

CONTENTS

7.1	INTRODUCTION	2
7.2	ASSESSMENT METHODOLOGY	3
	Scope	3
	Data sources	3
	Assessment approach	4
	Significance criteria.....	13
	Uncertainties and limitations.....	16
7.3	RELEVANT POLICY	17
	National Planning Policy Framework (March 2012)	17
	National Planning Practice Guidance	18
	Noise Policy Statement for England, 2010	18
	Cherwell District Local Plan (1996).....	19
	The Non-Statutory Cherwell District Local Plan (2004)	19
	Draft Cherwell Local Plan (2014).....	20
7.4	BASELINE CONDITIONS	21
	Baseline Road Traffic Noise Levels at Sensitive Receptors	21
	The projected future baseline.....	24
7.5	POTENTIAL EFFECTS	25
	Construction stage	25
	Post-completion stage	27
7.6	MITIGATION MEASURES	32
	Construction stage	32
	Post-completion stage	33
7.7	RESIDUAL EFFECTS	39
	Construction stage	39
	Post-completion stage	39
	Summary of effects.....	40
7.8	CUMULATIVE EFFECTS.....	41

Outline Planning Application

7.1 INTRODUCTION

7.1.1 This chapter has been prepared by Wardell Armstrong LLP to assess the noise and vibration impacts of the proposed development. It considers the potential impacts generated by the earthworks, construction phase and operational phase of the Proposed Development. The Site is proposed for mixed use. There is therefore the potential for both sensitive uses (such as residential properties and the primary school) and noise generating uses (such as units at the local centre) to exist on the same Site.

7.1.2 The chapter describes the methods used to assess the baseline conditions currently existing at the Site and surroundings; the potential impacts of the development arising from construction activities, additional traffic movements to and from the Site, and proposed noise sources, at existing noise sensitive locations; the impact of existing and future noise sources on sensitive areas of the Proposed Development; the mitigation measures required to prevent or reduce the impacts and the residual impacts.

7.1.3 This chapter should be read in conjunction with Chapter 2 of this Environmental Statement (ES), which give details of the Site location, and development works to be undertaken at the Site, respectively.

7.2 ASSESSMENT METHODOLOGY

Scope

7.2.1 The Proposed Development is situated to the east of Bloxham Road, Banbury. To the north of the site resides Banbury Academy and existing residential dwellings. The site is bordered to the east and south by open agricultural land, with existing farm buildings and residential dwellings beyond. The study area of the noise and vibration impact assessment centres on proposed receptors within this area. However, existing receptors afield have the potential to be affected by the Proposed Development. Therefore noise impact have been assessed at sensitive receptor location along main infrastructure routes within the vicinity of the Proposed Development. The assessment considers the following potential impacts associated with the Proposed Development off Bloxham Road, Banbury

- Construction Phase: Impact of noise and vibration, from the earthworks and construction of the development on sensitive receptors.
- Operational Phase – Road Traffic Noise and Existing Sensitive Receptors: Impact of noise on sensitive receptors due to development generated traffic using the existing road network.
- Operational Phase Assessment – Proposed sensitive receptors and noise: It has been necessary to consider the noise levels at noise sensitive areas of the proposed development, i.e. proposed residential areas and school Site.
- Operational Phase Assessment – Proposed Noise sources and Proposed and Existing Sensitive Receptors : It has been necessary to consider and assess the noise from proposed local centre on the proposed residential uses at Wykham Park Farm and at existing residential locations.

Data sources

7.2.2 The following sources of information have been used in the preparation of this report:

- Department for Communities and Local Government, National Planning Policy Framework (NPPF), published March 2012;
- Noise Policy Statement for England, 2010;
- National Planning Practice Guidance;
- British Standard 5228 -1:2009 “Code of Practice for noise and vibration control on construction and open sites – Part 1: Noise” (BS5228-1);

Outline Planning Application

- British Standard 5228 -2:2009 “Code of Practice for noise and vibration control on construction and open sites – Part 2: Vibration” (BS5228-2)
- British Standard BS6472: 2008 “Guide to Evaluation of human exposure to vibration in buildings. Part 1: Vibration sources other than blasting” (BS6472-1);
- The World Health Organisation’s “Guidelines for Community Noise”, 1999 (WHO 1999);
- British Standard 4142:1997 Method for rating industrial noise affecting mixed residential and industrial areas (BS4142);
- Department of Transport’s memorandum, “Calculation of Road Traffic Noise” (CRTN), 1988;
- Planning Policy Guidance Note 24: Planning and Noise”, 1994 (PPG24)
- Building Bulletin 93: Acoustic Design in Schools” (BB93;and
- Traffic flow information, provided by Jubb Consulting Engineers Limited.

Assessment approach**Construction Phase Assessment***Noise from Earthworks and Construction Phase Activities*

- 7.2.2 The activities associated with the earthworks and construction phase of the Proposed Development will have the potential to generate noise and create an impact on the surrounding area.
- 7.2.3 Guidance on the prediction and assessment of noise from development sites is given in British Standard 5228 -1:2009 “Code of Practice for noise and vibration control on construction and open sites – Part 1: Noise” (BS5228-1).
- 7.2.4 Construction noise can have disturbing effects on the surrounding neighbourhood. The effects are varied and are complicated further by the nature of the site works, which will be characterised by noise sources which will change location throughout the construction period. The duration of site operations is also an important consideration. Higher noise levels may be acceptable if it is known that the levels will occur for a limited period.

Outline Planning Application

7.2.5 For the purposes of this assessment, the occupants of existing residential properties in the vicinity of the Site are considered to be the receptors most likely to be affected by the construction phases of the development. Details of the receptors are set out in Table 7.1 and presented on Figure 7.2 within Appendix 7.3.

Table 7.1: Existing Noise Sensitive Receptor Locations

Receptor	Address	Bearing from Site	Approximate Distance to Site Boundary
CSR1	Crouch Cottages, Bloxham Road (A361)	West	20m
CSR2	Banbury Academy, Ruskin Road	North	20m
CSR3	Residential Estate (west of A4260)	North East	10m
CSR4	Wykham Farm Cottage, Wykham Lane	South East	5m
CSR5	Wykham Park Farm Cottage, Wykham Lane	South West	50m

7.2.6 Local authorities may also have their own procedures for control of construction activities that are proposed in their catchment area. Cherwell District Council (CDC) recommends that where work can be heard beyond the Site boundary, that this does not commence before the hours of 08.00 and does not carry on beyond the hours of 18.00 Monday to Friday. CDC suggests that work does not commence on a Saturday before 08.00 hours and ceases at 13.00 hours and that no work takes place on Sundays or public holidays. CDC does not specify any noise limits.

7.2.7 In the absence of any procedures for the control of construction activities, the Control of Pollution Act 1974 (COPA 1974) gives the local authority power to serve a notice under Section 60 imposing requirements as to the way in which works are to be carried out. This could specify times of operation, maximum levels of noise which should be emitted and the type of plant which should or should not be used.

7.2.8 Under Section 60 of the COPA 1974 Act the local authority has the power to serve a notice which could impose requirements as to the way in which works are to be carried out. This could specify times of operation, maximum levels of noise which should be emitted and the type of plant which should or should not be used. This is a common way of enforcing reasonable levels of construction noise.

7.2.9 However it might be preferable for the chosen contractor to obtain prior consent under Section 61 of COPA 1974. Section 61 - enables anyone who intends to carry out works to apply to the local authority for consent. Under Section 61 the local

Outline Planning Application

authorities and those responsible for construction work have an opportunity to settle any problems, relating to the potential noise, before work starts.

7.2.10 In addition to COPA 1974, BS5228-1 provides guidance on significance criteria for assessing the potential noise impacts associated with the construction phase of large projects.

7.2.11 The noise assessment for the construction phase details baseline daytime noise levels recorded at sensitive receptor locations and outlines the main construction activities that could give rise to noise impacts at receptors in the vicinity of the proposed development. It also sets out details of management and control measures to ensure that any possible impacts are mitigated.

Noise from Construction Vehicles

7.2.12 In addition to the earthworks and construction activities, vehicle movements to and from the Proposed Development have the potential to generate noise at existing sensitive receptors, in the immediate vicinity of the local road network.

7.2.13 At this stage, the number of construction vehicles is not known. However, the number of construction vehicles is not considered to be significant relative to the existing flows on the major road links within and surrounding the development Site. It is therefore considered that the level of road traffic noise at sensitive receptor locations will not change significantly, due to construction vehicles during the construction phases of the Development, and this impact has not therefore been considered further.

Vibration from Earthworks and Construction Phase Activities

7.2.14 Work involving heavy plant on an open site is likely to generate vibration, which may, in certain circumstances, propagate beyond the boundary of the Site. In situations where particularly heavy plant, vibrating compaction equipment or piling rigs are being used close to the Site boundary, nearby properties may experience ground-borne vibration.

7.2.15 Guidance on the assessment of vibration from development sites is given in British Standard 5228-2:2009 "Code of Practice for noise and vibration control on construction and open sites – Part 2: Vibration" (BS5228-2).

Outline Planning Application

- 7.2.16 The sensitive receptors most likely to be affected by vibration generated by the earthworks and construction phase works of the development are detailed in Table 7.1.
- 7.2.17 It is not possible to mitigate vibration emissions from an open site. It is important therefore to examine the proposed working method to ascertain what, if any, operations would be likely to cause unacceptable levels of vibration at nearby sensitive locations. It is possible that these operations could be modified to reduce their vibration impacts.
- 7.2.18 BS5228-2 2009 indicates that vibration can have disturbing effects on the surrounding neighbourhood; especially where particularly sensitive operations may be taking place. The significance of vibration levels which may be experienced adjacent to a Site is dependent upon the nature of the source.
- 7.2.19 Human perception of vibration is sensitive. People can detect and be annoyed by vibration before there is any risk of structural damage. Cases where damage to a building has been attributed to the effects of vibration alone are extremely rare; even when vibration has been considered to be intolerable by the occupants.
- 7.2.20 It is not possible to establish exact vibration damage thresholds that may be applied in all situations. The likelihood of vibration induced damage or nuisance will depend upon the nature of the source, the characteristics of the intervening solid and drift geology and the response pattern of the structures around the Site. Most of these variables are too complex to quantify accurately and thresholds of damage, or nuisance, are therefore conservative estimates based on a knowledge of engineering.
- 7.2.21 Where ground vibration is of a relatively continuous nature, there is a greater likelihood of structural damage occurring, compared to transient vibration; for example that caused by transiting vehicles.
- 7.2.22 BS5228-2 indicates that the threshold of perception is generally accepted to be between a peak particle velocity (PPV) of 0.14 and 0.3mm/sec. In an urban situation it is unlikely that such vibration levels would be noticed. The Highways Agency Research report No. 53 "Ground Vibration caused by Civil Engineering Works" 1986

Outline Planning Application

suggests that, when vibration levels from an unusual source exceed the human threshold of perception, complaints may occur. The onset of complaints due to continuous vibration is probable when the PPV exceeds 3mm/sec.

7.2.23 British Standard BS6472: 2008 "Guide to Evaluation of human exposure to vibration in buildings. Part 1: Vibration sources other than blasting" (BS6472-1) suggests that adverse comments or complaints due to continuous vibration are rare in residential situations below a PPV of 0.8mm/sec.

7.2.24 Continuous vibration is defined as "vibration which continues uninterrupted for either a daytime period of 16 hours or a night-time period of 8 hours". The proposed earthworks and construction works at the Site will not cause continuous vibration as defined in BS6472-1.

7.2.25 BS5228-2 2009 suggests that the onset of cosmetic damage is 15mm/sec (15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz for residential or light commercial type buildings).

7.2.26 The adverse residual impacts are assessed against the categories set out in Table 7.4.

7.2.27 The vibration assessment for the construction phase outlines the main construction activities that could give rise to vibration impacts at receptors in the vicinity of the proposed development. It also sets out details of management and control measures to ensure that any possible impacts are mitigated.

Operational Phase Assessment*Road Traffic Noise and Existing Sensitive Receptors*

7.2.28 The operational phase of the development will generate additional traffic movements on the existing road network. These additional vehicle movements have the potential to increase road traffic noise levels at existing receptors located adjacent to the main routes to and from the development.

7.2.29 The current and future traffic noise levels at a number of sensitive receptors; both with and without the development in place, have been predicted using the computer

Outline Planning Application

modelling software SoundPLAN Version 7.1. The computer modelling methodology conforms to the calculation procedures set out in the Department of Transport's memorandum, "Calculation of Road Traffic Noise" (CRTN), 1988. The memorandum was prepared to enable entitlement under the Noise Insulation Regulations 1975 to be determined; but it is stated in the document, that the guidance is equally appropriate for the calculation of traffic noise for land use planning purposes.

7.2.30 The procedures outlined in CRTN assume typical traffic and noise propagation conditions that are consistent with moderately adverse wind velocities and directions during specified periods. In CRTN, all noise levels can be expressed in terms of the index $L_{10(18 \text{ hour})}$ dB(A).

7.2.31 The data used in the road traffic noise assessment provided by Jubb Consulting Engineers Limited, the traffic and transportation consultant for the proposed development.

7.2.32 The noise assessment requires 18-hour traffic flows for the routes likely to be affected by development traffic. The traffic information has been derived from traffic counts and has been provided as 18 hour AAWT flows and HGV percentages. The flows used in the noise assessment are included in Appendix 7.1.

7.2.33 In summary, CRTN has been used to determine the noise levels at each existing sensitive receptor, for a total of 2 scenarios:

Scenario 3: 2022 Future Assessment Year, Without the Development in Place, i.e. Future Baseline + Committed Development Traffic; and

Scenario 4: 2022 Future Assessment Year, With the Development, i.e. Future Baseline + Committed Development Traffic + Proposed Development Traffic + Application Development Traffic

7.2.34 Details of the sensitive receptor locations are given in Table 7.2 and shown on Figure 7.2 provided in Appendix 7.3.

Outline Planning Application**Table 7.2: Existing Noise Sensitive Receptor Locations Considered for CRTN Predictions**

CRTN Receptor Number	Address	Approximate Grid Reference	
		X	Y
CRTN1	2 Crouch Cottages	444173.00	238753.00
CRTN2	2 Lansdown Close	444525.00	239099.00
CRTN3	123 Bloxham Road	444963.00	239543.00
CRTN4	The Bungalow, Bloxham Road	444005.00	238378.00

7.2.35 Impacts will also be felt at receptors adjacent to and beyond those listed above. However, impacts at these receptors will be no greater than the listed receptors.

Existing Sensitive Receptors and Vibration

7.2.36 It is considered that the operational phase of the development is unlikely to produce any significant groundborne vibration. Vibration from the operation of the completed development has not therefore been considered.

Proposed Sensitive Receptors (Wykham Park Farm) and Noise

7.2.37 In addition to assessing the noise impact of the development at existing receptors, an assessment is required to consider any potentially noise sensitive areas of the Proposed Development. These areas, i.e. residential dwellings and school site, will be subjected to noise from existing and proposed sources.

7.2.38 The dominant source of existing noise at the Proposed Development is road traffic from vehicles travelling along Bloxham Road (A361), adjacent to the Site. There will also be some additional noise from traffic generated by the development itself. To determine the existing noise levels, at the proposed sensitive areas of the development, attended noise surveys have been carried out. Details of the noise survey are summarised in Section 7.4 of this chapter and set out in full in Appendix 7.2.

7.2.39 Once operational, the Proposed Development Site will generate additional traffic movements on the local road network. These additional vehicle movements have the potential to increase road traffic noise at the proposed residential areas of the Site. The future traffic noise levels across the Site; both with and without the development in place, have been predicted using the computer modelling software

Outline Planning Application

SoundPLAN version 7.1. The computer modelling methodology conforms to the calculation procedures set out in CRTN.

7.2.40 In accordance with CRTN, the modelled noise levels can be expressed in terms of the index L_{A10} . The results of the noise modelling can be compared to current planning guidance by making small adjustments to the modelled noise levels, in accordance with a method set out in the former "Planning Policy Guidance Note 24: Planning and Noise", 1994 (PPG24). The L_{A10} can be converted to an $L_{Aeq\ 16\text{hour}}$ (dB) (as required by current planning guidance) by subtracting 2dB(A).

7.2.41 The noise assessment for the operational phase therefore details existing and future noise levels across the proposed development. These noise levels have been assessed, and, where necessary, mitigation measures have been recommended to ensure that the required external and internal noise levels are met.

World Health Organisation Guidelines for Community Noise, 1999

7.2.42 The World Health Organisation's "Guidelines for Community Noise", 1999 (WHO 1999) suggest appropriate criteria and noise limits for outdoor living areas and habitable rooms of residential dwellings. The following external and internal noise limits, for noise from external sources, are suggested by the WHO 1999 within sensitive areas of the residential dwellings:

55dB $L_{Aeq\ (16\ \text{hour})}$ during the daytime in outdoor living areas;

35dB $L_{Aeq\ (16\ \text{hour})}$ during the daytime in noise sensitive rooms other than bedrooms;

30dB $L_{Aeq\ (8\ \text{hour})}$ during the night-time in bedroom areas.

45dB L_{Amax} should not be exceeded during the night-time in bedroom areas.

British Standard 4142:1997 Method for rating industrial noise affecting mixed residential and industrial areas (BS4142)

7.2.43 Where industrial noise is dominant, BS4142 is used to assess the impact of the noise. Therefore, in addition to the assessment in accordance with WHO 1999, a BS4142 assessment has been carried out to consider the potential noise impact of existing industrial premises, on residential areas of the development.

7.2.44 The purpose of the BS4142 assessment procedure is to assess whether noise levels from factories, industrial premises, fixed installations or sources of noise of an

Outline Planning Application

industrial nature in commercial premises, are likely to give rise to complaints from people residing nearby.

7.2.45 BS4142 refers to noise from the industrial source as the 'specific noise'. BS4142 assesses the likelihood of complaint by comparing the specific noise level to the background noise level (L_{A90})

7.2.46 Certain acoustic features can increase the likelihood of complaints over that expected from a simple comparison between the specific noise level and the background noise level. In particular BS4142 identifies noise that contains discrete impulses and/or audible tonal qualities and in these cases recommends that a 5dB correction be added to the specific noise level. The specific noise level along with any applicable correction is referred to as the 'rating level'.

7.2.47 The greater the difference between the rating level and the background noise level, the greater the likelihood of complaints. The assessment criteria given by BS4142 are as follows:

A difference of +10dB indicates that complaints are likely.

A difference of +5dB is of marginal significance.

If the rating level is more than 10dB below the measured background noise level, this is a positive indication that complaints are unlikely.

7.2.48 During the daytime, BS4142 requires that noise levels are assessed over 1-hour periods. However, during the night-time, because sleep disturbance is the important issue and individual noise events are, therefore, more important, noise levels are assessed over 5-minute periods.

Proposed Primary School Site

7.2.49 The potential impacts of the existing and future sources of noise at the proposed primary schools sites have been assessed with reference to "Building Bulletin 93: Acoustic Design in Schools" (BB93). BB93 provides detailed guidance on recommended external and internal noise levels to be achieved at school development sites.

7.2.50 For new school developments, BB93 recommends that the following daytime noise levels should be achieved:

Outline Planning Application

An upper limit of 60 dB L_{Aeq} (30 minutes) at the boundary of external premises used for teaching and recreation.

55 dB L_{Aeq} (30 minutes) in unoccupied playgrounds, playing fields and other outdoor areas.

50 dB L_{Aeq} (30 minutes) in at least one area of the unoccupied playgrounds, playing fields and other outdoor areas, to ensure suitable noise levels for outdoor teaching.

Indoor ambient noise limits in schools of between 30 and 40 dB L_{Aeq} (30 minutes) depending on the use of the room.

Proposed Sensitive Receptors and Vibration

7.2.51 It is considered that the levels of vibration will not significantly affect the proposed sensitive areas of the development. Vibration from the operation of the completed development has not therefore been considered.

Significance criteria**Construction Noise Assessment Significance Criteria**

7.2.52 For the purposes of this noise assessment, the noise likely to be generated by the earthworks and construction phase have been assessed against significance criteria established, using the BS5228-1 ABC Method.

7.2.53 The ABC method for determining significance criteria requires the ambient noise levels at existing sensitive receptors to be determined. The ambient noise levels at each existing receptor location are then rounded to the nearest 5dB(A) to determine the appropriate threshold value in accordance with the category value, A B or C, as detailed in Table 7.3.

7.2.54 The noise level likely to be generated at the receptor during the construction phase, i.e. the ambient noise level plus construction noise, is then compared to the appropriate category value. If the noise level is greater than the appropriate category value, a significant noise impact may be registered.

Outline Planning Application

Table 7.3: Thresholds of Significant Impact from Construction Noise at Residential Receptors in accordance with the ABC Method of BS5228-1

Assessment Category and Threshold Value Period (L _{Aeq})	Threshold Value, in decibels (dB)		
	Category A ^{*1}	Category B ^{*2}	Category A ^{*1}
Daytime (0700 to 1900 hours) and Saturdays (0700 to 1300 hours)	65	70	75
*1 Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than this value.			
*2 Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.			
*3 Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.			

7.2.55 At this stage, the contractor to undertake the enabling and construction works is not known. However, it is considered that the enabling and construction works are likely to be restricted to daytime hours. Based on the ambient noise levels measured during the daytime period, the appropriate category value has been determined for each of the sensitive receptors detailed in Table 7.4. Details of the noise survey carried out at the sensitive receptors are set out in Appendix 7.2.

Table 7.4: Construction Noise Assessment Significance Criteria

Receptor	Average Measured Noise Levels (dB L _{Aeq} 20 minutes)	Ambient Noise Level Rounded to the nearest 5dB(A) (dB L _{Aeq} 20 minutes)	Appropriate Category Value A, B or C in accordance with BS5228-1	Noise Level above which activities of the Construction Phase may cause a significant impact at the Receptor (dB L _{Aeq})
ESR1	59.0	60.0	A	65.0
ESR2	48.0	50.0	A	65.0
ESR3	47.7	50.0	A	65.0
ESR4	45.1	45.0	A	65.0
ESR5	48.0	50.0	A	65.0

Outline Planning Application**Construction Vibration Assessment Significance Criteria****Table 7.5: Construction Vibration Assessment Significance Criteria**

Magnitude of Impact	Criteria for Assessing Construction Vibration impact
Large	> 10mm per sec. Vibration likely to be intolerable for more than brief exposure. Approaching the level at which cosmetic damage may occur in light structures.
Moderate	5mm - 10mm per second. Tolerance less likely even with prior warning and explanation.
Small	1mm – 5mm per second. Complaints are likely, but can be tolerated if prior warning and explanation given.
Negligible	<1mm per second. Below level at which complaints are likely.

Road Traffic Noise Assessment Significance Criteria

7.2.56 The changes in road traffic noise levels have been assessed against a set of significance criteria. The criteria shown in Table B6.6 are based upon guidance contained within the Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7, 2011 (DMRB) for the assessment of long term changes in road traffic noise. The criteria do not relate to the actual existing noise levels (i.e. traffic noise due to the current development) but only the predicted changes.

Table 7.6: Road Traffic Noise Assessment Significance Criteria

Magnitude of Impact	Criteria for Assessing Road Traffic Noise
Large	> 10.0 dB increase in traffic noise (equating to a doubling in the loudness of noise).
Moderate	5.0 – 9.9 dB increase in traffic noise (equating to a clearly perceptible increase in the loudness of noise).
Small	3.0 – 4.9 dB increase in traffic noise increase in traffic noise (equating to an increase in the loudness of the noise which is at or about the threshold of perception).
Negligible	0.1 – 2.9 dB increase in traffic noise. No perceptible increase in traffic noise.

Table 7.7 - Methodology for Determining Sensitivity

Sensitivity	Methodology
High	The location has little ability to absorb change without fundamentally altering its present character, or is of international or national importance. e.g. a hospital
Medium	The location has moderate capacity to absorb change without significantly altering its present character, or is of high importance. e.g. a residential dwelling
Low	The location is tolerant of change without detriment to its character, is of low or local importance. e.g. an industrial development

Table 7.8: Significance

MAGNITUDE	SENSITIVITY			
	High	Medium	Low	Negligible
Large	Major	Major	Moderate	Minor
Moderate	Major	Moderate	Minor	Negligible
Small	Moderate	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

Uncertainties and limitations

- 7.2.3 Traffic flow information for the construction phase of the development is not available at this stage and therefore it is not possible to undertake a quantitative assessment of the impact of these additional vehicles at existing sensitive receptor locations, however assumptions have been made and an assessment of construction stage impacts have been reported .

Outline Planning Application

7.3 RELEVANT POLICY**National Planning Policy Framework (March 2012)**

7.3.1 In March 2012 the 'National Planning Policy Framework' (NPPF) was introduced as the current planning policy guidance within England. Paragraph 123 of the NPPF states:

'Planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and that existing businesses, wanting to develop in continuance of their business, should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.'

7.3.2 In terms of 'adverse effects' the NPPF refers to the 'Noise Policy Statement for England' (NPSE), which defines three categories, as follows:

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

7.3.3 However, whilst the above terms are provided in NPSE, paragraph 2.22 acknowledges that these terms require further research in order to establish what is meant in terms of 'adverse impact'.

'It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our

Outline Planning Application

understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.'

National Planning Practice Guidance

- 7.3.4 The Planning Practice Guidance states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

Noise Policy Statement for England, 2010

- 7.3.5 The potential impacts of the existing and future sources of noise at the proposed residential areas of the Proposed Development have been assessed in accordance with the Noise Policy Statement for England (NPSE) March 2010 as required by the National Planning Policy Framework.

- 7.3.6 The NPSE discusses noise impacts in accordance with concepts established by the World Health Organisation. NPSE does not set specific adverse effect levels in order to provide for the necessary policy flexibility.

- 7.3.7 However, in the absence of absolute levels, it is considered appropriate to assess noise levels across the developed in accordance with the World Health Organisation's "Guidelines for Community Noise", 1999.

World Health Organisation Guidelines for Community Noise, 1999:

- 7.3.8 The World Health Organisation's "Guidelines for Community Noise", 1999 (WHO) suggest appropriate criteria and noise limits for outdoor living areas and habitable rooms of residential dwellings. In accordance with the requirements of WHO, the following external and internal noise limits, for noise from external sources, will need to be met within sensitive areas of the residential dwellings:

55dB

$L_{Aeq(16\text{ hour})}$ during the daytime in outdoor living areas;

35dB $L_{Aeq(16\text{ hour})}$ during the daytime in noise sensitive rooms other than bedrooms;

30dB $L_{Aeq(8\text{ hour})}$ during the night-time in bedroom areas.

45dB $L_{Af,max}$ should not be exceeded during the night-time in bedroom areas.

Outline Planning Application

Cherwell District Local Plan (1996)

7.3.9 The relevant policy that relates to an assessment of noise and vibration is Saved policy ENV 1: Development which is likely to cause materially detrimental levels of noise, vibration, smell, smoke, fumes or other type of environmental pollution will not normally be permitted is relevant to this assessment, which states that:

“The Council will seek to ensure that the amenities of the environment, and in particular the amenities of residential properties, are not unduly affected by development proposals which may cause environmental pollution, including that caused by traffic generation...

Where a source of pollution is already established and cannot be abated, the Council will seek to limit its effect by ensuring that development within the affected area maintains a suitable distance from the pollution source.”

The Non-Statutory Cherwell District Local Plan 2011 (2004)

7.3.10 The relevant policies that relate to an assessment of noise and vibration are set out below

Policy EN7 states that development sensitive to noise generated by road traffic will be:

“(i) refused where external noise levels exceed laeq. 16hr = 72db and laeq 8hr = 66db between 07:00-23:00 hrs and 23:00-7:00 hrs respectively

(ii) generally resisted where external noise levels between 07:00-23:00 hrs and 23:00-07:00 hrs fall into the ranges laeq 16hr = 63 to 72db and laeq 8 hr = 57 to 66db respectively.

(iii) expected to achieve a specified internal acoustic environment when the external noise levels between 07:00-23:00 hrs and 23:00-07:00 hrs fall into the ranges laeq 16 hr = 55 to 63db and laeq 8 hr = 45 to 57db respectively.”

Policy EN8 states that development sensitive to noise generated by rail traffic will be:

“(i) refused where external noise levels exceed laeq 16 hr = 74db between 07:00 - 23:00 hrs and laeq 8hr = 66db between 23:00 and 07:00 hrs.

(ii) generally resisted where external noise levels between 07:00 - 23:00 and 23:00 - 07:00 fall into the ranges laeq 16 hr = 66 to 74db and laeq 8 hr = 59 to 66db respectively.

Outline Planning Application

(iii) expected to achieve a specified internal acoustic environment when external noise levels between 07:00 - 23:00 and 23:00 - 07:00 hrs fall into the ranges laeq 16 hr = 55 to 66 db and laeq 8 hr = 45 to 59 db respectively.”

Policy EN9 states that:

“notwithstanding policies en7 and en8 development sensitive to vibration will be refused in locations where vibration levels are likely to affect the material comfort of end users.”

Draft Cherwell Local Plan (2014)

7.3.11 There are no specific policies that relate to the noise and development, however, implicit in the objectives of the Plan is a strategic objective to build sustainable communities. New housing needs to be provided in such a way that it minimises environmental impact, including through the elimination and control of pollution and the effective and efficient use of natural resources. Planning decisions can have an effect on travel to work, schools, noise and air quality, access to services, climate change and social networks which can all contribute to health and well-being.

Outline Planning Application**7.4 BASELINE CONDITIONS****Baseline Road Traffic Noise Levels at Sensitive Receptors**

7.4.1 In accordance with the method specified in CRTN, noise modelling has been carried out for the 4 receptors identified in Table 7.5 and shown on Figure 7.2 provided in Appendix 7.3 (i.e. CRTN1 to CRTN4). The noise modelling indicates the baseline noise levels at the façade of each receptor, in 2022. The noise modelling results are shown in Table 7.9.

Table 7.9: Results of the Predicted Baseline Road Traffic Noise Levels

CRTN Receptor Number	Predicted L10 18hour dB(A) at the façade of the Receptor – 2022 (Scenario 3)
CRTN1- 2 Crouch Cottages	64.0
CRTN2 - 2 Lansdown Close	69.4
CRTN3 - 123 Bloxham Road	69.2
CRTN4 - The Bungalow, Bloxham Road	68.8

7.4.2 In accordance with CRTN, the predicted level of road traffic noise at the façade of the existing receptors has been determined based on the number and composition of vehicles travelling along the local road links (i.e. the number and proportion of HGVs and LGVs), together with the speed of vehicles, distance of the receptor from the edge of the carriageway and angle of view of the road link. Further details of the CRTN modelling assumptions are included in Appendix 7.1.

Baseline Survey Information

7.4.3 In September 2012, Wardell Armstrong LLP carried out a noise survey to assess the noise levels across the proposed Wykham Park Farm development Site and at existing sensitive receptor locations. It is generally expected by Local Authorities that a noise survey within the last 3 years would be acceptable. Furthermore the baseline data within this assessment has only been used to for the assessment of the construction phase. The impact of road traffic has been determined through the use of future year traffic data within the noise models. Therefore it has been deemed that the existing noise survey undertaken in September 2012 is still robust.

7.4.4 Noise measurements were carried out at 5 monitoring locations, considered to be representative of the existing and proposed residential receptors in the immediate vicinity of the proposed Wykham Park Farm development.

Outline Planning Application

7.4.5 Monitoring locations 1 to 5 are also relevant to the Wykham Farm Park assessment of construction noise. The monitoring locations are shown on Drawing Number 7.1 provided at Appendix 7.3:

Monitoring Location 1: Located approximately 10m from the carriageway of the A361 (Bloxham Road). This monitoring location is also used for Crouch Cottages for the construction phase assessment;

Monitoring Location 2: In the northwestern part of the Proposed Development Site. This on-site monitoring location is considered to be representative of the existing Banbury School north of the saltway for the construction phase assessment;

Monitoring Location 3: In the northeastern part of the Proposed Development Site. This on-site monitoring location is considered to be representative of the existing properties in the residential area to the north east for the construction phase assessment;

Monitoring Location 4: In the southeastern part of the Proposed Development Site. This on-site monitoring location is considered to be representative of the existing residential receptor, Wykham Farm Cottage, for the construction phase assessment;

Monitoring Location 5: In the southwestern part of the Proposed Development site. This on-site monitoring location is considered to be representative of the existing residential receptor, Wykham Park Farm Cottage, for the construction phase assessment.

7.4.6 The full results and details of the monitoring are included in Appendix 7.2.

7.4.7 The daytime and night-time noise measurements have been arithmetically averaged to give a single daytime and night-time level for each location and these are shown in Table 7.10. In accordance with the shortened measurement procedures specified in CRTN, the measured daytime noise level at monitoring location 1 i.e. in the immediate vicinity of the A361, has been adjusted to predict the daytime level of road traffic noise at this location.

Outline Planning Application**Table 7.10: Average Daytime and Night-time Noise Monitoring Results (Figures in dB L_{Aeq})**

Monitoring Location	Time	Average Measured Noise Levels
1	0700-2300	59.0
	2300-0700	51.6
2	0700-2300	48.0
	2300-0700	33.3
3	0700-2300	47.7
	2300-0700	32.8
4	0700-2300	45.1
	2300- 0700	33.5
5	0700-2300	48.0
	2300 - 0700	37.3

*Daytime noise levels calculated in accordance with the shortened measurement procedure in CRTN 1988.

7.4.8 In addition to the average daytime and night-time noise levels, the range of maximum noise level recorded during each measurement period of the night-time survey, at monitoring locations 1 to 5, are summarised in Table 7.11.

Table 7.11: Maximum Night-time Noise Levels

Monitoring Location	Range of Maximum Measured Noise Levels (Figures in dB L _{Amax})
1	66.6 – 68.8
2	49.1 – 67.0
3	53.2 – 60.6
4	47.3 – 66.1
5	49.5 – 61.5

7.4.9 Table 7.10 shows that the noise levels in the western part of the site, located nearest to the A361, exceed the required daytime noise limit of 55dB L_{Aeq} 16 hour. The existing

Outline Planning Application

noise levels at the Proposed Development should not therefore be a determining factor in granting planning permission; however, mitigation measures are needed to be considered to achieve the noise levels required in garden areas and noise sensitive rooms.

The projected future baseline

7.4.10 In addition to the noise survey, noise modelling has been carried out to determine the daytime levels of road traffic noise across the site for the future year 2022, i.e. with committed development traffic in place. The results of the SoundPLAN daytime noise modelling is shown on Figure 7.7 provided in Appendix 7.3. The results of the noise modelling indicate that the noise levels in the western part of the site, located nearest to the A361, exceed the required daytime noise limit of 55dB $L_{Aeq, 16 \text{ hour}}$. Therefore, mitigation measures may need to be considered.

Outline Planning Application

7.5 POTENTIAL EFFECTS**Construction stage***Noise from Earthworks and Construction Phase Activities*

- 7.5.1 During the earthworks and construction stage, any work carried out at the Proposed Development is likely to generate noise that may propagate beyond the Site boundary.
- 7.5.2 At this stage the nature and timescales of activities likely to take place during the earthworks and construction phase are not known. Activities on the site, which could give rise to construction noise impacts include (but are not limited to):
Site preparation i.e. ground excavation, levelling of ground, trenching, trench filling, unloading and levelling of hardcore and compacting filling; And

Construction of the proposed redevelopment including piling, construction of access roads, fabrication processes e.g. planing, sanding, routing, cutting, drilling and laying foundations.
- 7.5.3 The levels of noise received at the receptors closest to the Proposed Development due to the activities above, would depend on the sound power levels of the machines used, the distance to the properties, the presence of screening or reflecting surfaces and the ability of the intervening ground to absorb the propagating noise.
- 7.5.4 The nearest noise sensitive receptors to the development boundary, as detailed in Table 7.1 will vary depending on the phase of the development under construction. Given the potentially small distances between construction activities and residential dwellings noise levels at the receptors may occur above those detailed in Table 7.3. The noise generated by the earthworks and construction phases of the development may therefore have short term, **moderate adverse** impact at the sensitive receptors located in the immediate vicinity of the construction phases of the development.
- 7.5.5 It is therefore recommended that standard mitigation measures be put in place to minimise potential impacts. Details can be found in section 7.6 of this chapter.

Outline Planning Application

Vibration from Earthworks and Construction

- 7.5.6 The earthworks and construction works have the potential to increase vibration levels at residential properties in the vicinity of construction phases of development during the proposed working hours.
- 7.5.7 Wardell Armstrong's archives contain field trial measurements of ground vibration associated with types of plant likely to be used at the proposed development. The representative, measured levels, made by Wardell Armstrong using a Vibrock B801 Digital Seismograph, are set out in Table 7.12.

Table 7.12: Measured Vibration Levels of Plant Under normal Operating Conditions (Figures in ppv mm per second)

Plant Type	Distance from Source		
	10m	20m	30m
25-30 tonne excavator	0.175	0.075	Background
25 tonnes dumptruck (Volvo A25)			
Loaded	1.000	0.150	Background
Empty	0.225	0.050	Background
Dozer	1.050	0.400	Background
Vibrating roller Drum			
Vibrator on	4.470	3.270	2.350
Vibrator off	0.500	0.150	0.050
Loading shovel	1.025	0.150	Background

- 7.5.8 The nearest sensitive properties to the proposed construction works, as detailed in Table 7.1 of this chapter, will vary depending on the phase of the development under construction. As a worst case scenario, earthworks and construction works may potentially take place at a distance of approximately 5 metres from existing and proposed residential properties.
- 7.5.9 At this distance, it is possible that vibration due to the operation of various construction plant, and in particular a vibratory roller, may be above the threshold of complaint. However, the vibration levels are highly unlikely to be above the threshold of structural damage. It is possible that residential properties would therefore potentially experience a minor impact. However this would occur for only limited periods during the works, i.e. when activities take place at the development phase boundaries.

Outline Planning Application

7.5.10 In addition to the earthworks and construction works described, it is possible that piling will be required. At this time the type(s) of piling, which would be used at various locations across the site, is not known and it is likely that the contractor responsible for undertaking the works at the site would decide the method of piling.

7.5.11 BS5228-2 recognises that the most common form of vibration associated with piling is the intermittent type derived from conventional driven piling. The intensity of vibration disturbance, which may be registered at a receptor, will be a function of many factors. These are set out in BS5228-2 and include:

- Energy per blow or cycle
- Distance between source and receptor
- Soil structure interaction i.e. nature of connection between soil and structure being monitored
- Construction of structure and location of measuring points e.g. soil surface, building foundation and internal structural element.

7.5.12 At this stage detailed information regarding the above is not known and the type of piling has not been confirmed. It is not therefore possible to assess the potential impacts of vibration generated by piling activities in accordance with the significance criteria set out in Table 7.5. To minimise the potential for vibration to be generated by piling it is recommended that careful consideration is given to the type of piling to be used. For example auger bored piles would be preferable to driven piles with regards to a reduced potential for noise and vibration to be generated. However, it is recognised that the piling process will need to be selected on the basis of the strata to be encountered, the loads to be supported and the economics of the system.

7.5.13 The receptors likely to be affected by piling will vary depending of the phase of the development under construction. Once the precise building locations, ground conditions for each location and type(s) of piling are confirmed, vibration levels could be estimated and recommendations for control made as appropriate.

Post-completion stage**Road Traffic Noise and Sensitive Receptors**

7.5.14 CRTN predictions have been carried out to assess any potential changes in road traffic noise at existing and proposed receptor locations due to the operation of the development.

Outline Planning Application

7.5.15 The changes in noise levels at each of the receptors considered have been assessed by comparing the noise levels predicted for the “Without development” scenario with the “With Development Plus Committed Development” scenario 2022. The results are shown in Table 7.13. Graphical representation of the predicted noise propagation for each scenario can be found within Figures 7.3 and 7.4 provided in Appendix 7.3.

Table 7.13: CRTN Predictions for the 2022 “Without Development” and “With Development Plus Committed Development” Scenarios and Changes in Predicted Road Traffic Noise Levels

CRTN Receptor Number	Predicted L10 18hour dB(A) at the façade of the Receptor		Figures in dB(A)
	2022 Without Development (Scenario 1) Figure 7.3	2022 With Development Plus Committed (Scenario 2) Figure 7.4	Change in Predicted Road Traffic Noise Levels in 2022 Figure 7.5
CRTN1 Crouch Cottages	64.0	64.3	+0.3
CRTN2 Lansdown Close	69.4	69.3	-0.1
CRTN3 Bloxham Road	69.2	69.3	+0.1
CRTN4 The Bungalow	68.8	69.2	+0.4

7.5.16 The changes in noise levels have been assessed against the significance criteria contained in Table 7.13. The results show that at each of the existing sensitive receptor locations, the noise impact due to changes in road traffic is **Negligible**. Therefore, noise from changes in road traffic levels need not be a consideration during the planning process. Graphical representation of the predicted change in noise propagation for each of the predicted years can be found within Figure 7.5 provided in Appendix 7.3.

Proposed Sensitive Receptors and Noise

Road Traffic Noise at Proposed Residential Properties

7.5.17 Noise modelling has also been carried out to determine the future levels of road traffic noise at the residential areas of the proposed development, with the committed development traffic and the Proposed Development traffic in place. The results of the SoundPLAN daytime noise modelling for 2022 (with the committed development

Outline Planning Application

and Proposed Development traffic in place, i.e. Scenario 2) are shown on Figure 7.4 provided in Appendix 7.3.

External Daytime Noise Levels

7.5.18 The Development Framework Plan (reference JJG043-035 I) indicates that residential properties are proposed in the vicinity of the major road link adjacent to the Proposed Development i.e. the A361.

7.5.19 The results of the noise modelling 2022, with the development and committed development in place, indicates that the level of road traffic noise at the proposed residential areas, located nearest to, and with a direct line of sight of the A361, will range between 55dB LAeq 16hour and 60dB LAeq 16hour. The noise impact due to changes in road traffic in 2022 is **Moderate to Major Adverse**.

7.5.20 Mitigation measures may therefore need to be considered in the design of the Proposed Development to ensure an external level of 55dB LAeq 16-hour is achieved in outdoor living areas, nearest to, and with a direct line of, sight of the A361 during the daytime.

7.5.21 Mitigation measures are discussed later within this noise and vibration chapter.

Internal Daytime Noise Levels

7.5.22 The noise modelling for the future year 2022, with the development in place, indicates that the level of road traffic noise at the proposed building facades of the residential areas, located nearest to, and with a direct line of sight of the A361, will range between 55dB LAeq 16hour and 60dB LAeq 16hour. The noise impact due to changes in road traffic in 2022 is **Moderate to Major Adverse**.

7.5.23 In turn, the level of noise attenuation that these facades, will need to provide to achieve an internal noise level of 35dB LAeq 16-hour, during the daytime period (WHO 1999) will be between 20dB(A) and 25dB(A).

7.5.24 Mitigation measures are discussed later within this noise and vibration chapter.

Outline Planning Application

Internal Night-time Noise Levels

- 7.5.25 To comply with the WHO Guidelines, the night-time noise levels from external sources, in bedrooms, should not exceed 30dB L_{Aeq} 8 hour and 45dB L_{Amax} .
- 7.5.26 Daytime and night-time noise measurements were taken at monitoring locations within close vicinity of the proposed development. Road traffic was the dominant source of noise at these monitoring locations. The measurements indicate that the average night-time noise levels are between 14.9dB(A) and 7.4dB(A) lower than the daytime levels respectively. The modelled daytime noise levels have therefore been corrected by -7.4dB(A), to determine the night-time noise level at the facades of the proposed residential areas located nearest to, and with a direct line of sight of, major road links within and adjacent to the development. Scenarios for the 2022 night-time noise contours are shown on Figure 7.6 provided in Appendix 7.3.
- 7.5.27 Before internal noise levels can be calculated 2.5dB(A) must be added to the predicted noise levels to allow for the reflection of noise from the proposed housing facades when the buildings are in place.
- 7.5.28 The predicted night-time noise levels at the proposed facades of the residential areas, located nearest to and with a direct line of sight of the major road link adjacent to the development, will range between 50dB L_{Aeq} and 55dB L_{Aeq} . The maximum noise levels measured at ESR1, which presents a representative location for the facades of the proposed residential dwellings facing the A361, will be 68.8dB L_{Amax} . In turn, the level of noise attenuation required at the façade, to achieve the required internal noise levels of 30dB L_{Aeq} 8-hour and 45dB L_{Amax} , during the night-time period, will be between 30dB(A) and 23.8dB(A).
- 7.5.29 Mitigation measures are discussed later within this noise and vibration chapter.

Road Traffic Noise at the Proposed Primary School Sites

- 7.5.30 The Development Framework Plan (reference JJG043-035 I) indicates that the development will include a school site, located in the northern, central part of the site.
- 7.5.31 In accordance with the requirements of BB93, the following daytime noise levels should be achieved:

Outline Planning Application

An upper limit of 60 dB L_{Aeq} (30 minutes) at the boundary of external premises used for teaching and recreation.

55 dB L_{Aeq} (30 minutes) in unoccupied playgrounds, playing fields and other outdoor areas.

50 dB L_{Aeq} (30 minutes) in at least one area of the unoccupied playgrounds, playing fields and other outdoor areas, to ensure suitable noise levels for outdoor teaching.

Indoor ambient noise limits in schools of between 30 and 40 dB L_{Aeq} (30 minutes) depending on the use of the room.

External Daytime Levels

7.5.32 The external daytime levels of road traffic noise at the proposed school site ranges between 50dB L_{Aeq} 16-hour and 55dB L_{Aeq} 16-hour. The noise impact due to changes in road traffic in 2022 is **Negligible to Minor Adverse**. Furthermore, once the development is in place, it will screen the school from the main source of noise the A361.

Internal daytime limits

7.5.33 In accordance with the requirements of BB93, the daytime Indoor ambient noise limits in schools range of between 30 and 40 dB L_{Aeq} (30 minutes) depending on the use of the room.

7.5.34 The noise modelling for the future year 2022, with the development in place, indicates that the level of road traffic noise at the proposed school facade, will range between 50dB L_{Aeq} 16hour and 55dB L_{Aeq} 16hour. The noise impact due to changes in road traffic in 2022 is **Moderate to Major Adverse** with no consideration of the screening provided by the proposed development and mitigation as a result of the building façade.

Outline Planning Application

7.6 MITIGATION MEASURES**Construction stage***Direct and indirect Noise and Vibration from Earthworks and Construction Phase Activities*

- 7.6.1 To minimise the potential impact of noise levels generated by the construction phase of the Proposed Development, at existing receptor locations in the immediate vicinity of the Site, mitigation measures will be put in place.
- 7.6.2 In addition, appropriate working practices will be implemented during each phase of the earthworks and construction works at the Site and would be incorporate into the future Construction Environmental Management Plan (CEMP).
- 7.6.3 The following measures will be put in place to minimise noise emissions:
- When works are taking place within close proximity to those sensitive receptors identified, screening of noise sources by temporary screen may be employed;
 - All plant and machinery should be regularly maintained to control noise emissions, with particular emphasis on lubrication of bearings and the integrity of silencers;
 - Site staff should be aware that they are working adjacent to a residential area and avoid all unnecessary noise due to misuse of tools and equipment, unnecessary shouting and radios;
 - A further measure to reduce noise levels at the sensitive receptors would include, as far as possible, the avoidance of two noisy operations occurring simultaneously in close proximity to the same sensitive receptor;
 - Adherence to any time limits imposed on noisy works by the Local Authority;
 - Implement set working hours during the week and at weekends;
 - Ensure engines are turned off when possible; and
 - Should earthworks/earthworks and construction activities need to be carried out during night-time hours, advance notice and details of any night working should be provided.
- 7.6.4 At this stage it is not proposed to introduce any specific vibration mitigation measures to any receptors. However, as with noise from earthworks and construction works, working practices should be implemented to prevent unnecessary vibration at all receptors as much as possible.

Outline Planning Application

- 7.6.5 To keep groundborne vibration to a minimum the following measures, as referred to in BS5228-2, should be put in place:
- Substitution: Where reasonably practicable plant and or methods of work likely to cause significant levels of vibration at the receptors identified, should be replaced by less intrusive plant/methods of working.
 - Vibration Isolation of plant at source: This may prove a viable option where the plant is stationary (e.g. a compressor, generator) and located close to a receptor.
- 7.6.6 In relation to piling, should it be required, there are a number of measures which can be implemented, depending upon the type of piling chosen. BS5228-2 indicates that mitigation might include: use of alternative methods, removal of obstructions, provision of cut-off trenches, reduction of energy input per blow, reduction of resistance to penetration. Continuous flight augering would cause minimal vibration even very close to the piling operation.
- 7.6.7 As the construction programme and methodologies become more defined it is suggested that the CEMP provides an overall strategy for control.
- 7.6.8 The vibration impacts of earthworks and construction phases, with the implementation of best working practice, are considered to be generally negligible, with only brief periods of minor adverse impacts.
- 7.6.9 The noise and vibration impacts of earthworks and construction phases, with the implementation of appropriate working practices as referred to above, are considered to be generally **negligible**.

Post-completion stage**Road Traffic Noise and Sensitive Receptors**

- 7.6.10 The noise levels predicted at the existing receptors locations, for the “Without Development” and “With Development” scenarios, in 2022, have been compared.
- 7.6.11 The results indicate that any change in road traffic noise at receptors CRTN1 to CRTN4 will be below the threshold of perception and will not be significant. Mitigation measures are therefore not necessary for these receptor locations.

Outline Planning Application

Proposed Sensitive Receptors and Noise*Road Traffic Noise at Proposed Residential Areas*External Daytime Noise Levels

7.6.12 To meet the outdoor requirements of WHO 1999 during the daytime, i.e. 55dB L_{Aeq}_{16hour}, mitigation measures may need to be considered along the boundaries of the residential areas located immediately adjacent to the A361.

7.6.13 The Development Framework Plan (drawing number JJG043-035 I) indicates that the proposed residential areas will set back from the A361 carriageway.

7.6.14 At this stage a detailed layout showing the individual plots is not available. To reduce the level of road noise in the proposed outdoor living areas of the development, it is recommended that the following mitigation measures are considered for inclusion in the detailed site design:

- The residential buildings proposed on the site, adjacent to the A361, could be constructed to act as a barrier themselves. For example properties at the boundary of the residential areas, located nearest to the A361 would protect properties further into the site;
- Positioning of garden areas on the shielded side of buildings away from the A361; and
- Local mitigation measures, i.e. 1.8m to 2.0m close boarded fence, could be constructed at garden areas with a line of sight of the A361 and employment and local centre areas.

7.6.15 Figure 7.4 provided in Appendix 7.3 shows a SoundPLAN model output for the daytime period of 2022 "With Development". The drawing indicates that the noise levels in proposed garden areas reduces when moving into the site. As these dwellings will also be immediately behind the proposed residential properties located nearest to, and with a direct line of sight of, the A361, they are likely to achieve the noise level of 55dB L_{Aeq}_{16hour} with the additional distance attenuation and screening.

Internal Daytime Noise Levels

7.6.16 To accord with WHO 1999, the daytime noise levels, from external sources, in living rooms should not exceed 35dB L_{Aeq}_{16 hour}.

Outline Planning Application

- 7.6.17 The noise attenuation provided by the overall building façade, for each property, has been considered to determine likely internal daytime noise levels. Subject to the provision of detailed building and design information it would be reasonable to assume that the design of the Proposed Development would include glazing to living room areas comprising about 25% of the façade area. To calculate the overall attenuation provided by this percentage of glazing in a brick or block façade, a non-uniform partition calculation can be used.
- 7.6.18 The calculation combines the different degrees of attenuation of the wall element and the window element. A façade comprising solid brick or blockwork, will attenuate by between 45-50 dB (BRE Digest 338 “Insulation against external noise”) whereas standard thermal glazing will attenuate traffic noise by 26-29dB(A) (BRE Digest 379 “Double glazing for heat and sound insulation”). The overall noise attenuation provided by the above combination is between 32dB(A) and 35dB(A).
- 7.6.19 Standard double glazing in a solid brick or blockwork façade would therefore be sufficient to achieve the internal daytime noise levels, with windows closed.
- 7.6.20 However, with windows open the attenuation provided by the façade will be approximately 15dB(A). This may allow the recommended internal noise limits to be exceeded in some living room areas, located nearest to and with a direct line of sight of the A361. To remove the need to open a window, and hence maintain the attenuation provided by the double glazing, acoustic ventilation may need to be considered in a number of properties. The acoustic ventilation proposed at the site should, as a minimum, comply with Building Regulations 2000 Approved Document F1 Means of Ventilation and British Standard BS5925 1991: “Code of Practice for Ventilation Principles and Designing for Natural Ventilation”.
- 7.6.21 The limited mitigation measures set out above should ensure that the required internal daytime noise limits are met in those areas of the site where the external noise levels are greater than 55dB $L_{Aeq\ 16\text{-hour}}$. Alternatively, noise sensitive living areas could be positioned away from the A361 on the screened sides of buildings.

Internal Night-time Noise Levels

- 7.6.22 To accordance with WHO 1999, the night-time noise levels, from external sources, in bedrooms should not exceed 30dB $L_{Aeq\ 8\text{ hour}}$ and 45dB L_{Amax} .

Outline Planning Application

- 7.6.23 The results of the noise modelling indicates that standard thermal glazing in a solid brick or blockwork facade (as detailed in paragraph B6.124) would be sufficient to achieve the internal night-time noise levels, with windows closed.
- 7.6.24 However, with windows open the attenuation provided by the façade will be approximately 15dB(A). This would allow the recommended internal noise limits to be exceeded in some bedrooms, located nearest to and with a direct line of sight of the A361. To remove the need to open a window and hence maintain the attenuation provided by the double glazing, acoustic ventilation may need to be considered for number of properties
- 7.6.25 The limited mitigation measures should ensure that the required internal night-time noise limits are met in those areas of the site where the external noise levels are greater than 45dB $L_{Aeq\ 8\ Hour}$ and 60dB L_{Amax} . Alternatively, bedrooms could be positioned away from the A361 on the screened sides of buildings.

Road Traffic Noise at the Proposed School Sites**External Daytime Noise Levels**

- 7.6.26 At this stage a detailed layout showing the design of the proposed school site is not available. Paragraph 7.5.33 shows that the outdoor requirements of BB93 during the daytime, i.e. 55dB $L_{Aeq\ 30\ minutes}$, are achieved without further mitigation
- 7.6.27 The mitigation measures required will depend on the location and the orientation of the proposed school buildings. For the purpose of this assessment, it is assumed that the proposed school building will be located in the south eastern corner of the school site.
- 7.6.28 Figure 7.4 provided in Appendix 7.3 demonstrates the level of noise likely to be achieved in playing areas in the southern part of the school site, without indicative school buildings and the proposed mitigation measures in place. The noise levels will achieve the required noise limit of 60dB $L_{Aeq\ 30\ minutes}$ at the school site boundary, together with the limit of 55dB $L_{Aeq\ 30\ minutes}$ across the majority of the playing fields.

Outline Planning Application

7.6.29 The location, shape and orientation of the school building(s) of the school site, could be designed to further reduce road traffic noise, and to ensure that an outdoor area suitable for teaching is created within the school site.

Internal Daytime Noise Levels

7.6.30 The level of noise attenuation that the facades of the school will need to provide, to achieve the more stringent internal noise level of 30dB $L_{Aeq\ 30\ minutes}$, during the daytime period (as required by BB93), will be between 20dB(A) and 25dB(A).

7.6.31 At this stage a detailed layout showing the design of the proposed school sites is not available. The level of attenuation the building facades will need to attenuate will therefore be dependent on the proposed use of the classroom.

7.6.32 Some of the building facades of proposed schools, located nearest to and with a direct line of sight of local roads, may require higher specification glazing should the more stringent internal noise limit of 30dB $L_{Aeq\ 30\ minutes}$ need to be achieved. The glazing unit will need to attenuate traffic noise by up to 30dB(A) to ensure that the overall noise attenuation provided by the façade (i.e. the combined wall and window) is be 36dB(A) with windows closed.

7.6.33 Standard double glazing will be sufficient to achieve the internal daytime noise levels of 40dB $L_{Aeq\ 30\ minutes}$, with windows closed.

7.6.34 In those areas of the site where noise levels at the school building facades exceed 45dB $L_{Aeq\ 30\ minutes}$, noise will only be attenuated adequately provided the windows remain closed. To remove the need to open a window and hence maintain the attenuation provided by the double glazing, acoustic ventilation will need to be installed in the building facades.

7.6.35 The implementation of glazing together with acoustic ventilation should ensure that the required internal noise limits are met in proposed school buildings.

Operational Noise and Sensitive Receptors

Outline Planning Application

7.6.36 A noise assessment may be required for units at the local centre once the proposed activities are known. This will take into account actual levels of activity and plant and recommendations will be made for mitigation as appropriate.

Outline Planning Application

7.7 RESIDUAL EFFECTS

Construction stage

Noise from Enabling Works and Construction

- 7.7.1 Once the working practices detailed in the mitigation section of this chapter are implemented the residual noise impacts associated with the earthworks and construction phase will be **negligible**, with only brief periods of minor adverse impacts likely.

Vibration from Enabling Works and Construction

- 7.7.2 Once the working practices detailed in the mitigation section of this chapter are implemented the residual vibration impacts associated with the earthworks and construction phase will be **negligible**, with only brief periods of minor adverse impacts likely.

Post-completion stage

Road Traffic Noise and Sensitive Receptors

- 7.7.3 The increase in road traffic noise in 2022, at the existing sensitive receptors adjacent the local road network in the immediate vicinity of the site, will not be perceptible and the impact will be negligible. Results at receptor CRTN1 indicate that there is a perceivable drop in noise level due to the realignment of the A361 and the inclusion of the proposed junction. Mitigation measures are therefore not considered necessary.

Proposed Sensitive Receptors and Noise

- 7.7.4 Once the mitigation measures detailed in the mitigation section of this chapter have been implemented the residual impact of road traffic noise from vehicles travelling along the A361, on the proposed residential areas and school site of the development, will be negligible.

Outline Planning Application**Summary of effects**

7.7.5 The effects identified are summarised in Table 7.14 below:

Table 7.14: Summary of effects

Potential effect	Significance (pre-mitigation)	Mitigation measure	Significance of residual effect
Construction stage			
Noise from Earthworks and Construction Phase Activities	Negligible to Moderate adverse	Appropriate working practice during construction including measures to minimise noise emissions	Negligible to Slight Adverse
Vibration from Earthworks and Construction	Minor	Appropriate working practice during construction including measures to minimise vibration emissions	Negligible to Slight Adverse
Post-completion stage			
Road Traffic Noise at Sensitive Receptors	Negligible	n/a	Negligible
External Daytime Noise Levels at Proposed Residential Areas	Moderate to Major Adverse	Location of outdoor living areas on screened side of dwellings or 1.8m to 2.0m close boarded fence, could be constructed at garden areas with a line of sight of the A361.	Negligible
External Daytime Noise Levels at Proposed School	Negligible to Minor Adverse	Local mitigation measures as required depending upon final layout	Negligible
Internal Daytime Noise Levels at Proposed School	Moderate to Major Adverse	Appropriate glazing and ventilation scheme	Negligible
Internal Daytime and Night-time Noise Levels at Proposed Residential Areas	Moderate to Major Adverse	Appropriate glazing and ventilation scheme	Negligible

Outline Planning Application

7.8 CUMULATIVE EFFECTS

- 7.8.1 The noise assessment also considers the cumulative impacts associated with the Proposed Development; consented; committed; and known development sites in the area of the site.
- 7.8.2 Traffic data for consented, committed and known development sites in the area of the site, together with all phases of the Proposed Development, has been obtained from Jubb Consulting Engineers Limited, the transport consultants for the Proposed Development and incorporated into the information used as a basis for the assessment of road traffic noise.
- 7.8.3 The changes in road traffic noise due to the development generated traffic have been assessed at a number of existing and proposed sensitive receptors. The assessment confirms that in accordance with the significance criteria included in this chapter, the increase in road traffic noise, at the existing sensitive receptors CRTN1 to CRTN4, will be imperceptible and the impact will be negligible. Mitigation measures are not therefore considered necessary.