A46 Coventry Junctions (Walsgrave)
Scheme number: TR010066

6.1 Environmental Statement
Chapter 11 – Noise and Vibration

APFP Regulations 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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A46 Coventry Junctions (Walsgrave)
Development Consent Order 202[x]

ENVIRONMENTAL STATEMENT
Chapter 11 - Noise and Vibration

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11. Noise and vibration

11.1. Introduction

11.1.1. This Chapter presents the information required by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) to be provided in the Environmental Statement (ES) to enable the identification and assessment of likely significant effects on noise and vibration.

11.1.2. As part of the Environmental Impact Assessment (EIA) process, this ES Chapter reports the predicted significant effects for noise and vibration as a result of the Scheme. This assessment includes a review of the existing baseline conditions, consideration of the potential impacts, identification of proportionate mitigation and evaluation of residual effects and their significance.

11.1.3. The approach to this assessment follows the methodology set out in the Environmental Scoping Report (**TR010066/APP/6.8**) and has been prepared in accordance with the Planning Inspectorate's Scoping Opinion (**TR010066/APP/6.9**), undertaken on behalf of the Secretary of State. ES Appendix 4.1 (Scoping Opinion Response) (**TR010066/APP/6.3**) contains further information on how each of the matters raised in the Scoping Opinion have been addressed.

11.1.4. The Chapter has also been produced in accordance with the Design Manual for Roads and Bridges (DMRB) standard LA 111 Noise and Vibration (Highways England, 2020).

11.1.5. ES Chapter 2 (The Scheme) (**TR010066/APP/6.1**) contains a detailed description of the Scheme.

11.1.6. The drawings referenced in this Chapter can be found in the ES Figures (**TR010066/APP/6.2**) and include the following:

- ES Figure 11.1: Noise Location Plan
- ES Figure 11.2: Road Traffic Noise Level Contours: Do-Minimum Opening Year
- ES Figure 11.3: Road Traffic Noise Level Contours: Do-Minimum Future Year
- ES Figure 11.4: Road Traffic Noise Level Contours: Do-Something Opening Year
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- ES Figure 11.6: Noise Difference Contour: Long-term Noise Change Without the Scheme
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- ES Figure 11.9: Construction Noise Contours – Enabling / Compound (Daytime)
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- ES Figure 11.19: Construction Noise Contours – Phase 5 (Daytime)
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- ES Figure 11.21: Construction Noise Contours – Phase 6 (Daytime)
- ES Figure 11.22: Construction Noise Contours – Phase 6 (Night-time)

11.1.7. The technical appendices referred to in this Chapter are presented in the ES Appendices (**TR010066/APP/6.3**) and include the following:

- ES Appendix 11.1: Glossary of Terms
- ES Appendix 11.2: Legislation and Policy Framework
- ES Appendix 11.3: Baseline Noise Survey
- ES Appendix 11.4: Model Validation
- ES Appendix 11.5: Construction Noise Assessment

11.1.8. This Chapter sets out and summarises potential impacts to the nearby human population via numerical determination. Changes to health outcomes for the health determinant of noise, or on other receptors such as cultural heritage sites

or protected species and wildlife can be viewed in the relevant chapters as detailed below:

- ES Chapter 6 Cultural Heritage (**TR010066/APP/6.1**)
- ES Chapter 8 Biodiversity (**TR010066/APP/6.1**)
- ES Chapter 12 Population and Human Health (**TR010066/APP/6.1**)

11.2. Competent expert evidence

11.2.1. The competent expert has a BSc (Environmental Studies) and has passed the Institute of Acoustics Diploma in Acoustics and Noise Control, is a Member of the Institute of Acoustics (MIOA) and the Institute of Environmental Science (MIEnvSc). The competent expert is an acoustician with over 17 years' experience in delivering and managing environmental noise assessments for challenging projects. This includes EIA and non-EIA projects in a range of sectors, such as large residential developments, office and commercial premises, industrial facilities, offshore wind farms and transportation including both road and rail.

11.3. Legislative and policy framework

11.3.1. The national legislation and regulatory framework applicable in this assessment for noise and vibration are summarised below in Table 11-1; further details are presented in ES Appendix 11.2 (Legislation and Policy Framework) (**TR010066/APP/6.3**).

Table 11-1 Summary of legislation and regulatory framework applicable to the air quality assessment

Legislation	Summary	How this legislation is addressed in the assessment
Control of Pollution Act 1974	The Control of Pollution Act 1974 offers protection against disturbance to residents that might be affected by construction activity. Much of the Act has now been replaced and extended by the Environmental Protection Act 1990. However, Sections 60 and 61, which relate to noise and vibration from construction sites, remain relevant. Section 60 of the Act enables a local authority to serve a notice specifying its noise control requirements covering plant or machinery hours of working, and levels of noise that can be emitted. Section 61 relates to prior consent in which the contractor consults with the local authority and provides an application prior to construction works commencing to obtain approval for the methods to be used and the steps proposed to	It is not considered likely that Section 61 consents will be required in relation to the Scheme; however, should they be required, the Outline Noise and Vibration Management Plan sets out the process to be undertaken by the Applicant. The Outline Noise and Vibration Management Plan forms part of the First Iteration Environmental Management Plan (EMP) (**TR010066/APP/6.5**). This will be developed into a Noise and Vibration Management Plan as part of the Second Iteration EMP and secured through

Legislation	Summary	How this legislation is addressed in the assessment
	minimize noise resulting from the works. If the local authority considers that the application contains sufficient information and that *"best practicable means"* (BPM) of noise control are being implemented, and if works are being carried out in accordance with the applications, it would not serve a notice under Section 60.	Requirement 4 of the draft DCO (**TR010066/APP/3.1**). Within this assessment, BPM of noise control for the proposed construction activities are set out in section 11.10 of this Chapter. These are also included within the Outline Noise and Vibration Management Plan.
The Land Compensation Act 1973	The Land Compensation Act (LCA) 1973 Part I includes provision for compensation for owners of land or property which has experienced a loss in property value from physical factors, including noise and vibration, resulting from the use of public works, such as new or improved roads. Noise and vibration are two of the factors which would be considered in any claim for compensation; the claim should consider all changes and effects, including betterment. Part II of the LCA imposes a duty on authorities to undertake or make a grant in respect of the cost of undertaking noise insulation work in or to eligible buildings. This is subject to meeting certain criteria given in the Noise Insulation Regulations 1975, as amended 1988.	The assessment presented in this chapter considers the changes in road traffic noise that would result from the Scheme, including improved noise mitigation in some areas, providing information that could be used to inform Part I and Part II claims.
Noise Insulation Regulations 1975 (as amended)	The Noise Insulation Regulations (NIR) 1975 (as amended) were made under Part 2 of the LCA 1973 for the obligatory and discretionary provision of noise mitigation measures for dwellings adjacent to new highways. Among the criteria for a property to qualify for insulation in living rooms and bedrooms is that the façade noise level is at least 68dB LA10,18h and that noise from the new or altered highways causes the total level to increase by at least 1dB.	This qualification threshold has been adopted herein as the Significant Observable Effect Level (SOAEL) for operational noise (detailed in section 11.5 of this Chapter). Operational noise from the Scheme, considering the mitigation measures detailed in this Chapter at section 11.10, is not predicted to result in significant increases at receptors with noise levels which currently exceed the SOAEL. No properties qualify for noise insulation.
The Environmental Noise (England) Regulations 2006	The Environmental Noise (England) Regulations (2006) (as amended) implement European legislation (Environmental Noise Directive 2002/49/EC) requiring the Secretary of State to develop noise action plans on a five-year rolling programme. Action plans have to be developed for the major noise sources (including road surfaces) and areas for which maps have been produced and that identified 'Important Areas' for future mitigation. The action plans seek to manage noise issues and effects including noise reduction, if necessary, based on the results obtained through the mapping process.	The requirements of the Environmental Noise (England) Regulations are actioned in the Department for Environment, Food, and Rural Affairs (DEFRA) Noise Action Plans. These are referred to in section 11.3 of this Chapter.

Legislation	Summary	How this legislation is addressed in the assessment
The Environmental Protection Act 1990	Part III, Section 79, of the Environmental Protection Act 1990 (EPA) defines what activities may constitute a statutory nuisance, and what activities are specifically exempt. The EPA does not apply to road traffic noise, and does apply to construction noise. The Environmental Protection Act (EPA) 1990 sections 79 and 80 places a duty on local authorities to serve abatement notices where noise from premises, vehicles and machinery are judged to constitute a statutory nuisance. Section 82 EPA allows any individual to apply to the magistrate's court for a noise abatement notice to be served if the court is convinced that a statutory nuisance exists. Compliance with these controls is required, although the requirements fall outside the planning system. The use of best practicable means to control emissions can constitute a ground of defence against charges that such a nuisance arises.	Within this assessment, BPM for the proposed construction activities are set out in section 11.10 of this Chapter. The BPM are also set out in the Outline Noise and Vibration Management Plan which forms part of the First EMP (**TR010066/APP/6.5**). This will be developed into a Noise and Vibration Management Plan as part of the Second Iteration EMP and secured through Requirement 4 of the draft DCO (**TR010066/APP/3.1**). A Statement Relating to Statutory Nuisance is also includes as part of the DCO submission (**TR010066/APP/6.6**)

National policy

National Networks National Policy Statement 2024

11.3.2. The National Networks National Policy Statement (NPS NN) (May 2024) sets out the policy which the Scheme should comply with. It is also the basis for informing a judgement on the impacts of a Scheme, for example whether the Scheme is consistent with the requirements of the NPS NN. Compliance of the Scheme with the NPS NN is detailed within the NPS NN Accordance Tables (**TR010066/APP/7.2**).

11.3.3. The requirements of the NPS NN in relation to assessing and mitigating the impacts of the Scheme on noise and vibration and how they have been addressed in the assessment are summarised in Table 11-2.

Table 11-2 Summary of NPS NN planning policy relevant to the noise and vibration assessment

NPS NN 2024 Paragraph Number	Summary	How this policy is addressed in the assessment
5.230	The NPS NN states "*Where noise impacts are likely to arise from the proposed development, the applicant should include the following in its noise assessment:* • *a description of the noise sources including the likely usage in terms of*	This chapter presents the noise assessment and comprises of the following sections: 11.1. Introduction 11.2. Competent expert advice 11.3. Legislative and policy framework

NPS NN 2024 Paragraph Number	Summary	How this policy is addressed in the assessment
	number of movements, fleet mix and diurnal pattern. For any associated fixed structures, such as ventilation fans for tunnels, information about the noise sources including the identification of any distinctive tonal, impulsive or low frequency characteristics of the noise • *identification of noise sensitive premises and noise sensitive areas that may be affected* • *the characteristics of the existing noise environment* • *a prediction on how the noise environment will change with the proposed development* • *in the shorter term such as during the construction period* • *in the longer term during the operating life of the infrastructure* • *at particular times of the day, evening and night (including weekends) as appropriate* • *an assessment of the effect of predicted changes in the noise environment on any noise sensitive premises and noise sensitive areas, including identifying whether any particular groups are more likely to be affected* • *measures to be employed in mitigating the effects of noise applicants should consider using the best available techniques to reduce noise impacts."*	11.4. Consultation 11.5. Assessment methodology 11.6. Assessment assumption and limitations 11.7. Study area 11.8. Baseline conditions 11.9. Potential impacts 11.10. Design, mitigation and enhancement measures 11.11. Assessment of likely significant effects (both during construction and operation) 11.12. Monitoring 11.13. Conclusions Glossary and acronyms The assessment is also supported by the following ES Appendices (**TR010066/APP/6.3**): ES Appendix 11.1: Glossary of Terms ES Appendix 11.2: Legislation and Policy Framework ES Appendix 11.3: Baseline Noise Survey ES Appendix 11.4: Model Validation ES Appendix 11.5: Construction Noise Assessment
5.231	The NPS NN states *"The nature and extent of the noise assessment should be proportionate to the likely noise impact."*	The operational assessment methodology undertaken herein is described in section 11.5 of this Chapter and is considered to be proportionate to the potential impacts of the Scheme.
5.232	The NPS NN states "*The potential noise impact elsewhere that is directly associated with the development, such as changes in road and rail traffic movements elsewhere on national networks, should be considered as appropriate."*	The potential noise impact assessment has been presented in section 11.9 and 11.11 of this Chapter.
5.233	The NPS NN states "*Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other*	This requirement is addressed in Section 11.5 of this Chapter where the assessment methodologies are described.

NPS NN 2024 Paragraph Number	Summary	How this policy is addressed in the assessment
	guidance. The prediction of road traffic noise should be based on the method described in Calculation of Road Traffic Noise [CRTN]." and "*For the prediction, assessment and management of construction noise, reference should be made to any relevant British Standards and other guidance which also give examples of mitigation strategies*".	
5.234	The NPS NN states *The applicant should consult Natural England with regard to the assessment of noise on designated nature conservation sites, protected landscapes, protected species or other wildlife. The results of any noise surveys and predictions may inform the ecological assessment. The seasonality of potentially affected species in nearby sites may also need to be taken into account.*	The Applicant has consulted with Natural England during the development of the Scheme as detailed in the Consultation Report (**TR010066/APP/5.1**) and as detailed in ES Chapter 8 (Biodiversity) (**TR010066/APP/6.1**). Noise modelling has informed the ecological assessment. Ecological noise sensitive receptors and an assessment of the impacts is presented in summary in ES Chapter 8 (Biodiversity) (**TR010066/APP/6.1)** and in detail in ES Appendix 8.16 (Noise Impacts Upon Ecological Receptors) (**TR010066/APP/6.3**).
5.235	*The Examining Authority and the Secretary of State should consider whether mitigation measures are needed for both operational and construction noise over and above any which may form part of the project application. The Secretary of State may wish to impose requirements to ensure delivery and future maintenance of all mitigation measures.*	The First Iteration EMP (**TR010066/APP/6.5**) and section 11.11 of this Chapter details the design of mitigation proposed in relation to the Scheme. The First Iteration EMP (**TR010066/APP/6.5**) will be developed into a Second Iteration EMP for each part for implementation during construction and is secured through Requirement 4 of the draft DCO (**TR010066/APP/3.1**).
5.236	NPS NN further states "*Mitigation measures for the projects should be proportionate and reasonable and may include one or more of the following:* • *engineering - containment of noise generated.* • *materials - use of materials that reduce noise (for example low noise road surfacing).* • *lay-out - adequate distance between source and noise-sensitive receptors; incorporating good design: to minimise noise transmission through landscaping and screening by natural or purpose-built barriers including topographical changes.*	The First Iteration EMP (**TR010066/APP/6.5**) and section 11.11 of this Chapter details the design of mitigation proposed in relation to the Scheme.

NPS NN 2024 Paragraph Number	Summary	How this policy is addressed in the assessment
	• *administration - specifying appropriate noise criteria or times of use (for example, in the case of railway station public address systems)"*	
5.237	NPS NN further states "*For most national network projects, the relevant Noise Insulation Regulations will apply. These place a duty on, and provide powers to, the relevant authority to offer noise mitigation through improved sound insulation to dwellings, with associated ventilation to deal with construction and operational noise. An indication of the likely eligibility for such compensation should be included in the assessment. In extreme cases, the applicant may consider it appropriate to provide noise mitigation, through compulsory acquisition of affected properties in order to gain consent for what might otherwise be an unacceptable development. Where mitigation is proposed to be dealt with through compulsory acquisition, such properties would have to be included within the Development Consent Order land in relation to which compulsory acquisition powers are being sought."*	The First Iteration EMP (**TR010066/APP/6.5**) and section 11.11 of this Chapter details the design of mitigation proposed in relation to the Scheme.
5.238	NPS NN states *"Applicants should consider opportunities to address the noise issues associated with the Important Areas as identified through the noise action planning process"*.	Noise Important Areas (NIA) within the study area have been identified in section 11.9 of this Chapter and have been considered in the assessments presented herein.
5.239	NPS NN states "*Due regard must have been given to the relevant sections of the Noise Policy Statement for England, National Planning Policy Framework and the Government's' associated planning guidance on noise*".	Consideration has been given to National policy in sections 11.5, 11.9, 11.10 and 11.11 of this Chapter.
5.240	NPS NN states "*The project should demonstrate good design through optimisation of scheme layout to minimise noise emissions and, where practicable and sustainable, the use of landscaping, bunds or noise barriers to reduce noise transmission. The project should also consider the need for the mitigation of impacts elsewhere on the road and rail networks that have been identified as arising from the development, according to government policy."*	The First Iteration EMP (**TR010066/APP/6.5**) and section 11.9 of this Chapter details the design of mitigation proposed in relation to the Scheme.

NPS NN 2024 Paragraph Number	Summary	How this policy is addressed in the assessment
5.241	NPS NN states "*The Secretary of State should not grant development consent unless satisfied that the proposals will meet the following aims, within the context of government policy on sustainable development:* • *avoid significant adverse impacts on health and quality of life from noise as a result of the new development* • *mitigate and minimise other adverse impacts on health and quality of life from noise from the new development* • *contribute to improvements to health and quality of life through the effective management and control of noise, where possible."*	The assessment reports the significance of effects in section 11.11. Mitigation is presented in section 11.10.
5.242	NPS NN states "*In determining an application, the Secretary of State should consider whether requirements are needed which specify that the mitigation measures put forward by the applicant are put in place to ensure that the noise levels from the project do not exceed those described in the assessment or any other estimates on which the decision was based."*	The First Iteration EMP (**TR010066/APP/6.5**) details the noise mitigation proposed in relation to the Scheme. The First Iteration EMP will be developed into a Second Iteration EMP for implementation during construction and is secured through Requirement 4 of the draft DCO (**TR010066/APP/3.1**).

National Planning Policy Framework 2023

11.3.4. The National Planning Policy Framework (NPPF) (December 2023) sets out the Government's planning policy framework for the whole of England, including the Government's expectation for content and quality of planning applications and local plan policy. The overall strategic aims of the NPS NN and NPPF are consistent. The NPPF may be an important and relevant matter but does not form the basis for a decision on a NSIP.

11.3.5. Paragraph 180 of the NPPF states "*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, or being adversely affected by, unacceptable levels of soil, air, water, or noise pollution or land instability*."

11.3.6. Paragraph 191 states "*Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and natural environment, as well as potential sensitivity of the site or wider area to impacts that could arise from the development. In doing so they should:*

- *mitigate and reduce to a minimum potential adverse impacts results from noise from new 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 […]".*

11.3.7. To comply with these requirements, this Chapter identifies all noise sensitive receptors within the study area including external areas with recreational or amenity value in section 11.8, and presents assessments of likely significant effects in section 11.11.

Planning Practice Guidance – Noise 2019

11.3.8. Planning Practice Guidance (PPG), last updated 22 July 2019, is a Government web-based resource which provides guidance on how the policy set out NPPF may be interpreted in practice for a range of issues. Under the title "How can noise impacts be determined?" PPG states: "*Plan-making and decision making need to take account of the acoustic environment and in doing so consider:*

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.*

In line with the Explanatory note of the noise policy statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level."

11.3.9. PPG further provides a noise exposure hierarchy which indicates the perception and outcomes associated with changes (increases and decreases) to effect levels (Table 1, ES Appendix 11.2 (Legislation and Policy Framework) (**TR010066/APP/6.3**)).

11.3.10. The requirements of PPG have been addressed in section 11.11 of this Chapter.

Noise Policy Statement for England 2010

11.3.11. The Noise Policy Statement for England (NPSE) (2010) seeks to promote good health and good quality of life through effective management of noise with the context of government policy on sustainable development by avoiding significant adverse impacts on health and quality of life, mitigating and minimising adverse impacts on health and quality of life and, where possible, contributing to the improvement of health and quality of life.

11.3.12. The NPSE also defines the following terms:

- **LOAEL** – the level above which adverse effects on health and quality of life can be detected
- **SOAEL** – the level above which significant adverse effects on health and quality of life occur

11.3.13. LOAEL and SOAEL have been adopted throughout this Chapter as key assessment thresholds in the identification of potential impacts. The relevant LOAEL and SOAEL for each assessment are described in section 11.5, having been taken from relevant and current Standards and guidelines.

Noise Action Plans 2019

11.3.14. Noise Action Plan: Roads (2019) have been published by DEFRA in order to comply with the requirements of the Environmental Noise (England) Regulations, and requires determination, through noise mapping, of exposure to environmental noise from major transportation sources and in agglomerations, provision of information to the public on environmental noise and its effects, adoption of action plans to manage environmental noise and preservation of environmental noise quality where it is good.

11.3.15. Paragraph 8.1 states *"The Regulations require that Action Plans should 'apply in particular to the most important areas as established by the strategic noise maps.'"*

11.3.16. Paragraph 8.3 states *"Important Areas with respect to noise from major roads outside agglomerations are where the 1% of the population that are affected by the highest noise levels from major roads are located according to the results of the strategic noise mapping."*

11.3.17. NIAs within the study area have been identified in section 11.8 and have been considered in the assessments presented herein.

Local policy

11.3.18. Local policy of relevance to the noise and vibration assessment is presented in Table 11-3.

Table 11-3 Local planning policy related to the assessment of noise and vibration effects

Policy document	Summary	How this policy is addressed in the assessment
West Midlands Local Transport Plan 2011 – 2016	The West Midlands Local Transport Plan (LTP3) provides the long term transport strategy and associated	The LTPs commitment to reducing ambient noise from transport network is addressed within this assessment by

Policy document	Summary	How this policy is addressed in the assessment
	policies for the West Midlands Metropolitan Area up to 2026. Under the long term theme 10: Improved environment and reduced carbon through new technologies, Policy GT9 looks to *"minimise noise nuisance from the transport network".*	adopting the use of low-noise road surfacing on the A46, as discussed in section 11.10 of this Chapter.
Coventry Local Plan 2011 – 2031 (2017)	Policy DS3 regarding Sustainable Development refers indirectly to noise stating: *'1. When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. It will work proactively with applicant to find solutions to be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area, including:* *[…]* *(e) increased health, wellbeing and quality of life.'*	This is addressed within this assessment by ensuring that any likely significant effects of noise and vibration are mitigated both during construction and during operation. section 11.11 of this Chapter presents the results of the noise and vibration assessment.
Rugby Borough Council Local Plan 2011 – 2031 (2019)	Policy HS5: Traffic Generation and Air Quality, Noise and Vibration *"Development proposals should promote a shift to the use of sustainable transport modes and low emission vehicles (including electric/hybrid cars) to minimise the impact on air quality, noise and vibration caused by traffic generation. Proposals should be located where the use of public transport, walking and cycling can be optimised. Proposals should take full account of the cumulative impact of all development including that proposed in this Local Plan on traffic generation, air quality, noise and vibration."*	The Scheme proposal is a new junction arrangement to reduce congestion on the local and strategic road networks.

National Highways policy

National Highways policy on Road Investment Strategy 2 (RIS)

11.3.19. Part of the RIS2 includes noise as a Key Performance Indicator (KPI) for National Highways (formerly Highways England). The reduction of noise impacts

from the strategic road network through the application of quieter surfaces and noise barriers are given as a benefit of capital renewals projects.

11.3.20. This assessment includes the use of low-noise road surfacing on the A46, as discussed in section 11.10 of this Chapter.

Standard and guidelines

World Health Organisation Night Noise Guidelines for Europe 2009

11.3.21. The World Health Organisation (WHO) Night Noise Guidelines for Europe was published for the development of future legislation and policy action in the area of assessment and control of night noise exposure. It also sets noise levels at which adverse health effects are observed.

WHO Environmental Noise Guidelines for the European Region 2018

11.3.22. The main purpose of these guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from various sources, including transportation noise. The current guidelines complement the Night Noise Guidelines from 2009.

British Standard (BS) 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise

11.3.23. Part 1 of the standard provides a methodology for predicting and assessing noise levels generated by fixed and mobile plant used for a range of typical construction operations.

BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration

11.3.24. Part 2 of the standard provides guidance on the effect of vibration and the likelihood it will cause complaint and cosmetic damage to buildings and gives recommendations for methods of vibration control.

BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration

11.3.25. BS 7385-2 gives guidance on the assessment of the possibility of vibration-induced damage in buildings due to a variety of sources, and identifies the factors which influence the vibration response of buildings.

DMRB LA 104 Environmental assessment and monitoring. Revision 2 2020

11.3.26. DMRB LA 104 sets out the requirements for environmental assessment of highways projects, including reporting and monitoring of significant adverse environmental effects.

DMRB LA 111 Noise and vibration, Revision 2 2020

11.3.27. DMRB LA111 sets out the requirements for noise and vibration assessments from road projects, applying a proportionate and consistent approach using best practice and ensuring compliance with relevant legislation.

DMRB LD 119 Roadside environmental mitigation and enhancement Revision 0 2020

11.3.28. DMRB LD 119 sets out the requirements for the design of roadside environmental mitigation and enhancement on highway projects.

DMRB CD 236 Surface course materials for construction 2020

11.3.29. DMRB CD 236 provides requirements for pavement surfacing for both flexible and rigid pavements.

BS EN 1793-2:2012 Road traffic noise reducing devices. Test method for determining the acoustic performance. Intrinsic characteristics of airborne sound insulation under diffuse sound field conditions

11.3.30. BS EN 1793-2:2012 specifies the laboratory method for measuring the airborne sound insulation performance of road traffic noise reducing devices in reverberant conditions.

Calculation of Road Traffic Noise (CRTN) 1988

11.3.31. CRTN provides procedures for predicting noise levels for a given flow of road traffic at sensitive receptors.

The Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment

11.3.32. The IEMA Guidelines set out key principles and advice on how to effectively integrate noise impacts and effects into the consenting process of all types of development, from EIA to smaller scale projects.

BS 7445-1:2003 Description and measurement of environmental noise. Guide to quantities and procedures

11.3.33. This part of BS 7445 defines the basic quantities to be used for the description of noise in community environments and describes basic procedures for the determination of these quantities.

Transport Research Laboratory (TRL) Converting the UK traffic noise index $L_{A10,18hr}$ to EU noise indices for noise mapping 2002

11.3.34. In this study the options for converting the UK traffic noise index to EU noise indices are reviewed and compared to establish advantages and disadvantages of each approach.

TRL, Groundborne vibration caused by mechanised construction works 2000

11.3.35. This report provides a review of current knowledge of ground vibration transmission and adds new information specific to construction works. The report aims to present methods of predicting vibration levels from all mechanised construction activities, which may cause groundborne vibration to be environmentally intrusive, given a knowledge of the characteristics of the plant and site conditions.

11.3.36. Further details on all of the Guidance is discussed in ES Appendix 11.2 (Legislation and Policy Framework) (**TR010066/APP/6.3**).

11.4. Consultation

11.4.1. An Environmental Scoping Report was submitted to the Planning Inspectorate in June 2023 (**TR010066/APP/6.8**). A Scoping Opinion (**TR010066/APP/6.9**) was received in response to the Environmental Scoping Report from the Planning Inspectorate on behalf of the Secretary of State. The Applicant's responses to the Scoping Opinion (**TR010066/APP/6.9**) are contained in the Scoping Opinion Response, ES Appendix 4.1 (**TR010066/APP/6.3**).

11.4.2. Responses in relation to the statutory consultation undertaken are presented in the Consultation Report (**TR010066/APP/5.1**). Details of how the applicant has undertaken further engagement with statutory consultees is set out in the Consultation Report (**TR010066/APP/5.1**).

11.4.3. Further engagement with both Rugby Borough Council and Coventry City Council was undertaken in December 2023 in response to necessary changes to the proposed baseline survey methodology (the survey changes are detailed in ES Appendix 11.3 (Baseline Noise Survey Report) (**TR010066/APP/6.3**)). The response from Rugby Borough Council indicated that they accepted the change

in methodology for the baseline survey. No response was received from Coventry City Council in regard to this enquiry.

11.4.4. Within the same engagement Rugby Borough Council made a comment in relation to the measurement locations and additional residential properties within the Coombe Abbey area. In response, it is confirmed that the measurement positions will be used in the verification of the noise model which in turn will enable the determination of the noise levels at the receptors. It is confirmed that the noise assessment includes the three residential receptors within the boundaries of Coombe Pool.

11.5. Assessment methodology

11.5.1. This section sets out the approach and methods adopted for the assessment of noise and vibration in line with the Scoping Opinion (**TR010066/APP/6.9)**. The matter of operational vibration has been scoped out as confirmed in the Scoping Opinion (I.D 3.7.2 (**TR010066/APP/6.9**)) and confirmed in 3.7.2 in Appendix 4.1 (Scoping Opinion Response) (**TR010066/APP/6.3**). The assessment methodology is in accordance with the DMRB LA 111 standard and accounts for the above policy and guidance.

11.5.2. Further detail regarding the assessment approach within DMRB LA 111 is presented in ES Appendix 11.2 (Baseline Noise Survey Report) (**TR010066/APP/6.3**). The assumptions incorporated into each assessment are described in section 11.6 of this Chapter.

Baseline survey and validation

11.5.3. As part of the assessment, a baseline noise survey was carried out in between January and March 2024 at positions representing the local roads likely to be affected by the Scheme. Environmental noise levels measured during the survey have been analysed to determine the UK road traffic noise index, dB $L_{A10,18hr}$, at each position in full accordance with the Calculation of Road Traffic Noise (CRTN) shortened methodology. Full details of the baseline survey are presented in ES Appendix 11.3 (Baseline Noise Survey Report) (**TR010066/APP/6.3**).

11.5.4. The measured road traffic noise levels have then been compared with the Do Minimum Opening Year (DMOY) scenario road traffic noise model to determine whether any adjustment to the model is necessary. This is discussed further in section 11.8 of this Chapter.

Assessment Approach - Construction noise

11.5.5. The assessment of construction noise has been carried out for a study area within 300m of the Order Limits This study area includes receptors at which there is the greatest potential for significant effects due to construction noise. The construction noise study area is presented in ES Figure 11.1 (Noise Location Plan) (**TR010066/APP/6.2**).

11.5.6. The level of noise due to construction has been estimated at sensitive receptors, by applying the following methods.

Prediction method: construction noise

11.5.7. The level of noise from each phase of the construction activity has been predicted using the Datakustik Cadna/A® noise modelling software, by applying the calculation methodologies within BS 5228-1.

11.5.8. Each area source is assigned the cumulative sound power level of all plant and activity occurring during the stage. This cumulative sound power level accounts for the type and sound output of each plant item, the number of plant items and the expected on-time for each activity as presented in ES Appendix 11.5 (Construction Noise and Vibration Model and Assessment) (**TR010066/APP/6.3**).

11.5.9. The construction noise levels predicted using this method represent the average construction noise level that will occur over the duration of each construction stage, accounting for the long-term movement of plant and activities over the works area.

LOAEL and SOAEL: construction noise

11.5.10. The LOAEL at each location is equal to the baseline ambient noise level ($L_{Aeq,Day}$) at that location. These baseline noise levels have been estimated from the DMOY road traffic noise model, in accordance with section 3.9 of DMRB LA 111, and the application of the conversions within the TRL study.

11.5.11. The SOAEL at each location is determined as per DMRB LA 111, which references BS 5228-1 section E3.2 and Table E.1 (the 'ABC Method'). This method allows a SOAEL to be defined that accounts for the existing ambient noise level in that location. For daytime construction activity, the SOAEL is either 65 dB, 70 dB, or 75 dB $L_{Aeq,T}$, depending on the existing ambient noise level in that location. The SOAEL values for evening and weekend works are then 10 dB lower than for daytime, and the SOAEL values for night-time works are 20 dB lower than for daytime.

11.5.12. Daytime working includes weekday periods from 0700 – 1900. Night working includes 2300 – 0700 each day. Evening and weekend working covers all periods not covered by daytime or night-time working.

Assessment Criteria – construction noise

Magnitude of impact

11.5.13. The magnitude of the construction noise impact is determined by comparing the predicted levels against the construction LOAEL and SOAEL values, as presented above.

11.5.14. The magnitude of impact of construction noise is determined in accordance with the following criteria, taken from DMRB LA 111 Table 3.16.

Table 11-4 Magnitude of impact for construction noise (DMRB LA 111 Table 3.16).

Magnitude	Noise level
Major	Above or equal to SOAEL +5 dB
Moderate	Above or equal to SOAEL and below SOAEL +5 dB
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

11.5.15. Noise contours showing the predicted construction noise levels, based on the 'worst day' per phase are presented in ES Figure 11-9 to Figure 11-22 (Construction Noise Contours) (**TR010066/APP/6.2**) for both daytime and night-time periods. The assessment of the predicted noise levels is presented in section 11.10 of this Chapter.

Determining significance: construction noise

11.5.16. For construction noise effects, DMRB LA 111 advises that a significant effect would occur when a moderate or major impact is expected for 10 or more days or nights in any 15 consecutive days or nights; or for a total number of days exceeding 40 in any six consecutive months.

11.5.17. The significant noise effect in the terms of this EIA is not necessarily a significant adverse impact on health and quality of life as detailed in the NPS NN. A summary of the findings against the NPS NN aims is provided separately in Table 11-27 in section 11.13 of this Chapter. ES Chapter 12 (Population and Human Health) (**TR010066/APP/6.1**) includes an assessment related to noise and health impacts.

Assessment approach - Construction vibration

11.5.18. The assessment of construction vibration has been carried out for receptors up to 100m from the construction works. This therefore includes the receptors at which there is the greatest potential for significant effects due to construction vibration.

11.5.19. The level of vibration due to construction has been estimated at sensitive receptors, by applying the following methods.

Prediction method: construction vibration

11.5.20. Construction vibration has been predicted only for the activities which have the potential to result in the highest levels of vibration. This is limited to compaction works in this instance; piling is likely to be required to construct overbridges and possible elsewhere for the retained cuttings however this will not occur within 30m to a sensitive receptor and therefore will not exceed the SOAEL (refer to Table 11-15). Vibrating rollers are proposed for use during earthworks, road formation, surfacing works, satellite compound construction, drainage, utility diversion, placing subbase and structure formation.

11.5.21. The level of vibration during compaction has been estimated using Annex E of BS 5228 and the TRL report Ground-borne Vibration Caused by Mechanised Construction Works.

11.5.22. The BS 5228 calculation method for vibration during compaction produces three results for the Peak Particle Velocity (PPV); one which has a 50% chance of being exceeded, one with a 33% chance, and once with a 5% chance of been exceeded. In this assessment, the value which has a 33% chance of being exceeded has been presented. This represents the vibration level that is towards the upper end of vibration due to compaction and represents the reasonable worst-case scenario against which the significance of the effect can be evaluated.

LOAEL and SOAEL: construction vibration

11.5.23. The LOAEL for construction vibration is 0.3 mm/s (Peak Particle Velocity PPV) which may be just perceptible in residential environments.

11.5.24. The SOAEL for construction vibration is 1.0 mm/s (PPV) which is the level that is likely to cause complaint but can be tolerated if prior warning and explanation has been given to residents.

Assessment criteria – construction vibration

Magnitude of impact

11.5.25. The magnitude of the construction vibration impact is determined by comparing the predicted levels against the construction LOAEL and SOAEL values, as presented above.

11.5.26. The magnitude of impact of construction vibration is determined in accordance with the following criteria, taken from DMRB LA 111 Table 3.33.

Table 11-5 Magnitude of impact for construction vibration (DMRB LA 111 Table 3.33)

Magnitude	Vibration level
Major	Above or equal to 10 mm/s PPV
Moderate	Above or equal to SOAEL and below 10 mm/s PPV
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

11.5.27. The magnitude of construction vibration impact has been determined as per details presented above for the worst-case construction activities with regards to vibration, and for the closest receptors to the works. These impacts are presented in section 11.9.

Determining significance: construction vibration

11.5.28. For construction vibration effects, DMRB LA 111 advises that a significant effect would occur when a moderate or major impact is expected for 10 or more days or nights in any 15 consecutive days or nights; or for a total number of days exceeding 40 in any six consecutive months.

11.5.29. The significant noise effect in the terms of this EIA is not necessarily a significant adverse impact on health and quality of life as detailed in the NPS NN. A summary of the findings against the NPS NN aims is provided separately in Table 11-27.

Assessment approach - construction traffic

11.5.30. The assessment of construction traffic has been carried out for roads which are likely to be used by construction traffic. In accordance with DMRB LA 111, the study area for the construction traffic noise assessment has been defined as the area within 50m of public roads with the potential for an increase in baseline noise level of 1 dB(A) or more as a result of the addition of construction traffic to existing traffic levels.

11.5.31. The level of noise increase due to construction traffic has been predicted for these roads, and therefore for sensitive receptors which are impacted by noise from these roads, by applying the following methods.

Prediction method: construction traffic

11.5.32. The construction traffic noise assessment has taken the baseline noise level to be consistent with the Do Minimum Opening Year (DMOY) (refer to paragraph 11.5.45) road traffic noise levels. The approach for the construction traffic assessment has been to identify the change in Basic Noise Level (BNL) on the

existing road network due to additional heavy vehicle movements, in accordance with CRTN calculation procedures.

11.5.33. The BNL calculation produces a road traffic noise level (dB $L_{A10,18hr}$) for each road link at a notional receptor located 10m from the road edge, accounting for the road speed (km/h), total traffic flow, and percentage of heavy goods vehicles. Noise level change has been determined by comparing the baseline and 'with construction traffic' BNLs calculated for the roads that will be used by construction traffic.

Assessment criteria – construction traffic

Magnitude of impact

11.5.34. The magnitude of impact for the short-term change in road traffic noise due to construction is considered using the method presented in DMRB LA 111 Table 3.17, using the criteria in Table 11-6 below.

Table 11-6 Magnitude of impact for construction traffic (DMRB LA 111 Table 3.17)

Magnitude	Change in Road Traffic Noise Level due to Construction Traffic (dB $L_{A10,18hr}$)
Major	Greater than or equal to 5.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Minor	Greater than or equal to 1.0 and less than 3.0
Negligible	Less than 1.0

Determining significance: construction traffic

11.5.35. For construction traffic noise effects, DMRB LA 111 advises that a significant effect would occur when a moderate or major impact is expected for 10 or more days or nights in any 15 consecutive days or nights; or for a total number of days exceeding 40 in any six consecutive months.

11.5.36. The significant noise effect in the terms of this EIA is not necessarily a significant adverse impact on health and quality of life as detailed in the NPS NN. A summary of the findings against the NPS NN aims is provided separately in Table 11-27.

Assessment approach - diversion routes

11.5.37. Traffic diversions due to road closures at night that are required to carry out the proposed construction works are considered for a study area of 25m from the kerb line of the diversion route (as per DMRB LA 111 paragraph 3.7). In accordance with the methodology presented in DMRB LA 111, identification of potential impacts resulting from diversion routes does not involve quantitative

assessment of impact magnitudes; DMRB LA 111 paragraph 3.7 Note 3 recognises that whilst it is possible to calculate changes in noise levels due to diversion routes, this is not a proportionate approach as it would require significant work in additional traffic modelling and noise calculations.

11.5.38. The likelihood of significant effects resulting from diversion routes is therefore determined predominantly through a review of the potential routes. However, to facilitate a more detailed assessment and provide greater understanding of potential impacts, an outline assessment of potential noise change on diversion routes has been undertaken using the baseline traffic data for the Scheme.

Prediction method: diversion routes

11.5.39. As with the construction traffic assessment, the outline diversion route noise assessment has taken the baseline noise level to be consistent with the DMOY road traffic noise levels. The approach for the assessment has been to identify the change in Basic Noise Level (BNL) on the existing road network due to the redistribution of diverted traffic; to represent a worst-case, it has been assumed that all traffic on closed roads will follow the proposed diversion routes.

Assessment criteria – diversion routes

Magnitude of impact

11.5.40. The magnitude of impact for the short-term change in road traffic noise due to diversion routes is considered using the same magnitude of impact as construction traffic (Table 11-6).

Determining significance: diversion routes

11.5.41. DMRB LA 111 paragraph 3.18 states: *"For diversion routes used at night, a major magnitude of impact for construction noise impact shall be determined for any noise sensitive receptors within the diversion route study area".*

11.5.42. The significant noise effect in the terms of this EIA is not necessarily a significant adverse impact on health and quality of life as detailed in the NPS NN. A summary of the findings against the NPS NN aims is provided separately in Table 11-27.

Assessment approach - operational noise

11.5.43. The assessment of operational noise has been carried out for a study area within 600m of the new or altered links. This study area includes receptors at which there is the greatest potential for significant effects due to operational noise.

11.5.44. The level of noise change due to operation has been predicted at sensitive receptors, by applying the following methods.

Prediction method: operational noise

11.5.45. DMRB LA 111 requires that road traffic noise levels are predicted and assessed for four scenarios, as follows:

- Do-Minimum[1] in the Opening Year (DMOY)
- Do-Minimum in the Future Year (DMFY)
- Do-Something[2] in the Opening Year (DSOY)
- Do-Something in the Future Year (DSFY)

11.5.46. A road traffic noise model has been constructed for each scenario, the assumptions for which are presented in section 11.5. These models apply the CRTN methodology, accounting for the forecast traffic volumes, characteristics, and speeds.

11.5.47. Noise level contours have then been produced to present road traffic noise levels across the study area within each scenario. Noise difference contours are also presented for the following comparisons:

- DMFY minus DMOY: This presents the long-term change in road traffic noise without the Scheme.
- DSOY minus DMOY: This presents the short-term change in road traffic noise on the opening of the Scheme.
- DSFY minus DMOY: This presents the long-term change in road traffic noise with the Scheme.

11.5.48. For each of the three comparisons described above, the number of receptors within the operational study area that are subject to no change, negligible, minor, moderate or major magnitude of impact (that may be either increases or decreases) are reported in section 11.8.

11.5.49. For noise sensitive receptors (NSRs) within buildings, the assessment of the change in road traffic noise has been undertaken for the position predicted to experience the greatest magnitude of noise change, in accordance with DMRB LA 111.

[1] Do Minimum: The existing road network without the Proposed Scheme but with changes to highways or developments that would occur independently of the Proposed Scheme.

[2] Do-Something: The future road network assuming the Proposed Scheme is operational and with changes to highways or developments that would occur independently of the Proposed Scheme.

11.5.50. For noise sensitive receptors located outdoors (i.e. Public Rights of Way (PRoW), Sites of Special Scientific Interest (SSSI) and cemeteries), the assessment of changes in road traffic noise has been undertaken for the daytime period only, assuming that these receptors will not be used by people during the night, therefore reducing its sensitivity. For PRoW and SSSI which span a considerable length or area, the assessment considers the noise impact at the majority length rather than at a specific single location.

11.5.51. As per section 11.6 any potential noise and vibration impacts on protected species and wildlife (including the SSSI) are addressed within ES Chapter 8 (Biodiversity) (**TR010066/APP/6.1**), section 8.9 Potential Impacts and section 8.11 Assessment of Likely Significant Effects

LOAEL and SOAEL: operational noise

11.5.52. The LOAEL and SOAEL values for operational road traffic noise are presented within Table 11-7. These are consistent with the effect levels established within DMRB LA 111 Table 3.49.1.

Table 11-7 Operational noise LOAELs and SOAELS for all receptors

Time period	LOAEL	SOAEL
Day (06:00 – 00:00)	55 dB $L_{A10,18hr}$ (façade)	68 dB $L_{A10,18hr}$ (façade)
Night (23:000 – 07:00)	40 dB $L_{night,outside}$ (free-field)	55 dB $L_{night,outside}$ (free-field)

11.5.53. For outdoor receptors such as PRoW and the Coombe Pool SSSI, the daytime effect levels are 3dB lower since these receptors are in free-field conditions.

Assessment criteria – operational noise

Magnitude of impact

11.5.54. The magnitude of impact for the operational noise change in the short-term is defined as in Table 11-8, taken from DMRB LA 111 Table 3.54a.

Table 11-8 Magnitude of change – short-term (DMRB LA 111 Table 3.54a)

Magnitude	Change in Road Traffic Noise Level due to Construction Traffic (dB $L_{A10,18hr}$)
Major	Greater than or equal to 5.0
Moderate	3.0 to 4.9
Minor	1.0 to 2.9
Negligible	Less than 1.0

11.5.55. The magnitude of impact for the operational noise change in the long-term is defined as in Table 11-9, take from DMRB LA 111 Table 3.54b.

Table 11-9 Magnitude of change – long-term (DMRB LA 111 Table 3.54b)

Magnitude	Change in Road Traffic Noise Level due to Construction Traffic (dB $L_{A10,18hr}$)
Major	Greater than or equal to 10.0
Moderate	5.0 to 9.9
Minor	3.0 to 4.9
Negligible	Less than 3.0

Determining significance: operational noise

11.5.56. For operational noise, DMRB LA 111 advises that, for an initial assessment of significance, a moderate or major magnitude of change in road traffic noise in the short-term is to be classed as ‘significant’.

11.5.57. Further assessment is then required to determine the final operational significance. This involves the consideration of the context and circumstance of each change in road traffic noise. The context and circumstance considerations are stated within DMRB LA 111 Table 3.60 which are also presented in Table 11-10. Road traffic noise changes that have a minor, moderate or major magnitude in the short-term are potentially significant once the context and circumstance has been considered.

Table 11-10 Determining final operational significance on noise sensitive buildings (taken from DMRB LA111 Table 3.60)

Magnitude	Change in Road Traffic Noise Level due to Construction Traffic (dB $L_{A10,18hr}$)
Noise level change (is the magnitude of change close to the minor/moderate boundary?)	1) Noise level changes within 1dB of the top of the ‘minor’ range can indicate that it is more appropriate to determine a likely significant effect. 2) Noise level changes within 1dB of the bottom of the ‘moderate’ range can indicate that it is more appropriate to consider a change is not likely a significant effect.

Magnitude	Change in Road Traffic Noise Level due to Construction Traffic (dB $L_{A10,18hr}$)
Differing magnitude of impact in the long-term and/or future year to magnitude of impact in the short-term	1) Where the long-term impact is predicted to be greater than the short-term impact, it can be appropriate to conclude that a minor change in the short-term is a likely significant effect. Where the long-term impact is predicted to be less than the short-term it can be appropriate to conclude that a moderate or major change in the short-term is not significant 2) A similar change in the long-term and non-project noise change can indicate that the change is not due to the project and not an indication of a likely significant effect.
Absolute noise level with reference to LOAEL and SOAEL (by design this includes sensitivity of receptor)	1) A noise change where all Do-Something absolute noise levels are below SOAEL requires no modification of the initial assessment. 2) Where any Do-Something absolute noise levels are above SOAEL, a noise change in the short-term of 1.0dB or over results in a likely significant effect
Location of noise sensitive parts of a receptor	1) If the sensitive parts of a receptor are protected from the noise source, it can be appropriate to conclude a moderate or major magnitude of change in the short-term and / or the long-term is not a likely significant effect. 2) Conversely, if the sensitive parts of the receptor are exposed to the noise source, it can be more appropriate to conclude a minor change in the short-term and/or the long-term is a likely significant effect. 3) It is only necessary to look in detail at individual receptors in terms of this circumstance where the decision on whether the noise change gives rise to a significant environmental effect is marginal.
Acoustic context	1) If a project changes the acoustic character of an area, it can be appropriate to conclude a minor magnitude of change in the short-term and / or long-term is a likely significant effect.
Likely perception of change by residents	1) If the project results in obvious changes to the landscape or setting of a receptor, it is likely that noise level changes will be more acutely perceived by the noise sensitive receptors. In these cases, it can be more appropriate to conclude that a minor change in the short-term and / or long-term is a likely significant effect. 2) Conversely, if the project results in no obvious changes for the landscape, particularly if the road is not visible from the receptor, it can be appropriate to conclude that a moderate change in the short-term and / or long-term is not a likely significant effect.

11.5.58. A significant noise effect in the terms of this assessment (for the EIA Regulations, 2017) is not necessarily a significant adverse impact on health and quality of life as detailed in the NPS NN. A summary of the findings against the NPS NN aims is provided separately in Table 11-27.

11.6. Assessment assumption and limitations

Scheme design

11.6.1. The assessment has been based on the Scheme description and construction strategy presented in ES Chapter 2 (The Scheme) (**TR010066/APP/6.1**).

11.6.2. Any potential noise and vibration impacts on protected species and wildlife are addressed within ES Chapter 8 (Biodiversity) (**TR010066/APP/6.1**) section 8.9 Potential Impacts and section 8.11 Assessment of Likely Significant Effects.

Construction noise and vibration

11.6.3. Information regarding construction programme, schedule, construction of the satellite compound, works phasing, construction plant, and diversion routes have been provided within ES Chapter 2 (The Scheme) (**TR010066/APP/6.1**) and the First Iteration EMP (**TR010066/APP/6.5**).

11.6.4. While the exact construction methods and programme may be further refined at the detailed design stage of the Scheme, the assessment of significant effects has been carried out with the appropriate level of robustness to ensure results are representative of a reasonable worst case scenario for the planned works and to ensure adequate mitigation can be provided.

11.6.5. Details of the construction phases, plant used and predicted construction noise levels are presented in ES Appendix 11.5 (Construction Noise and Vibration Model and Assessment) (**TR010066/APP/6.3**). Study areas for construction noise and vibration are presented in ES Figure 11.1 (Noise Location Plan) (**TR010066/APP/6.2**). Seven main construction phases are assessed, satellite compound construction / operation has been included within the mains works. Each construction phase has a number of construction stages, and each stage has one or more types of construction activity associated with it. Each construction activity requires certain plant types which are used to assess the noise emissions for each construction stage.

11.6.6. If the timing of phased construction activities identified in the construction noise and vibration assessment change due to programme refinement, resulting in different activities within the assessed phases, the noise assessment will be revisited to ensure a reasonable worst case assessment is undertaken and any appropriate mitigation identified.

11.6.7. The majority of the construction work will take place during the daytime and on Saturday mornings; typical construction times will be between 07:00-19:00 on weekdays and between 07:00-13:00 on Saturdays.

11.6.8. Night-time or weekend works will be required at some stage, such as, road tie-ins and traffic management. Night works will take place from 20:00 – 06:00. There may be exceptions to these hours for oversized deliveries, and junction tie-ins. There are likely to be extended working hours in the summer months to take advantage of the daylight or weather. These will need to be considered in further detail as construction methods are refined and proposals for night-time

work discussed and agreed with the environmental health department at the local authority.

11.6.9. The assessment of compaction vibration is based on vibratory rollers with two vibrating drums, a maximum drum vibration amplitude of 0.5mm and a drum width of 1m.

11.6.10. Based on the current indicative construction programme (section 2.6 of ES Chapter 2 (The Scheme) (**TR010066/APP/6.1**)) piling works will be limited to gantry works and rotary bored piling techniques will be utilised.

11.6.11. The construction information has been reviewed and assessed to determine the risk of a significant effect occurring, in accordance with DMRB LA 111. Where the risk of a likely significant effect is identified, monitoring and further detailed assessment works will be required by the Principal Contractor, in discussion with the local authority to agree the final plant proposals and work durations.

Construction traffic

11.6.12. The majority of construction traffic movements associated with the works (light vehicles and HGV's) will occur between the existing Brinklow Road compound and A46 (B4082 junction). The construction traffic route will utilise Brinklow Road, Clifford Bridge Road and the B4082 only. Construction vehicle movements within the works boundaries are considered in the construction noise assessment.

11.6.13. The maximum number of site-wide vehicle trips per day (each way) for any phase is assumed to not exceed 180 light vehicles and 100 HGVs as a worst case. This number of vehicles is considered to be the reasonable worst-case scenario and is based on input from the Principal Contractor; typical daily vehicle trips are understood to be in the magnitude of 120 light vehicles and 40 HGVs. Therefore, a total of 360 additional light vehicle and 200 additional heavy vehicle movements (allowing for the outward and return journeys) have been included in the construction traffic assessment on the construction traffic route described above. On this basis, the expected additional vehicle movements have been assessed on the following roads:

- Brinklow Road (both directions) between the Brinklow Road compound and Clifford Bridge Road junction
- Clifford Bridge Road (both directions) between Brinklow Road and B4082 junction
- B4082 (both directions) between Clifford Bridge Road and the A46 junction

11.6.14. Roads other than those detailed above should not typically be used by construction vehicles associated with the construction of the Scheme. This is controlled in the Outline Traffic Management Plan (**TR010066/APP/7.5**).

Construction diversion routes

11.6.15. There are currently three main diversion routes proposed to facilitate the construction of the Scheme, resulting from the following temporary road closures; A46 closure between M69 and Walsgrave junction; A46 closure between M69 and Binley Junction; and B4082 closure. These closures will occur during off-peak hours only (20:00 – 06:00) and will primarily utilise A4600 (Hinckley Road), B4082 (Clifford Bridge Road) and the A428 (Brandon Road). No closures or diversions are proposed during daytime hours or at weekends.

11.6.16. The impact of the proposed diversion routes has been assessed on the basis that all vehicles (including HGVs) diverted by the temporary closures will follow the signed diversion route and that the increased traffic flows along the diversion routes do not result in congestion or changes to the free-flowing traffic speed.

Operational noise

11.6.17. Table 11-11 describes the assumptions, limitations and data sources associated with the noise model and the operational noise assessment.

Table 11-11 Operational noise model assumptions, limitations and data sources

Model element	Assumptions and limitations
Traffic data	• The level of road traffic noise from the road network has been predicted using traffic data provided. LA10,18hr traffic noise levels have been predicted using Datakustik CadnaA® noise modelling software, in accordance with CRTN methodology and the modifications and guidance stated in DMRB LA 111. L_{night} traffic noise levels have been calculated using TRL Method 3. • L_{night} traffic noise levels have been calculated using the TRL conversion study. The choice of conversion method accounts for the type of road and the expected diurnal variation in traffic volumes and are the methods deemed most appropriate by the competent expert[3]. • The noise predictions contain the same inherent assumptions that were built into the traffic model to predict traffic flows, composition, and speed at each link. For a 1dB change to occur traffic flows need to increase by 25% or decrease by 20% (all other variables being equal). Therefore, small errors in traffic flow forecasts are unlikely to significantly affect results. • The Scheme opening year is assumed to be 2028 and the future year is assumed to be 2043.

[3] For all roads, the dB L_{night} index has been determined by applying TRL Method 3: motorways & non-motorways (an empirical relationship derived from noise measurements on urban roads). As per DMRB LA 111, TRL Method 3 provides reliable results for most UK roads.

Model element	Assumptions and limitations
Road alignments	• The road alignments have been modelled based on geo-referenced shapefiles that reflect the design as described in ES Chapter 2 (The Scheme) (**TR010066/APP/6.1**). • These have been supplemented by OS MasterMap and Google Maps Satellite data.
Road surfaces	• Unless stated otherwise roads have been assumed as comprising a hot-rolled asphalt surface. • For the 'Do-Something' scenarios, a low noise surface (-2.5dB Road Surface Influence) has been included along high-speed sections of the Scheme. • Bridge deck extents have been included as comprising hot-rolled asphalt.
Topography	• The topography for the core study area has been modelled based on 5 metre Digital Terrain Model (DTM) obtained from the Defra Survey Data Download portal online. The most recent data does not contain the recent works at Binley Junction Improvement Scheme, however topography data for this was provided by the Highways engineering team. • The contours created from the DTM are at 1 metre intervals (vertical resolution). • The topography contours modelled for the Scheme were produced based on 3D drawings provided by the Highways engineering team. • The topography contours modelled for the Scheme replace the DTM topography at areas within the Scheme boundary for all Do-Something scenarios.
Buildings	• Buildings have been modelled based on OS Mastermap (National Highways Geostore) data. • Building heights have been derived from eave height data from the above dataset and combined with Google Maps data. • No existing noise barriers or other close boarded fences or walls at property boundaries have been included in the model.
Ground cover	• Urban areas, watercourses, roads and building footprints have been included as acoustically reflective. • The remainder of intervening ground between roads and receivers has been modelled as acoustically absorbent as the remainder of the Scheme corridor passes through rural areas.
Address data	• Address and receptor sensitivity data has been defined from OS AddressBase Plus data.
PRoW, SSSI and Amenity	• PRoW data (locations, lengths and unique references) was obtained from Warwickshire County Council at Public Rights of Way – Public Rights of Way Map (warwickshire.gov.uk). • SSSI data was obtained from the Sites of Special Scientific Interest (England) | Sites of Special Scientific Interest (England) | Natural England Open Data Geoportal (arcgis.com).

Model element	Assumptions and limitations
	• Amenity areas to be include in the assessment were determined following a review of the operational study area in the context of Coventry Local Plan Policy GE1 Green Infrastructure and the three categories for Green Infrastructure defined therein. In accordance with part 4 of Policy GE1, amenity areas whose functionality may be impacted by the works have been included. • Some PRoW, SSSI and amenity areas span over a considerable area / length and their use is of a transient nature. The assessment of the potential noise impacts has been undertaken across the total area / length of these NSRs to provide a balanced approach, considering the impact across the majority of the path rather than at a specific single location. • Predicted noise levels are presented as free-field values.
Survey data	• The noise survey undertaken in February – March 2024, in accordance with the shortened measurement procedure in CRTN, has been used in the verification of the noise model.

11.7. Study area

11.7.1. DMRB LA 111 requires the definition of study areas during the construction and operational phase of a Scheme. The study areas considered in the construction and operational assessment are identified in ES Figure 11.1 (Noise Location Plan) (**TR010066/APP/6.2**) and summarised below.

Table 11-12 Noise and vibration study areas

Assessment element	Study area definition
Construction noise	300m from the closest construction activity. (DMRB LA 111, section 3.5, Note 1)
Construction vibration	100m from the closest construction activity with the potential to generate vibration. (DMRB LA 111, section 3.29, Note 1)
Construction traffic	For the construction traffic assessment, DMRB LA 111 paragraph 3.8 states that a study area shall be defined to include a 50m width from the kerb line of public roads with the potential for an increase in the baseline noise level of 1dB(A) or more as a result of the addition of construction traffic to existing traffic levels. As shown later in the Chapter, increases in the baseline noise level due to the addition of construction related traffic are predicted to remain below 1dB(A). Therefore, a study area for the construction traffic assessment is considered unnecessary, and the likelihood of significant effect is determined through assessment of the road traffic noise increase alone along specified roads, not at specific receptors.
Diversion routes	25m width from the kerb line of the diversion route. (DMRB LA 111, section 3.7)
Operational noise	The operational study area for this assessment has been defined as the area within 600m of new road links or road links physically changed or bypassed by the project. There are no road links outside of this area with the potential to experience a short-term BNL change of 3.0dB(A) or more. Road links predicted to have a short-term BNL change of more than 1.0dB(A) beyond this area are also predicted to have road traffic noise levels well below SOAEL due to the project. These road links have not been included in the model because the risk

Assessment element	Study area definition
	of likely significant effects is very low on these links. This is because a minor noise change where SOAEL is not met or exceeded due to the Scheme is considered to be not significant according to DMRB LA 111.

11.8. Baseline conditions

11.8.1. In order to establish the baseline sound conditions, noise monitoring was undertaken in the vicinity of the Scheme in February – April 2024. Full details of the survey undertaken are presented ES Appendix 11.3 (Baseline Noise Survey Report) (**TR010066/APP/6.3**). Noise monitoring positions are also identified in ES Figure 11.1 (Noise Location Plan) (**TR010066/APP/6.2**).

11.8.2. Measured baseline results have been compared with the predicted road traffic noise index, dB $L_{A10,18hr}$ for the DMOY scenario. This comparison is shown in ES Appendix 11.4 (Model Validation Report) (**TR010066/APP/6.3**).

11.8.3. The comparison between measured and modelled road traffic noise levels presented in ES Appendix 11.4 (Model Validation Report) (**TR010066/APP/6.3**) demonstrates a robust level of validation. The baseline noise survey is considered valid for use in this assessment. The model results are considered robust for representing the DMOY Scenario and no amendments have been applied.

11.8.4. The construction vibration baseline is assumed to be zero due to the absence of construction work prior to project commencement.

Receptors within the construction noise and vibration study areas

11.8.5. A total of 838 existing noise sensitive receptors have been identified within the 300m construction noise study area, not including seven PRoW and amenity areas.

11.8.6. Construction noise levels and impact magnitudes have been assessed for each construction phase and are mapped at all locations within the construction noise study area.

11.8.7. Construction vibration has been assessed for receptors within 100m meters to the construction works. This 100m vibration study area includes a total of 127 existing vibration sensitive receptors.

11.8.8. In terms of the road traffic diversion routes study area, there will be a very large number of properties within the diversion route study area due to length of the proposed diversion routes. In accordance with DMRB LA 111 the likelihood of

significant effect is determined through a review of the potential routes, and not the noise level changes at specific receptors along these routes.

11.8.9. The area within approximately 1km of the existing Walsgrave Junction is a mix of residential, community and commercial use as well as areas of undeveloped semi-natural environment. This includes:

- Residential communities to the north (approximately 1km to the north), west (approximately 300m to the west) and south-west (approximately 100m to the south-west) of the existing junction
- Schools such as Clifford Bridge Academy (approximately 350m to the west of the existing junction) and Pearl Hyde Primary School (approximately 600m to the north of the existing junction), and Wyken Community Centre (approximately 800m to the west of the existing junction)
- University Hospital Coventry (approximately 1km to the north of the existing junction)
- Coombe Pool SSSI, located directly east of the junction, is designated for its ornithology. This SSSI is located within Coombe Abbey, which is a Grade II* Registered Park and Garden
- Two public rights of way: 156/R75x/1 which crosses the A46 to the north of the Scheme; and 104/R31/2 which approximately follows the road layout at the Ansty Interchange
- Grade II listed structures at Hungerley Hall Farm within the Order Limits.
- Areas of amenity or Green Infrastructure (as defined on the Coventry Local Plan) including the external grounds of Pearl Hyde Primary School, Clifford Bridge Academy, Broadstreet Rugby Football Club (RFC), along with Spring Estates Allotment, Valencia Road Play Park and Brinklow Road Open Space.

11.8.10. There are no NIAs[4] located within 1km of the Order Limits. However, there are a number of NIAs located on surrounding roads. These include:

- One on the A46 south of the Binley Junction, >1.5km from the existing Walsgrave Junction (ID 14307)
- Three NIAs situated on the A4600 Antsy Road (IDs 324 (approximately 2.4km north, 11796 (approximately 1.5km west) and 14385 (approximately 1.6km north-west) of the existing Walsgrave Junction)
- Two on the A428 Brandon Road (ID 330, approximately 1km south-west)) and Binley Road (ID 11800, approximately 1.25km south-west) of the existing Walsgrave Junction

[4] Noise Important Areas are areas particularly affected by noise. They are defined in the Noise Action Plans as the area where the 1% of the population that are affected by the highest noise levels from major roads are located according to the results of the strategic noise mapping.

11.8.11. Ecological noise sensitive receptors and an assessment of the impacts is presented in the biodiversity ES Chapter (Biodiversity) (**TR010066/APP/6.1**).

11.8.12. No Environmental Noise Directive (END) quiet areas or potential END quiet areas have been identified in the study area for the Scheme. However, any areas valued for their tranquillity or amenity have been identified in accordance with Coventry Local Plan GE1 Green Infrastructure.

11.8.13. The operational study area, noise sensitive receptors, SSSIs and NIAs are shown in ES Figure 11.1 (Noise Location Plan) (**TR010066/APP/6.2**).

Value of receptors

11.8.1. Noise affects people in different ways. This may include factors such as annoyance and sleep disturbance, enjoyment of spaces, ability to communicate with others and ability to concentrate at home or at work.

11.8.2. Different receptors may be subject to the same sources and at the same times, but the significance is not the same (for example, dwellings which are occupied at night and commercial premises which are not occupied at night). Consequently, it is not appropriate to consider a single criterion when assessing the sensitivity of a receptor within an existing noise environment.

11.8.3. This assessment is focused on receptors with high sensitivity to noise and vibration. Most receptors that would be affected by noise and vibration arising from the Scheme are dwellings. However, there are other types of high sensitivity receptors in the study area that have been considered in the assessment, such as village halls, schools, places of worship and PRoW.

Future baseline

11.8.4. The Do Minimum traffic scenario is representative of the predicted growth in traffic, accounting for local and regional development. Cumulative impacts are implicit in the future Do Minimum and Do Something scenarios because committed developments as detailed in the Transport Assessment (**TR010066/APP/7.3**) are included in the traffic model.

11.8.5. Traffic growth aside, the future noise baseline around the Scheme is likely to be similar to the existing baseline. There are areas of proposed housing development alongside the A46 in the Local plans for Coventry City Council and Rugby Borough Council as well as within the wider surrounding area.

11.8.6. Future climate change has the potential to alter the noise climate, as rainfall, temperature and wind are factors that can influence the generation or propagation of noise. However, none of these factors are used within the NPS

NN stated calculation methodology for the prediction of road traffic noise (i.e., CRTN (Department of Transport and Welsh Office, 1988)). In addition, weather conditions in context of climate change, are not considered within the assessment methodology contained within DMRB LA 111.

11.9. Potential impacts

Construction noise

11.9.1. Construction noise generated by the project has the potential to adversely affect noise sensitive receptors within the 300m study area for a temporary period. Construction activities such as piling and use of heavy machinery during earthworks such as excavators, dozers, or rollers may result in adverse impacts and temporary disturbance at sensitive receptors. The greatest impacts are likely to occur at the closest receptors to the Scheme where construction activities occur. However, adverse noise impacts may also extend along elements of the existing road network, depending on haul routes and the quantity of construction-related traffic.

11.9.2. Factors which have the potential to affect construction phase noise and vibration impacts include:

- Construction plant inventory and utilisation
- The programme and the duration of activities with noise and vibration impacts exceeding relevant thresholds
- Hours of work
- Proximity of the works to receptors
- Frequency and routing of the movement of construction vehicles
- The location of compounds
- The routing of temporary diversions, the volumes of traffic using them and duration they are applied

11.9.3. The noise maps which present the predicted impacts for each set of construction stages are shown in ES Figure 11.9 to Figure 11.22 (Construction Noise Contours) (**TR010066/APP/6.2**). Maps are presented without mitigation for all construction phases both daytime and night-time for the worst affected time period within each phase.

11.9.4. The number of receptors for areas at which a moderate or major magnitude of impact could occur during the worst case time period (day / night) for each phase of construction are presented in Table 11-13 and Table 11-14. These impacts would potentially result in a temporary moderate or major adverse magnitude of impact without mitigation. Table 11-13 presents the results of the daytime period assessment and covers the planned works from 0700 to 1900 on

weekdays and 0700 to 1300 on Saturdays. Table 11-14 presents the results of the night-time, evening and weekend period assessment and covers the planned works from 1300 to 1900 on Saturdays.

11.9.5. The activities listed in Table 11-13 and Table 11-14 are not an exhaustive list of proposed activities for that overall phase and only outline activities occurring during the identified worst case day / night.

Table 11-13 Moderate and major noise impacts during daytime construction (0700 – 1900 weekdays, 0700 – 1300 Saturdays without mitigation.

Construction phase	Construction areas and tasks (summarised)	Magnitude of impact	Number of receptors predicted to experience impact	Receptors affected
Phase 1	Northwest: Sub base Southwest capping layer; Facing; Filter drainage; Drainage Removal; Ducting Farm Access Track: Reduce Dig Southern detention basin 1: Excavation Central pond 2: Excavation Northeast: Capping layer; Filter drainage; Drainage Removal; Ducting Southeast: Drainage Removal; Ducting West Northbound Carriageway: Excavation ex carriageway capping; Drainage; Drainage Removal East Southbound Carriageway: Excavation ex carriageway; capping; Drainage; Drainage Removal West Retaining earth wall (REW) Construction: REW Foundation East REW Construction: REW Foundation Deck Construction: Edge shutters and stop end	Moderate	1	Hungerley Hall Farmhouse
Phase 5	Reduce dig; place compact sub base; drainage; drainage removal; surfacing	Moderate	7	1, 2 Florence Road; 10, 13, 15, 17 Valencia Road; 64 Gainford Rise

Table 11-14 Moderate and major noise impacts during night-time (2300-0700 Weekdays), evening (1900 – 2300) and weekend construction (1300 – 1900 Saturdays)

Construction phase	Construction areas and tasks (summarised)	Magnitude of impact	Number of receptors predicted to experience impact	Receptors affected
Enabling	Create construction access of A46 and B4082	Moderate	42	26, 30, 32 Florence Road; 2, 4, 12, 18, 20, 28, 31, 33, 35 Valencia Road; 6, 9, 23, 26, 36, 38, 40, 42, 44, 46, 48, 50, 52, 53, 54, 55, 56, 58, 60, 62, 63 Gainford Rise; 1, 3, 4, 6, 8 Royston Close; 7, 8 Faygate Close; 9, 14 Bridport Close.
		Major	2	64 Gainford Rise, Hungerley Hall Farmhouse,
Phase 1	Carriageway slip roads: surfacing Pedestrian crossing: excavate	Moderate	95	Clifford Bridge Academy; 3, 4, 5, 6, 10, 15, 16, 18, 19, 20, 21, 22, 24, 25, 27, 29, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 46, 50, 51, 52, 53, 55, 56, 57, 58, 59, 61, 63, 65, 67, 69 Gainford Rise; 149, 157, 161, 175, 177 Coombe Park Road; 15, 19, 21, 23, 29, 33, 39, 41 Bracadale Close; 2, 5, 11 Royston Close; 118, 190, 192, 202, 204, 208, 210 Dorchester Way; 2, 3, 9, 10, Faygate Close; 10 Abbotsbury Close; 29 Keswick Walk; 8, 9, 10, 11, 12, 14, 15, 16, 17, 18 Bridport Close; 106, 116, 122, 124, 126, 134, 142, 144, 150, 160, 175, 177, 179 Clifford Bridge Road; Hungerley Hall Farmhouse
		Major	43	7, 9, 11, 12, 14, 30, 32 Gainford Rise; 4, 6, 7, 8, 11, 12 Faygate Close; 4, 6,

Construction phase	Construction areas and tasks (summarised)	Magnitude of impact	Number of receptors predicted to experience impact	Receptors affected
				7, 8, 9, 10, 12, 14, 15, 16, 17, 18, 19 Royston Close; 149, 196, 198, 200 Dorchester Way; 136, 138, 148, 152, 154, 156, 158, 162, 181, 183, 185, 187 Clifford Bridge Road
Phase 4	Construct central reservation	Moderate	9	6 Sevilla Close; 1, 2, 4, 12, 21 Valencia Road; 50, 64 Gainford Rise; Hungerley Hall Farmhouse
Phase 6	Final surfacing	Moderate	23	1, 2, 8 Florence Road; 2, 4, 6, 8, 10, 12, 13, 14, 15, 16, 17, 21 Valencia Road; 37, 62, 73, 75, 77, 83, 85 Gainford Rise; Hungerley Hall Farmhouse

11.9.6. Table 11-13 and Table 11-14 show that the closest receptors to some construction activities will potentially experience a temporary moderate or major magnitude of impact without mitigation.

11.9.7. DMRB LA 111 paragraph 3.19 advises that construction noise shall constitute a significant effect where it is determined that a moderate or major impact will occur for a duration of 10 or more days or nights in any 15 consecutive days or nights; or for a total number of days exceeding 40 in any six consecutive months.

11.9.8. The durations for which plant will be operating for each construction stage of work have not yet been finalised by the Principal Contractor. At this stage, a precautionary worst-case approach has been adopted, considering that the assessed construction activities have the potential to exceed the above durations. In reality this may not happen for all phases of work; in particular, the Phase 6 night-time works are expected to last for less than 10 shifts.

11.9.9. Tie-in construction works are likely to occur during the night-time period. Limited plant information is available for these works at this stage; however, it is possible that moderate or major adverse impacts could occur because of these works. It is considered unlikely that the tie in works would occur adjacent to individual receptors for 10 or more days or nights in any 15 consecutive days or nights (or for a total number of days or nights exceeding 40 in any six consecutive months)

and therefore noise from tie-in works is unlikely to constitute a significant effect. Due to the sensitive period during which these works will occur, the Principal Contractor shall implement mitigation including further detailed assessments and the application of best practicable means of noise control. This mitigation is detailed in the First Iteration EMP and Register of Actions and Environmental Commitments (REAC) (Annex A of the First Iteration EMP (**TR010066/APP/6.5**)) which will be developed into the Second Iteration EMP as secured by Requirement 4 in Schedule 2 of the draft DCO (**TR010066/APP/3.1**).

11.9.10. Section 11.11 presents specific noise mitigation measures and best practice techniques that are expected to reduce the potential for significant effect to occur due to construction noise.

Construction vibration

11.9.11. Table 11-15 sets out indicative distances, based on historical field measurements, at which certain construction activities are expected to result in a level of vibration below 1mm/s peak particle velocity (PPV).

Table 11-15 Distances at which vibration will not exceed SOAEL

Construction Activity	Furthest distance (m) which vibration levels could exceed the SOAEL of 1 mm/s PPV
Rotary piling (BS1 2008a)	30
Bulldozer (TRL 2000)	20
Tunnelling machine in soil[6]	15
Heavy vehicles (e.g. dump trucks)[6]	10

11.9.12. Most sensitive receptors are beyond 30m from the closest construction activity. For these receptors the magnitude of vibration is predicted to be no greater than a temporary minor adverse impact for all construction activities. At receptors located further from the Scheme, the construction vibration impact would be less.

11.9.13. There are sensitive properties located within 30m of construction activity that could experience moderate or major construction vibration impacts due to the proposed construction works. These properties and their relative distance to the works are detailed below:

- 1 Valencia Rd, Coventry CV3 2TL – approximately 25m from the Order Limits and nearest works area
- 1 and 2 Sevilla Cl, Binley, Coventry CV3 2AG – approximately 29m and 27m from the Order Limits and nearest works area respectively

- Hungerley Hall Farmhouse, Coventry CV3 2AE – approximately 8m from the Order Limits (approximately 35m from the nearest proposed vibratory compaction works)
- There are unoccupied (non-residential) listed structures of Hungerley Hall Farm which fall in closer proximity to the Order Limits than the farmhouse, including two barns which fall within the Order Limits. Given the works proposals, there is the potential for vibratory compaction works to occur within 1.5m of these structures

11.9.14. Based on the data presented in Table 11-15, typical works using heavy vehicles such as dump trucks should not typically exceed the SOAEL at any of the receptors. There is however potential for works using bulldozers and excavators to exceed the SOAEL value of 1 mm/s PPV at the listed non-residential structures of Hungerley Hall Farm due to proximity. The mitigation and control of these activities with relation to the Hungerley Hall Farm listed structures will be outlined in the First Iteration EMP (**TR010066/APP/6.5**).

11.9.15. Based on the current indicative programme piling works will be limited to gantry works and rotary bored piling techniques will be utilised. Vibratory compaction is the only other type of work with potential to result in construction vibration exceeding the SOAEL value of 1 mm/s PPV at receptors within 30m of the proposed works. Should additional piling be required following design and programme detailing, percussive and impact piling methods shall be avoided in favour of rotary piling.

11.9.16. Vibrating rollers are proposed across much of the scheme extents for use during earthworks, road formation, surfacing works, satellite compound construction, drainage, utility diversion, placing subbase and structure formation.

11.9.17. Breakers are due to be used on site and therefore their effect must be considered. Breakers will be used to break up the existing road surface and subbase. As the breakers will only be used on the existing road surface and due to the inherently short durations of use (short periods of use are required to minimise operator hand arm vibration), the breakers are not expected to affect nearby residential receptors. Vibration effects from breakers used in close proximity to the non-residential listed structures of Hungerley Hall Farm will be considered and mitigation outlined in the First Iteration EMP (**TR010066/APP/6.5**).

11.9.18. On the above basis, for the nearest residential receptors at which there is a risk of vibration effects, calculations of PPV, mm/s, resulting from vibratory rollers have been undertaken. The predicted level of vibration at the receptors within 30m of the works are presented in Table 11-16. The table shows the predicted vibration levels due to steady state of operation, and due to start-up and run-

down. The predicted vibration levels are expected to occur where compaction works take place at the closest works position to each receptor.

Table 11-16 Predicted ground borne vibration levels arising from vibratory rollers and compactor

Residential Receptor	Distance to Works (m)	Operation	Vibratory level PPV, mm/s (magnitude of impact)
1 Valencia Rd, Coventry CV3 2TL	25	Steady state of operation	0.54 (Minor)
		During start-up and run-down	0.77 (Minor)
1 Sevilla Cl, Binley, Coventry CV3 2AG	29	Steady state of operation	0.44 (Minor)
		During start-up and run-down	0.64 (Minor)
2 Sevilla Cl, Binley, Coventry CV3 2AG	27	Steady state of operation	0.48 (Minor)
		During start-up and run-down	0.70 (Minor)
Hungerley Hall Farmhouse, Coventry CV3 2AE	35	Steady state of operation	0.33 (Minor)
		During start-up and run-down	0.50 (Minor)
Note: There is a 33% chance that the presented vibration levels will be exceeded due to vibratory compaction. The presented vibration levels are considered to be a reasonable worst-case scenario.			

11.9.19. The predicted vibration levels fall below the SOAEL at all residential receptors within 30m of the Order Limits and as such a worst-case minor magnitude of impact is expected from construction vibration.

11.9.20. The primary cause of community concern in relation to construction vibration generally relates to building damage. However, with reference to BS 7385-2:1993, minor cosmetic damage in light or unreinforced buildings would require levels of at least 15 mm/s PPV. Based on the expected type of construction plant and the distances to the nearest residential buildings, it is considered extremely unlikely that minor cosmetic damage would occur at any residential receptor.

11.9.21. With regard to the non-residential listed buildings forming Hungerley Hall Farm (excluding the residential farmhouse), the proximity of the works presents a risk of cosmetic damage. However, it is not proportionate to infer a magnitude of impact using the same LOAEL and SOAEL criteria set out in section 11.5 as these relate to human perception and likelihood of complaints.

11.9.22. Accordingly, for non-residential non-occupied buildings where there is a risk of damage, approximately 15 mm/s PPV is equivalent the LOAEL, relating to the onset of cosmetic damage.

11.9.23. Section 7.5.2 of BS 7385-2:1993 states:

"Important buildings which are difficult to repair may require special consideration on a case-by-case basis. A building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive."

11.9.24. As such, Table 11-17 below presents a summary calculation of worst-case resultant vibration levels at the non-residential non-occupied structures of Hungerley Hall Farm with an indication of the risk of cosmetic damage occurring. This is considered further in the First Iteration EMP (**TR010066/APP/6.5**) including mitigation approaches.

Table 11-17 : Predicted ground borne vibration levels arising from vibratory rollers and compactor – Hungerley Hall Farm (non-residential, non-occupied)

Non-residential receptor	Distance to works (m)	Operation	Vibratory level PPV, mm/s (risk of damage)
Hungerley Hall Listed Structures (excluding Farmhouse)	≈ 1.5	Steady state of operation	18.1 (onset of cosmetic damage)
		During start-up and run-down	16.1 (onset of cosmetic damage)
Note: There is a 33% chance that the presented vibration levels will be exceeded due to vibratory compaction. The presented vibration levels are considered to be a reasonable worst-case scenario.			

11.9.25. The above assessment has demonstrated that, in terms of human perception of construction vibration, construction activities would result a worst-case minor adverse impact at all residential receptors. Given the nature of the Scheme and range of areas where compaction works will take place, there is a limited likelihood that vibratory compaction works will occur at fixed positions near individual receptors for 10 or more days or nights (or for a total number of days exceeding 40 in any six consecutive months) since this work is expected to progress linearly along the Scheme. However, vibration from the static works such as structure formation phases could occur for longer than these durations.

11.9.26. For this reason, section 11.11 of this Chapter presents specific vibration mitigation measures and best practice techniques that are expected to reduce the potential for significant effects occurring due to vibration from compaction works. Based on the results of the assessment presented in Table 11-17, the mitigation measures detailed in section 11-11 of this Chapter will also be implemented to ensure that damage is not caused to the listed buildings at Hungerley Hall Farm. Mitigation measures are detailed within the First Iteration EMP (**TR010066/APP/6.5**). The assessment of significant effects is then presented in section 11.12 of this Chapter.

Construction traffic

11.9.27. The change in road traffic noise due to the additional traffic flows associated with the construction of the Scheme has the potential to affect sensitive receptors

located along existing roads used by these vehicles. The potential for construction traffic noise impacts is dependent on the volume of construction traffic and the routing.

11.9.28. Most construction traffic movements associated with the works will occur between the Brinklow Road compound and the A46 (via B4082 junction), or within the construction area.

11.9.29. Given the predominantly residential nature of the local area surrounding the works (particularly to the west), the majority of construction related traffic shall not use any roads other than these to access site.

11.9.30. Table 11-18 below presents the baseline traffic flows on each road used for the construction traffic route and the change in road traffic noise that is expected due to the addition of 560 construction vehicle movements (180 light vehicles, 100 HGVs, accounting for outward and return journeys) during the daytime. Noise level change has been determined by comparing the baseline and 'with construction traffic' BNL for each road link, calculated in accordance with CTRN procedures.

Table 11-18 Predicted noise increases due to construction traffic during the daytime

Route	Baseline traffic flow (18-hour AAWT	Baseline traffic speed (km/h)	Baseline traffic % HGV	Expected increase in road traffic noise level (BNL, dBA)	Magnitude of impact
Brinklow Road	7550	46.1	4.1	+ 1.0	Minor
Clifford Bridge Road	18236	43.1	4.3	+ 0.4	Negligible
B4082	18213	40.2	3.3	+ 0.5	Negligible

11.9.31. As can be seen in Table 11-18, provided that construction related traffic uses only Brinklow Road, Clifford Bridge Road and B4082 during the daytime, the maximum number of trips per day as described in the assessment assumptions and limitations is predicted to increase the baseline road traffic noise level by a maximum of 1.0 dBA, equating to a worst-case minor impact.

11.9.32. As such, it is not expected that there will be any significant effects (defined as road traffic noise changes equal to or greater than 3.0 dB) resulting from construction traffic movements on the local road network.

Construction diversion routes

11.9.33. DMRB LA 111 states that the sudden change of traffic levels on diversion routes, as a result of night-time closures, is likely to cause disturbance to receptors next to (within 25m of) the road. It notes that a major magnitude of impact should generally be determined at any noise sensitive receptors within the diversion study area where the routes are used at night.

11.9.34. This determination of impact assumes that diversion traffic is mostly using local roads, as will be the case during all temporary closures excluding the B4082.

11.9.35. As such, it is expected that significant effects will occur at all noise sensitive receptors within 25m of the proposed night-time diversion routes.

11.9.36. To provide further clarity and understanding to the potential significant effects, an outline review of the change in BNL for each road link of the diversion routes has been undertaken to determine the likely magnitude of impact and to facilitate designation of appropriate mitigation.

11.9.37. This outline review identified that moderate and major impacts (noise changes greater than 3.0 dB) will be expected on the diversion routes for the following temporary closures when considered in the context of DMRB LA 111 Table 3.17 (replicated herein as Table 11-6):

- A46 between Walsgrave and M69/M6 (during northbound closures, southbound closures and full closures)
- A46 between Binley and the M69/M6 interchange

11.9.38. The outline review identified that a worst-case minor magnitude of impact (noise changes less than 3.0 dB) will likely occur during the following temporary closures:

- B4082 (bi-directional closure)

11.9.39. On this basis, and as per DMRB LA 111 guidance, a significant effect is likely where traffic utilising the A46 is diverted onto the local roads during night-time hours. Section 11.11 presents noise mitigation measures and best practice techniques that are expected to reduce the potential for significant effects, these are also outlined in the First Iteration EMP (**TR010066/APP/6.5**).

Operational noise

11.9.40. During operation there is the potential for changes to traffic flows and road alignment to result in noise changes at noise sensitive receptors, particularly from increased road traffic. Impacts due to changes in noise may affect

residential, and other sensitive receptors (for example community uses). Impacts can be beneficial or adverse. Factors which have the potential to affect road traffic noise include:

- Overall traffic volume
- Proportion of heavy vehicles
- Traffic speed i.e. changes in free-flow conditions and waiting times at junctions
- Road alignment (vertical and horizontal alignment)
- Acoustic screening features (for example earthworks, acoustic barriers, cutting, and structures)
- The type of carriageway surfacing material
- Change to the noise character of the existing area or non-acoustic factors (for example vegetation removal)

11.9.41. Table 11-19 to Table 11-21 present the changes in road traffic noise that are predicted at all dwellings and non-residential sensitive receptors within the operational study area. The short-term noise change (Do-Something Opening Year versus Do-Minimum Opening Year) and long-term noise change (Do-Something Future Year versus Do-Minimum Opening Year) have been used for determining where significant effects due to operational road traffic noise could occur.

11.9.42. ES Figure 11.2 to Figure 11.5 (Road Traffic Noise Level Contours) (**TR010066/APP/6.2**) include noise contour maps that illustrate $L_{A10,18hr}$ road traffic noise levels for each scenario. Noise difference contours are presented in ES Figure 11.6 to Figure 11.8 (Noise Difference Contours) (**TR010066/APP/6.2**) which illustrate the predicted change in road traffic noise for the following comparisons:

- Long-term noise change without the Scheme (DMFY minus DMOY)
- Short-term noise change with the Scheme (DSOY minus DMOY)
- Long-term noise change with the Scheme (DSFY minus DMOY)

11.9.43. The predicted operational impacts are presented in the following section. The embedded mitigation measures are then described in section 11.11. The significance of effects predicted to occur due to the operation of the Scheme is then presented and discussed in section 11.12.

Noise changes over the long-term without the Scheme (Do-Minimum Future Year versus Do-Minimum Opening Year)

11.9.44. Table 11-19 compares road traffic noise levels for the Do-Minimum Opening Year scenario with the Do-Minimum Future Year scenario (the "non-project noise change").

11.9.45. Outdoor non-residential receptors such as PRoW, amenity and SSSI have been excluded from the table.

Table 11-19 Summary of long-term noise changes, without the Scheme

Scenario / Comparison: Do-Minimum Opening Year 2028 versus Do-Minimum Future Year 2043						
Change in noise level, dBA		**Magnitude of impact**	**Daytime, dB $L_{A10,18hr}$**		**Night-time, dB $L_{night,outside}$**	
			Number of dwellings	**Number of non-residential sensitive receptors**	**Number of dwellings**	**Number of non-sensitive residential sensitive receptors**
Increase in noise level	<3.0	Negligible	1791	16	1444	12
	3.0-4.9	Minor	0	0	0	0
	5.0-9.9	Moderate	0	0	0	0
	>10.0	Major	0	0	0	0
No Change	0.0	No change	58	2	688	10
Decrease in noise level	<3.0	Negligible	492	6	209	2
	3.0-4.9	Minor	0	0	0	0
	5.0-9.9	Moderate	0	0	0	0
	>10.0	Major	0	0	0	0

11.9.46. The changes in road traffic noise level shown in Table 11-19 occur over the long-term without the Scheme and result from changes in traffic volume and traffic speed on the existing road network. Without the Scheme, all receptors are predicted to experience negligible or no change in road traffic noise level.

Noise changes due to the Scheme upon opening (Do-Something Opening Year versus Do-Minimum Opening Year)

11.9.47. Table 11-20 compares road traffic noise levels for the Do-Something Opening Year scenario with the Do-Minimum Opening Year scenario.

11.9.48. Outdoor non-residential receptors such as PRoW, amenity and SSSI are not included in the results table however are considered in the assessment discussion below.

11.9.49. The changes in road traffic noise shown in Table 11-20 are due to the Scheme over the short-term and result from changes in traffic flows and speeds on the existing network, as well as the construction of the new carriageway and re-alignment of the existing A46. Where incorporated, the changes take account of the embedded mitigation measures described in section 11.10.

Table 11-20 Summary of short-term noise changes, with the Scheme

Scenario / Comparison: Do-Minimum Opening Year 2028 versus Do-Something Opening Year 2028						
Change in noise level, dBA		Magnitude of impact	Daytime, dB $L_{A10,18hr}$		Night-time, dB $L_{night,outside}$	
			Number of dwellings	Number of non-residential sensitive receptors	Number of dwellings	Number of non-sensitive residential sensitive receptors
Increase in noise level	<1.0	Negligible	419	8	301	7
	1.0-2.9	Minor	0	0	0	0
	3.0-4.9	Moderate	0	0	0	0
	>5.0	Major	0	0	0	0
No Change	0.0	No change	22	0	257	3
Decrease in noise level	<1.0	Negligible	1284	11	1196	9
	1.0-2.9	Minor	603	5	583	5
	3.0-4.9	Moderate	13	0	4	0
	>5.0	Major	0	0	0	0

11.9.50. Table 11-20 demonstrates that the majority of building receptors will experience either no change or a negligible change in road traffic noise level over the short-term as a result of the Scheme. However, a moderate change in noise level is predicted at several residential receptors.

Beneficial impacts due to the Scheme upon opening

11.9.51. Beneficial impacts are predicted in the short term upon the opening of the Scheme, with the majority (≈ 80%) of residential and non-residential receptors expected to experience a negligible or minor beneficial. This includes Hungerly Hall Farmhouse.

11.9.52. Thirteen dwellings are expected to experience a moderate beneficial impact during daytime hours; four of these are also expected to experience a moderate beneficial impact during night-time hours. These dwellings are located primarily off Valencia Road (south of the primary works area) where the noise level change is controlled by the removal / realignment of the B4082 roundabout resulting in changes in the speed and traffic composition of the A46 in this area reducing noise levels.

11.9.53. Regarding the external amenity receptors identified within the study area (comprising two PRoWs, footpaths along Coombe Pool, Pearl Hyde Community School, Clifford Bridge Academy, Spring Estates Allotments, Valencia Road playpark, Brinklow Open Space and Broadstreet RFC), a worst-case negligible beneficial impact is expected at the following when considering the transient nature of use and the average noise change across the geographic extent of each: PRoW 156/R75x/1, Pearl Hyde Community School, Spring Estate Allotments, Clifford Bridge Academy and Valencia Road Play Park.

Adverse impacts due to the Scheme upon opening

11.9.54. Adverse impacts are predicted in the short-term upon the opening of the Scheme at 427 noise sensitive receptors during daytime hours (including 8 non-residential receptors) and 308 receptors during night-time hours (including 7 non-residential receptors).

11.9.55. The receptors adversely affected are typically those in close proximity to the A46, or with limited intervening structures to provide screening losses; these receptors span the extent of the A46 between M6/M69 junction and Binley to the south with no specific areas of concentrated adverse effect.

11.9.56. However, a worst-case negligible adverse impact is predicted in all cases during both daytime and night-time hours.

11.9.57. Regarding external amenity receptors, a worst-case negligible adverse impact is expected at the following when considering the transient nature of use and the average noise change across the geographic extent of each: PRoW_104/R31/2, Coombe Pool, Brinklow Road Open Space and Broadstreet RFC.

Noise changes over the long-term to the Scheme
(Do-Something Future Year versus Do-Minimum Opening Year)

11.9.58. Table 11-21 compares road traffic noise levels for the Do-Something Future Year scenario with the Do-Minimum Opening Year scenario. The changes in road traffic noise due to the Scheme over the long-term are due to changes in traffic flows and speeds, as well as the proposed new slip road and realignment

of the A46. Where incorporated, the changes take account of the embedded mitigation measures described in section 11.10.

11.9.59. Outdoor non-residential receptors such as PRoW, amenity and SSSI are not included in the results table however are considered in the assessment discussion below.

Table 11-21 Summary of long-term noise changes, with the Scheme for residential receptors.

Scenario / Comparison: Do-Minimum Opening Year 2028 versus Do-Something Future Year 2043						
Change in noise level, dBA		**Magnitude of impact**	**Daytime, dB $L_{A10,18hr}$**		**Night-time, dB $L_{night,outside}$**	
			Number of dwellings	**Number of non-residential sensitive receptors**	**Number of dwellings**	**Number of non-sensitive residential sensitive receptors**
Increase in noise level	<3.0	Negligible	879	15	828	14
	3.0-4.9	Minor	0	0	0	0
	5.0-9.9	Moderate	0	0	0	0
	>10.0	Major	0	0	0	0
No Change	0.0	No change	14	0	120	1
Decrease in noise level	<3.0	Negligible	1444	9	1390	9
	3.0-4.9	Minor	4	0	3	0
	5.0-9.9	Moderate	0	0	0	0
	>10.0	Major	0	0	0	0

11.9.60. Table 11-21 demonstrates that, within the study area, the vast majority of receptors are predicted to experience a negligible impact or 'No Change' due to the Scheme over the long-term. A small number of residential receptors are expected to experience a worst-case minor magnitude of change.

Beneficial impacts due to the Scheme over the long-term

11.9.61. Beneficial impacts are predicted due to the Scheme in the long-term at the majority (≈ 60 %) of residential and non-residential building receptors, including Hungerley Hall Farmhouse.

11.9.62. Four dwellings are expected to experience a worst-case minor beneficial impact during daytime hours; three of these are also expected to experience a worst-case minor beneficial impact during night-time hours. These dwellings are

located primarily off Valencia Road, where a moderate impact was predicted in the short-term.

11.9.63. No non-residential building receptors are expected to experience a beneficial impact greater than negligible.

11.9.64. With regard to external amenity receptors, a worst-case negligible beneficial impact is predicted at Pearl Hyde Community School, Spring Estate Allotments, Clifford Bridge Academy, and Valencia Road Play Park.

Adverse impacts due to the Scheme upon opening

11.9.65. No dwellings or non-residential receptors are predicted to experience minor, moderate or major adverse impacts due to the Scheme over the long-term, with all adversely affected receptors predicted to experience a worst-case negligible impact.

11.9.66. Regarding external amenity receptors, a worst-case negligible adverse impact is expected at the following when considering the transient nature of use and the average noise change across the geographic extent of each: PRoW_104/R31/2, PRoW_156/R75x/1, Coombe Pool Brinklow Road Open Space and Broadstreet RFC.

11.10. Design, mitigation and enhancement measures

Design

11.10.1. The development of the Scheme design has been an iterative process. The environment team has worked in close collaboration with the infrastructure design team to avoid or reduce environmental impacts through the Scheme design. This is referred to as embedded (or design) mitigation. The principles of the design and mitigation hierarchy outlined in DMRB LA 104 Environmental Assessment and Monitoring have been followed. The first principle being to avoid potential adverse effects, if at all feasible, before seeking to minimise or mitigate for any unavoidable impacts. Embedded mitigation for the Scheme is reported in ES Chapter 2 (The Scheme) (**TR010066/APP/6.1**).

11.10.2. Scheme design principles adopted to avoid or prevent adverse environmental effects are set out within the Scheme Design Report (**TR010066/APP/7.4**). This includes general principles and specific commitments that will inform the detailed design of the scheme. ES Chapter 3 (Assessment of Alternatives) (**TR010066/APP/6.1**) details the design alternatives that have been considered, including the environmental factors which have influenced the decision-making.

Mitigation

11.10.3. Mitigation is included in the REAC contained within the First Iteration EMP (**TR010066/APP/6.5**). The First Iteration EMP will be developed into the Second Iteration EMP for implementation during construction and is secured by Requirement 4 of the draft DCO (**TR010066/APP/3.1**) (Commitment G1 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)). Further information on the First Iteration EMP is provided within section 4.8 of ES Chapter 4 (Environmental Assessment Methodology) (**TR010066/APP/6.1**).

11.10.4. Mitigation measures in this section are in line with the aims and associated actions of NPS NN as detailed in DMRB LA 111 Table E/1.3.

Construction noise and vibration

11.10.5. The design interventions and mitigation measures that have been introduced to reduce the potential for significant effects due to noise and vibration from the construction of the Scheme are presented in this section. Unless stated otherwise, measures detailed within this section are considered to be embedded mitigation.

11.10.6. The design of mitigation for the construction assessment is undertaken using construction information to represent a reasonable worst case, therefore any uncertainties surrounding any specific or exact methods for construction will be reflected in the design of mitigation presented in this section.

11.10.7. An Outline Construction Noise and Vibration Management Plan has been prepared and is presented in the First Iteration EMP Appendix B2 (**TR010066/APP/6.5**). This will be refined as part of the Second Iteration EMP prior to construction commencing (Commitment NV1 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)).

11.10.8. Any works carried out during the pre-commencement period will be undertaken in accordance with the mitigation measures contained in the Pre-Commencement Plan (**TR010066/APP/6.7**).

11.10.9. Construction works will take place mainly during the daytime. Construction works outside of the normal construction hours of 07:00-19:00 weekday and 07:00-13:00 on Saturdays shall be minimised as far as practicable, as detailed in the First Iteration EMP (**TR010066/APP/6.5**) (Commitments G2 and NV2 of the REAC, Annex A of the First Iteration EMP (**TR010066/APP/6.5**)).

11.10.10. Night-time or weekend works will be required at some stages, such as, road tie-ins and traffic management. Night works will take place from 20:00-06:00 (Commitments G2 and NV2 of the REAC, Appendix A of the First Iteration

EMP (**TR010066/APP/6.5**)). There may be exceptions to these hours for oversized deliveries, and junction tie-ins. There are likely to be extended working hours in the summer months to take advantage of the daylight or weather.

11.10.11. Where it is determined that there is a risk of significant effect, where the Principal Contractor's preferred plant departs considerably from the plant which has been used for this assessment, as defined within ES Appendix 11.5 (Construction Noise and Vibration Model and Assessment) (**TR010066/APP/6.3**), or where works outside of the normal construction hours are unavoidable (for example certain tie-in works), the Principal Contractor will need to assess noise and vibration, consult with the environmental health department at the local authority, and agree appropriate methods of mitigation and monitoring that account for the location of works, hours of work and expected duration. This could form part of a section 61 prior consent application under the Control of Pollution Act 1974, or a less formal route may be possible pending discussions with the local authority (Commitments G2 and NV1 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)).

11.10.12. Mitigation measures in the form of temporary noise barriers shall be provided where it is safe and practical to do so during works where high noise levels are expected, and where the works will exceed 10 days or nights in any 15 consecutive days or nights; or for a total number of days exceeding 40 in any six consecutive months in accordance with BS:5228 Part 1 Noise (Commitment NV2 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)). This is considered to be essential mitigation and is described further in the paragraphs below.

11.10.13. Barriers will be installed as close to the works areas as possible and positioned such that all line of sight between the nearest receptors and works activity is removed (Commitment NV2 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)).

11.10.14. As the final locations of the barriers are still to be determined, a reasonable worst-case of the potential level of mitigation the barriers could achieve was considered. In this reasonable worst-case view, the noise source is mostly shielded from the receptor however it is partially visible, and therefore will only achieve a reduction in noise level of 5dB at receptors[5]. It is acknowledged that this is an indication only as in reality not all receptors would need mitigation and the receptors would receive different benefits from the barrier due to their different heights and proximities to the works.

[5] Correction identified as per British Standard 5228-1:2009 +A1:2014, Annex F Section 2.2.2.1

11.10.15. This -5dB level was applied across all receptors within the construction study area to determine the potential level of change attainable should the mitigation be installed. Table 11-22 and Table 11-23 set out the with / without mitigation numbers of properties in each magnitude level for daytime and night-time periods.

Table 11-22 Changes in magnitude level resulting from installation of temporary barriers - daytime

Phase	Without Mitigation (Number of NSR)				With Mitigation (Number of NSR)			
	Negligible	Minor	Moderate	Major	Negligible	Minor	Moderate	Major
Enabling	806	32	0	0	838	1	0	0
Phase 1	532	305	1	0	762	77	0	0
Phase 2	836	2	0	0	839	0	0	0
Phase 3	838	0	0	0	839	0	0	0
Phase 4	732	106	0	0	821	18	0	0
Phase 5	665	166	7	0	800	39	0	0
Phase 6	830	8	0	0	839	0	0	0

Table 11-23 Changes in magnitude level resulting from installation of temporary barriers – night-time

Phase	Without Mitigation (Number of NSR)				With Mitigation (Number of NSR)			
	Negligible	Minor	Moderate	Major	Negligible	Minor	Moderate	Major
Enabling	599	195	42	2	800	32	2	0
Phase 1	565	134	99	40	697	107	37	3
Phase 2	837	1	0	0	839	0	0	0
Phase 3	838	0	0	0	839	0	0	0
Phase 4	718	111	9	0	834	5	0	0
Phase 5	838	0	0	0	839	0	0	0
Phase 6	704	111	23	0	839	0	0	0

11.10.16. The precise locations and heights of the temporary barriers are to be determined by the Principal Contractor and confirmed to the local authority during detailed design stage as stated in the First Iteration EMP (**TR010066/APP/6.5**) (Commitment NV1 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)). Table 11-13 and Table 11-14 present the location and addresses of the residential receptors worst affected during each phase of construction.

11.10.17. A long-term noise barrier in the form of solid and imperforate site fencing / hoarding is proposed in proximity to Hungerly Hall Farm to mitigate noise effects during construction which is also essential mitigation (Commitment NV2

of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)). This is due to the proximity of the farmhouse to the Scheme and the extended duration for which works will take place. The specific alignment of, and agreement in principle to, the long-term noise barrier will be agreed following consultation with the occupier. However, following calculations, it has been determined that a barrier of sufficient height aligning with the Order Limits will be sufficient to mitigate all potentially significant effects with the exception of the night-time enabling phase works; a potential reduction from major to moderate impact is however feasible in this phase.

11.10.18. A review of the works and proposed mitigation will be undertaken at the detailed design stage by the Principal Contractor on the basis of finalised work locations and durations.

11.10.19. In addition to the above mitigation measures, best practicable means for noise and vibration mitigation shall be employed and included in the Outline Noise and Vibration Management Plan, included as part of the First Iteration EMP (**TR010066/APP/6.5**) where practicable (Commitment NV1 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)):

- Ensure the proposed plant noise emissions are similar or below the preliminary construction plant noise levels used within this assessment; and that the plant is the quietest available for the proposed use.
- Ensure equipment is maintained, in good working order, and is used in accordance with the manufacturer's instructions.
- Use equipment that is fitted with silencers or mufflers where available.
- Set time restrictions on certain noisy and vibratory activities such as earthworks and surfacing.
- Manage deliveries to prevent queuing of site traffic.
- Do not leave plant running unnecessarily.
- Plant with highly directional sound emissions shall be angled so that the direction of highest sound emissions does not face towards receptors where possible.
- Materials to be lowered instead of dropped from height.
- Alternative reversing warning systems (such as white noise alarms) shall be employed.
- The Principal Contractor shall advise members of the construction team during toolbox talk briefings on quieter working methods.
- Any fixed plant such as generators shall be positioned at least 20m from nearest receptor and shall have temporary/mobile noise screens erected around them where possible and necessary.

11.10.20. The potential effects of construction noise and vibration on local community receptors can be lessened by effective communication. Good public relations are invaluable in securing public acceptance of construction noise. People are typically more tolerant of construction noise and vibration if they understand the reason for it, the likely duration, start and finish dates, and that measures are being employed to reduce noise and vibration as far as practicable. Letter drops explaining this would aid communication with the local community. A dedicated site contact for the public and a complaints-handling procedure shall also be put in place (Commitment G5 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)).

11.10.21. For construction activities that could result in vibration levels at nearby receptors that exceed SOAEL (such as compaction works within 30m of residential receptors), the Principal Contractor shall (Commitment NV3 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)):

- inform the occupiers of the likely times and duration of works at least one week prior to works commencing
- carry these works out during the daytime (as currently proposed)
- monitor the vibration levels
- subject to securing permission from property owners, carry out a building condition survey to identify any sensitive aspects of the building and to ensure the current status of the building is recorded

11.10.22. For construction activities that have the potential to result in cosmetic damage (as stated in BS:5228 Part 2 Vibration) to the Grade II Listed structures at Hungerley Hall Farm, the Principal Contractor shall undertake the following which is considered to be essential mitigation (Commitment NV3 of the REAC (Annex A of the First Iteration EMP (**TR010066/APP/6.5**)):

- subject to securing permission from property owners, carry out a condition survey to identify any sensitive aspects of the wall and to ensure the current status of the wall is recorded
- carry out a construction vibration assessment to identify the expected vibration level that will occur during compaction works near to the wall (based on the minimum distance, and the confirmed compactor plant details)
- chose appropriate plant to ensure vibration levels expected to cause building damage do not occur
- monitor vibration at the location of the wall where compaction works (or equivalent) occur within approximately 10m of any listed structure

11.10.23. Based on the current indicative construction programme pilling works will be limited to gantry works and rotary bored pilling techniques will be utilised.

Construction traffic

11.10.24. Based on the assumed numbers of HGV movements, construction related traffic can use the existing A46 as required.

11.10.25. Use of local roads other than those set out in section 11.6 will be avoided where possible. Additionally, construction related traffic arriving from offsite shall be routed via the existing A46 and the haul roads which follow the Scheme alignment only. This shall be implemented in the Construction Traffic Management Plan (CTMP), which would be produced prior to construction and form part of the Second Iteration EMP, and based on the Outline Traffic Management Plan (OTMP) (**TR010066/APP/7.5**) (Commitments G4 and NV2 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)).

11.10.26. Should it be determined that other routes are required for construction related traffic, detailed noise impact assessments shall be undertaken by the Principal Contractor before these routes are used, and these shall be included in the CTMP of the Second Iteration EMP. Details shall be provided to the local authority. Should the alternative routes result in noise effects that require mitigation, this may include temporary screening, provision of noise insulation, or use of an alternative route (Commitment NV2 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)).

Diversion routes

11.10.27. For temporary traffic diversion routes, the noise mitigation measures will, where possible, include the use of trunk roads only (Commitment NV2 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)).

11.10.28. For each principal diversion the Principal Contractor shall review the options for temporary traffic management and diversion routes will be used following the least noise sensitive routes (Commitment NV2 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)).

11.10.29. If local roads do need to be used, DMRB LA 111 paragraph 3.22.1 recommends that different routes should be chosen for each closure to reduce the exposure of individual receptors. Furthermore, residents along routes likely to be affected by night-time traffic diversions with potential for significant noise effects will be notified in advance of arrangements (Commitment NV2 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)).

Operational noise

11.10.30. The design interventions and mitigation measures that have been introduced to reduce the potential for significant effects due to noise from the

operation of the Scheme are presented in this section. All mitigation in this section is considered to be embedded mitigation.

11.10.31. As part of the Scheme, sections of the roads within the Order Limits A46 dual carriageway shall be surfaced with a low-noise road surface (Commitment NV4 of the REAC, Appendix A of the First Iteration EMP (**TR010066/APP/6.5**)). For this high-speed carriageway, the surface material shall be specified to reduce road traffic noise by 2.5dB when compared with hot rolled asphalt surfacing.

11.10.32. The approximate extents of the low-noise road surfacing are presented in Table 11-24.

Table 11-24 : Low-noise road surface extents within Order Limits

Description	Approx Start Chainage	Approx End Chainage	Approximate length (m)
A46 Northbound Mainline Carriageway	320	1420	1,100
A46 Northbound Mainline Carriageway	1850	2090	240
A46 Southbound Mainline Carriageway	320	1380	1,060
A46 Southbound Mainline Carriageway	1860	2080	220
B4082	Entire Extent		-
A46 Northbound Slip roads, A46 Southbound Slip roads	Entire Extent		-
A46 Walsgrave dumbbell eastern roundabout, A46 Walsgrave dumbbell western roundabout	Entire Extent		-

11.10.33. The assessment concludes that mitigation in the form of noise barriers is not necessary to avoid significant adverse operational noise effects at residential receptors and therefore these have not been included.

Enhancement measures

11.10.34. No enhancement measures have been identified for noise and vibration.

11.11. Assessment of likely significant effects (both during construction and operation)

11.11.1. The residual effects due to noise and vibration once mitigation has been employed are presented in this section.

Construction noise

11.11.2. Even with the provision of temporary noise barriers, implementation of best practicable means, construction noise monitoring where required, and the

mitigation measures described within section 11.11 of this Chapter, construction noise may result in **significant** residual effects at a limited number of residential locations. The potential for residual significant adverse effects also exists at ecological receptors identified within ES Chapter 8 (Biodiversity) (**TR010066/APP/6.1**); more detail regarding the assessment, mitigation and any residual effects upon ecological receptors can be viewed there.

Construction vibration

11.11.3. The predicted vibration levels for earthworks, road formation, surfacing works, satellite compound construction, drainage, utility diversion, placing subbase and structure formation are expected to be below the SOAEL for all residential receptors in the study area. As such, **no significant effects** are expected at residential receptors.

11.11.4. Mitigation measures are proposed in section 11.11 of this Chapter such as early communication with affected receptor residents, pre-condition surveys, and vibration monitoring where necessary.

11.11.5. In addition to above, a significant effect would only occur if SOAEL levels are exceeded for 10 or more days or nights in any 15 consecutive days or nights; or a total number of days exceeding 40 in any 6 consecutive months. In reality, the use of compaction plant that causes high levels of vibration at the closest point to these receptors will not occur for periods of several days since this work is expected to progress linearly along the Scheme.

11.11.6. However, vibration from the static works such as structure formation could occur for longer durations and shall be considered in further detailed construction vibration assessments by the Principal Contractor on the basis of finalised work durations.

11.11.7. Compaction works (or other construction work types with high vibration emissions) which occur within approximately 10m of the Listed structures at Hungerley Hall Farm shall be designed so that vibration emissions are sufficiently limited at this location, and vibration monitoring shall be undertaken where necessary.

11.11.8. Based on the assessments detailed above and where mitigation is implemented in line within section 11.10 of this Chapter and the First Iteration EMP (**TR010066/APP/6.5**), vibration due to construction activity is anticipated to have **no significant adverse effect** at any vibration-sensitive receptor.

Construction traffic

11.11.9. Provided that construction related traffic uses only Brinklow Road, Clifford Bridge Road, and the B4082, increases in the BNL of roads used for construction traffic are predicted to have a worst-case minor magnitude of impact (based on a predicted worst-case 1.0 dB increase in road traffic noise from Brinklow Road during daytime hours). Therefore, **no significant adverse** noise effects due to construction traffic are predicted. This will be controlled in the Outline Traffic Management Plan.

Diversion routes

11.11.10. As the diversion routes will be in place during night-time hours and will utilise local roads, the magnitude of impact due to noise from diversion routes is predicted to be moderate to major according to the DMRB LA111 and the high-level assessments undertaken. The change in road traffic noise during temporary traffic diversions may therefore be expected to constitute a **significant effect**, albeit a temporary one.

Operational noise

11.11.11. The changes in road traffic noise predicted to result from the Scheme have been reported in accordance with DMRB LA 104 and LA 111 and include the mitigation measures described in section 11.11 of this Chapter.

11.11.12. An initial assessment of operational noise significance at noise sensitive receptors is summarised in this section and in Table 11-25. DMRB LA 111 states that for this initial assessment a moderate or major magnitude of impact at noise sensitive receptors are classed as 'significant'.

Table 11-25 Summary of the initial assessment of operational noise significance – short term

Initial assessment of operational noise significance	Number of receptors at which the initial assessment of operational noise is significant or not significant			
	Adverse		Beneficial	
	Daytime, dB $L_{A10,18hr}$	Night-time, dB $L_{night,outside}$	Daytime, dB $L_{A10,18hr}$	Night-time, dB $L_{night,outside}$
Significant	0	0	13	4
Not significant	2374	2374	2361	2370

11.11.13. Table 11-25 demonstrates that, for a vast majority of noise sensitive receptors within the operational study area, the effects associated with the short-term change in road traffic noise due to the Scheme are **not significant**.

11.11.14. For receptors located within buildings, all minor adverse and beneficial impacts in the short-term are predicted to have absolute noise levels below the SOAEL and the long-term impact is predicted to be minor or negligible. As such, short-term minor impacts are **not predicted to have significant noise effects**.

11.11.15. There are thirteen individual residential receptors where the effects associated with the change in road traffic noise due to the Scheme are initially significant during daytime and / or night-time periods. These are all located off Valencia Road, south of the primary works areas and are indicated to have a moderate beneficial impact in the short-term.

11.11.16. For receptors at which the effects are initially deemed significant, DMRB LA 111 requires the final operational significance to be determined using the justifications in DMRB LA 111 Table 3.60 (reproduced in ES Appendix 11.2 (Legislation and Policy Framework) (**TR010066/APP/6.3**)). The final operational noise significance at the thirteen identified residential receptors has been determined and are presented in Table 11-26.

Table 11-26 Final operational noise significance summary table

Receptor group	Magnitude of change	Conclusion of significance of environmental impact	Justification of significance conclusion
Residential receptors off Valencia Road	Moderate beneficial	Not Significant	All but one of the receptors are less than 1 dB into the moderate impact classification, and so it may be more appropriate to consider the change as not significant. In all instances, the long-term impact is lower than the short-term (and indicating non-significant effects). As such, it can be appropriate to conclude that a moderate change in the short-term is not likely significant. The works will not materially affect the acoustic character of the area or result in obvious landscape changes. As such it can be appropriate to conclude that a moderate change in the short-term is not likely significant.

11.11.17. In accordance with DMRB LA 111, no significant residual traffic noise effects, adverse or beneficial, are predicted due to the operation of the Scheme.

11.11.18. The assessment identifies that there are no dwellings where the façade noise level is at least 68dB $L_{A10,18h}$ and the noise from the new or altered highways causes the total level to increase by at least 1.0dB. As such, no properties are forecast to be eligible for insulation under the Noise Insulation Regulations 1975 (as amended).

11.12. Monitoring

11.12.1. The requirements for monitoring in relation to noise and vibration are presented below.

Construction

11.12.2. Impacts that are likely to constitute significant environmental effects from noise and / or vibration during construction shall be monitored. Monitoring of likely significant effects should include one or more of the following:

- Checking that noise and vibration management procedures and practices are sufficient to ensure that significant adverse effects are avoided.
- Verification that specific noise and vibration mitigation measures are in place for activities where there is potential for likely significant effects to occur in their absence.
- Measurement of vibration during bulldozer, compaction, or vibratory rolling works where these occur within 30m of vibration sensitive receptors.
- Measurement of vibration during construction works which occur within 11m of Listed structures at Hungerley Hall Farm.

11.12.3. Monitoring during the construction phase would be secured in the First Iteration EMP (**TR010066/APP/6.5**). During the construction phase of works, and in accordance with Requirement 4 of the draft DCO (**TR010066/APP/3.1**), a Second Iteration EMP will secure the monitoring requirements and procedures to reduce or eliminate impacts on the environment.

11.12.4. Details of whether noise and vibration during construction of the Scheme would constitute a statutory nuisance defined under the EPA1990 is set out in the Statement Relating to Statutory Nuisance (**TR010066/APP/6.6**).

Operation

11.12.5. Impacts that are likely to constitute significant environmental effects from noise during operation shall be monitored and include:

- Ensuring mitigation measures included with the project design are incorporated with the as-built project.
- Ensuring specifications of noise mitigation measures, including low noise surfaces, meet the design specifications.

11.12.6. DMRB LA 111 notes that post construction road traffic noise monitoring cannot provide a reliable gauge for whether the operational impacts are greater or less than those predicted in the assessment due to the following reasons:

- The assessment is based on annual average conditions with and without the project to ensure a like for like comparison which is not possible to replicate through monitoring within a reasonable timescale.
- Monitoring in the absence of the project would need to be completed before the start of the construction works and would therefore be a number of years before the monitoring with the Scheme in operation. In addition, the assessment completed for this ES is based on calculated noise levels from road traffic only, whereas ambient noise monitoring can be affected by other noise sources such as people, agricultural activities, military activities, aircraft etc.

11.12.7. Operational noise and vibration monitoring is therefore not proposed.

11.13. Conclusions

11.13.1. This Chapter considers the potential noise and vibration impacts of the Scheme on noise sensitive receptors.

11.13.2. The study area for construction noise, construction vibration and operational noise assessments have been determined using DMRB LA 111. Noise modelling has been undertaken for all noise sensitive receptors within the corresponding construction and operational study areas.

11.13.3. As part of the assessment a baseline noise survey was undertaken in February and March 2024 to gain an understanding of the existing noise climate within the vicinity of the Scheme. The long-term measurement positions correlated well with the predicted values at those locations. No adjustments to the noise model were considered necessary based on the findings of the survey.

11.13.4. A construction noise assessment has been undertaken, identifying that adverse impacts that are likely to constitute significant effects would occur without mitigation at some of the receptors closest to construction works. Suitable means of minimising the potential for significant adverse have been presented including the provision of temporary acoustic barriers. It is also necessary for the Principal Contractor to carry out further detailed construction noise assessments for overnight or weekend works where these could affect sensitive receptors for 10 or more days or nights in any 15 consecutive days or nights. Where all mitigation is implemented effectively, significant residual construction noise effects will be reduced but may still occur. Furthermore, there are receptors that could experience significant effects due to noise from night-time or weekend works and this will also need further consideration once further detail regarding the scope and duration of these works has been defined.

11.13.5. An assessment of potential construction vibration impacts has identified that significant effects are not expected to occur at any residential receptors as a

result of the proposed works. However, to demonstrate that Best Practicable Means have been observed, mitigation is proposed including prior warning of residents, pre-condition building surveys, restrictions on the timings of the works, and vibration monitoring at the closest properties to these works. The Scheme is not predicted to give rise to significant vibration effects subject to monitoring and effective implementation of the identified mitigation.

11.13.6. A construction traffic assessment has been undertaken. It is concluded that, provided that the anticipated vehicle movements and routes are restricted as described in this Chapter and defined in the OTMP potential significant effects are unlikely.

11.13.7. Consideration has been given to the traffic diversion routes during road closures required to undertake the construction works. It is concluded that, as diversion routes will occur at night and will utilise local roads, the noise changes due to diverted traffic are highly likely to cause disturbance at receptors within 25m of the road. On this basis, mitigation measures, including use of varying routes, and advance notice to residents, are proposed.

11.13.8. The assessment of operational noise includes embedded mitigation in the form of a low noise surface along high-speed sections of the Scheme. The assessment of operational noise demonstrates that there are no significant adverse noise effects expected due to changes in road traffic noise. This applies to all receptors within the study area and the NIAs identified outside of the study area.

11.13.9. The assessment identifies proportionate and reasonable actions to avoid significant adverse impacts on health and quality of life from noise and vibration as a result of the Proposed Development, providing compliance with the main objectives of the National Planning Policy Framework, Noise Policy Statement for England, Planning Practice Guidance on noise and NPS NN.

11.13.10. The aims of the NPS NN and associated actions are listed in DMRB LA 111. A summary of responses is set out in Table 11-27.

Table 11-27 NPS NN aims and associated actions.

NPS NN aims	Action
Aim 1: Avoid significant adverse impacts on health and quality of life from noise as a result of the new development. NOTE: Significant adverse noise effects occur when noise levels are above SOAEL.	Table E/1.3 of DMRB LA111 defines a significant adverse noise effect in NPS NN policy terms as a noise level above SOAEL. Noise levels are predicted to be below the SOAEL for construction noise when including for the mitigation measures detailed in section 11.10.

NPS NN aims	Action
	Existing operational noise within the study area exceeds the SOAEL at some receptors. Operational noise from the Scheme, considering the mitigation measures detailed in section 11.10, is not predicted to result in significant increases at receptors with noise levels which currently exceed the SOAEL. No properties qualify for noise insulation. Therefore, the Scheme meets this policy aim of NPS NN.
Aim 2: Mitigate and minimise other adverse impacts on health and quality of life from noise from the new development. NOTE: Other adverse impacts occur when noise levels are between LOAEL and SOAEL.	All design and mitigation measures (actions) to minimise adverse impacts are detailed in section 11.10. Measures include a noise reducing surface along high-speed sections of the Scheme to mitigate operational noise, and temporary noise barriers and use of best practicable means to mitigate construction noise. Mitigation measures are detailed in the First Iteration EMP (**TR010066/APP/6.5**) and the OTMP and secured through Schedule 2 in the DCO. Therefore, the Scheme meets this policy aim of NPS NN.
Aim 3: Contribute to improvements to health and quality of life through the effective management and control of noise, where possible. NOTE: Applies to all noise levels.	As a result of the measures (actions) proposed in section 11.10 of this Chapter, noise emissions from construction and operation are reduced. No perceptible change in road traffic noise levels is expected at Noise Important Areas. Reductions in operational noise occur at some receptors as a result of the Scheme. Therefore, the Scheme meets this policy aim of NPS NN.

Glossary and acronyms

Term	Definition
Ambient noise	Ambient noise is the total sound in a given situation at a given time usually composed of sound from many sources, near and far.
AAWT	Annual Average Weekday Traffic.
Basic noise level	The basic noise level (BNL) is a measure of source noise as defined in Appendix A
Calculation of road traffic noise	The technical memorandum that describes the procedures for calculating noise from road traffic (CRTN).
Construction noise assessment	An assessment which compares predicted noise levels from construction tasks to ambient noise levels at nearby noise sensitive receptors.
Construction vibration assessment	An assessment of magnitude of predicted vibration from construction activities.
Decibel	The unit of measurement used for sound pressure levels and noise levels quoted in decibels (dB). NOTE 1: The decibel scale is logarithmic rather than linear; the threshold of hearing is zero decibels while, at the other extreme, the threshold of pain is about 130 decibels. NOTE 2: These limits are seldom experienced and typical levels lie within the range of 30dB(A) (a quiet night time level in a bedroom) to 90dB(A) (at the kerbside of a busy road).
Diversion route	A set of approved routes to follow in case of closure of motorway / major A-roads.
Do-minimum	Scenario without the project.
Do-something	Scenario with the project.
Environmental Noise Directive quiet area	A location formally designated as a 2002/49/EC (END) quiet area.
Facade sound level	Sound level that is determined 1 metre (m) in front of a window or door in a facade.
Free-field sound level	The sound level, which is measured or calculated, in the open, without any reflections from nearby surfaces except the ground.
Future year	The 15th year after opening.
L_{A10}	The A-weighted sound level, in dB, that is exceeded 10% of the measurement period. NOTE: This is the standard index used within the UK to describe traffic noise.

Term	Definition
$L_{A10,18hr}$	The noise level, in dB, that is exceeded 10% of the time between 0600 and 2400.
L_{Aeq}	The equivalent continuous sound level (L_{Aeq}) is the level of a notional steady sound, which at a given position and over a defined period of time, would have the same A-weighted acoustic energy as the fluctuating noise.
L_{night}	A façade noise index derived from the LA10,18hr using the TRL conversion method PR/SE/451/02.
Long-term	Noise change based on the +15 year assessment (for example Do-minimum opening year scenario (DMOY) against Do-minimum future year scenario (DMFY) and DMOY against Do-something future year scenario (DSFY).
Lowest observed adverse effect level (LOAEL)	Level above which adverse effects on health and quality of life can be detected.
NIA	Noise Important Area.
Noise	Unwanted sound.
Noise mapping	The production of computer software generated maps showing how the predicted levels of outdoor noise vary with location.
Noise modelling	Software to predict noise levels. NOTE: This can be undertaken either by specialist software to provide a 3D representation of the project and nearby noise sensitive receptors or a simple spreadsheet.
Noise monitoring	Measurement of noise levels.
Noise sensitive receptor	Receptors which are potentially sensitive to noise. NOTE: Examples include dwellings, hospitals, healthcare facilities, education facilities, community facilities, END quiet areas or potential END quiet areas, international and national or statutorily designated sites, public rights of way and cultural heritage assets.
Non-project noise change	Noise change based on the DMOY against DMFY scenario, with no project implementation.
Sensitive buildings	Dwellings, including those that are listed, hospitals, healthcare facilities, education facilities or other buildings where noise or vibration can cause disturbance to people using the buildings.
Opening year	The first year of operation.
Operational noise assessment	An assessment to determine the operational noise impacts and effects of a road project.
Short-term	Noise change based on parallel assessment year (for example DMOY against Do-something opening year scenario (DSOY)).

Term	Definition
Significant observed adverse effect level (SOAEL)	The level above which significant adverse effects on health and quality of life occur.
Vibration	A to-and-fro motion which oscillates about a fixed equilibrium position.
Vibration sensitive receptor	Receptors which are potentially sensitive to vibration. NOTE: Examples include dwellings, hospitals, healthcare facilities, education facilities, community facilities, buildings containing vibration sensitive equipment and cultural heritage assets.

References

British Standards Institution (2008a). BS 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites. Noise.

British Standards Institution (2008b). BS 5228-2:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites. Vibration.

British Standards Institution (1993). BS 7385-2:1993. Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration.

British Standard Institute (2003). BS 7445-1:2003. Description and measurement of environmental noise. Guide to quantities and procedures.

British Standards Institution (2012). BS EN 1793-2:2012. Road traffic noise reducing devices. Test method for determining the acoustic performance. Intrinsic characteristics of airborne sound insulation under diffuse sound field conditions.

Control of Pollution Act 1974, c.40. Available at https://www.legislation.gov.uk/ukpga/1974/40/pdfs/ukpga_19740040_en.pdf

Coventry City Council (2017) Coventry City Council Local Plan 2011-2031

Department for Environment, Food and Rural Affairs (2010), Noise Policy Statement for England (NPSE).

Department for Environment, Food and Rural Affairs (2019), Noise Action Plan: Roads, Environmental Noise (England) Regulations 2006

Department for Levelling Up, Housing and Communities (2016), Planning Practice Guidance (websource https://www.gov.uk/government/collections/planning-practice-guidance) latest update 14/02/2024

Department for Levelling Up, Housing and Communities (2023), National Planning Policy Framework (NPPF).

Department for Transport. National Networks National Policy Statement (NN NPS). [Online]. Available from: National Networks - National Policy Statement (publishing.service.gov.uk)

Her Majesty's Government (UK). (1988). The Calculation of Road Traffic Noise (CRTN).

Her Majesty's Government (UK). (2018). Environmental Noise (England) Regulations 2006 (amended 2018)

Her Majesty's Government (UK). (1990). Environmental Protection Act 1990, UK Public General Acts 1990 c. 43

Highways England (2020). Design Manual for Roads and Bridges CD 236 – Surface course materials for construction. Version 4.1.0 [online] available at: https://www.standardsforhighways.co.uk/tses/attachments/815f3a3c-efe5-4555-9003-9ee38c2d080b?inline=true. Accessed April 2024.

Highways England (2020). Design Manual for Roads and Bridges LA 104 - Environmental assessment and monitoring. Revision 1 [online] available at: https://www.standardsforhighways.co.uk/search/0f6e0b6a-d08e-4673-8691-cab564d4a60a. Accessed April 2024

Highways England (2020). Design Manual for Roads and Bridges, LA 111: Noise and Vibration. Revision 2. [online] available at: https://www.standardsforhighways.co.uk/search/cc8cfcf7-c235-4052-8d32-d5398796b364 Accessed April 2024

Highways England (2020). Design Manual for Roads and Bridges, LD 119: Roadside environmental mitigation and enhancement. [online] available at: https://www.standardsforhighways.co.uk/search/6cacd1e7-dcff-4ff8-aa64-bd5556a5eedc. Accessed April 2024

Rugby Borough Council (2019) Rugby Borough Council Local Plan 2011-2031

The Noise Insulation Regulations 1975 No.1763. Available at https://www.legislation.gov.uk/uksi/1975/1763/pdfs/uksi_19751763_en.pdf

Transport Research Laboratory (TRL) (2002). Converting the UK traffic noise index LA10,18hr to EU noise indices for noise mapping.

Transport Research Laboratory (2000). Groundborne vibration caused by mechanised construction works.

World Health Organisation (2018). Environmental Noise Guidelines for the European Region.

World Health Organisation (2009). Night Noise Guidelines for Europe.