

13 NOISE & VIBRATION

13.1 INTRODUCTION

13.1.1 This chapter assesses the potential noise and vibration effects associated with the Proposed Development on the existing nearby Noise Sensitive Receptors (NSRs). This will include the potential noise and vibration effects that may occur during the construction phase(s) and potential operational noise effects that may occur once the whole Proposed Development is built and in full use.

13.1.2 This chapter presents:

- the relevant methodologies, policy and legislation;
- baseline noise conditions;
- construction noise and vibration assessments;
- operational noise assessment; and
- a summary of mitigation/enhancement measures.

13.1.3 An assessment summary is provided in section 13.7 below.

13.1.4 Glossary of acoustical terms is provided in **Appendix 13.1**.

13.2 ASSESSMENT APPROACH

Methodology

13.2.1 The sensitivity or importance of all NSRs considered in this assessment is 'high'. The majority of the NSRs are residential properties. However, there are also school premises east of the Application Site.

Baseline Noise Measurement Survey

13.2.2 The baseline noise measurements were undertaken between 29 November 2017 and 06 December 2017 in general accordance with British Standard 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures (BS 7445-1).

13.2.3 The Environmental Protection department of Coventry City Council (CCC) requested that 24-hour monitoring is undertaken, where possible, and that noise report shall include results for "**L_{Aeq}, L_{A10}, L_{A90} and L_{Amax} noise descriptors, together with a calculated arithmetical average for the L_{Aeq}**". These requests have been complied with in this assessment.

13.2.4 Twenty-four-hour monitoring was undertaken at two sites comprising 15 minutes samples, in non-consecutive hours during the day, were undertaken at four additional sites. A summary of the key findings from the baseline noise survey is provided in section 13.3 below and the full noise survey details are provided in **Appendix 13.2**.

Construction Phase Methodology

Noise

13.2.5 BS 5228-1:2009(+A1:2014) 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise' (BS 5228-1) is the industry standard guidance for assessing construction noise effects.

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- 13.2.6 BS 5228-1 provides “Example Method 2” for determining significant noise levels due to construction activities. For the appropriate period (daytime, evening/weekends or night-time), construction activities are deemed to be significant if the total noise (Pre-construction ambient plus construction noise) exceeds the pre-construction ambient noise by +5dB or more. This is subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq,period}$, from construction noise alone, for the daytime, evening and night-time periods, respectively.
- 13.2.7 If these thresholds are exceeded in conjunction with other factors such as duration of the exposure, then a potentially significant effect may be considered to occur.

Vibration

- 13.2.8 BS 5228-2:2009(+A1:2014) ‘Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration’ (BS 5228-2) is the industry standard guidance for assessing construction vibration effects.
- 13.2.9 For assessing construction phase vibration levels, a peak particle velocity (PPV) threshold of 0.3mm/s PPV would be appropriate for the identification of the onset of adverse effects, above which vibration might be just perceptible in residential environments. This level is based on the guidance values provided in BS 5228-2.
- 13.2.10 Vibration levels of 1mm/s PPV can be assumed to be the onset of moderate adverse effects. Above this level within a residential environment, vibration from construction would likely disturb, startle, cause annoyance or interfere with work activities of receptors. This level is based on the guidance values provided in BS 5228-2.
- 13.2.11 Unless the building is particularly susceptible to vibration then there is minimal risk of even cosmetic building damage at vibration levels below 15mm/s PPV.

Operational Phase Methodology

- 13.2.12 The Calculation of Road Traffic Noise, 1999, (CRTN) is the industry standard guidance for predicting noise levels from roads. CRTN has been used to predict Basic Noise Levels (BNLs) on the existing nearby roads, based on traffic flow, % Heavy Goods Vehicles (HGVs) and speed limits. The supporting traffic data has been supplied by the appointed traffic consultant for the project, Phil Jones Associates Ltd (PJA Ltd).
- 13.2.13 The Design Manual for Roads and Bridges Volume 11, Section 3, Part 7 – ‘Noise and Vibration’ (DMRB HD213/11), is the industry standard guidance for assessing the magnitude of changes in road traffic noise levels.
- 13.2.14 For the purposes of this assessment, the more stringent short-term criteria, within DMRB HD213/11, has been considered, which is presented in **Table 13.1** below.

Table 13.1: Criteria for Road Traffic Noise Effects

Magnitude of Effect	Change in Noise dB $L_{A10,18hour}$
Major (High)	≥ 5.0
Moderate (Medium)	3.0 – 4.9
Minor (Low)	1.0 – 2.9
Negligible	0.1 – 0.9
No Change	0.0

- 13.2.15 The significance, in EIA terms, of the changes in noise will also depend on other factors such as the absolute noise levels and other contextual considerations. This is outlined in further detail below.

Assessment of Significance

- 13.2.16 The Explanatory Note to the Noise Policy Statement England (NPSE), provides the definition of Significant Observable Adverse Effect Level (SOAEL):

SOAEL – significant observed adverse effect level. This is the level above which significant adverse effects on health and quality of life occur.

- 13.2.17 Values for SOAEL should be determined on a strategic or project basis taking into account site specific factors. It is important to note that noise levels predicted to exceed the SOAEL do not necessarily result in a significant environmental effect in EIA terms. An overall judgement on significant environmental effects would consider factors including: absolute noise level; magnitude of change; the sensitivity of the receptors; duration of effect; number/proportion of receptor(s) effected, and other contextual considerations.

- 13.2.18 The relevant criteria, at which significant environmental effects will be deemed to have occurred, are outlined below:

Construction Phase

Noise

- 13.2.19 It is important to note that although construction noise levels above the BS 5228-1 threshold values could result in minor to moderate adverse effects, it would not necessarily result in a significant environmental effect in EIA terms. A significant environmental effect may occur when the threshold values from BS 5228-1, Method 2, are exceeded for a period of one month or more, unless works of a shorter duration are likely to result in significant effects.

Vibration

- 13.2.20 Construction vibration levels, at nearby residential properties, should generally be kept below 1mm/s and ideally below 0.3mm/s PPV. Minor to Moderate adverse effects could occur at vibration levels between 0.3 to 1.0mm/s PPV.

- 13.2.21 Based on the guidance in BS5228-2, professional judgement and prior project experience, a Significant environmental effect could be judged to occur where:

- 1mm/s PPV is exceeded regularly throughout the day/evening without prior warning or exceeded regularly for several days.
- 10mm/s PPV is exceeded for more than just a very brief exposure (more than a few seconds).
- 15mm/s is exceeded at all, as this is the point where the risk of cosmetic damage increases in normal buildings.

Operational Phase

- 13.2.22 Minor and moderate adverse effects would be judged based on the criteria in **Table 13.1** above. Based on professional judgement and prior project experience the follow judgements on significance of environmental effects are provided:

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- 13.2.23 Where absolute BNLs at existing residential properties are below the threshold for Noise Insulation Regulations (i.e. façade level of 68 dB LA10,18hr) a significant environmental effect may occur where a 'Major' change in noise of ≥5dB occurs.
- 13.2.24 Where absolute BNLs at existing residential properties are at, or above, the threshold for Noise Insulation Regulations (i.e. façade level of 68 dB LA10,18hr) a significant environmental effect may occur where a 'Moderate' change in noise of ≥3dB occurs.
- 13.2.25 Notwithstanding all of the above criteria for significant environmental effects, there may be other contextual considerations that effect overall judgement of significance of environmental effects.

Legislative and Policy Framework

- 13.2.26 The relevant planning policy and legislation, as it relates to the assessment of noise and vibration, is summarised in **Table 13.2** below.

Table 13.2: Regulatory and Policy Framework for Noise and Vibration Effects

Regulation/policy	Summary of requirements
Noise Policy Statement for England (NPSE) 2010	Within the context of Government policy on sustainable development, the Noise Policy aims to: <ul style="list-style-type: none"> • Avoid significant adverse effects as a result of the scheme; • Mitigate and minimise adverse effects as a result of the scheme; and • Contribute to the enhancement of the acoustic environment.
National Planning Policy Framework (NPPF) 2019	Planning policies and decisions should contribute to and enhance the natural and local environment by preventing new and existing development from contributing to, being put at unacceptable risk from, for being adversely affected by, unacceptable levels of noise pollution. 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: <ul style="list-style-type: none"> • Mitigate and reduce to a minimum potential adverse impact resulting from noise from the development – and avoid noise giving rise to significant adverse impacts on health and quality of life. • Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.
Planning Practice Guidance Noise (PPG-N), 2014	PPG-N provides advice on how planning can manage potential noise impacts in new development. Noise should not be considered in isolation and should instead be viewed in relation to social, economic and environmental context.
Professional Practice Guidance "ProPG: Planning and Noise", 2017 – ANC, IOA & CIEH (Pro-PG)	This guidance document aims to collate and fill the gaps in the existing technical guidance relating to noise and planning, to help achieve more consistent decision making during the planning process.

Regulation/policy	Summary of requirements
Control of Pollution Act 1974, as amended. (CoPA)	Section 60 – Control of noise on construction sites. Section 61 – Prior consent for work on construction sites. Section 71 – Codes of practice for minimising noise. Section 72 – “Best practicable means”.
Environmental Protection Act 1990, as amended, (EPA)	Section 79 (1) (ga) noise that is prejudicial to health or a nuisance and is emitted from or caused by a vehicle, machinery or equipment in a street constitutes a statutory nuisance (NB: local authorities should inspect their areas to detect any statutory nuisances) Section 79 (9) provides interpretation of “best practicable means”.

National Planning Policy

13.2.27 National Planning Policy is summarised in **Table 13.2** above.

The Development Plan

13.2.28 The ‘Coventry City Council Local Plan adopted 6th December 2017, states:

“A suitable residential environment will include safe and appropriate access, have adequate amenity space and parking provision and be safe from environmental pollutants such as land contamination, excessive noise and air quality issues”.

13.2.29 The above principally relates to site suitability and the appropriate design of the Proposed Development, which is outlined in this chapter (assessment of effects and mitigation by design sections) and covered in detail in **Appendix 13.2**.

Scoping Criteria

13.2.30 As set out in Chapter 2, an EIA Scoping was undertaken with Coventry City Council (CCC) which set out the proposed methodology and likely potential effects to be assessed for the construction and operation phases. At the EIA scoping stage, the potential for noise effects from the following sources were identified:

- construction noise;
- construction vibration;
- operational traffic noise on existing roads; and
- operational noise from fixed building services.

13.2.31 However, there are no fixed external building services noise sources proposed i.e. energy centre, generators, air conditioning systems, etc. Therefore, operational noise from fixed external building services plant can be scoped out of further assessment.

13.2.32 There are no operational vibration effects anticipated. Any vibration occurring from the existing road network is a maintenance issue and newly formed access roads will all have smooth surface finishes; therefore, operational vibration is scoped out of further assessment.

13.2.33 The Environmental Protection department at CCC provided scoping opinion feedback. This focused on assessing the noise climate affecting the Proposed Development, in terms of meeting appropriate noise limits inside and outside the new residential properties and providing suitable mitigation measures in the design, where required, to ensure these limits are achieved. This is covered in more detail in **Appendix 13.2**. Having seen the environmental scoping report, CCC raised no concerns or

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comments on the proposals for assessing the potential noise and vibration effects from the Proposed Development on the existing NSRs.

13.2.34 Accordingly, the Assessment considers the following potential effects:

- Construction Phase – temporary noise effects;
- Construction Phase – temporary vibration effects;
- Operational Phase – road traffic noise effects;
- Operational Phase – site suitability for the Proposed Development is covered separately in **Appendix 13.2**;

Extent of Study Area

13.2.35 Regarding construction phase(s), the extent of the study area is 300m from the proposed construction work across the Application Site, in accordance with BS 5228-1.

13.2.36 In terms of operational noise effects, due to road traffic on local road network, the study area is 50m from the carriageway edge. This is based on professional judgement and prior experience of similar projects, and the fact that the potentially effected frontline properties provide screening to NSRs further back.

Limitations to the Assessment

13.2.37 The assessment of construction phase activities is limited by the necessary assumptions that are made regarding:

- type and number of plant items;
- on-time estimates; duration of works;
- construction methods;
- vehicle movements; and
- other similar assumptions.

13.2.38 Measured, historic noise and vibration level data are provided in BS 5228-1&2 for various plant items, methods and environmental conditions. This data is used in the noise and vibration assessment, which is standard practice, in lieu of specific plant noise and vibration data sheets.

13.2.39 Exact building locations on the Application Site are not confirmed at this outline stage, therefore, worst case estimates have been made where required when calculating separation distances between the construction works and existing NSRs.

13.2.40 The assessment of operational road traffic noise levels is limited to the accuracy of the forecast traffic data provided.

13.3 BASELINE CONDITIONS

Site Description and Context

13.3.1 The baseline noise climate, across the Application Site, is comprised of constant road traffic noise from the M6 motorway, located some 700m to the north. Traffic noise from the M6 is the dominant noise source across the Application Site. There is additional noise from intermittent vehicle noise on local roads and birdsong. There is also occasional noise from the rugby club located adjacent to the northern site boundary.

Nearest Noise Sensitive Receptors

Residential Receptors

13.3.2 There are residential NSR located adjacent to the Application Site to the south-east on Thompsons Road and to the east and north-east on Bennetts Road North. There are also isolated properties approximately 150m to the north/northwest of the Application Site on Burrow Hill Lane.

Educational Receptors

13.3.3 Keresley Newland Primary Academy is located approximately 120m to the east of the Application Site off Bennetts Road North.

Recreational Receptors

13.3.4 Keresley Community Library is located approximately 120m to the south-east of the Application Site of Bennetts Road.

Baseline Survey Information

13.3.5 Noise monitoring was undertaken at various locations across the Application Site and comprised both short term attended measurements at four locations (ST1 to ST4) and longer term unattended measurements at two locations (LT1 & LT2). Measurements were undertaken between Wednesday 29 November 2017 and Monday 06 December 2017. Additional short term attended measurements were undertaken at LT2 on 02 February 2019.

13.3.6 A summary of the baseline noise survey details is provided below, with additional information provided in **Appendix 13.2** along with a figure of the noise measurement locations (Figure 13.2.1 within Appendix 13.2).

Baseline Noise Level Summary

13.3.7 The long-term noise data has been analysed and the findings are summarised in **Table 13.3** below.

Table 13.3: Summary of Baseline Noise Levels at Long Term Monitoring Positions LT1 and LT2

Noise Level Parameter (dB)	LT1	LT2
Average Traffic Noise Level - $L_{A10,18\text{hour}}$ (0600-2400h)	54.7	53.0
Average (Logarithmic) Daytime Ambient - $L_{Aeq,16\text{hour}}$ (0700-2300h)	53.5	52.0
Average (Arithmetic*) Daytime Ambient - $L_{Aeq,16\text{hour}}$ (0700-2300h)	53.4	51.8
Average (Logarithmic) Night-time Ambient - $L_{Aeq,8\text{hour}}$ (2300-0700h)	49.2	49.0
Average (Arithmetic*) Night-time Ambient - $L_{Aeq,8\text{hour}}$ (2300-0700h)	49.0	48.7
Maximum Noise Time Level - $L_{Amax,F}$ (2300-0700h)	69.6	69.0
Average Daytime Background noise level - dB $L_{A90,1\text{hr}}$	49.3	49.5
Average Night-time Background noise level - dB $L_{A90,1\text{hr}}$	45.6	45.9

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13.3.1 There is little difference between the noise levels measured at LT1 and LT2 because the constant road traffic noise from the M6 is the dominant factor at both positions. The ambient noise levels measured at the short-term sample positions, were also very consistent, ranging between 51 and 54dB_{L_{Aeq,15min}} at all positions, including the additional short term sample measurements at LT2.

13.3.2 Adopting a daytime/evening ambient noise level of 52dB _{L_{Aeq,T}} is appropriate for all existing NSRs adjoining the Application Site boundary.

13.4 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

Construction

13.4.1 At this stage, specific details of construction methodologies to be used for the Proposed Development are unknown. The assessment is therefore based on typical construction activities for this type of development based on experience of similar developments.

13.4.2 The construction works have been divided into the following construction phases, which represent typical activities for this type of development:

- Site preparation and earthworks (including the formation of haul routes);
- Substructure works (foundations);
- Superstructure works (erection of brick buildings); and
- External works (Access roads, hard-standings and landscaping).

Construction Noise

13.4.3 The type of plant and equipment assumed in the assessment, together with associated noise levels, is provided in **Table 13.4**.

Table 13.4: Summary of Assumed Construction Plant and Equipment

Construction Activity	Equipment	BS5228-1 Reference	Plant Noise Level, dB L _{Aeq} at 10m	% on time	Total Activity Noise Level, dB L _{Aeq} at 10m
Site preparation and earthworks	Tracked excavator (40t)	C.2.14	79	80	86
	Tracked Excavator (25t)	C.2.19	77	80	
	Dozer	C.2.13	78	50	
	2x Dump truck (tipping fill)	C.2.30	79	30	
	Vibratory roller	C.2.39	74	50	
	4-axle lorry collecting material	C.2.34	80	10	
Substructure works	Tracked excavator	C.4.64	75	50	83
	Dump truck	C.2.30	79	30	
	Concrete mixer truck + pump	C.4.32	78	30	
	Delivery wagons	C.11.7	79	10	
	2x Poker vibrator	C.4.33	78	15	
	Vibratory tamper	C.4.35	63	15	

Construction Activity	Equipment	BS5228-1 Reference	Plant Noise Level, dB L _{Aeq} at 10m	% on time	Total Activity Noise Level, dB L _{Aeq} at 10m
	Compressor	D.6.19	72	15	
	Vibratory plate (petrol)	C.2.41	80	15	
Superstructure works	Delivery wagons	C.11.7	79	15	81
	Mobile telescopic crane	C.4.41	71	15	
	Telescopic handler	C.2.35	71	30	
	Concrete mixer truck + pump	C.4.32	78	30	
	Compressor for power tools	D.7.11	74	50	
	Hand tools (nail gun)	C.4.95	73	10	
	Circular saw	C.4.72	79	10	
	Generator for lighting	C.4.86	65	30	
External works	Tracked excavator (15t)	C.2.24	73	50	82
	Asphalt paver + tipper lorry	C.5.31	77	50	
	4-axle lorry	C.2.34	80	10	
	Vibratory roller	C.5.26	77	20	
	Vibratory plate (petrol)	C.2.41	80	20	

13.4.4 The distances at which significant effects may occur (i.e. where the noise level is greater than 65 dB L_{Aeq}, assuming daytime works only) from each construction activity are presented in **Table 13.5**.

Table 13.5: Distance from works within which significant noise effects may occur

Construction Activity	Construction noise >65 dB L _{Aeq} within distance, m
Site preparation and earthworks	83
Substructure works	63
Superstructure works	52
External works	58

13.4.5 The results in **Table 13.5** indicate that significant effects may occur at properties within 83m of construction activities without mitigation.

Construction Noise Effects on Residential Receptors

13.4.6 Residential properties within 83m of the Application Site include those on Thompson Road to the south (approximately 33 properties) and Bennetts Road North to the east and north (approximately 56 properties). Only the first row of properties is counted as these will provide screening, thus reducing noise levels to properties beyond.

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- 13.4.7 Construction activities with noise levels exceeding 65 dB L_{Aeq} are likely to be ongoing for longer than a month, although due to the transitory nature of much of the activity, exactly how long each individual property may be exposed to such high levels is not clear at this stage. The magnitude of effects of construction noise would be, **temporary medium/high adverse** and would therefore be of **moderate to major significance**.

Construction Noise Effects on Educational Receptors

- 13.4.8 The Keresley Newland Primary Academy buildings are located beyond 83m of the Application Site and are also screened by properties on Bennetts Road North. The western section of playing fields is located within 83m of the Application Site but is also screened by properties on Bennetts Road North. The effects of construction noise are therefore **not expected to be significant** at Keresley Newland Primary School or Keresley Community Library.

Construction Noise Effects on Recreational Receptors

- 13.4.9 Keresley Community Library is located beyond 83m of the Application Site and is also screened by properties on Bennetts Road. The effects of construction noise are therefore **not expected to be significant** at Keresley Community Library.

Construction Traffic Noise

- 13.4.10 The level of construction traffic would be expected to be relatively low compared to the existing level of traffic on local roads, being less than 10 daily construction traffic movements compared to circa 1,700 existing daily traffic movements on Bennetts Road North. Construction traffic effects would be expected to be **negligible**, being significantly less than a +1dB increase in traffic noise due to construction traffic, and **not significant**.

Construction Vibration

Compaction Activities

- 13.4.11 A vibratory roller would likely be used for surface compaction. This would be a relatively short-term activity in terms of potential exposure at any given receptor. Based on typical assumptions for vibratory compaction plant, a resultant PPV of:
- greater than 1mm/s may occur within approximately 25 – 35m of works;
 - greater than 10 mm/s may occur within approximately 5 - 10m of works;
 - and,
 - greater than 15mm/s may occur within approximately 3m of works.

Piling Activities

- 13.4.12 At this stage it is not known whether piling would be required as part of the foundations for dwellings, although it is considered unlikely. The vibration effects of piling are dependent on a number of factors, such as ground condition and the method of piling used. If percussive piling is proposed then vibration levels are likely to exceed those presented above in relation to compaction, and a specific piling noise and vibration assessment should be conducted prior to commencing works to assess the potential effects.

Construction Vibration Effects on Receptors

- 13.4.13 Residential properties within 35m of the Application Site include those on Thompson Road to the south (approximately 32 properties) and Bennetts Road North to the east

and north (approximately 54 properties). Such a level may be perceptible but is not likely to cause complaint, particularly if prior warning is given to residents and works are of a short duration (less than a few days). The magnitude of effects of construction vibration would therefore be expected to be **temporary, medium adverse** and would therefore be of **moderate significance** at properties beyond 5m and within 35m of the Application Site boundary.

13.4.14 Of these properties, there are several receptors located close to the Application Site boundary (within 5 to 10m); namely three dwellings to the north-east, and two dwellings and the Post Office/convenience store to the east. Vibration levels may approach or exceed 10mm/s at these receptors, however, any such exposure would be very limited duration. The magnitude of effects of construction vibration would therefore be expected to be **temporary, high adverse** and would therefore be of **major significance** at properties within 10m of the Application Site boundary.

Construction Traffic Vibration

13.4.15 Vibration from construction traffic would most likely be caused by poor road surface on the haul temporary access roads, which could be easily rectified with regular maintenance. On the public highway, vibration is proportional to noise generated and effects would therefore be expected to be **negligible and not significant**.

Operation

Road Traffic Noise Effects

13.4.16 The traffic noise assessment is based on a comparison of the BNLs for the 'Do Minimum' (DM) and the 'Do Something' (DS) scenarios in the opening year (2026). The DM scenario includes existing traffic, and the effects of committed developments (excluding two other developments within the Keresley Sustainable Urban Extension (SUE) to the south of the Application site; these are assessed in the cumulative assessment).

13.4.17 The results of the road traffic assessment are shown in **Table 13.6**.

Table 13.6: Road traffic noise assessment

Road Link	2026 DM				2026 DS				Change, dB
	AAWT	Speed, kph	%HGV	BNL, dB LA10,18h	AAWT	Speed, kph	%HGV	BNL, dB LA10,18h	
Bennetts Road N (North of Site Access)	2179	64	18	65.1	2147	64	16	64.7	-0.4
Bennetts Road N (South of Site Access)	2179	48	18	64.0	5048	48	7	65.4	+1.3
Howat Road	4831	48	11	66.2	4831	48	11	66.2	-0.1
Bennetts Road N (between Howat Road and Exhall Road)	7010	48	13	68.2	10212	48	8	68.8	+0.5
Thompsons Road	594	48	8	56.4	594	48	8	56.4	0.0
Exhall Road	5916	48	15	67.9	6839	48	11	67.8	0.0
Bennetts Road N (between Thompsons Road and Fivefield Road)	4625	48	10	65.8	6855	48	6	66.5	+0.7

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Road Link	2026 DM				2026 DS				Change, dB
	AAWT	Speed, kph	%HGV	BNL, dB LA10,18h	AAWT	Speed, kph	%HGV	BNL, dB LA10,18h	
Fivefield Road	2270	48	50	67.6	2705	48	44	67.9	+0.3
Watery Lane	1907	97	43	69.2	2368	97	38	69.8	+0.6
Bennetts Road S (between Watery Lane and Penny Park Lane)	3649	48	4	63.2	5045	48	3	64.3	+1.1
Bennetts Road S (between Penny Park Lane and Sandpits Lane)	9301	48	3	66.9	9509	48	2	66.8	-0.1
Penny Park Lane	7025	48	0	64.5	7034	48	0	64.5	0.0
Sandpits Lane	7024	48	0	64.5	7103	48	0	64.6	0.0
Keresley Brook Road	4194	48	0	62.3	4487	48	0	62.6	+0.3
Keresley Green Road (between Benson Road and Scotchill Roundabout)	10894	48	5	68.3	11430	48	5	68.5	+0.2
The Scotchill	11485	48	1	67.1	11565	48	1	67.1	0.0
Kersley Road	24699	48	8	72.6	25080	48	8	72.7	+0.1
Tamworth Road (between Waste Lane and Scotchill Roundabout)	12274	48	14	70.9	12239	48	14	70.9	0.0
Tamworth Road (between Fivefield Road and Long Lane)	12415	48	17	71.4	12419	48	16	71.3	-0.1

13.4.18 The results of the assessment indicate that the change in noise level is less than 1dB for the majority of road links. The effects on these links would be, at worst, permanent **negligible adverse**, and **not a significant** environmental effect.

13.4.19 The exceptions to the above are Bennett Road North (south of Site Access) and Bennett Road South (between Watery Lane and Penny Park Lane) which would experience increases of +1.3 and +1.1 dB, respectively. The effect on these links would be **permanent minor adverse** and **not a significant** environmental effect, particularly as the constant distant road traffic from the M6 would help mask perception of such changes in noise on local roads.

13.5 MITIGATION, ENHANCEMENT AND RESIDUAL EFFECTS

Mitigation by Design

13.5.1 There is specific mitigation by design, with regards to noise and vibration, in terms of the effects of the existing (baseline) noise levels on the Proposed Development. This includes: inclusion of land buffers between houses and noise sources (roads); provision of solid garden fences (>1.5m height) particularly in proximity to noise sources, and provision of appropriately specified glazing and passive trickle

ventilators. Trickle ventilation will allow background ventilation inside dwellings without the need to open windows, hence, maintain appropriate indoor noise levels.

- 13.5.2 These measures are discussed in more detail in the noise assessment of site suitability in **Appendix 13.2**.

Additional Mitigation

Construction Mitigation

- 13.5.3 On 6 April; 2015, BS5228-1 and BS5228-2 gained Approved Code of Practice status (in England) under the power conferred by sections 71(1)(b), (2) and (3) of the Control of Pollution Act 1974 (CoPA), as enacted under The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015. Compliance with the best practice noise mitigation requirements states therein became a statutory obligation under the Act. All construction contractors would therefore be required to follow standard good-construction practice as outlined in BS5228-1 and BS5228-2.
- 13.5.4 Normal working hours will be 0800 to 1800 hours Monday to Friday and 0800 to 1300 hours on Saturdays, with no normal works taking place on Sundays or banks holidays.
- 13.5.5 All plant machinery will be regularly maintained to control noise emissions; noise emitted by plant items should not exceed the limits quoted in either the relevant EC Directive, UK Statutory Instrument or BS5228-1 and the demolition of buildings will, whenever possible be undertaken without the use of pneumatic breakers. There will be no processing (including crushing) of demolition rubble on site, and instead such materials would be exported to a suitable site.
- 13.5.6 Deliveries will be programmed to arrive during working hours only. Care will be taken when unloading vehicles and construction vehicles will be routed on major roads only.
- 13.5.7 The use of acoustic barriers or screens will be applied as appropriate; and compressors brought onto the site will be silenced or sound reduced models fitted with acoustic enclosures. Where an acoustic barrier eliminates line of site between the source and receiver, a reduction in sound levels of 10dB would be anticipated. Where the acoustic barrier partially screens a noise source a 5dB reduction would be anticipated. It is anticipated that acoustic barriers could provide full screening in the majority of instances and as such a 10dB reduction in sound levels is assumed.
- 13.5.8 Site staff will be made aware of nearby noise sensitive receptors and avoid unnecessary noise due to misused of tools, excessive shouting, audio equipment.
- 13.5.9 Construction works may, where possible, be phased such that dwellings are first constructed towards the boundaries of the site, thus providing both a physical and spatial barrier between existing dwellings and future works within the site.
- 13.5.10 For vibratory works, such as compaction and piling (if applicable), good practice will be employed to reduce the levels of vibration (and noise) as far as possible. This will include the choice of equipment or method, reducing the impact energy, the use of dollies to prevent metal or metal contact, etc.. Local residence will be informed of any such works in advance. The contractor will prepare a task specific noise and vibration assessment do determine the potential effects of such works.
- 13.5.11 Where required, suitable action levels would be proposed (i.e. 10mm/s) for the worst-case activities close to properties. Vibration monitoring would then ensure that the risk is managed during any such works.

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13.5.12 If appropriate, the contractor may apply for Section 61 prior consent under the CoPA to ensure that best practicable means are employed to manage the effects of noise and vibration.

13.5.13 It is proposed that the construction works are managed within a Construction Environment Management Plan (CEMP) to ensure that best practice methods of working and mitigation are followed.

Operational Mitigation

13.5.14 There are no mitigation measures with regards to operational noise.

Mitigation Summary

13.5.15 A summary of the mitigation requirements is provided in **Table 13.7**.

Table 13.7: Mitigation

Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	How measure would be secured		
		By Design	By S.106	By Condition
1	Compliance with Approved Codes of Practice, BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014			X
2	Normal working hours will be 0800 to 1800 hours Monday to Friday and 0800 to 1300 hours on Saturdays, with no normal works taking place on Sundays or banks holidays.			X
3	Construction works managed within a Construction Environment Management Plan (CEMP)			X
4	Provision of buffers i.e. distance separation, between dwellings and Bennett's Road North.	X		
5	Use of solid garden fences, particularly when adjacent to noise sources.	X		
6	Appropriate acoustic specification for glazing and trickle ventilators.	X		

Enhancements

13.5.16 The Proposed Development dwellings may provide a level of acoustic screening of noise from the M6 motorway, located some 700m to the north of the site, at existing dwellings to the south of the Application Site on Thompsons Lane.

Residual Effects

Residual Construction Effects

13.5.17 The distances at which significant effects may occur (i.e. where the noise level is greater than 65 dB L_{Aeq}, assuming daytime works only) from each construction activity assuming 10dB mitigation can be achieved through screening are presented in **Table 13.8**.

Table 13.8: Distance from works within which significant effects may be expected (with mitigation)

Construction Activity	>65 dB L _{Aeq} within distance, m
Site preparation and earthworks	33
Substructure works	25
Superstructure works	21
External works	23

13.5.18 The results in **Table 13.8** indicate that significant effects may occur at properties within 33m of construction activities with the implantation of good-practice mitigation.

13.5.19 The number of properties potentially exceeding 65 dB L_{Aeq} due to construction activities (i.e. within 33m of the Application Site) remains the same (approximately 89 properties). However, the absolute level of the noise will be reduced, together with the distance within the Application Site boundary that works may exceed 65 dB L_{Aeq} at nearby NSRs. This reduces the duration at which noise levels are likely to be above 65 dB L_{Aeq} at any given NSR and therefore reduces the likelihood that significant effects would occur. The effects of construction noise would therefore be expected to be **minor** and **not significant** with the implementation of good-practice mitigation.

13.5.20 With the use of best practicable means, levels of vibration due to compaction and/or piling activities close to receptors would likely be expected to be within acceptable levels and would not cause significant effects. If required, vibration monitoring will be undertaken to ensure no significant environmental effects occur. At this stage the methods are unknown and this would require further assessment prior to commencing works.

13.5.21 All other construction effects are as described in **Section 13.4** above.

Residual Operational Effects

13.5.22 All operational effects are as described in **Section 13.4** above.

13.6 CUMULATIVE AND IN-COMBINATION EFFECTS

Intra-project Cumulative Effects

13.6.1 There are no intra-project cumulative effects.

Inter-project Cumulative Effects

Inter-project Cumulative Construction Effects

13.6.2 Although there are a number of proposed developments to the south of the Application Site, with all sites exercising good practice mitigation, and with the separation and screening between the sites, some noise may be audible at nearby dwellings from difference construction sites, but significant cumulative construction effects are not expected.

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Inter-project Cumulative Operational Effects

13.6.3 The DM scenario traffic data includes committed developments with the exception of the two committed developments with the Keresley SUE to the south of the Application Site. The results of the road traffic assessment including these sites are shown in **Table 13.9**.

Table 13.9: Road traffic noise assessment (Cumulative)

Road Link	2026 DM				2026 DS				Change, dB
	AAWT	Speed, kph	%HGV	BNL, dB LA10,18h	AAWT	Speed, kph	%HGV	BNL, dB LA10,18h	
Bennetts Road N (North of Site Access)	2179	64	18	65.1	2116	64	15	64.5	-0.6
Bennetts Road N (South of Site Access)	2179	48	18	64.0	5012	48	6	65.2	+1.1
Howat Road	4831	48	11	66.2	4831	48	11	66.2	-0.1
Bennetts Road N (between Howat Road and Exhall Road)	7010	48	13	68.2	10216	48	8	68.8	+0.5
Thompsons Road	594	48	8	56.4	612	48	8	56.6	+0.1
Exhall Road	5916	48	15	67.9	7269	48	9	67.6	-0.3
Bennetts Road N (between Thompsons Road and Fivefield Road)	4625	48	10	65.8	9515	48	7	68.2	+2.4
Fivefield Road	2270	48	50	67.6	3410	48	26	67.1	-0.5
Watery Lane	1907	97	43	69.2	8589	97	16	73.3	+4.1
Bennetts Road S (between Watery Lane and Penny Park Lane)	3649	48	4	63.2	5831	48	3	64.9	+1.7
Bennetts Road S (between Penny Park Lane and Sandpits Lane)	9301	48	3	66.9	7971	48	3	66.3	-0.7
Penny Park Lane	7025	48	0	64.5	4658	48	0	62.8	-1.8
Sandpits Lane	7024	48	0	64.5	3503	48	0	61.5	-3.0
Keresley Brook Road	4194	48	0	62.3	3103	48	0	61.0	-1.3
Keresley Green Road (between Benson Road and Scotchill Roundabout)	10894	48	5	68.3	11497	48	4	68.3	0.0
The Scotchill	11485	48	1	67.1	11636	48	1	67.2	+0.1
Keresley Road	24699	48	8	72.6	26109	48	7	72.7	+0.1
Tamworth Road (between Waste Lane and Scotchill Roundabout)	12274	48	14	70.9	12105	48	14	70.8	-0.1
Tamworth Road (between Fivefield Road and Long Lane)	12415	48	17	71.4	13267	48	15	71.4	+0.0

- 13.6.4 The results of the assessment indicate that the change in noise level is less than 1dB for the majority of road links. The effect on these links would be, at worst, permanent **negligible adverse**, and **not significant**.
- 13.6.5 Permanent **minor adverse effects** would be experienced at Bennett Road North (south of Site Access), Bennetts Road North (between Thompsons Road and Fivefield Road) and Bennett Road South (between Watery Lane and Penny Park Lane). The effects on these links would be permanent **minor adverse** and **not significant**.
- 13.6.6 Permanent moderate adverse effects would be experienced on Watery Lane and such an increase would be regarded as significant in isolation. However, this increase is directly attributed to the proposed Keresley Link Road, which incorporates Watery Lane, and not the Proposed Development itself. As such, the cumulative effect is **not significant**.
- 13.6.7 There would also be permanent **minor beneficial** effects on Penny Park Lane and Keresley Brook Road, and **permanent moderate beneficial** effects on Sandpits Lane.
- 13.6.8 In summary, there are no significant cumulative operational noise effects directly attributable to the Proposed Development.

13.7 SUMMARY

Introduction

- 13.7.1 This chapter has assessed the potential construction and operational noise and vibration effects associated with the Proposed Development on the existing nearby Noise Sensitive Receptors (NSRs).

Baseline Conditions

- 13.7.2 The baseline noise climate across the Application Site is comprised of constant road traffic noise from the M6 motorway, located some 700m to the north. Traffic noise from the M6 is the dominant noise source across the Application Site. There is additional noise from intermittent vehicle noise on local roads and birdsong. There is also occasional noise from the rugby club located adjacent to the northern site boundary.
- 13.7.3 Nearby NSR include residential properties on Thompsons Road to the south and Bennetts Road North to the east and north-east. There are also isolated properties approximately 150m to the north/north-west on Burrow Hill Lane. Keresley Newland Primary Academy is located approximately 120m to the east and Keresley Community Library is located approximately 120m to the south-east.

Likely Significant Effects

Construction

- 13.7.4 Construction noise and vibration may, at times, be adverse at NSRs adjacent to the Application Site in terms of both average sound levels and overall duration of works, particularly for works taking place close to the Application Site boundary. However, due to the transitory nature of the works and use of best practice mitigation (BPM), it is considered likely that no significant environmental effects would occur. Construction noise and vibration effects would not be significant at Keresley Newland Primary Academy or Keresley Community Library due to the distance from the Application Site and screening provided by existing buildings.

Noise & Vibration

- 13.7.5 Construction traffic noise is not expected to be significant due to the comparatively higher existing traffic flows on nearby roads.

Operational

- 13.7.6 Operational noise effects, in terms of changes to local traffic flows, have been assessed. Although a general increase in traffic flows is expected, the increases are not sufficient for the corresponding noise increases to cause a significant environmental effect.

Mitigation and Enhancement

Construction

- 13.7.7 Construction mitigation will be based on good construction practices. This will include restrictions on working hours, the use of well-maintained machinery, the selection of quiet machinery where possible, site staff training, phasing of works, where possible, and the use temporary noise barriers and screens. Noise and vibration would be managed through a Construction Environment Management Plan (CEMP). This mitigation would be secured through planning conditions should consent be granted.
- 13.7.8 With the use of good practice mitigation, noise and vibration levels from the site, together with the potential duration of exposure to high noise levels would reduce at nearby NSRs. Although some construction works would still be audible, as would be expected from all construction works, the effects would not be expected to be significant.

Operational

- 13.7.9 There are no mitigation measures with regards to operational traffic noise affecting existing receptors and the effects would be as described above, being not significant. In terms of mitigating noise affecting the Proposed Development, several measures have been incorporated into the design, including land buffers, solid garden fencing and appropriate acoustic specifications for glazing and trickle ventilators.

Conclusion

- 13.7.10 The Proposed Development would not be expected to generate significant noise and vibration effects during the construction or operational phases. Good practice mitigation measures would be required during the construction phase, but these are not a barrier to development.
- 13.7.11 **Table 13.10** provides a summary of effects, mitigation and residual effects with regards to noise and vibration.

ENVIRONMENTAL STATEMENT

Noise & Vibration

Table 13.4: Summary of Effects, Mitigation and Residual Effects.

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
Construction								
Adjacent dwellings on Thompsons Road and Bennetts Road North	Construction noise from activities within the Application Site	Temporary Direct	High	Medium to high adverse	Local	Moderate to Major Adverse	Good practice mitigation	Minor Adverse
Adjacent dwellings on Thompsons Road and Bennetts Road North	Construction vibration from compaction and/or piling within the Application Site - TBC	Temporary Direct	High	Medium to high adverse	Local	Moderate to Major Adverse	Good practice mitigation	Minor Adverse
Dwellings adjacent construction traffic routes	Noise and vibration due to construction traffic to and from Application Site	Temporary Direct	High	Negligible	Local	Negligible	Not applicable	Negligible
Operation								
Dwellings adjacent to local traffic routes	Changes in noise level due to changes in traffic flows	Permanent Direct	High	Low adverse	Local	Negligible	Not applicable	Negligible

ENVIRONMENTAL STATEMENT

Noise & Vibration

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
Cumulative and In-combination								
Adjacent dwellings on Thompsons Road and Bennetts Road North	Construction noise from activities within the Application Site and from nearby sites	Temporary Direct	High	Medium to high adverse	Local	Moderate to Major Adverse	Good practice mitigation	Negligible
Dwellings adjacent to local traffic routes	Changes in noise level due to changes in traffic flows	Permanent Direct	High	Low to Medium - adverse & beneficial (predominantly due to Keresley Link Road).	Local	Minor Adverse	Not applicable	Minor Adverse