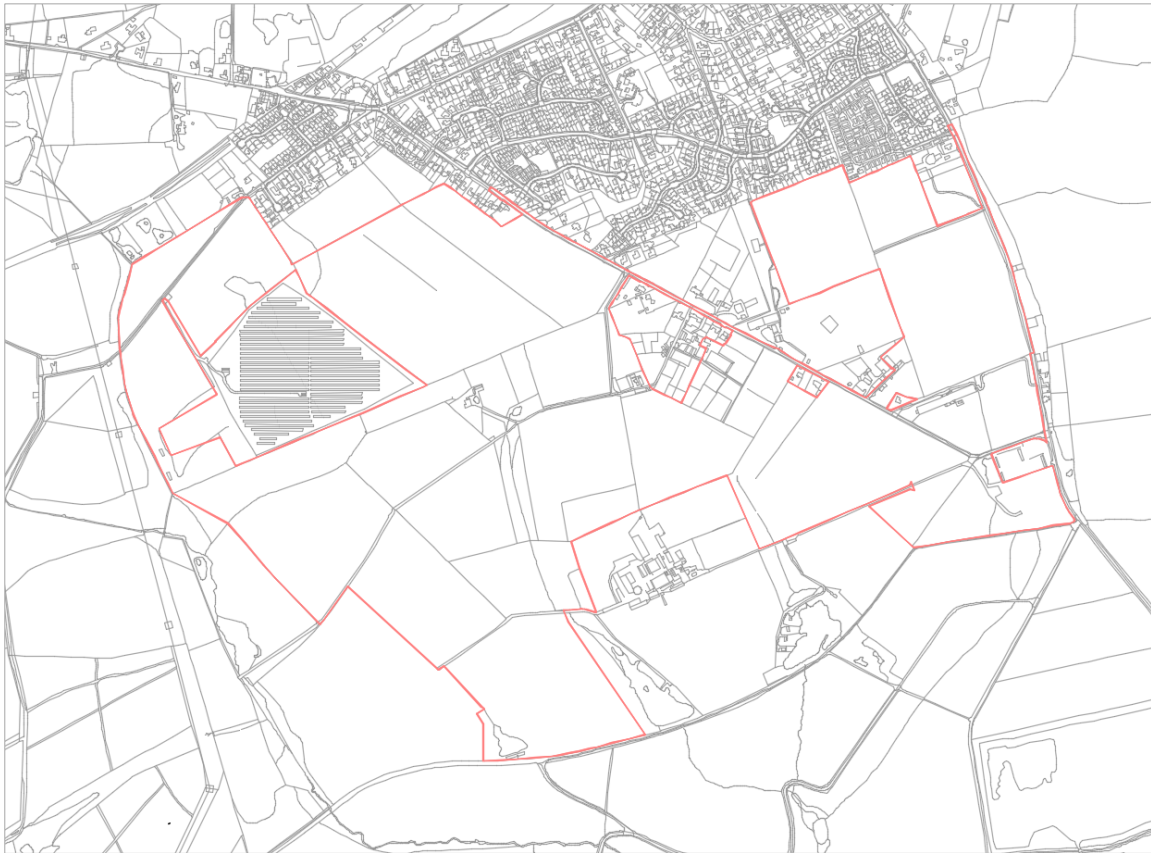
There are no vibration sources, such as a railway line adjacent or near (within 25 metres) to the Site which can give rise to tactile vibration or structure borne noise. On this basis vibration is not considered a material consideration to the development and has been scoped out.

The Site location is illustrated in **Figure 1**.

1.1 Proposed Development

The Client is seeking outline planning permission for construction of approximately 1,700 residential homes with associated amenities including: a village centre, primary school, doctors surgery and health centre, local shops, cafes and pubs, community hall and enterprise hub and studios. The proposed development will include open space, a recreation ground/village park and private soft landscaping.

Figure 1: Site Location



2. Planning Policy & Guidance

This section presents the key planning policy and guidance documents pertaining to noise within England relevant to the proposed development. These documents set out the aims, many of which are comparable, without providing details on specific noise levels, the latter of which are transposed into British Standards or sector specific guidance which are presented within Section 3 of this report.

2.1 National Planning Policy Framework

The National Planning Policy Framework¹ (NPPF) was revised 20th July 2021. With regard to noise the NPPF promotes ‘good design’ as part of ‘sustainable development’ and advocates ‘preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels ofnoise pollution...’

Paragraph 185 of NPPF states ‘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 life;
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;’

Paragraph 187 of the NPPF introduces the ‘Agent of change principle’. ‘Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.’

2.2 Noise Policy Statement For England

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development the Noise Policy Statement For England² (NPSE) aims to:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.

It introduces the concept of noise “effect levels” although it does not equate these to a specific level of noise as this is likely to be different for different noise sources, receptors and time of day. The effect levels are as follows:

- NOEL – No Observed Effect Level: Level below which no effect on health and quality of life due to noise can be detected;
- LOAEL – Lowest Observed Adverse Effect Level: Level above which adverse effects on health and quality of life can be detected;
- SOAEL – Significant Observed Adverse Effect Level: Level above which significant adverse effects on health and quality of life occur.

¹ Ministry of housing, Communities and Local Government. (July 2021) National Planning Policy Framework. HMSO.

² Defra. (2010) Noise Policy Statement For England (NPSE).

Predominantly, guidance is drawn from the World Health Organisation (WHO) when setting specific noise levels to the above effect levels, which essentially have been transposed into various British Standards, Policy and Guidance.

2.3 Local Planning Policy

2.3.1 Christchurch and East Dorset Local Plan Part 1 – Core Strategy (2014)³

The Christchurch and East Dorset Local Plan Part 1 – Core Strategy was adopted in April 2014. It sets out the broad development strategy for the councils until 2025 including general policies. A number of the policies make reference to noise but none specific to residential and school developments and prevailing noise climates.

³

<https://www.dorsetcouncil.gov.uk/documents/35024/290487/Christchurch+and+East+Dorset+Adopted+Core+Strategy.pdf/9ce14f8d-e447-fed2-c665-f50b37748ca5> [accessed 8/12/2022]

3. Residential Amenity Criteria

Compliance with the noise assessment criteria presented within Section 3 of this report allows the Planning Policy requirements discussed within Section 2 to be satisfied.

Table 3-1 presents a summary of guideline values currently used in the assessment of residential amenity in England, drawn from BS8233:2014 and ProPG. This is also reflective of those contained within the Core Strategy Section 4 'Policies for a healthy built environment'.

Table 3-1: Summary of Recommended Noise Levels – Residential Amenity

Activity	Location	Noise Level	
		Day time	Night-time
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedrooms	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$ 45 dB $L_{Amax,F}$ (note 1)
Relaxing, Enjoyment	Private gardens	50-55dB $L_{Aeq,16h}$	-

Note: ¹Not to be exceeded for more than 10 times within the night-time period.

When considering external amenity spaces such as gardens, balconies and terraces, the guidance provided in BS 8233 and reproduced in ProPG is:

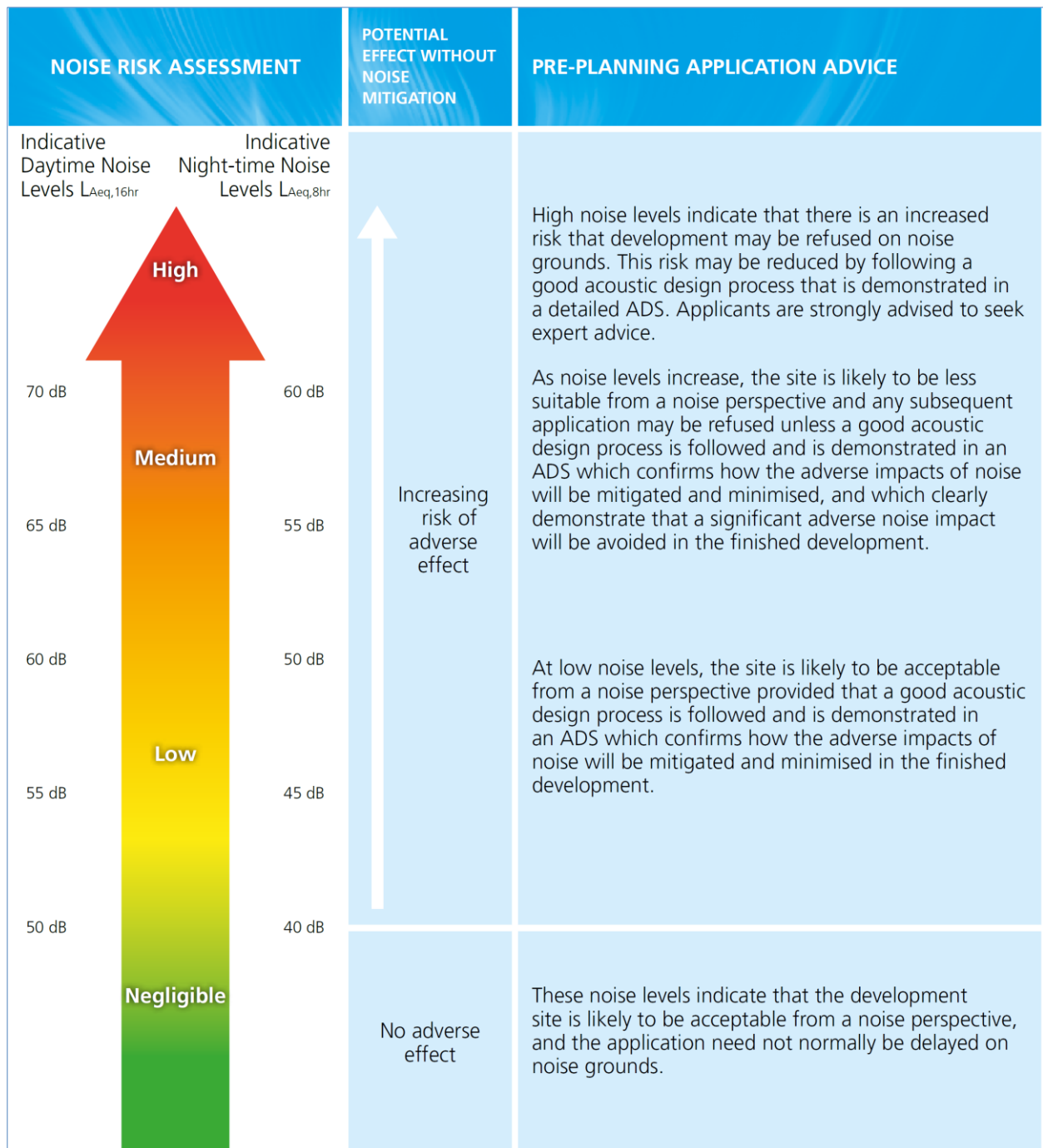
“the acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50-55 dB $L_{Aeq,16h}$. These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited.”

3.1 ProPG – New Residential Development

ProPG provides a methodology for undertaking a preliminary noise assessment of a proposed development site. The Stage 1 ProPG Initial Noise Risk Assessment is based on the prevailing day (07:00-23:00) and night-time (23:00-07:00) noise levels at the site, established through either measurement or prediction, without any new or additional mitigation. This provides an indication of the likely risk of adverse effects from noise were no subsequent mitigation be included as part of the development proposals. It should indicate whether the Site is considered to pose a negligible, low, medium or high risk from a noise perspective. It is on this basis that the preliminary noise assessment of the Site will be undertaken.

Figure 2 has been reproduced from ProPG illustrating the associated noise risks based on the prevailing noise levels. It is important to note that the assessment of noise risk serves to provide an indication as to the initial suitability of the site for residential development and as to what the acoustic issues are likely to be.

Figure 2: ProPG Stage 1 Initial Site Noise Risk Assessment



Note:

- Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
- Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".
- $L_{Aeq,16h}$ is for daytime 0700-2300, $L_{Aeq,8hr}$ is for night-time 2300-0700.
- An indication that there may be more than 10 noise events at night (2300-0700) with $L_{Amax,F}>60dB$ means the site should not be regarded as negligible

3.2 School Amenity – Noise Criteria

Guidance on the suitability of a site for school use is drawn from Acoustic design of schools: performance standards: Building Bulletin 93⁴ and Acoustics of Schools a design guide⁵. These documents issued in 2015 which are collectively referred to as BB93 replace BB93:2003.

When considering a new site for school use it states, “*For new schools, 60dB $L_{Aeq,30min}$ should be regarded as an upper limit for external noise at the boundary of external areas used for formal and informal outdoor teaching and recreation.*” It goes on to state that “*It may be possible to meet the specified indoor ambient noise levels on sites where external noise levels are as high as 70dB $L_{Aeq,30min}$ but this will require considerable building envelope and sound insulation or screening.*”

The recommended noise level within unoccupied playgrounds, playing fields and other outdoor areas is $\leq 55\text{dB } L_{Aeq,30min}$ with at least one area suitable for outdoor teaching activities where noise levels are below $50\text{dB } L_{Aeq,30min}$. Acoustic screening can be used to achieve these recommended outdoor noise levels.

The upper limit for the indoor ambient noise level within teaching classrooms is $35\text{dB } L_{Aeq,30min}$ for new build, allowable up to 40dB where a natural ventilation (or hybrid) ventilation strategy is adopted. Regular discrete noise events from aircrafts or trains should not exceed $60\text{dB } L_{A01,30 mins}$.

3.3 Fixed External Plant & Building Services

The primary source of guidance in relation to noise which is industrial in nature, such as fixed building services plant, industrial and commercial operations, is provided in BS 4142:2014+A1:2019⁶. BS 4142 states that the potential impact from industrial / commercial sound is based on the level difference between the source, known as the ‘specific sound level’ ($L_{Aeq,Tr}$), compared with the ‘background sound level’ ($L_{A90,T}$) that exists in the absence of the source in question. Where the sound contains any acoustic characteristics such as tonality, impulsiveness and intermittency then the specific noise level is adjusted in-line with BS 4142 to determine the ‘rating level’ ($L_{Ar,Tr}$).

Typically, the greater the difference between the rating level and the background sound level the greater the potential of an adverse impact. BS 4142 states:

- A difference of +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of +5dB or more is likely to be an indication of an adverse impact, depending on the context; and
- 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.

BS4142 further states; “Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.”

Context is an important consideration of a BS4142 assessment, and the impact may require modification due to context, which may include:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and

⁴ Department of Education. Education Funding Agency. (Feb 2015) *Acoustic design of schools: performance standards: Building Bulletin 93*. DoEd.

⁵ IoA, ANC. (Nov 2015). *Acoustics of schools a design guide*. IoA / ANC

⁶ British Standard Institute (BSI) (2019) BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound. BSI.

- Design measures that secure good internal and / or outdoor acoustic conditions, such as: façade insulation treatment; ventilation and / or cooling techniques which reduce the need to have open windows and acoustic screening.

With regard to bullet one, BS4142 states that “Where background sound levels and rating levels are low, absolute levels might be as, or more relevant than the margin by which the rating level exceeds the background. This is especially true at night.”

The latest BS4142 does not define ‘low’ in the context of background sound levels nor rating levels. The 1997 version of BS4142 defined very low background sound levels of being less than about 30dB L_{A90} and low rating levels as being less than about 35dB $L_{Ar,Tr}$. The Technical Note⁷ on the standard by Acoustics and Noise Consultants (ANC) suggest that “*similar values would not be unreasonable in the context of BS4142, but that the assessor should make a judgement and justify it where appropriate.*”

BS 4142 standard is not intended to be applied to the assessment of indoor sound levels.

⁷ ANC. (2020). Technical Note BS4142:2014+2019 Version 1.0. Acoustics and Noise Consultants (ANC).

4. Environmental Baseline Noise Conditions

A baseline noise survey was undertaken from Thursday 7th July to Tuesday 12th July 2022 at four key locations and supplemented by two short-term noise measurements. Environmental Health of Dorset Council was informed in advance of the survey, but they do not provide comment at pre-application stage. Monitoring locations are illustrated in **Figure 3** together with the redline application boundary. A description of the noise monitoring locations is presented in **Table 4-1** with a summary of measured noise levels in **Table 4-2**.

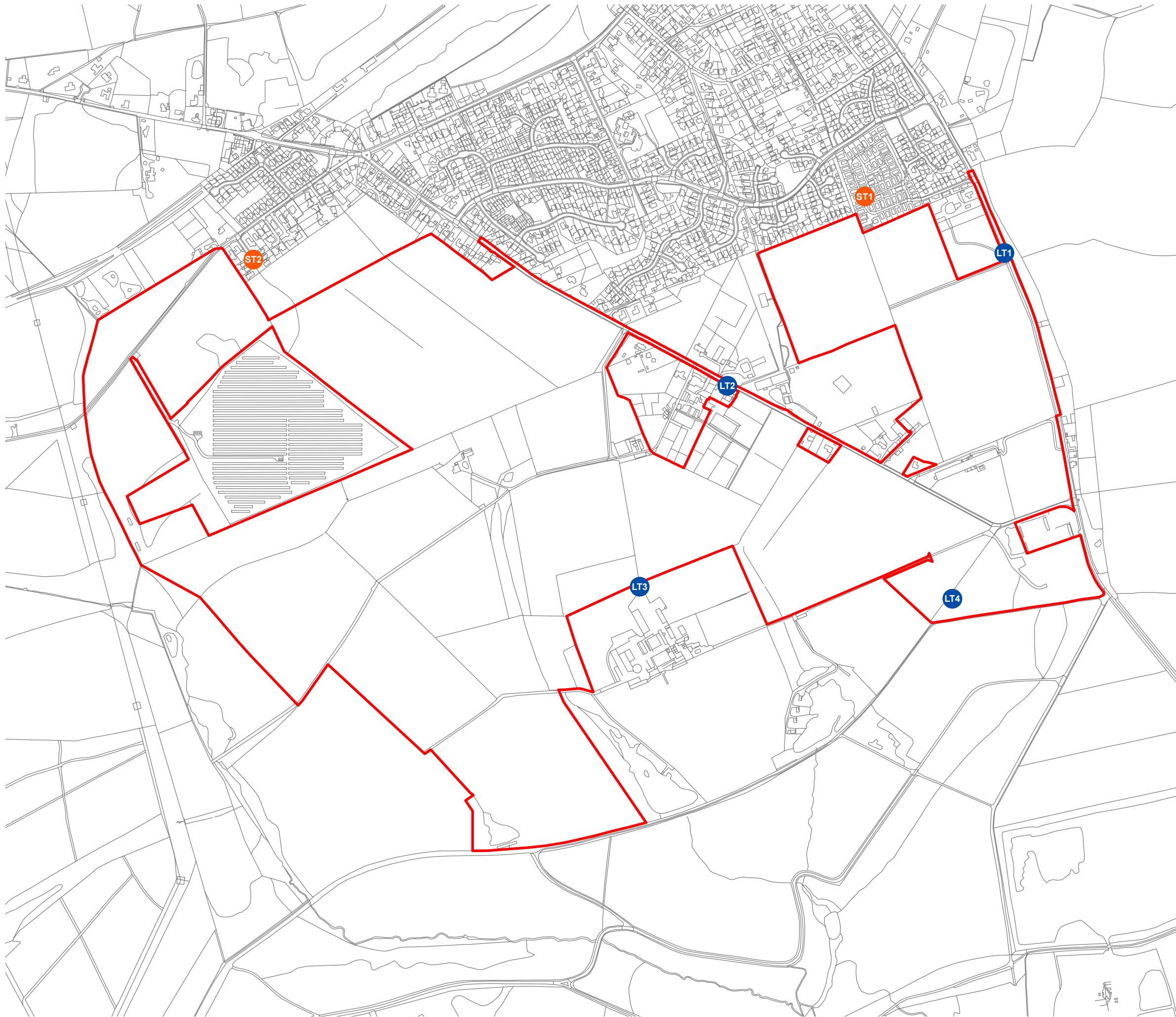
Table 4-1: Description of Noise Monitoring Locations

ID	Location	Description
LT1	Hillbury Road (approx. 5m from road edge)	Dominant noise road traffic noise Hillbury Road.
LT2	Ringwood Road (approx. 4m from road edge)	Dominant noise occasional vehicle on Ringwood Road.
LT3	North of Warren House Farm (approx. 245m from Ringwood Road)	No dominant source, general ambient noise sources (distant road traffic noise, occasional birdsong, occasional cows mooing, some occasional farm noise – tractors).
LT4	South eastern boundary (approx. 190m from Ringwood Road)	No dominant source, general ambient noise sources (distant road traffic noise, occasional birdsong, occasional cows mooing, some occasional farm noise – tractors). Noise from Cemex Hamer Warren Quarry Landfill was not noted as discernible during set up and take down of equipment.
ST1	Hillbury Park (approx. 210m from Hillbury Road)	No dominant source, general ambient noise sources (distant road traffic noise, occasional birdsong, occasional dogs barking and general neighbourhood noise).
ST2	Blackwater Grove (approx. 310m from Ringwood Road)	Quiet - no dominant source, general ambient noise (distant road traffic noise, occasional birdsong and general neighbourhood noise).

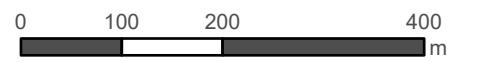
Each location exhibited a regular diurnal variation in noise levels with higher levels during the daytime period and lower noise levels during the night-time period when road traffic and human activity subsided. Time history plots of the measured noise levels are presented in **Appendix B**.

Noise levels at the weekend period were generally comparable to weekday levels. The noise levels measured adjacent to Hillbury Road were the highest followed by those measured adjacent to Ringwood Road. The measured noise levels adjacent to Hillbury Road indicate regular traffic, evidenced by a higher L_{A10} value compared to the L_{Aeq} value. Where traffic is intermittent, such as adjacent to Ringwood Road, the L_{Aeq} is higher than the measured L_{A10} value. This also occurs during the night-time period at both LT1 and LT2.

At all other locations the measured noise levels were ‘quiet’ with no dominant source and were noted to comprise of general ambient noise of distant road traffic noise, farm noise (tractors) and birdsong. This is expected given the ‘rural’ setting. This is also evidence by the low measured background noise levels (L_{A90}) during both the day and night-time periods.



- Site Boundary
- Short Term Noise Monitoring Location
- Long Term Noise Monitoring Location



Project Details	WIE19098-108: Alderholt
Figure Title	Figure 3: Noise Monitoring Locations
Figure Ref	WIE19098-108_GIS_NM_3A
Date	December 2022
File Location	\\waterman-consulting.com\legacyfile\LNCS_WIEL\Projects\WIE19098\108_Noise\9 www.watermangroup.com

Table 4-2: Summary of Measured Noise Levels

Location	Period [#]	L _{Aeq,T} dB ¹	L _{AFmax} dB ²	L _{A10,T} dB ³	L _{A90} dB ³ (Mode)	L _{A01} dB ³
LT1 Hillbuy Road	Day	62	83	60	34 (35)	74
	Night	53	81	37	24 (20)	53
LT2 Ringwood Road	Day	58	83	53	33 (34)	70
	Night	48	79	34	24 (21)	47
LT3 Warren Park Farm	Day	45	68	43	34 (37)	49
	Night	42	66	35	28 (22)	43
LT4 South Eastern Boundary	Day	39	59	40	32 (31)	46
	Night	34	57	33	26 (24)	40
ST1 Hillbury Park	Day	47	78	47	35 (-)	55
ST2 Blackwater Grove	Day	40	60	42	33 (31)	48

Note: ¹ Logarithmic average; ² 90th Percentile; ³ Arithmetic average. # Day period 0700-2300, Night-time period 2300-0700. All values rounded to nearest whole dB

5. Noise Assessment

A 3-dimensional CadnaA noise model of the existing Site and surrounds was developed using OS free data⁸, LiDAR Defra data⁹ and drawings provided by Scott Worsfold Associates LTD Architects. The noise model was calibrated using the measured noise levels and is based on the day and night where the highest overall level was recorded. For example, at LT1, Hillbury Road the overall average daytime noise level was (61.8dB) 62dB $L_{Aeq,16h}$, whereas on Friday and Tuesday the overall measured daytime noise level was 62.6dB $L_{Aeq,16h}$, although marginal it was the latter that was used for calibration of the noise model. During the night-time period the overall average night-time noise level was (53.3dB) 53dB $L_{Aeq,8h}$, whereas on Thursday night the measured overall night-time noise level was 54.7dB $L_{Aeq,8h}$. Again, although marginal, it was the latter that was used for the calibration of the noise model.

Table 5-1 presents a comparison between the measured noise levels and those predicted using CadnaA noise modelling software.

Table 5-1: Comparison Between Measured & Predicted Noise Levels

Location	Period	Measured Noise Level dB L_{Aeq}	Cadna dB L_{Aeq}	CadnaA minus Measured
LT1	Day	62.6	62.7	0.0
	Night	54.7	54.7	0.0
LT2	Day	59.2	59.3	+0.1
	Night	49.4	49.4	0.0
LT3	Day	48.4	47.6	-0.8
	Night	44.0	42.4	-1.6
LT4	Day	40.6	41.7	+1.1
	Night	36.7	33.4	-3.3

There is good correlation between the predicted noise levels using CadnaA noise modelling software and the measured noise levels. It is considered this provides a robust basis on which to assess the suitability of the site for residential and school use.

5.1 Residential Amenity

5.1.1 ProPG Stage 1 Noise Risk Assessment

Figures 3 and **4** present the day and night-time predicted noise levels and ProPG Level 1 Noise Risk across the site. During the daytime period the noise contour plot is predicted at 1.5 metres above ground level and at night-time at 4 metres above ground level, being generally representative of the location of residents during these time periods. With regard to residential development, for the majority of the site there is predicted to be negligible noise risk and therefore noise is not indicated to be a material planning consideration, with the exception of areas adjacent to Hillbury Road and Ringwood Road. This is expected given the rural setting.

⁸ [OS OpenMap - Local | OS Data downloads | OS Data Hub](#)

⁹ [Defra Survey Data Download](#)

Figure 4: Daytime Noise Levels & ProPG Level 1 Noise Risk Assessment (1.5m agl)

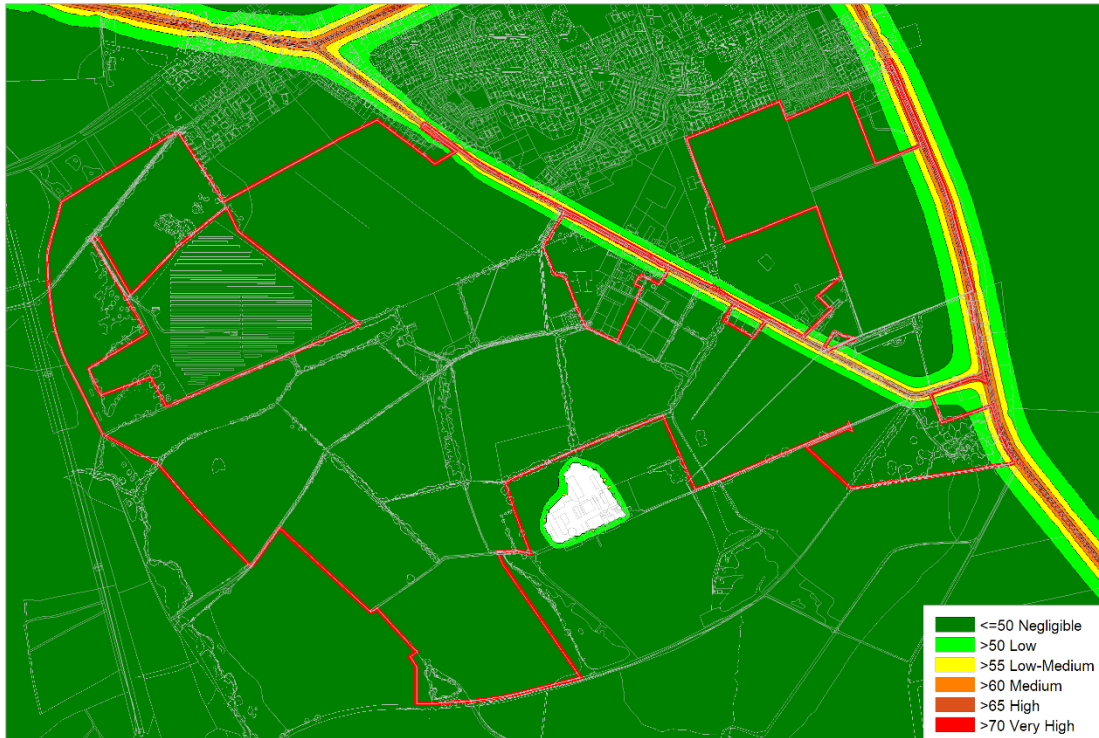
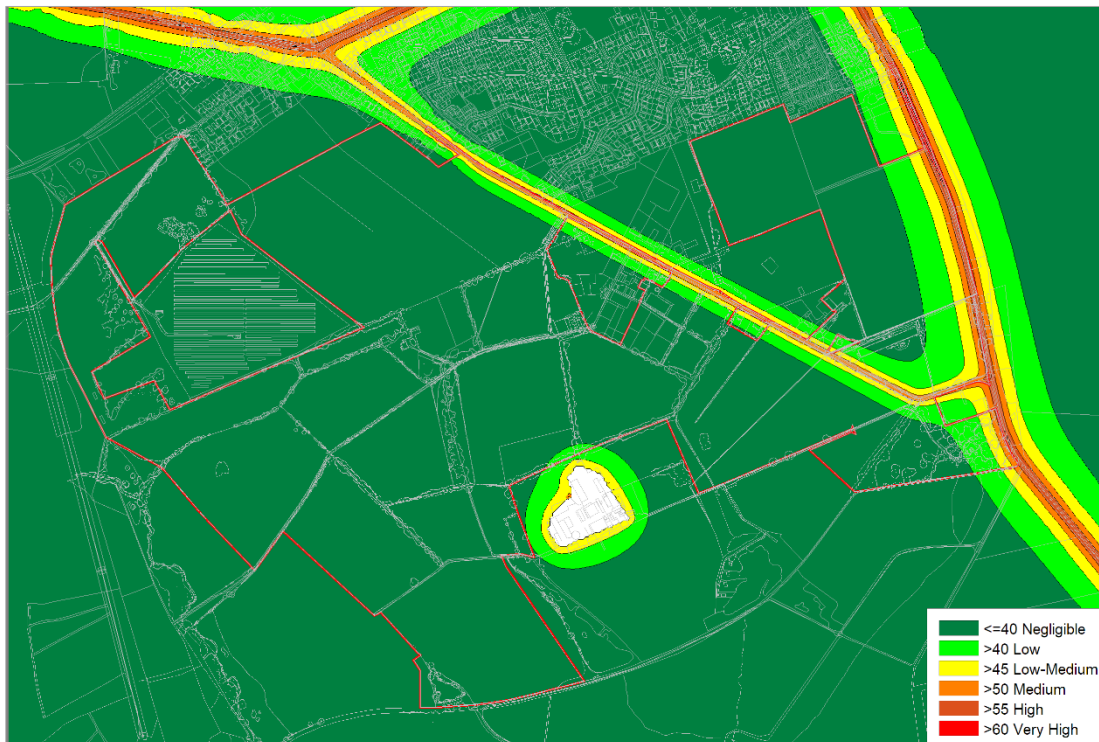


Figure 5: Night-Time Noise Levels & ProPG Level 1 Noise Risk Assessment (4.0m agl)



Adjacent to Hillbury Road the noise risk is identified as medium reducing to low-medium and adjacent to Ringwood Road the noise risk is identified as low-medium. This indicates that in areas proximate to the roads, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed demonstrating how the potential adverse impacts of noise will be mitigated and minimised in the finished development.

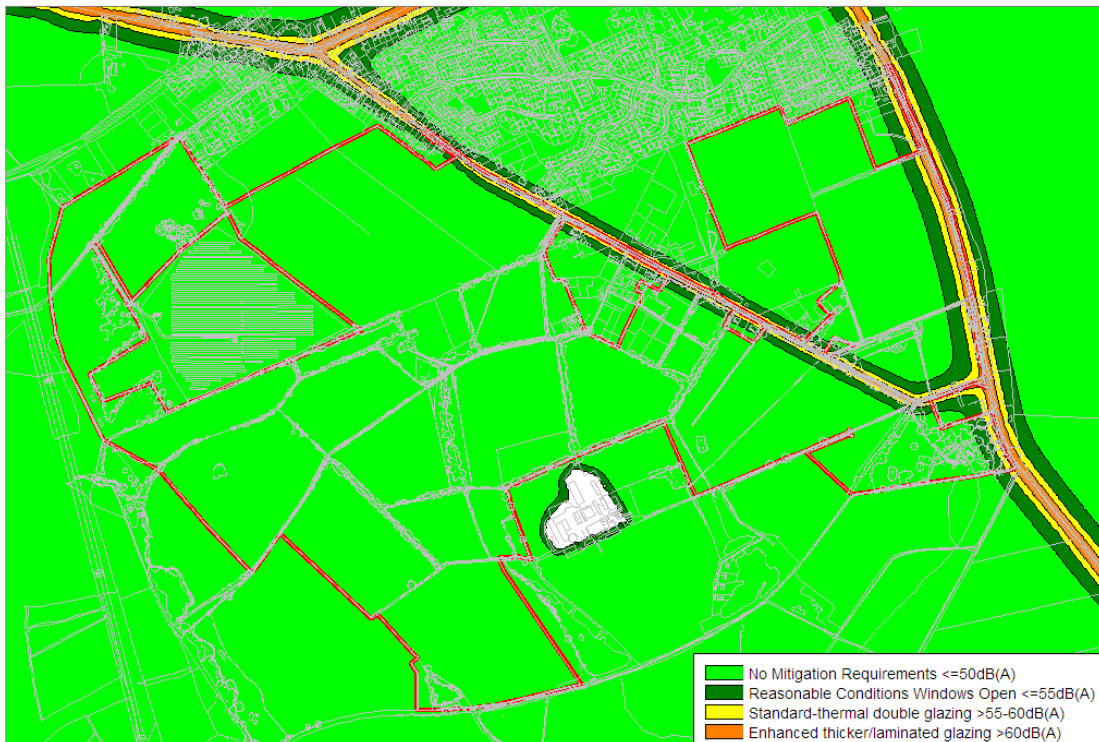
5.1.2 Internal Ambient Noise Levels

It is generally accepted that where daytime façade noise levels are $\leq 50\text{dB } L_{Aeq,16h}$ the internal ambient noise level (IANL) with windows open (based on 50% glazing) would be $\leq 35\text{dB } L_{Aeq,16h}$ thereby satisfying the criteria of BS8233:2014. Similarly, night-time façade noise levels of $\leq 45\text{dB } L_{Aeq,8h}$ and $\leq 60\text{dB } L_{Amax}$ would result in IANLs of $\leq 30\text{dB } L_{Aeq,8h}$ and $\leq 45\text{dB } L_{Amax}$ with windows open, again satisfying the criteria of BS8233.

Where the design intent is a natural ventilation strategy through opening of windows then BS8233:2014 considers that IANLs could be increase by 5dB and reasonable internal conditions still provided. This equates to a daytime façade noise level of $\leq 55\text{dB } L_{Aeq,16h}$ and night-time façade noise levels of $\leq 50\text{dB } L_{Aeq,8h}$ and $\leq 65\text{dB } L_{Amax}$. This approach is also reflected in ProPG.

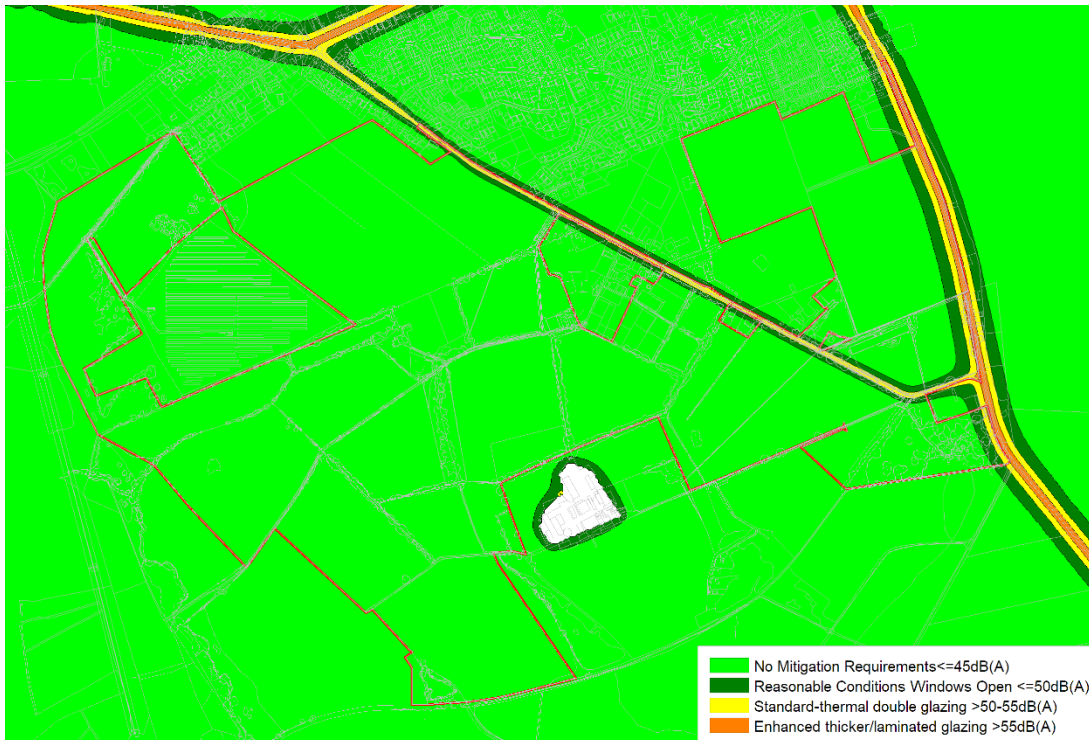
Figures 6 and 7 indicate where guideline IANLs are likely to be achieved with windows open. For the majority of the Site, as indicated by Stage 1 ProPG Noise Risk Assessment (refer to Figure 4 and 5).

Figure 6: Indicative Mitigation Requirements Day



Although the overall average measured noise level at LT3 Warren Farm indicates no mitigation requirements, from investigation of the time history plot, the noise level at times is elevated up to $62\text{dB } L_{Aeq,15min}$, assumed to be associated with operations at Warren Farm. This will be a consideration as the design develops to avoid potential land-use conflicts.

Figure 7: Indicative Mitigation Requirements Night



Based on the measured noise levels and noise modelling, standard thermal double glazing (closed) with through frame trickle vents (open) should allow BS8233 guideline internal ambient noise levels (IANLs) to be satisfied, although depending on set-backs, this may need upgrading for bedrooms, due to the measured L_{Amax} during the night-time period. Location of bedrooms on the rear of facades facing away from Hillbury Road and Ringwood Road would maximise screening and reduce the required glazing and ventilation sound insulation requirements, although this is not always possible to accommodate with scheme design.

Table 5-2 presents acoustic specification for glazing and ventilation based on the prevailing noise level with is predominantly transport based.

Table 5-2: Acoustic Specification for Glazing and Ventilation (*Transportation noise only*)

External Noise Level Not Exceeding		Acoustic Performance Requirement	
Day dB L_{Aeq}	Night dB L_{Aeq} (dB L_{AFmax})	Windows dB R_w+C_{tr}	Ventilators dB $D_{n,ew}+C_{tr}$
<50	<45 (<60)	No requirement	
57	52 (67)	26 (Standard Thermal Glazing)	32 (Standard Window Mounted Trickle Ventilator)
60	55 (70)		
63	58 (73)	29	35
66	61 (76)	32	38
69	64 (79)	35	41
72	67 (82)	38	44

Acoustic Spectrum LT3 Warren Park Farm & LT4 South Eastern Boundary

Bar charts 1 to 4 present the measured day and night-time 1/3 octave measured noise levels at LT3 Warren Park Farm and LT4 South Eastern Boundary nearest to Cemex Hamer Warren Quarry and Landfill. LT4 day bar chart only included data during the operational hours of the quarry and landfill.

During the daytime period at LT3 Warren Park Farm the noise spectrum does not indicate any tonal elements. During the night-time period a significant tone is indicated at 8kHz but the absolute noise level is low.

During the daytime period within the operational hours of Cemex Hamer Warren Quarry and Landfill, the measured noise spectrum at LT4 does not indicate any tonal elements. During the night-time period the noise spectrum illustrates a higher low frequency content between 25Hz-100Hz with another increase at the high frequency between 4kHz-8kHz, but there are no significant tones evident and the absolute noise levels are low.

Overall the measured noise spectrums together with the absolute noise levels do not indicate any potential constraint to development based on the acoustic spectrums.

5.1.3 External Amenity

With regard to external amenity, a daytime noise level of $\leq 55\text{dB L}_{\text{Aeq},16\text{h}}$ is generally the accepted approach based on current credited guidance within ProPG and BS8233. **Figure 4** indicates that this condition is predicted to be satisfied within the majority of the Site. Areas proximate to the Hillbury Road and Ringwood Road are exposed to levels above $55\text{dB L}_{\text{Aeq},16\text{h}}$.

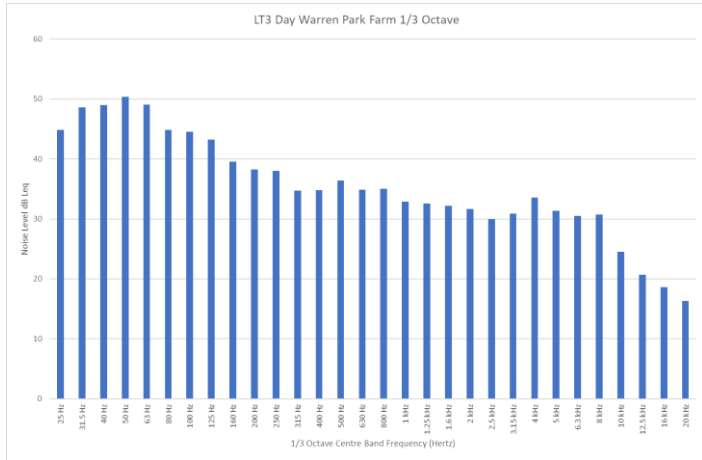
Based on the measured noise levels and noise modelling, the set back to the daytime $55\text{dB L}_{\text{Aeq},16\text{h}}$ contour line is around 20-25m from Hillbury Road and approximately 10m from Ringwood Road.

In light of the above the acoustic recommendations are as follows:

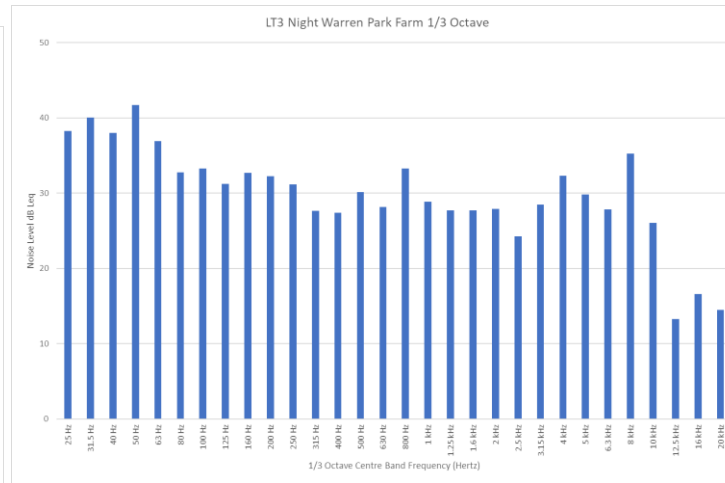
- Maximise set-back to the build-line adjacent to Hillbury Road and Ringwood Road.
- Locate gardens at the rear of properties adjacent to Hillbury Road and Ringwood Road to maximise screening to external amenity areas.



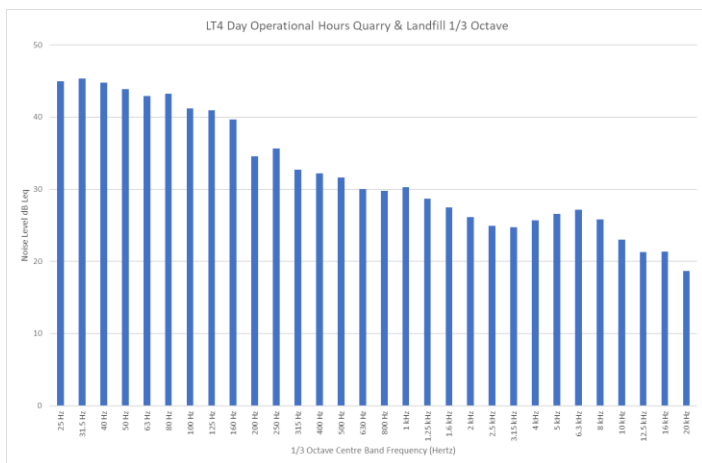
Bar Chart 1: LT3 Day Warren Park Farm



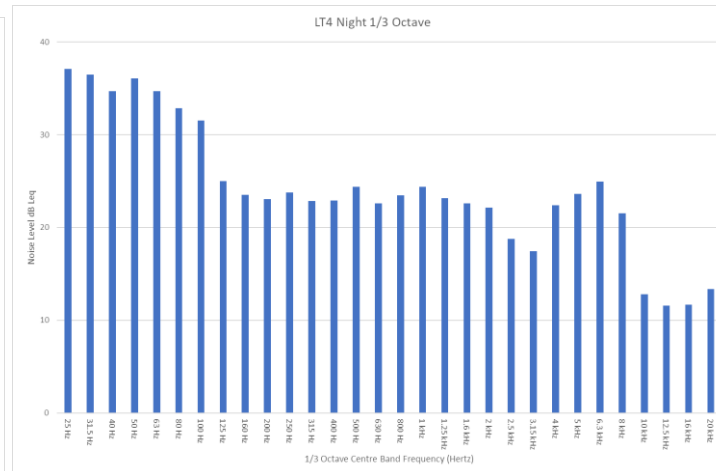
Bar Chart 2: LT3 Night Warren Park Farm



Bar Chart 3: LT4 Day Operation Hours Quarry/Landfill



Bar Chart 4: LT4 Night South Eastern Boundary



5.2 School Amenity

Figure 4 illustrates that, with the exception of areas directly adjacent to Hillbury Road and Ringwood Road, the site is suitable for school use without any noise constraints. Prevailing noise levels would allow BB93 internal noise levels to be achieved with open windows together with suitable external noise levels for formal outdoor teaching and playing fields.

5.3 Fixed External & Building Services Plant

Should there be any fixed external and building services plant associated with the development, the plant noise limits would be stringent due to the low prevailing background sound levels, especially during the night-time period where the average and modal values ranged from 20 to 28dB L_{A90} .

This will be subject to agreement with Dorset Council, but the preliminary recommendation is that noise from fixed external and building services plant should not exceed 35dB $L_{A,T,r}$ during the daytime period and 30dB $L_{A,T,r}$ during the night-time period at the nearest receptor location. This would safeguard existing and future residential amenity.

6. Masterplan

Figure 8 presents the illustrative Masterplan.

Figure 8: Illustrative Masterplan



The Masterplan illustrates the build line is set-back from Hillbury road together with garden areas predominantly at the rear of buildings thereby screened from road traffic noise. Adjacent to the rerouted Ringwood Road the set-back to build line is not as pronounced but predominantly garden areas are at the rear of buildings screened from the road.

The Masterplan illustrates a set-back to the build line from Warren Park Farm with gardens at the rear of buildings and therefore screened from any potential noise from the Farm. Although the measured overall noise levels at this location (LT3 Warren Park Farm) indicate a negligible noise risk, the time history plot indicates there are periods where a significant increase in noise occurs which may be discernible against the general low ambient noise levels. On this basis the proposed set-back and strategic location of gardens would provide mitigation against the potential conflict of land-uses thereby ensuring suitable residential amenity without constraints to operations at Warren Park Farm. This statement is based on the measured noise levels from the baseline survey.

7. Summary & Conclusions

Baseline environmental noise levels at the site and surrounds were established through survey conducted from Thursday 7th July to Tuesday 12th July 2022. For the majority of the site the conditions are 'quiet' and reflective of its rural setting. Within these areas noise is not regarded as a material consideration to development.

The results of the baseline noise survey were used to develop and calibrate a 3D noise model which was used to generate noise contours across the site and to inform the potential constraints to development.

The highest noise levels were measured adjacent to Hillbury Road and Ringwood Road. Development within these areas will need to consider noise in their acoustic design. Depending on set-back to the build line, standard thermal double glazing (closed) with through frame trickle vents (open) should allow BS8233 guideline internal ambient noise levels to be satisfied, although bedroom specification may require enhancement due to the measured L_{Amax} noise levels during the night-time period adjacent to the roads.

The recommendations for residential development are:

- Maximise set-back to the build-line adjacent to Hillbury Road and Ringwood Road.
- Locate gardens at the rear of properties adjacent to Hillbury Road and Ringwood Road to maximise screening to external amenity areas.
- Where possible locate bedrooms on rear facing facades away from Hillbury Road and Ringwood Road.

With the exception of areas directly adjacent to Hillbury Road and Ringwood Road, the site is suitable for school use without any noise constraints. Prevailing noise levels would allow BB93 internal noise levels to be achieved with open windows together with suitable external noise levels for formal outdoor teaching and playing fields.

Noise from Cemex Hamer Warren Quarry and Landfill does not appear to be a material consideration to development at the site, based on measured noise levels at LT4. This closest area to the quarry and landfill is currently indicated as SANG and therefore less sensitive than residential housing which is illustrated at greater distance.

This will be subject to agreement with Dorset Council, but the preliminary recommendation is that noise from fixed external and building services plant should not exceed 35dB $L_{A,Tr}$ during the daytime period and 30dB $L_{A,Tr}$ during the night-time period at the nearest receptor location. This would safeguard existing and future residential amenity.

The prevailing background sound levels (dB L_{A90}) are 'low' which will result in stringent plant noise limits, especially during the night-time period where the average and modal values ranged from 20 to 28dB L_{A90} .

Preliminary recommendation is that noise from fixed external and building services plant should not exceed 35dB $L_{A,Tr}$ during the daytime period and 30dB $L_{A,Tr}$ during the night-time period at the nearest receptor location. This would safeguard existing and future residential amenity. This is subject to agreement with Dorset Council.

The Masterplan illustrates mitigation measures such as build line set-back from roads and garden areas at the rear of buildings thereby screened to road traffic noise. This is also illustrated within the area proximate to Warren Park Farm

In summary, for the majority of the Site noise is not a material consideration to residential and school development. In areas adjacent to Hillbury Road and Ringwood Road suitable amenity could be provide through provision of suitable glazing and ventilation together with strategic layout.

APPENDICES

A. Glossary of Acoustic Terminology

AAWT-18h	Annual Average Week Day Traffic over the time period 0600-0000. Only includes Monday to Friday data.																		
Ambient sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.																		
Assessment period	The period in a day over which assessments are made.																		
A-weighting	A frequency weighting applied to measured or predicted sounds levels in order to compensate for the non-linearity of human hearing.																		
Background noise	Background noise is the term used to describe the noise measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L_{90} noise level (see below).																		
Background Sound Level dB $L_{A90,T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.																		
Broadband	Containing the full range of frequencies.																		
Decibel [dB]	<p>The level of noise is measured objectively using a Sound Level Meter. This instrument has been specifically developed to mimic the operation of the human ear. The human ear responds to minute pressure variations in the air. These pressure variations can be likened to the ripples on the surface of water but of course cannot be seen. The pressure variations in the air cause the eardrum to vibrate and this is heard as sound in the brain. The stronger the pressure variations, the louder the sound that is heard.</p> <p>The range of pressure variations associated with everyday living may span over a range of a million to one. On the top range may be the sound of a jet engine and on the bottom of the range may be the sound of a pin dropping.</p> <p>Instead of expressing pressure in units ranging from a million to one, it is found convenient to condense this range to a scale 0 to 120 and give it the units of decibels. The following are examples of the decibel readings of every day sounds:</p> <table border="0" style="margin-left: 20px;"> <tr><td>Four engine jet aircraft at 100m</td><td>120 dB</td></tr> <tr><td>Riveting of steel plate at 10m</td><td>105 dB</td></tr> <tr><td>Pneumatic drill at 10m</td><td>90 dB</td></tr> <tr><td>Circular wood saw at 10m</td><td>80 dB</td></tr> <tr><td>Heavy road traffic at 10m</td><td>75 dB</td></tr> <tr><td>Telephone bell at 10m</td><td>65 dB</td></tr> <tr><td>Male speech, average at 10m</td><td>50 dB</td></tr> <tr><td>Whisper at 10m</td><td>25 dB</td></tr> <tr><td>Threshold of hearing, 1000 Hz</td><td>0 dB</td></tr> </table>	Four engine jet aircraft at 100m	120 dB	Riveting of steel plate at 10m	105 dB	Pneumatic drill at 10m	90 dB	Circular wood saw at 10m	80 dB	Heavy road traffic at 10m	75 dB	Telephone bell at 10m	65 dB	Male speech, average at 10m	50 dB	Whisper at 10m	25 dB	Threshold of hearing, 1000 Hz	0 dB
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Male speech, average at 10m	50 dB																		
Whisper at 10m	25 dB																		
Threshold of hearing, 1000 Hz	0 dB																		
dB(A): A-weighted decibels	The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the 'A' filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.																		
Façade Noise Level	A noise level measured or predicted at the façade of a building, typically at a distance of 1m, containing a contribution made up of reflections from the façade itself (+3 dB).																		
Free Field Noise Level	A noise level measured or predicted which is unaffected by reflections, generally taken as being 3m from any reflecting surface excepting the ground.																		
L_{Amax} noise level	This is the maximum noise level recorded over the measurement period.																		
L_{Amin} noise level	This is the lowest level during the measurement period.																		

Appendices

L_{Aeq,T} noise level	<p>This is the 'equivalent continuous A-weighted sound pressure level, in decibels' and is defined in British Standard 7445 as the 'value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time'.</p> <p>It is a unit commonly used to describe construction noise, noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise.</p>
L_{A90} noise level	<p>This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.</p>
L_{A10} noise level	<p>This is the noise level which is achieved for 10% of the monitoring period and is often used to describe road traffic noise.</p>
Rating Level, dB L_{Ar,Tr}	<p>Specific sound level plus any adjustment for the characteristic features of the sound.</p>
Residual Sound	<p>Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound source.</p>
Sound Reduction Index (R)	<p>The sound reduction index is a single-number rating of the sound reduction through a wall or other building element. Since the sound reduction may be different at different frequencies, test measurements are subjected to a standard procedure which yields a single number that is about equal to the average sound reduction in the middle of the human hearing range.</p>
Specific Sound Level, L_{Aeq,Tr}	<p>Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval T.</p>
Weighted Sound Reduction Index dB R_w	<p>Single number rating used to describe the laboratory airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.</p>
C_{TR}	<p>An adjustment to the R_w scale to take account of the lower performance against a typical spectrum of road traffic noise dominated by low frequencies.</p>
D_{ne,W}	<p>Weighted element normalised level difference.</p>
PPV	<p>Ground vibration is measured in terms of Peak Particle Velocity (PPV) with units in mm/s. It should be noted that the PPV refers to the movement within the ground of molecular particles and not surface movement. The displacement value in mm refers to the movement of particles at the surface (surface movement).</p>

Appendices

B. Baseline Noise Survey

Table B1 presents the equipment detail used for the baseline noise survey. The equipment was field calibrated before and on completion of the survey with no significant drift.

Table B1: Equipment Detail

Location	Description	Serial Number	Date of Last Calibration
LT1 Hillbury Road	Rion NL-52 Type 1 Sound Level Meter	1087405	31 st March 2022 Certificate Number UCRT22/1484
	Rion NH-25 Pre-amplifier	87611	
	Rion UC-59 Microphone	14336	
LT2 Ringwood Road	Rion NL-52 Type 1 Sound Level Meter	586907	20 th July 2021 Certificate Number TCRT21/1892
	Rion NH-25 Pre-amplifier	87026	
	Rion UC-59 Microphone	13365	
LT3 Warren Park Farm ST1 Hillbury Park	Rion NL-52 Type 1 Sound Level Meter	01143565	2 nd Feb 2021 Certificate Number TCRT21/1090
	Rion NH-25 Pre-amplifier	43591	
	Rion UC-59 Microphone	10129	
LT4 South Eastern Boundary ST2 Blackwater Grove	Rion NL-52 Type 1 Sound Level Meter	01043379	12 th March 2021 Certificate Number TCRT21/1177
	Rion NH-25 Pre-amplifier	43407	
	Rion UC-59 Microphone	06864	

The weather conditions during the baseline survey were monitored remotely¹⁰ and are summarised in Table B2. Throughout the survey period conditions were suitable for valid noise measurements. The weather station IHAMPH195 is approximately 3km north-east of the Site at Fordingbridge.

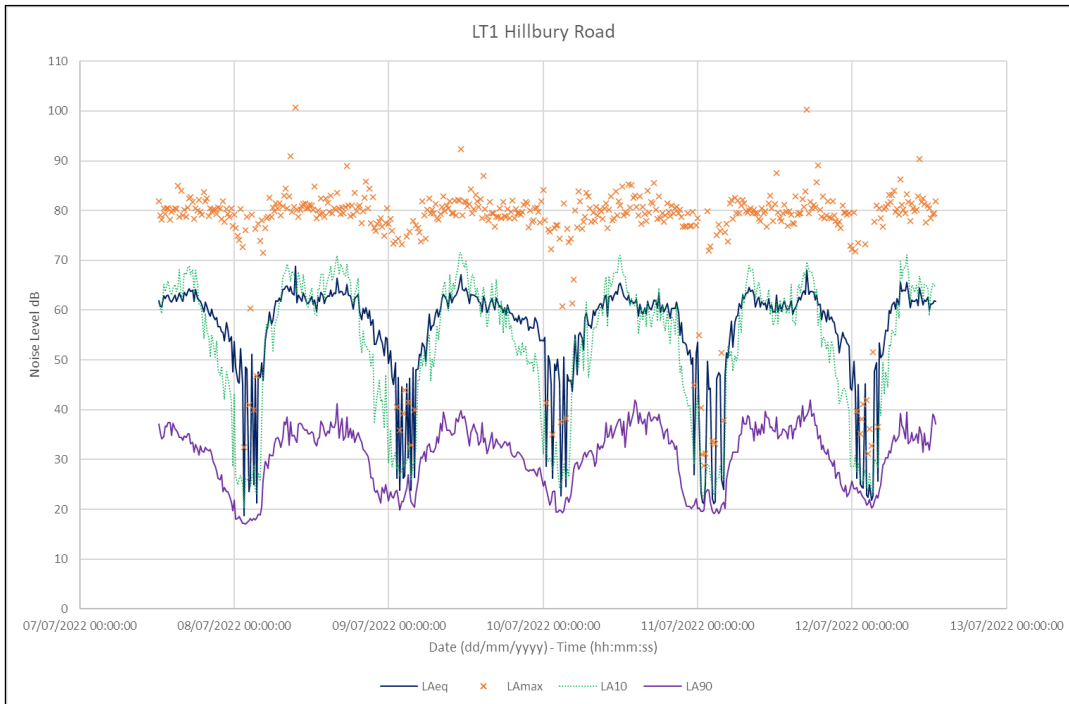
Table B2: Weather Details During The Survey Period

	Temp avg °C	Wind speed avg m/s	Wind Direction avg	Rain
Thursday 7th July 2022	19.1	1.6	NE	No
Friday 8th July 2022	20.4	1.2	NNW	No
Saturday 9th July 2022	21.0	1.6	NNE	No
Sunday 10th July 2022	20.5	1.0	S	No
Monday 11th July 2022	21.6	1.0	SSW	No
Tuesday 12th July 2022	22.7	<1.0	NNE	No

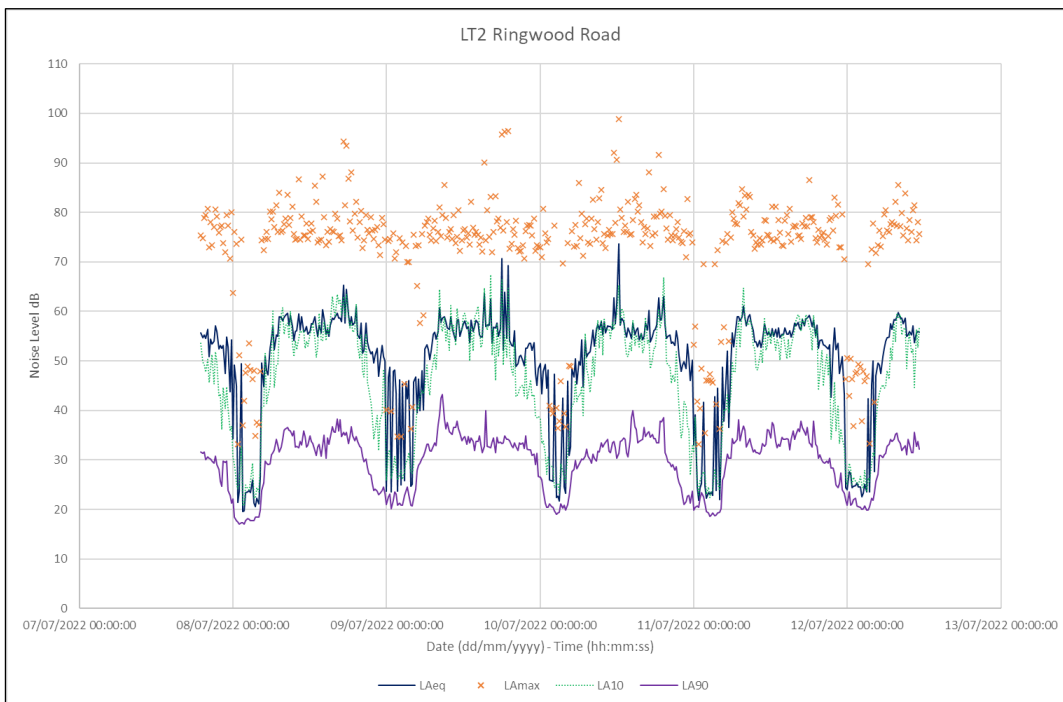
¹⁰ <https://www.wunderground.com/dashboard/pws/IHAMPSHI95/graph/2022-07-8/2022-07-8/daily>

Appendices

Graph B1: Time History Plot LT1 Hillbury Road

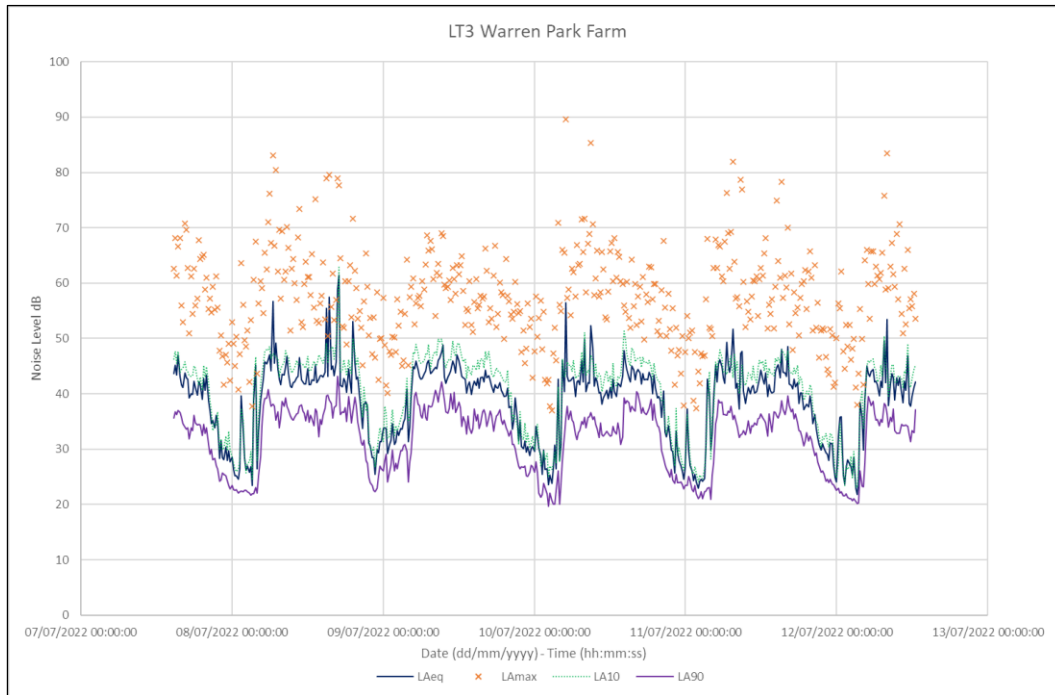


Graph B2: Time History Plot LT2 Ringwood Road

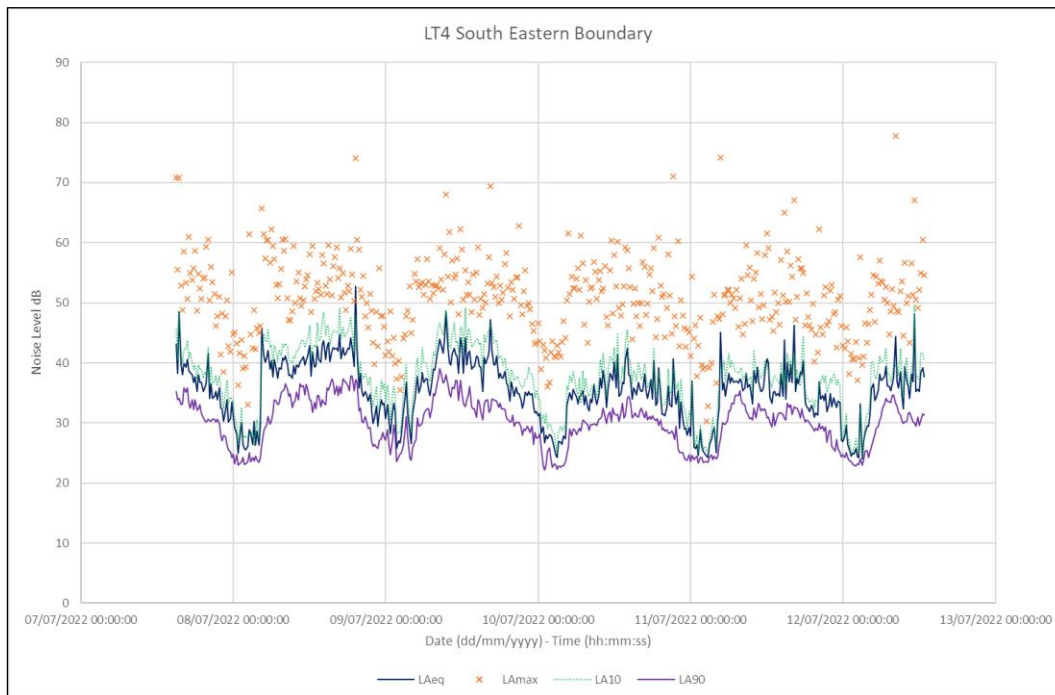


Appendices

Graph B3: Time History Plot LT3 Warren Park Farm



Graph B4: Time History Plot LT4 South Eastern Boundary



Appendices

UK and Ireland Office Locations

