



# LAND TO THE WEST OF HATFIELD

Environmental Statement – Chapter 9: Noise and Vibration

Arlington Business Parks GP Limited

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## 9 NOISE AND VIBRATION

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### 9.1 INTRODUCTION

This chapter of the Environmental Statement (ES) reports the findings of an assessment of the likely significant effects on noise and vibration as a result of the proposed mixed development on land to the west of Hatfield (the 'Proposed Development') during its construction and operation. In addition, the existing noise climate across the Proposed Development site has been assessed for the suitability of the intended use and where appropriate outline mitigation measures specified.

In the context of this assessment, noise is defined as unwanted or undesirable sound derived from sources such as road traffic, rail, industry and construction works that interfere with normal activities, including conversation, sleep or recreation. Related to noise is vibration, which results from the transmission of low frequency energy, typically through the medium of ground or buildings. It results in small movements of the transmitting medium, which can cause discomfort if the movements are large enough or be re-radiated as noise.

This chapter of the ES describes the legislative and planning policy of relevance to the Proposed Development in the context of noise and vibration; the baseline conditions currently existing across the Site and at sensitive receptors near to the Site; the methods used to assess the potential impacts arising from the Proposed Development; and the residual effects following consideration of mitigation measures integral to the design of the Proposed Development.

The assessment is based on detailed environmental noise measurements undertaken at the Site and predictive modelling of the future noise levels.

In summary, the noise and vibration assessment addresses:

- The potential constraints from existing and potential future sources of noise and vibration on the internal noise and vibration environments within the Proposed Development and where necessary sets out the types of mitigation measures that would be adopted to overcome these constraints; and
- the Proposed Development's potential impacts and likely effects of noise and vibration on existing sensitive receptors during the demolition and construction works, as well as from operational noise.

This assessment and ES chapter has been undertaken and produced by Hoare Lea LLP.

### 9.2 METHODOLOGY

#### 9.2.1 Legislation and Planning Policy Guidance

In England there are two legislative instruments that address noise and vibration: the Environmental Protection Act 1990 (EPA); and the Control of Pollution Act (1974) (CoPA).

The EPA provides powers to control noise where a statutory noise nuisance exists. Section 80 describes the powers of the Local Authority to serve a notice requiring the abatement of a nuisance or prohibition

of its occurrence/reoccurrence. Section 82 gives individuals subject to a statutory nuisance the right to make representations to the courts and for the courts to take such action.

The CoPA requires that 'Best Practicable Means' (as defined in section 72 of CoPA) are adopted to control construction noise on any given site. The CoPA makes reference to BS 5228 as best practicable means.

Noise Policy Statement for England (NPSE) advises that noise impacts should be assessed on the basis of adverse and significant adverse effect. The NPSE does not provide any specific guidance on assessment methods or noise limits. However, the concepts summarised in Table 9.1 are introduced and can be applied when considering the significance of noise impacts.

*Table 9.1 - Observed Effect Levels*

Effect Level	Description
No Observed Effect Level (NOEL)	This is the noise level below which no effect can be detected. In simple terms, below this level of noise, there is no detectable effect on health and quality of life due to the noise being assessed.
Lowest Observed Adverse Effect Level (LOAEL)	This is the level of noise above which adverse effects on health and quality of life can be detected.
Significant Observed Adverse Effect Level (SOAEL)	This is the level of noise above which significant adverse effects on health and quality of life occur.

National Planning Policy Framework (NPPF) sets out the Government's planning policies and how these are expected to be applied. This includes some general aims in relation to noise.

Online Planning Practice Guidance (PPG) has been published to provide greater details in relation to the relevance of noise to the planning process following the introduction of the NPPF and NPSE. Further guidance on each of the various observed effect levels set out in the NPSE is provided in the table detailed in the section headed 'How to Recognise when Noise could be a concern?' However, no specific target noise levels are provided. It notes that no action is required for noise levels below LOAEL, noise levels between LOAEL and SOAEL should be mitigated and reduced to a minimum, noise levels above SOAEL are to be avoided and higher still noise levels, considered to have an Unacceptable Observed Adverse Effect (UOAE) should be prevented.

Further specific guidance relating to mineral extraction noise is provided in PPG section 'Assessing environmental impacts from mineral extraction-noise'. Noise limits are recommended for normal operation and increased levels proposed for limited activities that are typically noisier.

The Welwyn Hatfield District Plan was adopted by Welwyn Hatfield Borough Council in April 2005. Most of the policies were saved in April 2008. Included in the list of saved policies is R19 Noise and Vibration that states:

*Proposals will be refused if the development is likely:*

- (i) To generate unacceptable noise or vibration for other land uses; or*
- (ii) To be affected by unacceptable noise or vibration from other land uses.*

*Planning permission will be granted where appropriate conditions may be imposed to ensure either:*

- (iii) An adequate level of protection against noise or vibration; or*
- (iv) That the level of noise emitted can be controlled.*

*Proposals should be in accordance with the Supplementary Design Guidance.*

### 9.2.2 Scoping Assessment

There are no nearby sources of vibration that are likely to generate perceptible levels across the Site and the site does not contain any uses that are likely to generate vibration; therefore, an operational vibration assessment has been scoped out.

Noise from existing sources, such as road traffic and nearby commercial uses, have been measured and assessed for its suitability for the noise-sensitive uses across the Proposed Development. Additional consideration has been given to the likely future noise climate, in particular the proposed extensions of the quarry near Hatfield aerodrome and the quarry at Furze Field.

Noise and vibration potentially generated during the construction phase of the Proposed Development has been assessed at nearby existing sensitive receptors and earlier phases of the Proposed Development that may be occupied.

Noise generated during the operation of the Proposed Development, including any fixed plant or changes in road traffic noise levels has been assessed at existing sensitive receptors.

Consultation took place with Welwyn Hatfield Borough Council (WHBC) on 15<sup>th</sup> August 2018, where details of the proposed assessment methodology and baseline noise survey locations were provided. No comments were raised by WHBC and this chapter reflects the information provided during the consultation.

The Guidelines for Environmental Noise Impact Assessment (published by the Institute of Environmental Management and Assessment) address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. In accordance with the guidelines the following must be determined:

- the noise impact;
- the noise effect; and
- the significance of the effect

### 9.2.3 Assessment Methodology

#### 9.2.3.1 Construction Noise and Vibration

Full details of the exact construction method, plant and duration is not available at this stage of the development proposals. The construction noise impact assessment considers the typical activity based on the type and scale of development. The analysis of likely construction noise has been undertaken in accordance with BS 5228-1 'Code of practice for noise and vibration control on construction and open sites - Part 1: noise' which provides methods for predicting construction noise levels based on reference data for the emissions of typical construction plant and activities.

Table 9.2 below shows the assumed construction stages that would take place on Site and the associated sound power levels during these stages. These sound power levels are based on the likely worst-case scenarios. Assumptions have been made in terms of what plant items will be in operation and the percentage of time the relevant plant will be in use during a 10-hour period. It is considered likely that the majority of the site will not require any piled foundations; however, impact piling has been included as a worst case.

Table 9.2 – Assumed Construction Work Stage Sound Power Levels

Work stage	Plant / equipment assumed to be in operation	Total sound power level, L <sub>WA</sub> (dB)
Substructure / foundations	20t excavator; dumper; muck away lorry; mobile crane; hydraulic hammer piling rig; and concrete pump.	117
Superstructure	MEWPS (cherry picker); and material hoists	95
Fit out	Various hand tools.	90

The exact location and number of active plant is not possible to confirm at this stage; therefore, construction noise levels have been calculated for minimum and maximum possible distance to nearby receptors, assuming all plant is operational at that distance, as set out in Table 9.4. This is a worst-case as it is not always possible to locate all plant at a short distance. The receptors considered in the assessment are listed below in Table 9.3.

Table 9.3 – Noise-Sensitive Receptors

Ref.	Name	Coordinates		
		X	Y	Local height (m)
R1	The Runway	520745	209219	4
R2	Walker Drove	520760	208929	4
R3	Nimrod Drive	520785	208616	4
R4	Astwick Manor	520441	209976	4
R5	Astwick Manor Lodge	520514	210085	4
R6	Earlier phase of the Proposed Development	n/a	n/a	4

Table 9.4 – Minimum and Maximum Distances Between Construction Activity and Receptors

Ref.	Name	Distance, metres	
		minimum	maximum
R1	The Runway	90	900
R2	Walker Drove	135	1,150
R3	Nimrod Drive	200	1,450
R4	Astwick Manor	70	1,200
R5	Astwick Manor Lodge	50	1,500
R6	Earlier phase of the Proposed Development	120	1,400

The calculated construction noise levels have then been compared against absolute noise limits for temporary construction activities which are commonly regarded as providing an acceptable level of protection from the short-term noise levels associated with construction activities. The levels used are derived from BS 5228-1 informative Annex E criteria which does not represent mandatory limits but rather a set of example approaches intended to reflect the type of methods commonly applied to construction noise. In broad terms, the example criteria are based on a set of fixed limit values which, if exceeded, may result in a significant effect unless ambient noise levels are sufficiently high to provide a degree of masking of construction noise.

The range of guidance values detailed in BS 5228 Annex E have been used to numerically define the magnitude levels, as per Table 9.5. The presented impact levels have been normalised to free-field daytime noise levels occurring over a time period, T, equal to the duration of a working day on site. BS 5228 Annex E provides varied definitions for the range of daytime working hours which can be grouped for equal consideration. The values presented in Table 9.5 have been chosen to relate to daytime hours from 08:00 to 18:00 on weekdays, and 08:00 to 13:00 on Saturdays. As construction noise will always be an introduction of a noise source which would otherwise not be there, where impacts are identified to occur they will always be adverse and never beneficial.

*Table 9.5 – Magnitude of Impact – Construction Noise*

Magnitude of impact	Noise level, dB L <sub>Aeq, T</sub>	Details
Very high	> 82	Trigger level exceeded for temporary rehousing, or cost thereof, as set out in BS 5228-1 E.4.
High	≤ 82 > 72	Trigger level for construction noise insulation works exceeded, but not the trigger level for temporary rehousing.
Medium	≤ 72 > 65	Trigger level for construction noise insulation works not exceeded.
Low	≤ 65	Below the most stringent category in BS 5228-1 Table E.1 (Category A)

The impacts of traffic movements associated with construction of the Proposed Development have been assessed based on the change in road traffic noise level rather than the absolute noise level generated. Table 9.6 lists the criteria taken for short-term changes in road traffic noise from the Design Manual for Roads and Bridges (DMRB) Section 3 Part 7, used to determine the magnitude of impact for construction traffic noise.

*Table 9.6 – Magnitude of Impact – Construction Traffic Noise*

Magnitude of impact	Change in L <sub>A10, 18hr</sub> Noise Level, dB	Details
Very high	≥ 5.0	Described in DMRB as a major magnitude of impact, likely to lead to a perceptible change in road traffic noise.
High	< 5.0 ≥ 3.0	Described in DMRB as a moderate magnitude of impact, may result in a perceptible change in road traffic noise under normal conditions.

Medium	< 3.0 ≥ 1.0	Described in DMRB as a minor magnitude of impact, may only result in a perceptible change in road traffic noise at the upper end of the range under certain conditions.
Low	< 1.0	Described in DMRB as a negligible magnitude of impact, would not result in a perceptible change in road traffic noise.

### 9.2.3.2 Site Suitability

The assessment of the suitability of the existing and likely future noise climate across the Site draws on several guidance documents. As outlined above the NPSE discusses LOAEL and SOAEL and current policy is that, depending on context, noise levels below LOAEL are acceptable with no further consideration needed, noise levels between LOAEL and SOAEL will need to be mitigated and noise levels above SOAEL are to be avoided.

Three main sources, or potential sources, of noise have been identified in the area to be: road traffic, commercial activity and mineral extraction from the nearby proposed quarry extensions. In the absence of any specific guidance in the NPSE relating to the levels of noise from different sources to effect levels, DEFRA commissioned AECOM to carry out research to identify the potential threshold levels for LOAEL and SOAEL for residential receptors affected by different sources of transportation noise. A summary of AECOM's findings was published in the report entitled '*Possible Options for the Identification of SOAEL and LOAEL in Support of the NPSE*', dated 2014 (AECOM Report). This has been used in this assessment to define effect levels for road traffic noise. The values for LOAEL have been derived from BS 8233: 2014 'Guidance on sound insulation and noise reduction for buildings' to relate to reasonable internal noise levels with a window open for ventilation.

Noise assessments have been undertaken for the two proposed quarry extensions and values for LOAEL and SOAEL have been used in the assessment of the Furze Field quarry extension. This assessment also considers the cumulative noise from both quarries. The noise assessments for the two quarry extensions has been used to inform the assessment of the Proposed Development. Predicted quarry noise levels across the Site have been taken from the reports and assessed against the LOAEL and SOAEL criteria also provided.

Noise from the commercial units to the east of the Site has been assessed using guidance found within BS 4142: 2014 'Methods for rating and assessing industrial and commercial sound' which rates this type of noise against the measured background sound level ( $L_{A90,T}$ ). Commercial noise is corrected to account for any acoustic features present in it to give the rating level ( $L_{Ar,Tr}$ ). The lower the rating level is relative to the background sound level, the less likely the commercial noise will have an adverse impact. This principle has been used to determine the values for LOAEL and SOAEL for commercial noise.

Table 9.7 sets out the criteria used in this assessment for the suitability of the noise climate at noise-sensitive receptors within the Proposed Development. It includes the threshold effect levels for the main different types of noise present across the Site and an overall threshold for the total noise from all sources.

Table 9.7 - Threshold Effect Levels, External Noise Levels.

Noise Source	LOAEL Threshold		SOAEL Threshold		Details informing Effect Levels
	Day	Night	Day	Night	



Road traffic	55 dB L <sub>Aeq</sub> , 16hour	45 dB L <sub>Aeq</sub> , 8hour	66 dB L <sub>Aeq</sub> , 16hour	56 dB L <sub>Aeq</sub> , 8hour	BS 8233 and AECOM Report.
Quarry activity – normal works	45 dB L <sub>Aeq</sub> , 1 hour or 5 dB above background	-	55 dB L <sub>Aeq</sub> , 1 hour or 10 dB above background	-	Furze Field noise assessment report.
Quarry activity – limited noisier works	60 dB L <sub>Aeq</sub> , 1 hour		70 dB L <sub>Aeq</sub> , 1 hour		Furze Field noise assessment report.
Commercial activity	Rating level not more than 5 dB above background.		Rating level not more than 10 dB above background.		BS 4142.
Total combined noise	55 dB L <sub>Aeq</sub> , 16hour	45 dB L <sub>Aeq</sub> , 8hour	66 dB L <sub>Aeq</sub> , 16hour	56 dB L <sub>Aeq</sub> , 8hour	

Where the external noise level exceeds the value for LOAEL mitigation has been specified to reduce the external noise level and to provide reasonable internal noise levels as specified in BS 8233 and reproduced below in Table 9.8.

Table 9.8 – Reasonable indoor ambient noise levels for dwellings

Activity	Location	Day (07.00 – 23.00)	Night (23.00 – 07.00)
Resting	Living room	35 dB L <sub>Aeq</sub> , 16hour	-
Dining	Dining room / area	40 dB L <sub>Aeq</sub> , 16hour	-
Sleeping (daytime resting)	Bedroom	35 dB L <sub>Aeq</sub> , 16hour	30 dB L <sub>Aeq</sub> , 8hour

### 9.2.3.3 Operational Noise Impacts

Operational noise from the Proposed Development may arise from any fixed plant associated with the commercial use and local centre and from potential changes in road traffic flows and therefore noise levels. The noise-sensitive receptors that have been included in this assessment are provided in Table 9.3.

Noise from commercial activity and fixed plant associated with the local centre will not be known at this stage of the development to any degree of certainty. Therefore, noise limits have been proposed for such activity based on guidance contained within BS 4142 and the measured background noise levels.

As with the assessment of commercial noise on the suitability of the site, the magnitude of impact of commercial noise considers the difference between the noise rating level of the plant or activity and the prevailing typical background noise levels. Table 9.9 provides the magnitude of operational noise from commercial activity.

Table 9.9 – Magnitude of Impact – Commercial Noise

Magnitude of impact	Difference L <sub>A,T</sub> - L <sub>A90,T</sub>	Details
Very high	> 10	Described in BS 4142 to be a likely indication of a significant adverse impact, depending on context.

High	≤ 10 > 5	An adverse impact is expected in this range; however, not a significant adverse impact.
Medium	≤ 5 > 0	Small impact may be present, does not exceed the threshold at which BS 4142 considers an adverse impact to occur.
Low	≤ 0	Described in BS 4142 as a low impact.

As the assessment for the impact of commercial noise sets limits rather than assesses predicted noise levels of proposed commercial activity and plant a threshold of the rating level equal to the background noise level has been selected as an appropriate limit as it would be equivalent to a low impact.

The change in long-term road traffic noise level has been calculated through a noise model of the Site and surrounding area. The level of noise from existing roads near to the Site has been measured during the baseline noise survey. Future noise levels have been calculated using a noise model created in DataKustik Cadna-A (version 2018 MR 1) proprietary noise modelling software. This software implements the environmental noise propagation prediction methodology set out in the Calculation of Road Traffic Noise (CRTN) and ISO 9613-2 for predicting the level of daytime noise from road traffic. Three road traffic scenario years have been created in the noise model, using road traffic flow data provided by transport consultants Vectos.

The road traffic scenario years cover: the current year, 2018, to enable a comparison to be made against the baseline survey data; future year, 2028, considered as the year of opening; and the design year, 2040, taken to be representative of the 15<sup>th</sup> year after opening. It is noted that the design year would be 2043; however, due to limitations with accuracy of reasonable future growth assumptions and available data, 2040 is regarded to be representative for the design year.

The change in road traffic noise resulting from the Proposed Development has been calculated using the noise model scenarios for the design year with and without the Proposed Development traffic. Table 9.10 lists the criteria taken for long-term changes in road traffic noise from DMRB Section 3 Part 7, used to determine the magnitude of impact for operational traffic noise.

*Table 9.10 – Magnitude of Impact – Operational Traffic Noise*

Magnitude of impact	Change in $L_{A10, 18hr}$ Noise Level, dB	Details
Very high	≥ 10.0	Described in DMRB as a major magnitude of impact, likely to lead to a perceptible change in road traffic noise over a long-term.
High	< 10.0 ≥ 5.0	Described in DMRB as a moderate magnitude of impact, may result in a perceptible change in road traffic noise under normal long-term conditions.
Medium	< 5.0 ≥ 3.0	Described in DMRB as a minor magnitude of impact, may only result in a perceptible change in road traffic noise at the upper end of the range under certain long-term conditions.
Low	< 3.0	Described in DMRB as a negligible magnitude of impact, would not result in a perceptible change in road traffic noise over a long-term.

### 9.2.3.4 Sensitivity of Receptor

Sensitive receptors in the assessment have been classified into the following categories of sensitivity. These categories have been determined based on the guidance contained in BS 8233, World Health Organization Guidelines, and other relevant reference criteria. Table 9.11 summarises the sensitivities for the different receptor types. It should be noted that residential receptors are classed as high sensitivity, according to the classification system adopted for this assessment and represent those closest to the Proposed Development.

Table 9.11 – Sensitivity of Receptor

Sensitivity	Receptor description
Very high	Concert hall, recording studios, buildings containing specialist vibration sensitive equipment
High	Residential receptors including residential healthcare and educational facilities (both residential and non-residential).
Medium	Non-residential healthcare and hospitals; noise-sensitive leisure receptors e.g. hotels, museums or libraries; places of worship.
Low	Commercial facilities e.g. retail or office uses

### 9.2.3.5 Significance of Effect

The significant effect of a predicted impact, as summarised in Table 9.12, was determined through a standard method of assessment based on professional judgement, considering the sensitivity of the receptor (as set out in Table 9.11) and the magnitude of change / impact (as set out in Table 9.5, Table 9.6, Table 9.9, and Table 9.10). ‘Moderate’ and ‘Major’ significant effects are considered as ‘significant’ in the context of the noise impact assessment for the EIA. ‘Negligible’ and ‘Minor’ significant effects are considered as ‘not significant’ in the context of the noise impact assessment for the EIA.

Table 9.12 – Determination of Significance of Effect

		Magnitude of Change / Impact			
		Very High	High	Medium	Low
Sensitivity	Very High	Major	Major	Moderate	Minor
	High	Major	Moderate	Minor	Negligible
	Medium	Moderate	Minor	Minor	Negligible
	Low	Minor	Negligible	Negligible	Negligible

## 9.3 BASELINE CONDITIONS

Background noise monitoring has been carried out to determine the existing baseline conditions. Figure 9.1 shows the background noise monitoring locations at which measurements were made. Unattended noise monitoring was carried out at positions L1, L2, L3 and L4. Short-term attended noise level measurements were conducted at S1 and S2 around the Site.

All measurements consisted of contiguous fifteen-minute duration samples of ambient sound levels ( $L_{Aeq,15\ min}$ ), maximum sound levels ( $L_{Amax(fast)}$ ) and background sound levels ( $L_{A90,15\ min}$ ). The microphones of

the sound level meters were positioned at a height of approximately 1.3 metres above the local ground level and under free-field conditions for all measurement locations (both unattended and attended). The survey equipment was field calibrated immediately before and immediately after usage; no significant drift (<0.5 dB) in level was found to have occurred for any piece of equipment.

Weather condition were appropriate for noise monitoring throughout the whole survey, with no rain and low wind speeds.

The dominant source of noise on site is distant road traffic noise. To a lesser extent aircraft noise was also observed. Other sources of noise included natural sounds such as wind disturbed vegetation. Towards the east of the Site, adjacent to the commercial distribution facility, noise associated with HGVs was observed, such as engines of passing vehicles and doors closing.

Table 9.13 presents the overall daytime and night-time measured noise levels at the four unmanned logger positions L1, L2, L3 and L4. Table 9.13 also provides the logarithmic average of the ambient noise level for the period, the typical background noise level and the highest events noise for the ninetieth percentile of the maximum levels measured during the night-time.

*Table 9.13 – Summary of Noise Levels at L1, L2, L3 and L4*

Ref	Daytime noise levels		Night-time noise levels		
	dB, LAeq, 16hour	dB, LA90, 1hour	dB, LAeq, 8hour	dB, LA90, 15min	dB, LAmax
L1	48	36	42	30	65
L2	49	35	40	30	67
L3	48	39	42	31	68
L4	50	41	44	30	68

In addition to the longer-term unmanned noise logger data, shorter-sample spot measurements were taken during the daytime at two further locations. Table 9.14 provides a summary of the short-term attended measurement data.

*Table 9.14 – Summary of Noise Levels at S1 and S2*

Ref	Daytime noise levels	
	dB, LAeq, 20 minute	dB, LA90, 20 minute
S1	69	54
S2	46	41

## 9.4 ASSESSMENT OF EFFECTS

### 9.4.1 Construction Effects

Table 9.15 provides a summary of the calculated noise levels during each of the phases of construction at the receptor locations. R6 has been taken as a receptor within the Site built and occupied under an earlier phase of the construction. Minimum and maximum distances set out in Table 9.4 have been assumed to provide the upper and lower levels of construction noise respectively.

Table 9.15 – Construction Noise Levels

Ref	Range of noise level, dB $L_{Aeq, 10 \text{ hour}}$ , for corresponding construction phase		
	Substructure	Superstructure	Fit-out
R1	50 – 70	28 – 48	23 – 43
R2	48 – 66	26 – 44	21 – 39
R3	46 – 63	24 – 41	19 – 36
R4	47 – 72	25 – 50	20 – 45
R5	46 – 75	24 – 53	19 – 48
R6	46 – 67	24 – 45	19 – 40

One of the closest receptors, R5 Astwick Manor Lodge, is predicted to be exposed to a high magnitude of impact during the substructure phase of construction. This will occur when piling is taking place at the minimum possible distance to the dwellings. As piling continues further away from the receptors this noise level will diminish.

Noise levels during the superstructure phase of construction predominantly range between minor and moderate magnitudes of impact for the closest of works. Except for any envelope works taking place adjacent to R5 the remaining two phases of construction are likely to be of minor, negligible or neutral magnitudes of impact. For the remainder of the receptors and construction phases, impacts would be medium to low.

On balance the overall magnitude of impact from construction noise levels is medium and the greatest sensitivity of receptor nearby is high. Therefore, the overall effect of construction noise would be of minor significance effect, which is not significant in terms of the EIA.

The second aspect of construction noise impacts associated with the Proposed Development is the change in noise from construction vehicles using the local road network. The assessment considers the noise impacts associated with the change in short-term road traffic noise by subtracting the calculated noise without the construction traffic from the noise with the construction traffic. Table 9.16 provides a summary of the change in road traffic noise levels adjacent to existing roads which are likely to be used construction vehicles for the Proposed Development.

Table 9.16 – Summary of Changes in Road Traffic Noise - Construction

Road name	Change in noise, dB
A1057	0.0
Coopers Green Lane (North of Hatfield Avenue)	0.0
Coopers Green Lane (South of Hatfield Avenue)	0.0
A1001 (South of Cavendish Way Roundabout)	0.0
A1001 SB (North of Cavenish Way Roundabout)	0.0
A1001 NB (North of Cavenish Way Roundabout)	0.0
Hatfield Avenue	0.0
A1(M) Northbound (J3-J4)	0.0
A1(M) Southbound (J4-J3)	0.0
Mosquito Way North of Albatross Way	0.0
Mosquito Way South of Albatross Way	0.1

Albatross Way	0.4
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The change in road traffic noise due to the construction of the Proposed Development would result in impacts that are of low magnitude. The nearby sensitive receptors are dwellings which are considered to have high sensitivity. Taking the greatest impact, 0.4 dB increase for any dwellings along Albatross Way, a low magnitude of change upon a highly sensitive receptor results in a negligible significant effect, which is not significant in EIA terms.

#### 9.4.2 Operational Phase Effects

The first aspect of operational noise impacts associated with the Proposed Development is the noise from the operation of the commercial uses, including fixed building services plant, deliveries / waste collection and any extract fans.

Details regarding the size, likely positions, specifications and operational hours of any fixed plant are yet to be confirmed. Noise limits in-line with BS4142 have, therefore, been provided for any fixed plant serving the Proposed Development. This assessment assumes that fixed plant will be operational 24 hours a day.

As detailed earlier, a fixed plant noise limit rating level equal to the background noise level is proposed, in line with BS 4142 guidance. Table 9.17 provides the background noise level used and the plant noise limit for the receptors and residential units within the development. The noise limits would apply at the nearest residential dwelling and not at the boundary of the commercial use.

Table 9.17 – Noise Limits for Commercial Operations and Plant

Ref	Measured background noise level		Noise limit, Rating Level	
	Daytime dB, LA90, 1hour	Night-time dB, LA90, 15minutes	Daytime dB, LAr, 1hour	Night-time dB, LAr, 15minute
R1	39	31	39	31
R2	35	30	35	30
R3	35	30	35	30
R4	41	30	41	30
R5	41	30	41	30
R6	36	30	36	30

BS 4142 advises that, depending on the context, rating levels equal to or below the background sound level are an indication of the specific sound source having a low impact. Consequently, provided the noise limits in Table 9.17 are not exceeded, operational noise from fixed plant would have a low magnitude of impact, which for residential receptors with high sensitivity would result in permanent negligible adverse effect. Therefore, noise impacts in relation to fixed plant serving the operation of the Proposed Development are anticipated to be not significant.

The second aspect of operational noise impacts associated with the Proposed Development is the change in noise from vehicles using the local road network. The assessment considers the noise impacts associated with the change in long-term road traffic noise by subtracting the calculated noise in 2040 without the Proposed Development from the noise with the Proposed Development fully operational.

Figure 9.2 provides a noise map of the difference in road traffic noise levels due to vehicles accessing the site during the operation of the development.

The change in road traffic noise due to the operation of the Proposed Development would result in low magnitude of change. The nearby sensitive receptors are dwellings which are considered to have high sensitivity. A low impact upon a highly sensitive receptor results in a negligible adverse significant effect, which is not significant in EIA terms.

### 9.4.3 Suitability of Site

There are three main sources of noise noted affecting the development: road traffic noise, commercial noise and quarry noise. The following assesses the suitability of the site by considering each of the above individually and also considers the cumulative effect due to all noise sources simultaneously. The suitability of the site has been assessed against the threshold effect levels given in Table 9.7.

#### 9.4.3.1 Road Traffic Noise

Road traffic noise levels for the design year with the development in place have been considered for this aspect of the assessment of site suitability. The modelled scenario includes traffic data predictions provided for the 2040 scenario with the development buildings in place.

The noise model has been used to calculate predicted noise levels incident on the facades of the development buildings and noise levels in external amenity areas. The table below summarises the worst-case noise levels:

Table 9.18 – Transportation Noise Levels Predicted across the Proposed Development Site

Assessment Location	Transportation noise, façade noise level, Daytime dB, $L_{Aeq, 16 \text{ hour}}$	Transportation noise, external amenity level, Daytime dB, $L_{Aeq, 16 \text{ hour}}$	Transportation noise, façade noise level, Night-time dB, $L_{Aeq, 8 \text{ hour}}$
North of Site	59	55	54
East of Site	48	48	42
South of Site	49	50	44

Note, for the north of the site it is assumed the external amenity areas benefit from natural screening provided by the development buildings, that is the amenity areas are not facing onto Coopers Green Lane.

For all but the few elevations overlooking Coopers Green Lane, noise levels incident on the facades of the development buildings have been calculated as less than 55 dB  $L_{Aeq, 16 \text{ h}}$  during the day and less than 45 dB  $L_{Aeq, 8 \text{ h}}$  during the night. Noise levels predicted during both the day and night are below the LOAEL threshold for each period. Noise levels due to road traffic are considered acceptable with no further consideration on this basis.

For the few elevations overlooking Coopers Green Lane subject to elevated levels the predictions are below the SOAEL threshold during both the day and night. Mitigation options are discussed for achieving suitable internal conditions within these dwellings.

### 9.4.3.2 Quarry Noise

Noise assessments addressing quarry noise have been undertaken by WYG Planning & Environment as detailed in the report *Hatfield Quarry Extension – Furze Field, Hatfield Noise assessment*, dated February 2016 (report reference A092700-1 issue 3). The report considers the two proposed quarry extensions and values for LOAEL and SOAEL have been used in the assessment of the Furze Field quarry extension. This assessment also considers the cumulative noise from both quarries.

The noise assessments previously undertaken for the two quarry extensions has been used to inform the assessment of the Proposed Development. Predicted quarry noise levels across the Site including mitigation have been taken from the reports and assessed against the LOAEL and SOAEL criteria also provided, as summarised below. The assessment below considers the worst-case assessment locations on the Proposed Development Site:

Table 9.19 – Quarry Noise Levels with Mitigation and Assessment of Site Suitability

Assessment Location	Noise Level from Mineral Extraction Activity dB, $L_{Aeq, 1hour}$	LOAEL Criteria: 45 dB $L_{Aeq, 1 hour}$ Or 5 dB above background	SOAEL Criteria: 55 dB $L_{Aeq, 1 hour}$ Or 10 dB above background	Assessment
North of Site	55	45	55	At SOAEL threshold
East of Site	42	45	51	Below LOAEL
South of Site	54	45	55	Above LOAEL, below SOAEL

The assessments indicate that noise associated with the operation of quarries is above the LOAEL threshold but below or at the SOAEL threshold at the north and south of the site and below the LOAEL threshold at the east of the site.

The conclusion of the report prepared by WYG Planning & Environment is that cumulative noise levels from the proposed activities at Furze Field and mineral extraction on land at Hatfield Aerodrome to the south are predicted to be within all criteria, set out in the Hertfordshire County Council Minerals Local Plan Review and national Planning Policy Guidance, at all times during the proposed operating hours and are not expected to have a significant adverse impact nor give rise to significant noise intrusion. Noise due to operations at both quarry sites is considered acceptable with no further consideration on this basis.

### 9.4.3.3 Commercial Noise

Assessments of commercial noise have been undertaken based on the results of the survey at measurement position L3. The survey data and audio recorded at this location has been scrutinised to quantify specific noise levels for the adjacent commercial uses. These have been assessed against the typical background noise levels obtained for the day and night periods of interest.

Commercial noise has been assessed following the BS 4142 methodology.

Table 9.20 – BS 4142 assessment of Commercial Noise - Daytime

Results			Commentary
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Measured specific sound level	$L_{Aeq,1\text{ min}} =$	46 dB	Sound pressure level for typical event of duration 1 minute.
Total specific sound level	$L_{Aeq,1\text{ h}} =$	36 dB	Representative value for the equivalent continuous sound pressure level over reference time interval (worst case 6 events per interval)
Acoustic feature corrections		+3 dB	Noise characteristics anticipated to be audible at receptor point: intermittency +3 dB
Rating level	$L_{Ar,1\text{ h}} =$	39 dB	(36 + 3) dB = 39 dB
Background sound level	$L_{A90,1\text{ h}} =$	39 dB	
Excess of rating over background sound level		0 dB	(39 - 39) dB = 0 dB

Table 9.21 – BS 4142 assessment of Commercial Noise – Night-time

Results			Commentary
Measured specific sound level	$L_{Aeq,1\text{ min}} =$	46 dB	Sound pressure level for typical event of duration 1 minute.
Total specific sound level	$L_{Aeq,15\text{ min}} =$	37 dB	Representative value for the equivalent continuous sound pressure level over reference time interval (worst case 2 events per interval)
Acoustic feature corrections		+3 dB	Noise characteristics anticipated to be audible at receptor point: intermittency +3 dB
Rating level	$L_{Ar,15\text{ min}} =$	42 dB	(37 + 3) dB = 40 dB
Background sound level	$L_{A90,15\text{ min}} =$	31 dB	
Excess of rating over background sound level		+9 dB	(40 - 31) dB = +9 dB

The BS 4142 assessments indicate that for the worst-case affected aspects of the Proposed Development, daytime operational noise levels affecting the development are below the LOAEL threshold and night-time operational noise levels affecting the development are below the SOAEL threshold.

The above assessments are for Proposed Development receptors at the closest point to the commercial noise source, at approximately 60 metres distance. With increasing distance from the noise source, the impact of noise is reduced: at approximately 170 metres distance or greater noise would be reduced to below the LOAEL threshold during the night.

It is understood that a 5-metre-high acoustic screen is proposed along the eastern boundary of the Proposed Development, and as such is considered embedded mitigation. Assuming this screening is midway between the commercial noise source and receptors at 60 metres the attenuation due to screening will be in the order of 10 dB(A). This would result in commercial noise being below the LOAEL threshold during both the day and night throughout the site.

Noise due to commercial operations is considered acceptable with no further consideration on this basis.

**9.4.3.4 Total Combined Noise Level.**

Assessments of the total combined noise level are presented below.

*Table 9.22 –Total Combined Noise Level - Daytime*

Assessment Location	Noise Level from Road Traffic dB, L <sub>Aeq,16 h</sub>	Noise Level from Mineral Extraction Activity dB, L <sub>Aeq, 1hour</sub>	Noise Level from Commercial Sources dB, L <sub>Aeq, 1hour</sub>	Total Noise Level, dB, L <sub>Aeq,T</sub>
North of Site	59	55	36	60
East of Site	48	54	36	55
South of Site	49	54	36	55

*Table 9.23 –Total Combined Noise Level – Night-time*

Assessment Location	Noise Level from Road Traffic dB, L <sub>Aeq,8 h</sub>	Noise Level from Mineral Extraction Activity dB, L <sub>Aeq, 1hour</sub>	Noise Level from Commercial Sources dB, L <sub>Aeq, 15 min</sub>	Total Noise Level, dB, L <sub>Aeq,T</sub>
North of Site	54	-	37	54
East of Site	42	-	37	43
South of Site	44	-	37	45

For all but the few elevations overlooking Coopers Green Lane to the north of the site, total combined noise levels have been calculated as less than 55 dB L<sub>Aeq,16 h</sub> during the day and less than 45 dB L<sub>Aeq,8 h</sub> during the night. Noise levels predicted during both the day and night are below the LOAEL threshold for each period.

For the few elevations overlooking Coopers Green Lane subject to elevated levels the predictions are below the SOAEL threshold during both the day and night. This is due to road traffic. Mitigation options are discussed for achieving suitable internal conditions within these dwellings.

**9.4.4 Cumulative Effects**

The road traffic flow data provided includes all other cumulative developments; therefore, cumulative noise effects have already been accounted for in the above assessment.

The assessment of the noise from mineral extraction works associated with the two proposed quarry extensions has already considered the cumulative effects.

**9.5 MITIGATION**

**9.5.1 Construction Mitigation**

Construction noise levels have been determined to be not significant; therefore, mitigation is not necessary to avoid significant effect. However, it is possible that during the construction phase noise may

be audible at nearby sensitive receptors, as best practice and to regulate construction noise levels it is recommended that the levels of noise during the construction phase are monitored as part of an Environmental Management Plan (CEMP). Also, the below good practice measures should be incorporated into the CEMP to help control noise emissions from the site.

- Regular communication between the contractor and affected neighbours to clearly understand the anticipated level and duration of noise throughout the construction period. Where excessive noise cannot be avoided, adjacent neighbours should be notified as to when such noisy works will be undertaken and these times adhered to.
- Adequate planning should be undertaken within the project to prevent noise emissions from double handling of materials and overlapping of high noise activities.
- Loading and unloading of vehicles, dismantling of site equipment such as scaffolding or moving equipment or materials around the site are to be conducted in a manner as to minimise noise generation. Vehicles should be switched off when not in use. The use of reverse beepers shall be avoided as far as is practicable with safe operating practices.
- Compressors should be 'sound reduced' models, fitted with properly lined and sealed acoustic covers, to be kept closed whether the machines are in use. All percussive tools shall be fitted with mufflers or silencers of the type recommended by the manufacturer.
- All machines in intermittent use shall be shut down in the intervening periods between works if possible, or throttled down to a minimum.
- Where possible, equipment should ideally be powered by mains electricity in preference to locally powered sources such as diesel generators. Hand tools to be electrically powered.
- To minimise breakout and as far as is practically possible when taken against the scope of works, ensure that all external windows and doors to the existing building are kept closed.
- No radios or similar noise-producing entertainment devices.
- Contractors should belong to the Considerate Contractors Scheme.

### 9.5.2 Operational Mitigation

Operational noise levels have been determined to be not significant if the commercial noise limits set out in Table 9.17 are adhered to. Therefore, no mitigation is necessary for the operation of the Proposed Development.

### 9.5.3 Mitigation for Site Suitability

The sound insulation properties of the building envelope depend upon the external noise levels present at the façade and the proposed design criteria for the internal noise levels of specific rooms, dependant on their use. A standard thermal double-glazed window when closed provides the required sound insulation performance to comply with the internal noise levels stated in Table 9.8.

Simple natural ventilation using opening windows will provide a level difference in the order of 15 dB. Measured noise levels are in the order of 50 dB  $L_{Aeq,16h}$  daytime and 44 dB  $L_{Aeq,8h}$  night-time. On this basis open window ventilation is suitable for achieving BS 8233 compliant noise levels of 35 dB  $L_{Aeq,16h}$  daytime and 30 dB  $L_{Aeq,8h}$  night-time internally for the majority of the development site.

For more exposed dwellings to the north of the Proposed Development Site overlooking Coopers Green Lane, predicted noise levels are elevated due to road traffic and activities associated with the minerals extraction facility (daytime only). Total noise levels incident on the façade are predicted up to 60 dB  $L_{Aeq,16h}$

h dB daytime and 54 dB  $L_{Aeq,8h}$  night-time. Open window ventilation is not a suitable solution in these areas; an alternative solution should be considered. For example, mechanically assisted cross ventilation may be possible on plots with openings on the shielded elevations. When selecting the alternative system consideration should be given to thermal overheating. Purge ventilation could be by means of opening windows as the rooms would be deemed to be unoccupied under purge ventilation.

The noise level in the external amenity spaces comprising gardens and public spaces are 55 dB  $L_{Aeq, 16hour}$  or less, or have an area that is. Screening is provided by buildings and garden fencing as embedded mitigation. No further mitigation is considered practicable to provide an imperceptible reduction in noise. It is assumed there will be no main external amenity spaces facing onto Coopers Green Lane.

A 5 m high acoustic barrier is included on the eastern boundary that is shared with the existing commercial units. This is part of the Proposed Development and considered as embedded mitigation.

## 9.6 RESIDUAL EFFECTS

### 9.6.1 Residual Construction Effects

The good practice mitigation measures are likely to provide a small reduction in the overall level of construction noise. It is considered that a medium magnitude of impact will remain after mitigation, resulting in a minor residual effect. This is considered to be not significant.

### 9.6.2 Residual Operational Effect

No operational mitigation is necessary, so the Proposed Development would result in a negligible residual effect, which is not significant.

### 9.6.3 Residual Effect of Site Suitability

Will appropriate screening, glazing and ventilation discussed above, the noise levels within dwellings across the Site would be reasonable and therefore, considered to be appropriate for the intended use.

## 9.7 SUMMARY OF EFFECTS

A summary of effects is presented in Table 9.24.

Table 9.24 – Summary of Effects

Stage	Pre-mitigation			Mitigation description	Residual	
	Magnitude	Sensitivity	Effect		Magnitude	Effect
Construction activity	Medium	High	Minor	Good practice	Medium	Minor
Construction traffic	Low	High	Negligible	n/a	Low	Negligible
Operational plant	Low	High	Negligible	n/a	Low	Negligible
Operational traffic	Low	High	Negligible	n/a	Low	Negligible

## 9.8 CONCLUSIONS

The potential noise impacts from the Proposed Development upon existing sensitive receptors have been assessed using criteria derived from national policy and guidance documents. In addition, the existing noise climate across the development site has been assessed for the suitability of the proposed residential use against Effect Levels set out in policy.

Assessment of noise from construction of the Proposed Development shows that, although there is potential for short-term high levels of noise when activity is taking place close to receiver locations, these events will be infrequency and temporary. Overall, the construction noise levels have a medium magnitude of impact upon high sensitive receptors results in a minor significant effect, which is considered not significant in EIA terms.

Potential operational noise impacts from the Proposed Development is limited to noise from any plant and increased levels of traffic producing increased levels of traffic noise. The Proposed represents a low magnitude of impact. This magnitude of impact on high sensitive receptors corresponds to a negligible significant effect, which is not significant in EIA terms.

When assessing the suitability of the site considering road traffic noise, the assessments have concluded that for all but the few elevations overlooking Coopers Green Lane to the north of the site noise levels are below the LOAEL during both the day and night. No further consideration is required in these areas for this type of noise. For more exposed elevations overlooking Coopers Green Lane mitigation has been discussed for achieving suitable internal noise levels in line with current British Standard guidance.

In the assessments considering site suitability due to operational noise associated with the mineral extraction facilities and proposed extensions to these, the assessments have concluded that noise is predicted to be within all criteria at all times during the proposed operating hours and are not expected to have a significant adverse impact nor give rise to significant noise intrusion. No further consideration to this noise is required on this basis.

For the commercial operations associated with the units to the east of the Proposed Development, the assessments have concluded that with the embedded mitigation of the proposed acoustic screening along the boundary commercial noise is predicted to be below the LOAEL threshold during both the day and night throughout the site. No further consideration to this noise is required on this basis.

For all but the few elevations overlooking Coopers Green Lane to the north of the site, total combined noise levels have been calculated to be below the LOAEL threshold for each period. No further consideration is required in these areas of the Proposed Development. For the few elevations overlooking Coopers Green Lane subject to elevated levels the predictions are below the SOAEL threshold during both the day and night. This is generally due to road traffic. Mitigation options are discussed for achieving suitable internal conditions within these dwellings in line with current British Standard guidance.