

Appendix 12.1: 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]	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. 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. 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: <table> <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
Four engine jet aircraft at 100m	120 dB																		
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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																		
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.																		
$L_{Aeq,T}$ noise level	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'. 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.
LA₉₀ noise level	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.
LA₁₀ noise level	This is the noise level which is achieved for 10% of the monitoring period and is often used to describe road traffic noise.
Rating Level, dB L_{A,r,T}	Specific sound level plus any adjustment for the characteristic features of the sound.
Residual Sound	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.
Sound Reduction Index (R)	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.
Specific Sound Level, LA_{eq,T}	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval T.
Weighted Sound Reduction Index dB R_w	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.
C_{TR}	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.
D_{ne,W}	Weighted element normalised level difference.
PPV	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).

Appendix 12.2: Noise & Vibration Legislation, Policy and Guidance

The following legislation, policy and guidance has informed the assessment of noise and vibration effects within the Noise & Vibration Chapter.

Legislation

Control of Pollution Act, 1974

Part III of the Control of Pollution Act 1974¹ (CoPA) is dedicated to noise and is specifically concerned with noise pollution including codes of practice and encouraging Best Practicable Means (BPM) for noise reduction.

Section 60 governs noise emissions from Construction Sites enabling Local Authorities to set restrictions, such as operational hours and noise limits, upon the construction to foster reasonably practicable noise minimisation.

Section 61 enables construction sites to submit construction plans and noise minimisation steps for approval.

Section 62 pertains to noise in the street, specifically limiting loudspeaker use in the street to between the hours of 8am to 9pm and completely banning loudspeaker operation in the street for commercial advertisement purposes.

Section 68 governs noise emissions from plant or machinery in much the same way as Section 60, enabling Local Authorities to set restrictions or require mitigation strategies for plant and machinery connected to construction or factories.

Environmental Protection Act (1990).

Part 3 of the Environmental Protection Act 1990² (EPA 1990) imposes a duty on every local authority to inspect its area for statutory nuisances and to take reasonable steps to investigate any complaints of statutory nuisance that it receives. If a statutory nuisance is deemed to exist then a notice will be served requiring the abatement of the nuisance and this notice shall include a list of steps that should be taken to reduce the nuisance. It covers noise from premises or from vehicles, equipment or machinery in the street. Noise also includes vibration.

Part 3, S79 (9) states “*noise emitted from premises so as to be prejudicial to health or a nuisance;*”

Part 3, S79 (ga) states “*noise that is prejudicial to health or a nuisance and is emitted from or caused by a vehicle, machinery or equipment in a street.*”

For the issue to count as a statutory nuisance it must do one of the following:

- Unreasonably and substantially interfere with the use or enjoyment of a home or other premises;
- Injure health or be likely to injure health.

¹ Secretary of State (1974). ‘Control of Pollution Act 1974’. Available at <https://www.legislation.gov.uk/ukpga/1974/40>

² Secretary of State (1990) ‘Environmental Protection Act’. Available at <https://www.legislation.gov.uk/ukpga/1990/43/part/III>

If the council consider a statutory nuisance is happening or will happen in the future they must serve an abatement notice to stop or restrict the noise. The notice is served on either the person responsible or the owner/occupier of the premises.

Council can also serve a notice on people carrying out construction or demolition works and tell them how the work should be carried out to avoid a potential statutory noise nuisance. The notice can specify; a noise level, a plant or machinery that can be used, the hours when work can be done and steps that need to be taken to minimise noise. Those failing to comply with the notice can be prosecuted and fined an unlimited amount, with further fines for each day that they fail to comply.

Planning Policy

National Planning Policy Framework (2024)

The National Planning Policy Framework³ (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 198 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 200 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.’

The NPPF reflects advice within Noise Policy Statement for England (NPSE) in that they promote the avoidance of significant adverse impacts and reduction of other adverse impacts on health and quality of life; set within the context of the Government’s policy on sustainable development.

Noise Policy Statement for England (2010)

Published in 2010 by the Department for Environment, Food and Rural Affairs, the Noise Policy Statement for England⁴ (NPSE) lists three noise policy aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

³. Ministry of Housing, Communities and Local Government (December 2024, amended February 2025) National Planning Policy Framework [online]. Available from: National Planning Policy Framework (publishing.service.gov.uk)

⁴ Department for Environmental Food and Rural Affairs (March 2010). ‘Noise Policy Statement for England’ (NPSE). Available at <https://www.gov.uk/government/publications/noise-policy-statement-for-england>

- 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 sets out the long-term vision of government noise policy as to “*Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.*”

The ‘Explanatory Note’ within the NPSE provides further guidance on defining ‘significant adverse effects’ and ‘adverse effects’ using the concepts:

- No Observed Effect Level (NOEL) - the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

The three aims can therefore be interpreted as follows:

- The first aim is to avoid noise levels above the SOAEL;
- The second aim considers situations where noise levels are between the LOAEL and SOAEL. In such circumstances, all reasonable steps should be taken to mitigate and minimise the effects. However, this does not mean that such adverse effects cannot occur; and
- The third aim considers situations where noise levels are between the LOAEL and NOEL. In these circumstances, where possible, reductions in noise levels should be sought through the pro-active management of noise.

The NPPF and the NPSE provide the concepts for defining various levels of effect, but do not translate these into actual noise levels against which a proposed development can be assessed as acceptable, acceptable with various degrees of mitigation, or unacceptable. It is for individual Local Authorities to interpret the concepts in the NPPF and NPSE and translate them into noise level criteria to be applied in their area.

Local Policy

North Herts Local Plan 2011-2031⁵

The North Hertfordshire Local Plan 2011-2031 was adopted on Tuesday 8 November 2022 and replaces the saved policies of the District Plan Second Review with Alterations.

Policy SP18: Site GA2 – Land off Mendip Way, Great Ashby, allocates it as a Strategic Housing Site for a new neighbourhood of approximately 600 homes. The policy does not contain specific reference to noise or vibration with regard to the allocated Strategic Housing Site, only that ‘A comprehensive and deliverable Strategic Masterplan for the entire allocation is to be prepared and agreed between the landowner/developer and the Council.

⁵ <https://www.north-herts.gov.uk/sites/default/files/2022-12/North%20Hertfordshire%20Local%20Plan%202011-2031.pdf>

Guidance

The following guidance has informed the assessment of noise and vibration effects within this Chapter.

BS 5228 – ‘Code of Practice for Noise and Vibration Control on Construction and Open Sites’ Part 1⁶: 2009 + A1: 2014 and Part 2⁷: 2009+A1:2014

BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014 provide guidance on the assessment of noise and vibration effects during the redevelopment of a site, including procedures for estimating noise levels from construction activities and vibration attributable to vibratory rolling and piling activities. The guidance does not define acceptable limits. However, it does provide potential methods for assessing the significance of noise and vibration effects, which should be defined on a site-specific basis. BS 5228 also provides guidance on minimising potential effects through the use of mitigation and the adoption of BPM.

Calculation of Road Traffic Noise⁸ (1988)

The technical memorandum Calculation of Road Traffic Noise (CRTN) (1988) provides methods for the calculation of road traffic noise levels, taking into account factors such as distance between the road and the receptor, road configuration, ground cover, screening, angle of view, reflection from facades and traffic flow, speed and composition. The noise parameter calculated used for assessment purpose is the Basic Noise Level (BNL) which is the L_{A10-18} hour based on the 18-hour Annual Average Weekday Traffic (18hr-AAWT) at a distance of 10m from the road edge with the source 3.5m roadside and 0.5m above ground level.

Design Manual for Roads and Bridges (DMRB) LA111⁹ Noise and Vibration (2020)

This document sets out the requirements for assessing and reporting the effects of highways noise and vibration from construction, operation and maintenance projects. It states *“The construction, operation and maintenance of highway projects can lead to changes in noise and vibration levels in the surrounding environment.”* It further states *“This document sets out the requirements for noise and vibration assessments from road projects, applying a proportionate and consistent approach using best practice and ensuring compliance with relevant legislation.”*

Although specific to highway projects the noise criteria for changes in noise level can be used as a basis for the assessment of changes in road traffic noise due to changes in traffic volume, percentage HGV and speed and therefore magnitude.

⁶ BSI (2014). BS 5228-1:2009+A1:2014 ‘Code of Practice for Noise and Vibration Control on Construction and Open Sites- Part 1: Noise’. BSI

⁷ BSI (2014). BS 5228-2:2009+A1:2014 ‘Code of Practice for Noise and Vibration Control on Construction and Open Sites- Part 2: Vibration’. BSI

⁸ DoT (1988). ‘Calculation of Road Traffic Noise’. HMSO.

⁹ Highways England (2020). Design Manual for Roads and Bridges, ‘LA 111 Sustainability and Environmental Appraisal. Noise and Vibration’ – Version 2. Crown Copyright Available at <https://www.standardsforhighways.co.uk/dmr/b/search/cc8cfc7-c235-4052-8d32-d5398796b364>

Guideline For Environmental Noise Impact Assessment¹⁰ (2014)

The IEMA guidelines address the key principles of noise impact assessment and states “they are applicable to all development proposals where noise effects are likely to occur.”

It provides advice on how to scope a noise assessment; issues to be considered when defining the baseline noise environment, prediction of changes in noise levels as a result of implementing development proposals; and definition and evaluation of the significance of the effect of changes in noise levels *“for use only where the assessment is undertaken within an EIA.”*

Planning Policy Guidance - Noise

Planning Policy Guidance Noise¹¹ is a web-based resource on the NPPF and provides advice on planning and noise. It provides a hierarchy of noise exposure effects although a specific noise level is not assigned. The hierarchy table of noise exposure is reproduced below.

¹⁰ Institute of Environmental Management and Assessment (October 2014). ‘Guidelines for Environmental Noise Impact Assessment’

¹¹ [Noise - GOV.UK \(www.gov.uk\) https://www.gov.uk/guidance/noise--2](https://www.gov.uk/guidance/noise--2)

PPG-Noise: Noise Exposure Hierarchy Table¹²

Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

BS 4142 – ‘Methods for Rating and Assessing Industrial and Commercial Sound’ (2019)

BS 4142¹³ is used in the assessment of sound of an industrial and/or commercial nature. The standard provides an objective method for rating the likelihood of adverse impacts on nearby NSRs, having regard to the context in which a sound occurs. BS 4142 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.”

BS 8233 – ‘Guidance on Sound Insulation and Noise Reduction for Buildings’ (2014)

BS 8233¹⁴ builds on the World Health Organisation (WHO) guidelines, providing guidance for the control of noise in and around both new and refurbished buildings. BS 8233 recommends internal ambient noise criteria for a range of indoor spaces including residential land uses. The indoor ambient noise levels for unoccupied spaces relevant to this assessment are presented in **Table 8.2.1**.

BS 8233 Guideline Noise Levels for Residential Spaces

Activity	Location	Daytime $L_{Aeq,16hr}$ (07:00 to 23:00)	Night-Time $L_{Aeq,8hr}$ (23:00 to 07:00)
Resting	Living room	35dB	n/a
Dining	Dining room/ area	40dB	n/a
Sleeping (daytime resting)	Bedroom	35dB	30dB

Unlike the previous version, BS 8233:2014 does not provide recommendations in relation to maximum noise levels in residential bedrooms at night from individual noise events such as vehicle or aircraft movements. Instead, it advises:

“Regular individual noise events...can cause sleep disturbance. A guideline value may be set in terms of SEL (Sound Exposure Level) or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values.”

World Health Organisation – ‘Guidelines for Community Noise’ (1999)

This WHO Guidelines for Community Noise¹⁵ document provides guidance of a similar nature to BS 8233, although it places more emphasis on the potential health effects associated with noise. Specifically, the document recommends internal and external noise levels that will provide an acoustic environment that is conducive to uninterrupted speech and sleep. Daytime noise limits aim to prevent the majority of the population being moderately or seriously annoyed by noise. Night-time noise limits are intended to ensure a good night’s sleep.

WHO – ‘Night Noise Guideline for Europe’ (2009)

Based on review of scientific evidence, Night Noise Guidelines¹⁶ (NNG) for Europe recommends an Night outside of 40 dB should be the target to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. Night,outside value of 55 dB is recommended as an interim target for the countries where the NNG cannot be achieved in the short term for various reasons, and where policy-makers choose to adopt a stepwise approach. These

¹³ BSI (2019) BS4142:2014+A1:2019 ‘Methods for Rating and Assessing Industrial and Commercial Sound’. BSI.

¹⁴ BSI (2014) BS8233:2014 ‘Guidance on sound insulation and noise reduction for buildings’. BSI

¹⁵ World Health Organisation (WHO) (1999); ‘Guidelines for Community Noise’, WHO, Geneva.

¹⁶ World Health Organisation (WHO) (2009); ‘Night Noise Guidelines for Europe’, WHO.

guidelines are applicable to the Member States of the European Region, and may be considered as an extension to, as well as an update of, the previous WHO Guidelines for community noise (1999).

WHO Environmental Noise Guidelines for the European Region, (2018)

WHO Environmental Noise Guideline for the European Region¹⁷ which provides advice based on the health effects of noise taking account of research done since the publishing of Guidelines for Community Noise and Night Noise Guideline for Europe. It recommends environmental noise guideline values based on individual transportation sources (road, rail and air) in terms of the Lden and Lnight parameters. Although the 2018 WHO Environmental Noise Guidelines for the European Region supersedes the WHO's Guidelines for Community Noise and complements WHO's Night Noise Guidelines for Europe, it recommends that all the indoor guideline values within Guidelines for Community Noise should remain valid. Notwithstanding this, the latest WHO guidance on external noise levels is yet to be transported into UK standards, policy or guidance.

¹⁷ WHO. (2018); 'Environmental Noise Guidelines for the European Region'. WHO.

Appendix 12.3: Consultation

From: Patricia Howes [REDACTED]
Sent: Thursday, April 6, 2023 2:47 PM
To: Innes Urbanski <[REDACTED]>
Subject: RE: North East Stevenage EIA - Proposed Baseline Noise Survey

Innes

The proposed noise assessment methodology is satisfactory.

Yours sincerely

Patricia Howes

Environmental Health Officer

From: Innes Urbanski [REDACTED] >
Sent: 06 April 2023 12:03
To: Patricia Howes <[REDACTED]>
Subject: FW: North East Stevenage EIA - Proposed Baseline Noise Survey

Hi Patricia,

Thank you for your call yesterday. A Screening Opinion Request was issued in February 2022 (ref: 22/00329/SO), which came back as EIA Development. This should hopefully provide you with the relevant reference that you need to look at the planning history for the Site and what is potentially proposed.

If you can confirm by email your comment on the proposed baseline noise survey strategy that would be greatly appreciated.

Kind regards

Innes Urbanski MIOA

Associate Director

Waterman Infrastructure & Environment Ltd

[REDACTED]

From: Innes Urbanski

Sent: 05 April 2023 10:06

To: [REDACTED]

Cc: [REDACTED]

Subject: North East Stevenage EIA - Proposed Baseline Noise Survey

Dear Environmental Health,

We are undertaking the noise and vibration EIA of the proposed residential development referred to as North East Stevenage EIA, which is located on land off Great Ashby Way. For completeness I have cc'd in the planning officers (Naomi Reynard and Nigel Smith) together with the EIA co-ordinator (Maeve Ryan).

The reason for this email is to seek your approval in principle on the proposed baseline strategy which will form the basis for the noise assessment. There are no sources of vibration at the site or surrounds therefore baseline vibration is taken as zero.

We propose to conduct long-term unattended noise measurements at 3 locations illustrated on the plan below, to establish noise levels at the Site and within the vicinity of the nearest residential receptors that may be effected by the proposed development. The environmental noise loggers would be installed for a period of 5-days covering a weekday and weekend period. The following noise parameters would be measured in 15-minute contiguous data sets; LAeq, LMax, LA10 and LA90. In addition to this a short-term daytime noise measurement (weekday) would be conducted adjacent to Mendip Way road to provide an indication of daytime noise levels within the vicinity of residential houses at this location.

Proposed Noise Monitoring Locations



The noise monitoring locations may however be subject to change depending on site conditions and security.

If you could let me know if you agree in principle with the baseline approach or indeed if there is something additional that you wish for us to consider.

Thanks in advance and kind regards

Innes Urbanski MIOA

Associate Director

Waterman Infrastructure & Environment Ltd

[REDACTED]

Waterman Group is a multidisciplinary consultancy providing sustainable solutions to meet the planning, engineering design and project delivery needs of the property, infrastructure, environment and energy markets.

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Appendix 12.4: Baseline Noise Survey

Table 12.4.1 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 12.4.1: Equipment Detail

Location	Description	Serial Number	Date of Last Calibration
LT1 Tile Kiln Farm	Rion NL-52 Type 1 Sound Level Meter	921231	25/2/2022
	Rion NH-25 Pre-amplifier	21273	Certificate Number 1502030-1
	Rion UC-59 Microphone	04266	
LT2 Merrick Close	Rion NL-52 Type 1 Sound Level Meter	654029	21/10/2022
	Rion NH-25 Pre-amplifier	54074	Certificate Number 1503640-1
	Rion UC-59 Microphone	08283	
LT3 Dane End Farm	Rion NL-52 Type 1 Sound Level Meter	375678	21/10/2022
	Rion NH-25 Pre-amplifier	65805	Certificate Number 1503640-2
	Rion UC-59 Microphone	11167	
LT4 Cleveland Way / Ryders Hill	Rion NL-52 Type 1 Sound Level Meter	1076307	4/8/2022
	Rion NH-25 Pre-amplifier	76524	Certificate Number 1503064-2
	Rion UC-59 Microphone	12357	
All	Acoustic Calibrator Rion NC-75	35270122	3/8/2022 Certificate Number 1503064-1

During the baseline survey weather conditions were monitored remotely¹ and data sets where windspeeds greater than 5m/s and/or rain were removed from the subsequent data analysis. This included Friday day and night-time periods due to wind speeds exceeding 5m/s.. A summary of weather conditions during the baseline survey are presented in Table 12.4.2.

Table 12.4.2: Summary of Weather Conditions During Survey

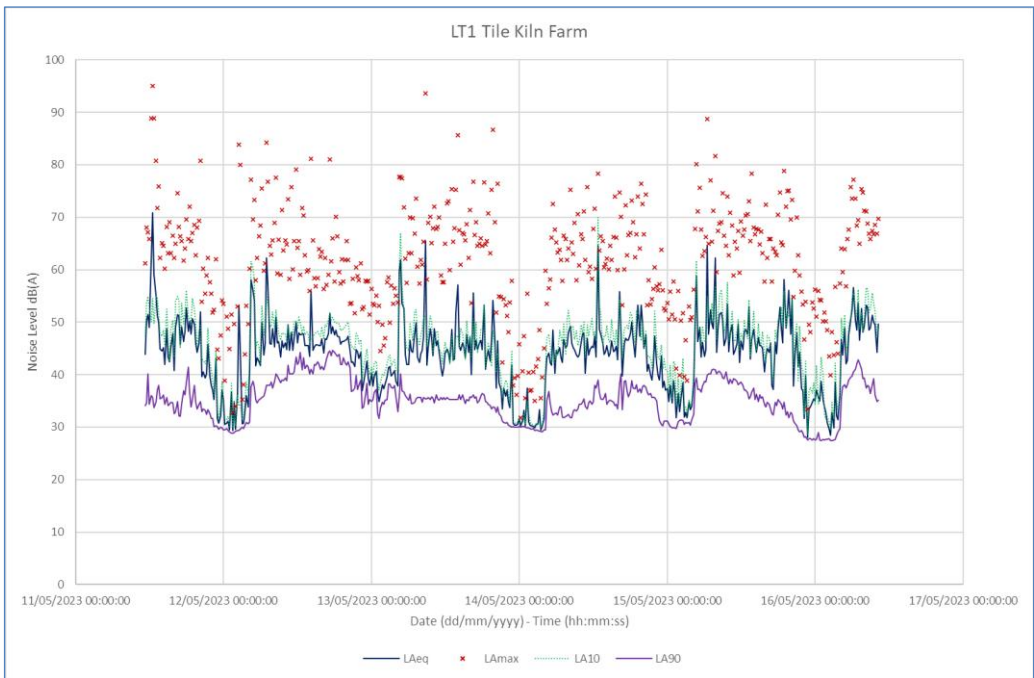
Day	Date	Temp Av. °C	Wind Ave m/s	Wind High m/s	Direction	Periods >5m/s	Rain	Time
Thursday	11/05/2023	12.5	<4.0	2	NW		Yes	2000-2105
Friday	12/05/2023	9.6	2	8	NNE	0555-0000	Yes	1130-1450
Saturday	13/05/2023	9.1	1.5	7	NNE	0000-0935	No	
Sunday	14/05/2023	12.5	<1	3	NNW		No	
Monday	15/05/2023	10.9	1	6	NNE	0630-1500	No	
Tuesday	16/05/2023	10.6	<1	4.5	NNW		No	

Graphs 12.4.1, 12.4.2, 12.4.3 and 12.4.4 present the time history plots of measured noise levels for

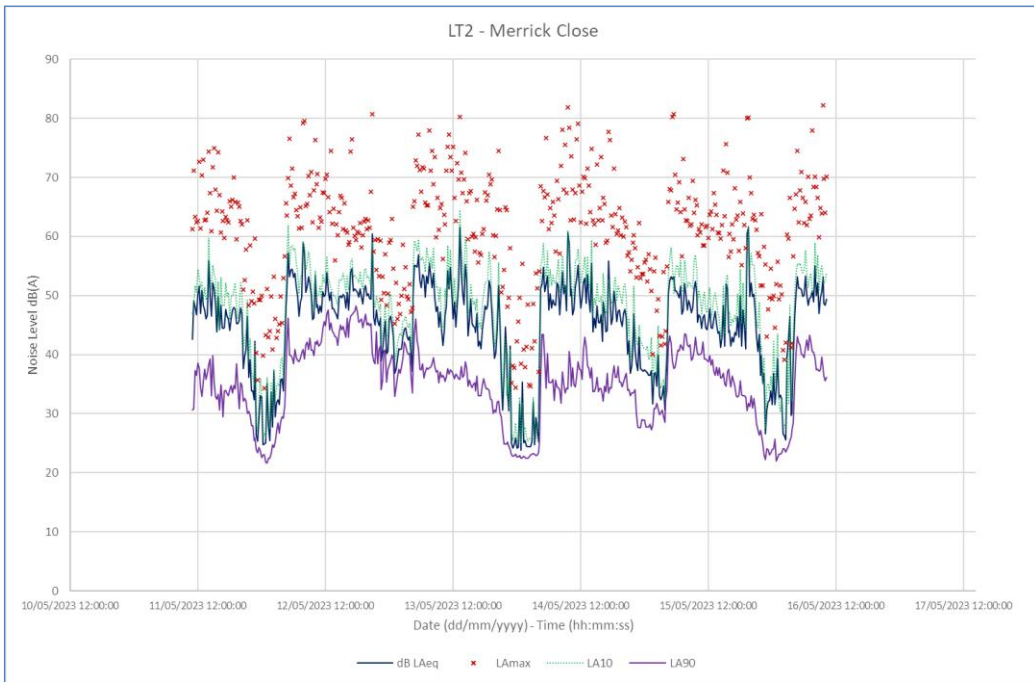
¹ <https://www.wunderground.com/dashboard/pws/IHITCH71>

monitoring locations LT1, LT2, LT3 and LT4 respectively.

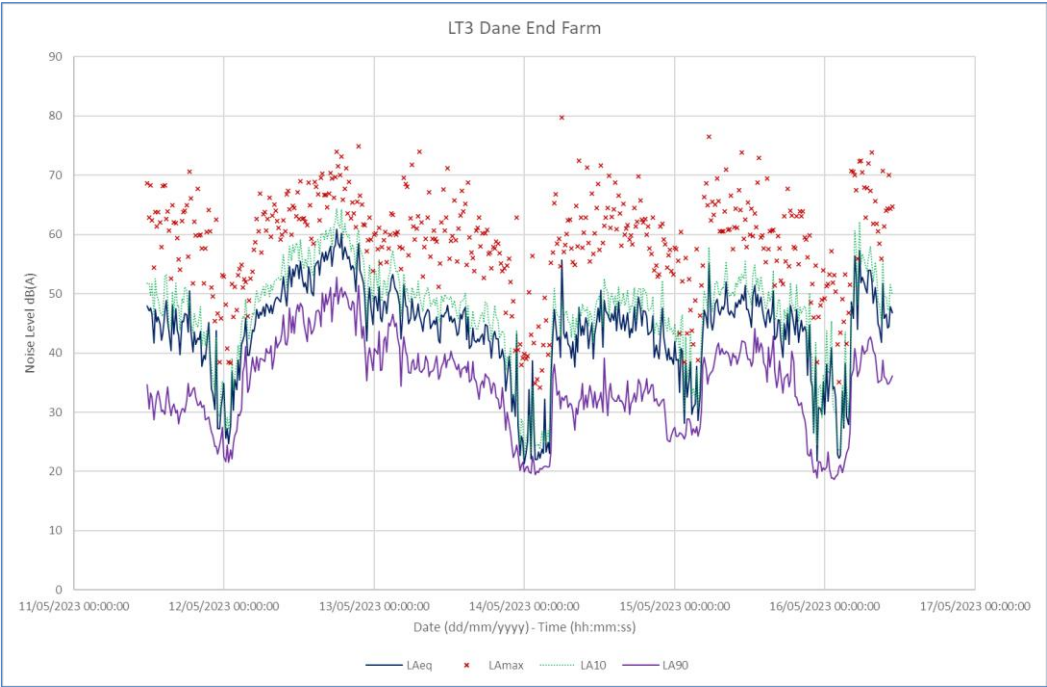
Graph 12.4.1: LT1 Tile Kiln Farm



Graph 12.4.2: LT2 Merrick Close



Graph 12.4.3: LT3 Dane End Farm



Graph 12.4.4: LT4 Cleveland Way / Ryders Hill

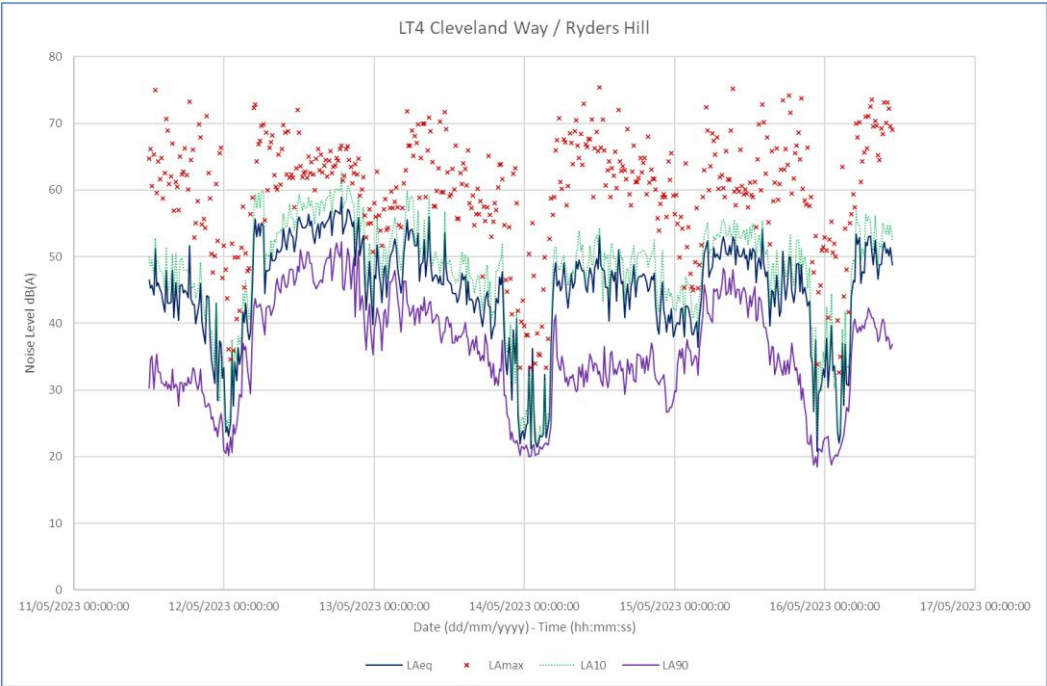


Table 12.4.3 presents the measured noise levels at ST1, Mendip Way.

Table 12.4.3: ST1 Mendip Way

Date - Start Time	LAeq	LAmx	LA10	LA90
11/05/2023 10:33:55	53.6	70.6	56.9	39.8
11/05/2023 10:38:55	53.5	72.1	54.3	39.7
11/05/2023 10:43:55	59.3	75.9	61.1	42.3
11/05/2023 10:48:55	54.5	73.5	55.6	41.3
11/05/2023 10:53:55	56.2	71.6	59.5	40.7
11/05/2023 10:58:55	57.5	73.2	61.3	40.9
11/05/2023 11:03:55	58.8	76.1	61.6	40.9
11/05/2023 11:08:55	54.1	71.0	57.8	37.5
11/05/2023 11:13:55	59.0	76.5	61.2	41.4
11/05/2023 11:18:55	56.3	72.8	58.3	38.9
11/05/2023 11:23:55	56.3	72.8	59.6	37.9
11/05/2023 11:28:55	53.7	70.2	56.2	41.4
11/05/2023 11:33:55	58.2	72.7	61.3	40.8
11/05/2023 11:38:55	58.9	76.2	61.1	43.4
11/05/2023 11:43:55	57.0	73.3	59.9	41.4
11/05/2023 11:48:55	59.6	75.3	62.6	42.1
11/05/2023 11:53:55	57.2	73.3	60.7	43.2
11/05/2023 11:58:55	57.1	74.0	59.9	41.0

Appendix 12.5: Construction Assessment Methodology

Construction Noise Assessment

The significance criteria for the construction noise assessment are based on 'The ABC Method' from BS 5228-1:2009+A1:2014. An extract describing this method is provided below.

Example Method 1 – The ABC Method

Table 12.5.1 shows an example of the threshold of likely significant effect at dwellings when the Site noise level rounded to the nearest decibel, exceeds the listed value. The table can be used as follows: for the appropriate period (night, evening / weekends or day), the ambient noise level is determined and rounded to the nearest 5 dB. This is then compared with the site noise level. If the site noise level exceeds the appropriate category value, then a significance effect is deemed to occur.

Table 12.5.1: Example threshold of significant effect at dwellings

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A ^{A)}	Category B ^{B)}	Category C ^{C)}
Night-time (23.00-07.00)	45	50	55
Evenings and weekends ^{D)}	55	60	65
Daytime (07.00-19.00) and Saturdays (07.00-13.00)	65	70	75

NOTE 1: A likely significant effect is indicated if the site L_{AeqT} noise level, exceeds the threshold level for the Category appropriate to the ambient noise level

NOTE 2: If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a likely significant effect is indicated if the total L_{Aeq} noise level for the period increases by more than 3 dB due to site noise.

NOTE 3: Applied to residential receptors only.

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

B) Category B: threshold values to use when the ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

C) Category C: threshold values to use when the ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

D) 19.00-23.00 weekdays, 13.00-23.00 Saturdays and 07.00-23.00 Sundays.

(Source: BS 5228-1:2009+A1:2014, Page119)

In this case, the threshold of significance has been determined using the ABC method of BS5228-1:2009+A1:2014. Calculations have not been undertaken for the evening or night-time periods as it is assumed that evening and night-time construction work would only be undertaken under exceptional circumstances and not without prior approval. Exceptional circumstances may include concreting operations where the pumping of concrete to foundations has to be a continuous process which may require operations outside the daytime period.

Table 12.5.2 presents the ABC BS5228 construction threshold daytime noise levels based on the measured prevailing noise levels. Table 12.5.3 presents the nearest distance from works to the sensitive receptors.

Table 12.5.2: Construction Threshold Noise Levels

SR Ref	SR Description	Daytime Noise Level dB $L_{Aeq,T}$	BS5228 ABC Threshold Noise Level dB $L_{Aeq,T}$	Distance from Site Boundary (approx. m)	Distance from Nearest Development Area (approx. m)
A	Tile Kiln Farm (LT1)	49	65	15	45
B	The Bungalows, Warrengreen Lane (LT1)	49	65	10	135
C	Dane End Farm (LT3)	45	65	150	225
D	Merrick Close (LT2)	50	65	30	50
E	Mendip Way, (ST1)	57	65	25	195
F	Grampian Place (LT2)	50-57	65	15	170
G	Cromdale Walk (LT2)	50-57	65	15	110
H	Cleveland Way / Ryders Hill (LT4)	46	65	40	60
I	Future Residential	-	65	Within Site	15
J	Future School	-	65	Within Site	40

Table 12.5.3: Shortest Distance From Works to Sensitive Receptors

SR Ref	SR Description	Distance from Site Boundary (approx. m)	Distance from Nearest Development Area (approx. m)
A	Tile Kiln Farm	15	45
B	The Bungalows, Warrengreen Lane	10	135
C	Dane End Farm	150	225
D	Merrick Close	30	50
E	Mendip Way,	25	195
F	Grampian Place	15	170
G	Cromdale Walk	15	110
H	Cleveland Way / Ryders Hill	40	60
I	Future Residential	Within Site	15
J	Future School	Within Site	20

Table 12.5.4 presents the magnitude of construction noise used in the assessment of the predicted daytime construction noise level. The magnitude is as detailed within DMRB LA 111i Table 3.12 'Construction time period – LOAEL and SOAEL' and Table 3.16 'Magnitude of impact and construction noise descriptors' and information provided within Appendix E of BS 5228:2009-1+A1:2014.

Table 12.5.4: Magnitude of Construction Noise Level

Magnitude	Demolition & Construction Noise Level dB $L_{Aeq,T}$	Definition
Negligible	< Baseline (Prevailing) Noise Level	The effect is not of concern
Small	$\leq$ Construction Threshold Noise Level	The effect is undesirable but of limited concern
Medium	>Threshold Noise Level to <Threshold +5dB (or ≤ 75 dB $L_{Aeq,T}$, whichever is highest	The effect gives rise to some concern but is likely to be tolerable depending on scale and duration
Large	>Threshold +5dB (or >75dB $L_{Aeq,T}$, whichever is highest	The effect gives rise to serious concern and it should be considered unacceptable, exception for very brief exposure depending on the absolute level

Where T is taken as 10 hours Monday to Friday and 5 hours Saturday.

Generic calculations were undertaken using the data and procedures set out in BS 5228-1:2009+A1:2014 for the noisiest construction operations, to derive indicative noise levels at selected sensitive receptors (SRs). The highest noise levels tend to be associated with plant associated with, earthworks, piling, concreting, pavement work. During the fit-out, construction noise would be significantly lower. The calculations assume that plant would be operating at the closest point to the receptor and take account of CEMP affording 10dB attenuation.

The noisiest construction operations and associated noise levels with no mitigation are considered to be as follows:

- Earthworks 74 dB $L_{Aeq,1h}$ at 10m
- CFA Piling 75 dB $L_{Aeq,1h}$ at 10m
- Concreting 73 dB $L_{Aeq,1h}$ at 10m
- Pavement 71 dB $L_{Aeq,1h}$ at 10m

Table 12.5.5 presents the generic plant and on-time used in the calculation of the construction noise levels with no mitigation applied. A maximum worst case noise level over a one hour period was calculated, assuming that plant would be operating at the closest point to the nearest receptor. In practice, noise levels would tend to be lower owing to greater separation distance as the works progress. They would also tend to reduce over a 10-hour working day (week-day, 5 hours Saturday) owing to periods of plant inactivity.

The closest receptors to the proposed Development are identified Figure 12.1.

Table 12.5.5 Generic Construction Noise Levels (no mitigation)

Phase / Plant	BS5228-1:1997+A1:2014	LAeq @10m	Kh	(t/T)*100	Partial Exposure	Barrier Attenuation	Noise Level @ NSR LAeq,1h (dB)	Overall LAeq,1h (dB)
Earthworks								84
Tracked Excavator (14t)	Table C2 ref 7	70	0	1	0	0	70.0	
Tracked Excavator (14t)	Table C2 ref 7	70	0	1	0	0	70.0	
Wheeled Backhoe Loader (8t)	Table C2 ref 8	68	0	1	0	0	68.0	
Hydraulic Vibratory Compactor (Tracked Excavator)	Table C2 ref 42	78	0	1	0	0	78.0	
Dozer (11t)	Table C2 ref 13	78	0	1	0	0	78.0	
Lorry (4-axle wagon)	Table C2 ref 34	80	0	1	0	0	80.0	
CFA								85
Crawler mounted rig - Continuous Flight Auger Piling Cast In-Situ	Table C3 ref 21	79	0	1	0	0	79.0	
Tracked Excavator	Table C3 Ref 23	68	0	1	0	0	68.0	
Tracked Excavator Inserting Cylindrical Metal Cage	Table C3 Ref 24	74	0	1	0	0	74.0	
Truck Mounted Concrete Pump + Boom Arm	Table C4 ref 29	80	0	1	0	0	80.0	
Concrete Mixer Truck	Table C4 Ref 20	80	0	1	0	0	80.0	
Pump Boom + Vibrating Poker	Table C4 ref 36	71	0	1	0	0	71.0	
Pump Boom + Vibrating Poker	Table C4 ref 36	71	0	1	0	0	71.0	
Concreting								83
Truck Mounted Concrete Pump + Boom Arm	Table C4 ref 29	80	0	1	0	0	80.0	
Concrete Mixer Truck	Table C4 Ref 20	80	0	1	0	0	80.0	
Pump Boom + Vibrating Poker	Table C4 ref 36	71	0	1	0	0	71.0	
Pavement Works								81
Road planer	Table C5 ref 7	82	0	0.25	-6	0	76.0	
Spreading chip and fill	Table C5 ref 12	77	0	0.25	-6	0	71.0	
Vibratory roller	Table C5 ref 20	75	0	0.25	-6	0	69.0	
Asphalt paver (+ tipper lorry)	Table C5 ref 30	75	0	0.25	-6	0	69.0	
Vibratory compactor (asphalt)	Table C5 ref 29	82	0	0.25	-6	0	76.0	
Lorry (4-axle wagon)	Table C2 ref 34	80	0	0.25	-6	0	74.0	



The calculation of construction noise is determined from the following calculation

$\text{dB } L_{Aeq} \text{ at receptor} = \text{Noise level at 10m} - 20 \times \text{Log (distance to receptor from works / 10)}$

Table 12.5.6 presents the predicted construction noise levels at receptor locations when works are being undertaken at the shortest distance with implementation of CEMP affording 10dB attenuation.

Table 12.5.6 Scenario 1 Predicted Construction Noise Levels With CEMP & Level of Effect

SR ID	SR	Prevailing Noise Level dB LAeq,T	Construction Threshold Level dB LAeq,T	Earthworks (dB / Effect)	CFA Piling (dB / Effect)	Concreting (dB / Effect)	Pavement (dB / Effect)
A	Tile Kiln Farm	49	65	71 (Moderate Adverse)	62 (Minor Adverse)	60 (Minor Adverse)	68 (Moderate Adverse)
B	The Bungalows, Warrensgreen Lane	49	65	74 (Moderate Adverse)	52 (Minor Adverse)	51 (Minor Adverse)	71 (Moderate Adverse)
C	Dane End Farm	45	65	51 (Minor Adverse)	48 (Minor Adverse)	46 (Minor Adverse)	48 (Minor Adverse)
D	Merrick Close	50	65	64 (Minor Adverse)	61 (Minor Adverse)	59 (Minor Adverse)	62 (Minor Adverse)
E	Mendip Way,	57	65	66 (Moderate Adverse)	49 (Negligible)	47 (Negligible)	63 (Minor Adverse)
F	Grampian Place	50-57	65	71 (Moderate Adverse)	50 (Negligible)	49 (Negligible)	68 (Moderate Adverse)
G	Cromdale Walk	50-57	65	71 (Moderate Adverse)	54 (Minor Adverse)	52 (Minor Adverse)	68 (Moderate Adverse)
H	Cleveland Way / Ryders Hill	46	65	62 (Minor Adverse)	60 (Minor Adverse)	58 (Minor Adverse)	59 (Minor Adverse)
I	Future Proposed Residential	-	65	71 (Moderate Adverse)	72 (Moderate Adverse)	70 (Moderate Adverse)	68 (Moderate Adverse)
J	Future Proposed School	-	65	71 (Moderate Adverse)	63 (Minor Adverse)	61 (Minor Adverse)	68 (Moderate Adverse)

Vibration

Table 12.5.8 presents typical distances for various construction operations which give rise to just perceptible vibration.

Table 12.5.8: Distance at which vibration is just perceptible

Construction Activity	Distance from Activity when Vibration may Just be Perceptible (metres)
Heavy vehicles	5 – 10
Excavation	10 – 15
CFA Piling	15 – 20
Rotary Bored Piling	20 – 30
Vibratory Piling	40 – 60

Note:

Distances for perceptibility are only indicative and dependent upon a number of factors, such as the radial distance between source and receiver, ground conditions, and underlying geology

Table 12.5.9 presents typical vibration levels for rotary bored piling, which is taken as being indicative of that arising from CFA piling, extracted from BS5228-2.

Table 12.5.9: Typical vibration levels with distance from piling (BS5228-2)

Distance (m)	Rotary Bored Piling PPV mm/s
5	0.22 - 0.54
10	0.30 - 1.10
20	0.05 - 0.55
30	0.03

Note: Dependent on ground conditions and underlying geology

The level of effect is determined from information presented within Tables 12.5.8, 12.5.9 and distance from works to receptors presented as Table 12.5.3.

Typical CEMP Measures

A Construction Environmental Management Plan (CEMP) would be secured by condition and formulated in consultation with North Herts District Council, incorporating relevant legislation and other relevant. The CEMP would set out a range of mitigation measures and environmental controls which would include the management of construction related noise and vibration. The Site would also be registered for the Considerate Constructors Scheme. Control measures to minimise noise and vibration would include but not limited to:

- Use of hoarding to the required height and density appropriate to the noise sensitivity of the Site;
- Use of modern, quiet and well maintained machinery such as electric powered plant, where possible and hoists should use the Variable Frequency Converter drive system;
- Vehicles and mechanical plant used for the works would be fitted with exhaust silencers, which would be maintained in good and efficient working order and operated in such a manner as to minimise noise emissions in accordance with the relevant EU / UK noise limits applicable to that equipment or no noisier than would be expected based the noise levels quoted in BS 5228. Plant should be properly maintained and operated in accordance with manufacturers' recommendations. Electrically powered plant would be preferred, where practicable, to mechanically powered alternatives;
- Avoidance of unnecessary noise (such as engines idling between operations, excessive revving or engines) by effective site management;
- Use of acoustic screens or enclosures where possible to reduce localised noise emissions around key plant;
- Establish noise and vibration target levels (a Section 61 agreement under the Control of Pollution Act 1974 (COPA)) to reduce noise and vibration to a minimum in accordance with best practicable means, as defined in Section 72 of COPA;
- Using low impact techniques where possible (demolition munchers);
- Off-site prefabrication or preparation of building elements where possible to reduce on-site works;
- Changing, where possible, methods and processes to keep noise and vibration levels low as reasonably practicable (e.g. dismantling rather than traditional demolition works where adjoining or immediately adjacent to buildings);
- Resilient mounting of plant/equipment where required to prevent vibration transfer into building structures;
- Removal of obstructions at piling locations (old basements/foundation if relevant) prior to piling to reduce generated vibration levels;
- Use of broad-band audible alarms wherever practicable including reversing alarms and other equipment such as mobile elevated work platforms;
- Positioning and or screening plant as far away from residential property as physically possible;
- Works would be limited to the specified hours (08:00 and 18:00 Monday to Friday and 08:00 to 12:30 on Saturdays, excluding Public Holidays). Any works outside of these times will be agreed in advance with North Herts District Council; and

Liaison with the occupants of adjacent properties most likely to be affected by noise or vibration from activities on the Site. The occupants should be informed of the nature of the works, proposed hours of work and anticipated duration prior to the commencement of activities.

Appendix 12.6: Road Traffic Noise Assessment

The magnitude of the Short-Term change in road traffic noise (year of completion with and without Development 2030) are presented. The magnitude of change has been derived from advice contained within Design Manual for Road and Bridges (DMRB), LA 111 Noise and Vibration.

Table 12.6.1 presents the magnitude of change in road traffic noise based on a short-term assessment.

Table 12.6.1: Magnitude of Change in Road Traffic Noise

Change in Noise Level Short Term Assessment	Magnitude of Change
0.0 – 0.9	Low/Negligible
1.0 – 2.9	Small
3.0 – 4.9	Medium
≥5	Large

Both with and without Development traffic data includes committed developments.

Table 12.6.2: Operational Development Traffic Noise Assessment 2035 (Short-Term Assessment)

Assessment of L _{A10} 18-hour Basic Noise Levels at 10m from Road											
Road		2035 Without Development			2035 With Development			% Flow Change	2035 Without	2035 With	Change
		% HGV	Speed kph	Flow	% HGV	Speed kph	Flow				
1	Mendip Way (South)	0.6	48	2064	0.6	48	10000	384.4	57.9	65.4	7.5
2	Great Ashby Way (East)	1.9	48	4448	1.9	48	5619	26.3	62.3	63.4	1.0
3	Great Ashby Way (West)	1.4	48	5929	1.4	48	12694	114.1	63.4	66.7	3.3
4	Orwell Avenue	0.5	48	3265	0.5	48	4566	39.8	60.4	61.9	1.5
5	Canterbury Way	1.5	48	15504	1.5	48	20968	35.2	67.6	68.9	1.3
6	Martins Way (West)	2.1	64	22636	2.1	64	26957	19.1	71.1	71.9	0.8
8	Grace Way	1.8	48	10823	1.8	48	11966	10.6	66.2	66.6	0.4
9	Gresley Way	1.6	64	9828	1.6	64	10751	9.4	67.3	67.7	0.4
10	Martins Way (East)	1.6	64	6918	1.6	64	7166	3.6	65.8	66.0	0.2
11	A1155	1.5	64	13278	1.5	64	13324	0.3	68.6	68.6	0.0
12	New Road Into Development	-	-	-	0.0	32	7935	-	-	62.4	-