

CONTENTS

4	Environmental assessment methodology.....	1
4.1	Introduction.....	1
4.2	Environmental Scoping Report	1
4.3	Evidence Plan Process.....	3
4.4	Surveys and Predictive Techniques and Methods	4
4.5	General Assessment Assumptions and Limitations	9
4.6	Significance Criteria	11
4.7	Duplication of Assessment	15
4.8	Design, Mitigation and Enhancement Measures.....	16
4.9	Monitoring.....	20

FIGURES

None

APPENDICES

4.1 – Outline of Environmental Management Plan

4 Environmental assessment methodology

4.1 Introduction

- 4.1.1 This chapter of the Preliminary Environmental Information (PEI) Report details the approach taken to the preliminary assessment of likely significant environmental effects, and which will be used to undertake the Environmental Impact Assessment (EIA). It introduces the requirements of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) and the Design Manual for Roads and Bridges (DMRB), references other guidance documents and sets out the overall approach to the assessment of the likely significant effects of the project undertaken by the topics in this PEI Report.
- 4.1.2 The adopted scope, approach and method of assessment for each topic are outlined in the topic chapters (Chapter 5: Air Quality to Chapter 14: Road Drainage and the Water Environment), with further details such as survey methods provided.
- 4.1.3 The environmental factor assessments are based on the requirements of the latest version of each component of the DMRB under “Sustainability & Environment Appraisal”. Each topic chapter in this PEI Report refers specifically to the applicable DMRB standard(s) used.

4.2 Environmental Scoping Report

- 4.2.1 A draft Environmental Scoping Report (ESR) was prepared in October 2020 and was shared informally with Statutory Environmental Bodies (SEB) and Local Planning Authorities (LPA) to aid consultation around the scope of assessment, particularly in relation to the potential implications of ‘Project Speed’, as described in Section 1.3 of Chapter 1: Introduction. The draft ESR set out the proposed scope of work and methods to be applied in carrying out the EIA, as well as the proposed structure of the Environmental Statement (ES).
- 4.2.2 Comments received from SEB and LPA were considered and addressed through an update to the draft ESR, which was also fully refreshed to the latest project status. The final ESR (Highways England, 2020a)¹ was submitted with the formal request for a Scoping Opinion² made by Highways England to the Planning Inspectorate under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) in June 2021.
- 4.2.3 The Planning Inspectorate issued its formal Scoping Opinion on 23 July 2021 and this was made available on the Planning Inspectorate website at the following address:
<https://infrastructure.planninginspectorate.gov.uk/projects/north-west/a66-northern-trans-pennine-project/>
- 4.2.4 The formal Scoping Opinion, along with responses to this statutory consultation, will inform the EIA and the content of the ES. This PEI Report builds on the ESR, which informed the Scoping Opinion.

¹ Highways England (2020a) A66 Northern Trans-Pennine Environmental Scoping Report, available at: <https://infrastructure.planninginspectorate.gov.uk/projects/north-west/a66-northern-trans-pennine-project/> [accessed 10 August 2021]

² A Scoping Opinion is the written opinion of the Secretary of State (SoS) which details the scope and level of detail to be included in the ES to accompany the DCO application.

Scope of assessment

Scoped in

- 4.2.5 The environmental assessment will consider the following environmental factors in line with the requirements of DMRB, the EIA Regulations and the Scoping Opinion:
- Air quality
 - Biodiversity
 - Climate
 - Cultural heritage
 - Geology and soils
 - Landscape and visual
 - Material assets and waste
 - Noise and vibration
 - Population and human health
 - Road drainage and water environment

Topics scoped out

- 4.2.6 The following topics have been scoped out of further assessment.
- **Major events** (major accidents and disasters): by virtue of the nature and location of the project it was considered there is unlikely to be a significant risk of major accidents and disasters not already adequately considered within other topic chapters, or mitigated through project design and the requirements of existing legislation to prevent major accidents and to protect the health and safety of people.
 - **Heat and radiation:** the EIA Regulations introduced the requirement for the emission of heat and radiation to be considered. The project does not introduce any sources of heat and radiation and there are no sensitive receptors (for example, hospitals or schools) for this effect within the route corridor. Hence the topic of heat and radiation and been scoped out based on negligible risk.
 - **Electric and Magnetic Fields (EMF):** the project does not impact any receptors from potential sources of EMF due to it being a road construction scheme. There are no electrical installations such as substation and connecting underground cables or overhead lines from the project, therefore there are no health impacts associated with EMF. The EMF have subsequently been scoped out of the assessment.

Topics partially scoped out

- 4.2.7 Through the scoping process, a number of topics that are scoped in overall for further assessment did identify particular resources/features that would be scoped out and this has been agreed by PINS through its Scoping Opinion. These include:
- **Biodiversity:** identified specific types of designated sites, protected species or habitats scoped out depending upon the scheme that is subject to the assessment.
 - **Climate:** scoped out vulnerability to climate change for the construction phase based on the timescales for construction.
 - **Cultural heritage:** all physical effects on heritage resources during operation, as impacts would have occurred during construction.

- **Geology and soil:** scoped out new and historic contamination, specific geological features and soil resources depending on the scheme, and risk of encountering unexploded ordnance across the route.
- **Landscape and visual:** scoped out effects on conservation areas and landscape and visual effects in some locations.
- **Population and human health:** scoped out certain elements of the population and human health impacts, dependent upon the scheme.
- **Road drainage and the water environment:** scoped out flood risk and impacts at M6 Junction 40 and A1(M) Junction 53 Scotch Corner.

4.2.8 The overall scoping in/out associated with each topic assessment is summarised in scoping summary tables presented in the ESR and in the relevant topic tables in the Scoping Opinion.

Transboundary effects

4.2.9 Regulation 32 of the EIA Regulations requires the consideration of any likely significant effects on the environment of another European Economic Area (EEA) State. Guidance on transboundary effects is provided in Planning Inspectorate Advice Note Twelve: development with significant transboundary impacts consultation (Planning Inspectorate, 2018a)³. The Planning Inspectorate will determine if the project is likely to result in significant transboundary effects.

4.2.10 As the project involves upgrade works to a trunk road to make it dual carriageway throughout, any significant environmental effects are most likely to be experienced at local or regional level. It is considered unlikely that the project would have a significant environmental effect, either on its own or cumulatively, in another European Economic Area state.

4.3 Evidence Plan Process

4.3.1 The Evidence Plan process was initially developed by the Major Infrastructure Environment Unit (MIEU) of Department for Environment, Food and Rural Affairs (Defra) to provide a formal mechanism to agree between applicants and statutory bodies what information and evidence an applicant for a Nationally Significant Infrastructure Project (NSIP) should submit in support of an application. The process has been implemented successfully, largely in the offshore wind sector, with some recent examples considering key aspects of EIA as well as Habitats Regulations Assessment (HRA).

4.3.2 The project is being developed to an ambitious programme, which aims to optimise the Development Consent Order (DCO) process, ensuring a focus on key issues and requirements, therefore, the Evidence Plan process has been identified as a tool that is potentially useful to aid consultation with key stakeholders and enhance agreements reached at the pre-application process. Engagement between stakeholders and the project is already strong, and therefore the process is seen to be beneficial in guiding and recording the engagement.

4.3.3 Whilst the programme does not allow for the formal process to be applied (and strong ongoing engagement means it is not necessary), Highways England has chosen to adopt the principles of the Evidence Plan process to guide the

³ Planning Inspectorate (2018a) Advice Note Twelve: Transboundary impacts and process, Version 5, available at: <https://infrastructure.planninginspectorate.gov.uk/wpcontent/uploads/2013/04/Advice-note-12v2.pdf> [accessed 10 December 2020]

consultation and development of the EIA and HRA for the project, in relation to key areas of legislation and National Policy. The process is being led by the Integrated Project Team (IPT) (Highways England, their delivery partners and advisors) and supported, as appropriate, by the Planning Inspectorate.

- 4.3.4 The intention is that this process will inform the Statements of Common Ground prepared with the SEB and Local Impact Reports prepared by the LPAs.
- 4.3.5 The Evidence Plan process will culminate in a working document developed by the parties involved on an ongoing basis up to the point of application. The document is being developed with the SEB and LPA and informed by wider consultation.

4.4 Surveys and Predictive Techniques and Methods

Requirements of DMRB

- 4.4.1 All aspects of the development, environmental assessment (in addition to the EIA Regulations) and design requirements of motorways and all-purpose trunk road projects are governed by standards set out in DMRB.
- 4.4.2 All EIA work and environmental reporting on the project has been undertaken in accordance with the standards set out in DMRB and any other applicable topic-specific guidance identified in this PEI Report.
- 4.4.3 DMRB standards on EIA set out three 'levels' of EIA assessment and reporting: '*scoping*', '*simple*' and '*detailed*'. These levels are not intended to be sequential (i.e. applied one after another in order), but 'consequential', in that the level to be applied at any stage of environmental reporting is determined on a topic-by-topic basis according to the following factors:
- Results of any previous assessment work (especially the scoping report).
 - Likely scale or significance of impact (not the scale of development).
 - Degree of uncertainty about the potential impact of the scheme.
- 4.4.4 DMRB defines topic-specific requirements for each assessment and reporting. The assessments undertaken at PEI Report stage and which are proposed for the various topics in the EIA are discussed in each of the topic chapters (Chapter 5: Air Quality to Chapter 14: Road Drainage and the Water Environment).

Development Consent Order (DCO) boundary and study area

- 4.4.5 The draft DCO boundary for the purposes of consultation includes the land anticipated at this stage likely to be required temporarily and/or permanently for the construction, operation and maintenance of the project. The final DCO boundary will be confirmed as the design and mitigation evolves and will be reflected in the DCO application. For the purposes of the assessment presented within this PEI Report the land within the draft DCO boundary has been defined as being in one of two categories:
- Land likely to be subject to some form of earthworks (as a minimum, removal of vegetation and topsoil) – shown using a blue boundary (the 'engineering boundary').
 - Land that may be required for environmental mitigation purposes, which may involve some clearance of vegetation and/or soil disturbance but might also be non-intrusive in nature such as enhancements to existing habitats – shown using a green boundary (the 'environmental mitigation boundary').

- 4.4.6 For the purposes of the assessment within this PEI Report, the draft DCO boundary is assumed to be the outer boundary of the blue and green land combined. The figures presented for each topic show the most relevant boundaries for that figure. There are a number of locations where there have been small changes to the boundary assumed in this assessment, as described in Chapter 2. None of these changes are expected to lead to new or different likely significant effects to those already identified in this PEI Report.
- 4.4.7 An engineering boundary and an environmental mitigation boundary are shown separately in order to inform the assessment and ensure it is based on a reasonable worst-case scenario. The principal impacts of the project are likely to be experienced within the engineering boundary, with the land shown within the environmental mitigation boundary used for mitigation.
- 4.4.8 The design of the project will continue to be developed, including in response to statutory consultation feedback; and the DCO boundary will be finalised and reflected in the DCO application. The latest version of the draft DCO boundary is presented in Figure 2-1: M6 Junction 40 to Kemplay Bank to Figure 2-8: A1(M) Junction 53 Scotch Corner.
- 4.4.9 Study areas have been defined individually for each environmental factor in the relevant topic chapter (Chapter 5: Air Quality to Chapter 14: Road Drainage and the Water Environment), taking account of DMRB and other relevant topic-specific guidance where applicable, the geographic scope of the potential impacts relevant to that topic or of the information required to assess those impacts. The study areas for air quality and noise are also influenced by the traffic modelling outcomes, as are the other environmental factors which draw upon them for key information (e.g. climate and population and human health). The study areas are described within each relevant chapter of this report. The study area for each environmental factor in this PEI Report incorporates the draft DCO boundary as a minimum for the project.
- 4.4.10 The EIA and ES will be based on the DCO boundary (known at that stage as the 'Order limits') presented on the plans which will form part of the DCO application.

Approach to assessment of scheme alternatives

- 4.4.11 As described in Chapter 2: The Project, in addition to the design development of the project, as a result of further work ongoing to understand the baseline environment and further development of the design of the Preferred Route, it was considered appropriate to undertake some further detailed appraisal of alternative alignment routes and alternative junction arrangements at this stage. Chapter 2: The Project clearly sets out which schemes this affects and describes any alternatives still under consideration at the time of submitting this PEI Report. Where the ongoing consideration of alternatives affects some schemes, the widest geographical limits of each of the potential scheme alternatives has been used to define the study area for each topic.
- 4.4.12 For two of the schemes – Appleby to Brough and Cross Lanes to Rokeby, the alternatives apply only to certain sections of the scheme, and each of the alternatives for the different sections can be combined into a number of different possible routes. This is set out in detail within Chapter 2: The Project. The topic chapters assess these in one of two ways:
- For topics that assess impacts that relate to the physical presence of the road and associated infrastructure (e.g. through site clearance for construction of the physical presence of the road during operation) the topic has considered

the effects of the full scheme, using the combination of alternatives that aligns most closely to the original alignment announced as part of the PRA in Spring 2020. The assessment then sets out how the effects would be different if the alternatives were brought forward for each of the relevant sections.

- For topics that assess impacts that can have effects beyond the physical limits of the road (Landscape and Visual, Noise and Vibration and Population and Human Health) the assessment has considered each of the combinations of alternatives for the full schemes and sets out how the effects would differ depending on which combination is brought forward.

4.4.13 The approach used is defined in each topic chapter.

Identification of baseline and future baseline conditions

4.4.14 In order to preliminarily identify the likely significant effects of the project on the environment, it is important to understand the environment that would be affected by the project (the 'baseline conditions'). Understanding the baseline allows the measurement of changes that are likely to be caused by the project.

4.4.15 This has been established through desk-based research including the collection of pre-existing data, primary data collection through site surveys and engagement with stakeholders and third parties to gather information relevant to establishing the baseline environment of the site.

4.4.16 The baseline conditions are not necessarily the same as those that exist at the current time; they are the conditions that would exist in the absence of the project either (a) at the time that construction is expected to start, for impacts arising from construction or, (b) at the time that the project is expected to open to traffic, for impacts arising from the operation of the project. Therefore, the identification of the baseline and future conditions involves predicting changes that are likely to happen in the intervening period, for reasons unrelated to the project. This would entail taking current conditions and committed development into consideration and using experience and professional judgment to predict what the baseline and future conditions might look like prior to start of construction and operation. This includes taking account of natural changes, as far as this can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.

4.4.17 It is essential for an EIA that sufficient data is obtained to form the basis of the assessment. Each topic chapter includes a description of the current (baseline) environmental conditions and future baseline scenario. This is based on the study area identified for each topic chapter.

4.4.18 This PEI Report presents baseline information representing the conditions of the environment and on the basis of information available at the time of writing. When describing the future baseline scenario for each environmental factor within the respective topic chapters, readily available information such as local plans and climate change scenario data has been utilised to provide a description of the committed development and natural changes in the local environment over an appropriate timescale that the datasets support.

4.4.19 Each topic chapter sets out what baseline information is currently available, what additional data is to be collected to inform the ES and how this information will be gathered. It is important to note that the preliminary findings that are presented in this PEI Report are based on the baseline information currently available and the assessment will be updated as additional data are gathered. The updated baseline

information and final assessment findings will be presented in the ES, which will support the DCO application submission.

- 4.4.20 Any impact of the Covid-19 pandemic on the collection and validity of baseline data used to inform the PEI Report or the future ES assessments, future trends or key assumptions are discussed in detail, where applicable, in each topic chapter.

Defining assessment years and scenarios

- 4.4.21 The EIA will assess the environmental impacts of the project at key stages of both the construction and operational phases. Where appropriate, these will be compared to the pre-construction (i.e. current) baseline and, if relevant, to the situation that will be expected to prevail in the future in absence of the proposed works (i.e. the projected future baseline). This PEI Report follows the same methodology, to the extent that information is available to inform the assessment at the current time.
- 4.4.22 The assessment of effects involves comparing a scenario without the project and a scenario with the project. These are referred to as the do-minimum⁴ and do-something scenarios respectively. The do-minimum scenario represents the future baseline with minimal interventions and without new infrastructure comprised in the project. The likely significant environmental effects for do-something scenarios are preliminarily assessed for the baseline year and future year, or series of future years, depending on the environmental factor. For assessing construction phase effects, the baseline year represents the conditions prior to construction starting.
- 4.4.23 The assessment carried out at earlier stages of the project was based on a phased construction programme of seven years commencing in 2024 and the route being fully open in 2031. Work is ongoing, however, to review both a 10-year construction programme (as set out in RIS2) and an accelerated 5-year construction programme. It is currently anticipated that the construction activities will commence in 2024 and the scheme open to traffic in 2029 (following a 5-year accelerated construction programme).
- 4.4.24 The current construction strategy assumes a phased approach to construction, meaning that it is likely some parts of the project will be operational whilst others are under construction. No detail on the phasing of construction is currently available. This will be considered further in the ES, which will set out the assumed phasing and opening years for each scheme and how this has informed the assessments. As set out in Chapter 2: The Project, the assessment presented in this PEI Report assumes a worst-case scenario of all schemes under construction at the same time.
- 4.4.25 For the purposes of the assessment in this PEI Report, the opening year when the project is to become operational, i.e. fully open to traffic, is assumed be 2029 (though an exception to this in relation to modelling is noted below). The future year scenario (a period after the project opens for traffic) is assumed to be 2044, 15 years (Highways England, 2020b)⁵ after opening, when mitigation measures (e.g. landscape planting) are likely to have achieved their desired outcome.

⁴ Do-minimum includes normal trunk roads operation and maintenance activities for the purposes of ensuring the continued functioning and safety of the network.

⁵ Highways England (2020b) Design Manual for Roads and Bridge LA 107 Landscape and visual effects, available at: <https://www.standardsforhighways.co.uk/dmrb/search/bc8a371f-2443-4761-af5d-f37d632c57340> [accessed 10 August 2021]

- 4.4.26 For assessing operational phase effects (such as the effects of traffic on noise and air quality) the baseline year represents the situation prior to any effect e.g. opening the project to traffic.
- 4.4.27 Current scientific knowledge and methods of assessment have been used to identify foreseeable changes to inform the future baseline.

Traffic Assessment

- 4.4.1 In order to define the need for the project, to refine the design, and to understand the effects of it, detailed operational traffic modelling and assessments have been completed at each stage of project development and are ongoing to inform the current stage of design. The *Local Traffic Report* (Highways England, 2020c)⁶ presents the outputs of the traffic modelling and assessment undertaken to date, considering both the changes to traffic on the A66 itself but also the changes to the local road network and the wider strategic network. The traffic modelling is ongoing and will be reported in full in a Traffic Assessment, which will accompany the DCO application.
- 4.4.2 The output of the traffic modelling is utilised within this PEI Report to inform the noise and air quality modelling in particular. Each chapter that utilises this data includes a description of the information used to inform the modelling.
- 4.4.3 It should be noted that the traffic data used to inform this PEI assessment utilises information from the traffic modelling undertaken at the previous stage of assessment. The key change that is not represented in the data is the change in construction programme now assumed. The traffic modelling is based on an opening year of 2031, which is later than that assumed throughout the rest of the PEI Report (2029). This limitation is recognised in the relevant limitations sections of the affected chapters and the modelling will be revised at ES to reflect an opening year of 2029. This difference is not expected to lead to any new or different significant effects being identified.

Combined and cumulative effects

- 4.4.4 Combined and cumulative effects result from multiple actions on receptors over time and are generally additive or interactive (synergistic) in nature. They can also be considered as effects resulting from incremental changes caused by other past, present or reasonably foreseeable actions together with the project, identified as:
- Combined effects from a single project – the project (i.e. the interrelationship between different environmental factors where numerous different effects impact a single receptor).
 - Cumulative effects from different projects (together with the project being assessed).
- 4.4.5 The methodology for the consideration of combined effects of the project and cumulative effects with other proposed developments is presented in Chapter 15: Assessment of Cumulative Effects. The combined and cumulative effects of the project in conjunction with other proposed developments will be assessed and the findings will be presented within the ES.

⁶ Highways England (2020c) Local Traffic Report, available as part of the consultation material on <http://www.highwaysengland.co.uk/A66-NTP> [accessed 16 September 2021]

- 4.4.6 The PEI Report considers specific effects related to climate change. Chapter 7: Climate outlines a preliminary assessment of the effect of the project on climate and the vulnerability of the project to climate change. The combined effects of the project and climate change on the receiving environment, resources and community (the in-combination climate change impacts) are considered by each environmental factor team and the preliminary findings are presented as an appendix to the climate chapter of this PEI Report.

4.5 General Assessment Assumptions and Limitations

Dealing with uncertainty

- 4.5.1 In assessing the effects of the project from an environmental perspective, the principle of the 'Rochdale Envelope'⁷ has been applied, in accordance with the Planning Inspectorate advice note nine: Rochdale Envelope (Planning Inspectorate, 2018b) which states:

"The 'Rochdale Envelope' approach is employed where the nature of the Proposed Development means that some details of the whole project have not been confirmed (for instance the precise dimensions of structures) when the application is submitted, and flexibility is sought to address uncertainty."

- 4.5.2 At the current stage in the design process, absolute certainty about construction timing, phasing and methodology is not possible. It is anticipated that as the design develops more certainty will be gained. This will be documented in the ES. There will, however, be some areas where the appointed design and build contractor will determine final design or final methods. This will be highlighted in the ES where applicable, together with an explanation of the approach to ensuring the reasonable worst case impacts are assessed. Where applicable, any assumptions on reasonable worst case for the purposes of developing this PEI Report are identified in the relevant topic chapters of this report.

Limits of deviation

- 4.5.3 Limits of Deviation (LoD) are the limits within which the DCO will authorise the project to be constructed. Changes to the preliminary project design may occur typically as a result of ground conditions or environmental factors which it may not be possible to identify in the period prior to the DCO application. The LoD allow for a tolerance with respect to any distances and points shown on the plans that will accompany the DCO application. All works would take place within the LoD, the extent of which will be subject to full consideration in the ES.
- 4.5.4 The DCO will allow for the project to be constructed anywhere within the maximum extent of the defined LoD. This would include a vertical deviation and a lateral deviation. As a result, there is some necessary flexibility as to the exact scheme detail taken through to construction.
- 4.5.5 Appropriate LoD will be determined and assessed, enabling a robust assessment that allows for a level of flexibility at the detailed design stage. A level of flexibility is essential to enable the design and construction to take account of new factors and to facilitate further design development by the appointed contractor(s) but must be

⁷ Planning Inspectorate (2018b) Using the Rochdale Envelope, Version 3, available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2013/05/Advice-note-9.-Rochdale-envelope-web.pdf> [accessed 9 December 2020]

within an assessment envelope that has considered the reasonable worst-case environmental effects. The flexibility will vary depending on the sensitivity of receptors and may be fixed at certain locations to prevent significant effects. Any LoD relied upon for the assessment will be secured via the DCO such that the project cannot be constructed outside of the parameters assessed.

- 4.5.6 Where LoD or flexibility are retained in the DCO application to aid buildability, this will be clearly described within the ES. Both the ES and DCO application will set out the parameters within which flexibility has been retained. This approach accords with the Rochdale Envelope approach outlined above. The modelling to inform the assessments (e.g. noise, air quality) for the purposes of the PEI Report is based on the consultation design, but the relevant chapters highlight receptors for which the impact may differ depending on where within the engineering boundary the road is constructed (e.g. if the actual road alignment moves within the boundary, would there be more or different significant effects than those identified based on the consultation design).

Baseline traffic data

- 4.5.7 In terms of the production of traffic forecasts, the project has followed appraisal advice from Department for Transport's (DfT) 2020 guidance 'A route map for updating TAG (Transport Analysis Guidance) during uncertain times' (Department for Transport, 2020)⁸, which includes growth revisions reflecting both anticipated Covid-19 impacts and impacts from growth forecasts issued by the Office for Budget Responsibility (OBR), which represent a significant reduction in growth compared to any previous OBR update.
- 4.5.8 The anticipated February 2021 TAG appraisal update has been further delayed, as such the advice within the July 2020 document will continue to be followed until the updated advice becomes available. It is anticipated that the traffic data to be used in the EIA and reported in the ES will be based on the updated guidance if available.
- 4.5.9 The approach to traffic modelling and limitations associated with it, is set out in the Local Traffic Report⁹.

Proportionality

- 4.5.10 The project comprises eight individual schemes that will be delivered in four packages. This complexity means that it has been necessary for each environmental factor assessment to identify effects and propose mitigation specific to each scheme (including any options for those schemes) as well as considering the potential for route wide effects.
- 4.5.11 Effects from multiple schemes on a single receptor are not considered to be cumulative effects. Where a receptor is predicted to experience an effect or effects resulting from more than one scheme, the overall predicted effects of the project as a whole (i.e. considering effects arising from any of the schemes) on that receptor is reported only once (as the location in which the greatest effects would be caused),

⁸ Department for Transport (2020) Appraisal and Modelling Strategy A route map for updating TAG during uncertain times, available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/951075/tag-route-map-2020.pdf [accessed 10 March 2021]

⁹ The Local Traffic Report is available as part of the consultation material at <http://www.highwaysengland.co.uk/A66-NTP>

in the scheme within which the receptor is located (or if the receptor is located between schemes, within the scheme it is closest to). The exception to this is the landscape assessment (see Chapter 10: Landscape and Visual Effects), where the scale of the landscape receptors (Landscape Character Units) means that different locations within the receptor may experience different effects from different schemes. Where this is the case, the receptors are reported for each of the schemes where they are affected, but the assessment for that location considers the overall effects of the project (all schemes).

- 4.5.12 Given the scale and complexity of the A66 Northern Trans-Pennine (NTP) upgrade, it is important that the ES is proportionate and focusses on a preliminary view of the likely significant effects of the project. All non-significant effects will be reported in tabular form in an appendix to demonstrate consideration of all potential effects, but the ES will report only on likely significant effects and the proposed mitigation as required.

4.6 Significance Criteria

Environmental assessment methodology

- 4.6.1 The assessment presented in this PEI Report, which will be carried through to the EIA, takes into account relevant DMRB standards including:
- *DMRBLA 101 - Introduction to Environmental Assessment* (Highways England, 2019a)¹⁰
 - *DMRBLA 102 - Screening projects for Environmental Impact Assessment* (Highways England, 2019b)¹¹
 - *DMRBLA 103 - Scoping projects for environmental assessment* (Highways England, 2019c)¹²
 - *DMRBLA 104 - Environmental assessment and monitoring* (Highways England 2019d)¹³
- 4.6.2 Each individual topic chapter provides details of the methods that have been used to define the baseline and assess effects. These methods draw upon DMRB and other relevant guidance. The level of detail in the assessment is commensurate with the level of design information available at this stage and the proportionality that will be required in each assessment. The methodology adopted, however, results in a clear and robust preliminary assessment that allows the likely significant effects of

¹⁰ Highways England (2019a) Design Manual for Roads and Bridges LA 101 Introduction to environmental assessment, available at:

<https://www.standardsforhighways.co.uk/dmr/search/54b0eb69-fd65-4fa5-a86b-7313f70b3649>
[accessed 9 December 2020]

¹¹ Highways England (2019b) Design Manual for Roads and Bridges LA 102 Screening projects for Environmental Impact Assessment, available at:

<https://www.standardsforhighways.co.uk/dmr/search/dc73affe-4f24-4077-8637-e79e4fb7b198>
[accessed 9 December 2020]

¹² Highways England (2020c) Design Manual for Roads and Bridges LA 103 Scoping projects for environmental assessment, available at:

<https://www.standardsforhighways.co.uk/dmr/search/fb43a062-65ad-48d3-8c06-374cfd3b8c23>
[accessed 9 December 2020]

¹³ Highways England (2019d) Design Manual for Roads and Bridges LA 104 Environmental assessment and monitoring, available at:

<https://www.standardsforhighways.co.uk/dmr/search/78a69059-3177-43dc-94bd-465992cfda82>
[accessed 9 December 2020]

the project to be understood including, for example, where assessment parameters are used, based on the information available at this time. Topic-specific requirements can be found in the topic chapters within this PEI Report (Chapter 5: Air Quality to Chapter 14: Road Drainage and the Water Environment).

4.6.3 The preliminary assessment of each environmental factor forms a separate chapter of this PEI Report. For each chapter within this PEI Report, the following has been addressed, in conformity to DMRB and EIA Regulations:

- Legislation and policy context
- Assessment methodology
- Assessment assumptions and limitations
- Definition of the study area
- Description of the baseline environmental conditions
- Identification of potential impacts (including effects arising during the construction and operational phases)
- Identification of design, mitigation and enhancement measures, where appropriate
- Preliminary assessment of the likely significant effects of the project taking account of the mitigation identified
- Preliminary details of any likely monitoring requirements.

4.6.4 Each topic chapter provides details of the methodology for baseline data collection and evaluation of effects based on EIA good practice guidance documents and relevant topic specific guidance where available.

Assessment of effects

4.6.5 The EIA process requires the identification of the likely significant environmental effects of the project. This includes consideration of the likely effects during the construction and operational phases of the project.

4.6.6 *DMRBLA 104* provides a standard approach to the determination of significance of environmental effects for highway schemes. This includes consideration of the following:

- Assigning value (or sensitivity) of receptors.
- Assigning magnitude of impact.
- Assigning significance of impact.

Assigning value of receptors

4.6.7 Receptors are defined as individual environmental features that have the potential to be affected by a project. For each topic, baseline studies have informed the identification of potential environmental receptors. Some receptors will be more sensitive to certain environmental effects than others. The value (or sensitivity) of a receptor may depend, for example, on its frequency, extent of occurrence or conservation status at an international, national, regional or local level.

4.6.8 Value (or sensitivity) is defined within each topic chapter and takes into account factors including the following:

- Vulnerability of the receptor to change.
- Recoverability of the receptor (ability of recover from a temporary impact).
- Importance of the receptor.

4.6.9 As a general guide, the definitions set out in Table 3.2N of DMRB LA 104 have been taken into account (except where topic standards and guidance requires

otherwise). This includes a five-point scale for assigning environmental value (or sensitivity) as shown in Table 4 1: Environmental value (sensitivity) and descriptions (based on Table 3.2N of DMRB LA 104) below.

Table 4-1: Environmental value (sensitivity) and descriptions (based on Table 3.2N of DMRB LA 104)

Value (sensitivity) of receptor/ resource	Typical description
Very high	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale

Magnitude of impact

- 4.6.10 In line with DMRB LA 104 the magnitude of impacts on receptors is reported within the environmental assessments. The descriptions for magnitude of impact (as outlined in Table 4 2: Magnitude of impact and typical descriptions (based on Table 3.4N of DMRB LA 104 are applied to the project. Where relevant, individual topic chapters set out variations in magnitude description requirements.
- 4.6.11 For each topic, the likely significant environmental impacts have been identified and will be refined further within the ES. The likely environmental impact arising from the project has been identified and compared with the baseline (the situation without the proposed scheme). Impacts are divided into those occurring during the construction and operation phases.
- 4.6.12 As a general guide, the definitions set out in Table 3.4N of DMRB LA 104 have been taken into account (except where topic standards and guidance require otherwise). This includes a five-point scale for assigning impact magnitude as shown in Table 4-2: Magnitude of impact and typical descriptions (based on Table 3.4N of DMRB LA 104

Table 4-2: Magnitude of impact and typical descriptions (based on Table 3.4N of *DMRB LA 104*)

Magnitude of impact		Typical criteria descriptions
Major	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality.
Moderate	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Minor	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Assigning significance

- 4.6.13 In *DMRB LA 104* it states the likely significance of effects must be reported in accordance with the EIA Directive (which has been implemented in the UK by the EIA Regulations).
- 4.6.14 *DMRB LA 104* recognises “*the approach to assigning significance of effect relies on reasoned argument, the professional judgement of competent experts and using effective consultation to ensure the advice and views of relevant stakeholders are taken into account.*”
- 4.6.15 Each topic chapter defines the approach taken to the preliminary assessment of significance. Where appropriate, topic chapters have adopted the general approach set out in Table 3.7 within *DMRB LA 104*. Where relevant, individual environmental factors have set out variations in significance description requirements, further to topic-specific standards and guidance.
- 4.6.16 The evaluation of significance takes into account industry and professional standards and guidance, codes of practice, policy objectives regulations or standards, advice from statutory consultees and other stakeholders, as well as expert judgement of the EIA practitioners, based on specialist experience. For some topics and is explained at paragraph 4.4.3, a simplified or quantitative approach is considered appropriate as set out in Table 3.8.1 within *DMRB LA 104*.
- 4.6.17 Slight, moderate, large or very large effects may be beneficial or adverse. Except where guidance requires otherwise, the significance of effect is described using the terms **very large, large, moderate, slight and neutral**. In terms of the EIA

Regulations, significant effects are generally those where the significance of the effect is 'moderate' or greater. Effects determined to be slight or neutral are deemed 'non-significant' and will therefore not require specific mitigation. The exception to this is where the combination of multiple slight effects has the potential to lead to a significant (i.e. moderate or above) cumulative effect.

- 4.6.18 Not all environmental factors use the above approach. For example, some topics do not use a matrix-based approach but instead use numerical values to identify impacts (e.g. noise and vibration). The approach for each environmental factor is defined in the relevant DMRB or topic standard and is described in the relevant topic chapter.
- 4.6.19 The preliminary assessment of the significance of environmental effects covers the following factors:
- The receptors/resources (natural and human) which would be affected and the pathways for such effects.
 - The geographic importance, sensitivity or value of receptors/resources.
 - The duration (long or short term); permanence (permanent or temporary) and changes in significance (increase or decrease).
 - Reversibility - e.g. is the change reversible or irreversible, permanent or temporary.
 - Environmental and health standards (e.g. local air quality standards) being threatened.

4.7 Duplication of Assessment

- 4.7.1 Other assessments are required in order to comply separately with legislation outside of the EIA Regulations.

Habitats Regulations Assessment (HRA)

- 4.7.2 A preliminary HRA Screening (Stage 1) has been undertaken for each Special Area of Conservation (SAC) and Special Protection Area (SPA) that could be affected by the project, including (refer to Chapter 6: Biodiversity and Appendix 6.1: Draft Habitat Regulation Screening Report):
- River Eden Special Area of Conservation (SAC)
 - Helbeck and Swindale Woods SAC
 - Moor House – Upper Teesdale SAC
 - North Pennine Moors SAC
 - North Pennine Moors Special Protection Area (SPA)
 - Asby Complex SAC.
- 4.7.3 Where likely significant effects on any of these sites cannot be ruled out beyond reasonable scientific doubt at this stage, this determines any requirement for an Appropriate Assessment.
- 4.7.4 The full HRA process will define any requirement for mitigation that is necessary to ensure there is no adverse effect on the integrity of these sites, alone or in combination with other plans and projects. Any required mitigation is then incorporated into the project.
- 4.7.5 Full details of these assessments will be included within the ES and the full reports will accompany the DCO application.

Flood Risk Assessment and Water Framework Directive (WFD) Compliance Assessment

- 4.7.6 A Flood Risk Assessment (FRA) and a Water Framework Directive (WFD) Compliance Assessment is being undertaken alongside the EIA. The ES will also use the conclusions of these assessments to determine the extent to which the project could be susceptible to flooding or increase the risk of flooding elsewhere, as well as the extent to which the project could impact on the current and future target WFD status of water bodies.
- 4.7.7 Where potential adverse effects are identified in the ES, an assessment of these effects is used to inform what mitigation measures need to be incorporated into the design and construction methods of the project to remove or reduce the effect. The results will be presented in the ES.

4.8 Design, Mitigation and Enhancement Measures

- 4.8.1 One of the key requirements of an EIA is that measures are taken to avoid, reduce and, where possible, remedy significant adverse environmental effects. These are termed mitigation measures and their development is part of an iterative EIA process. The EIA will identify mitigation measures using a hierarchical system in line with the requirements of *DMRBLA 104*:

“Avoidance and prevention: design and mitigation measures to prevent the effect (e.g. alternative design options or avoidance of environmentally sensitive sites).

Reduction: where avoidance is not possible, then mitigation is used to lessen the magnitude or significance of effects.

Remediation: where it is not possible to avoid or reduce a significant adverse effect, these are measures to offset the effect.”

- 4.8.2 Also in line with *DMRB LA 104*, the ES will report on the following categories of mitigation:

“Embedded mitigation: project design principles adopted to avoid or prevent adverse environmental effects. This will be reported in the project description and not repeated in each topic chapter of the ES.”

“Essential mitigation: measures required to reduce and if possible offset likely significant adverse environmental effects, in support of the reported significance of effects in the environmental assessment. This will be reported in relevant topic chapter of the ES.”

- 4.8.3 The project has also considered opportunities to deliver environmental enhancements. Where these are part of the main project they have been included in the DCO application and considered as part of the EIA. Other enhancements which are additional to the main project may be referenced in the ES but will sit outside the DCO application.
- 4.8.4 Mitigation measures have been developed in response to the findings of surveys, initial assessments and consultation. These mitigation measures shall be designed principally to address impacts the occurrence, timing and location of which can be predicted in advance and are intrinsic to the design of the project.

Embedded mitigation

- 4.8.5 DMRBLA 104 defines embedded mitigation as “*project design principles adopted to avoid or prevent adverse environmental effects.*”
- 4.8.6 The first preference in mitigating any impact is to seek engineering and design measures to entirely avoid or eliminate the impact. Where this is not possible, the design should seek to reduce the magnitude of the impact. Impacts can be avoided or reduced, for instance, through changes to the horizontal or vertical alignment of the project, junction strategy or other aspects of the project layout; or through changes in the methods and/or materials to be used in construction.
- 4.8.7 The project design continues to evolve as part of an iterative process between the engineering and environmental design and assessment teams, and through active engagement with statutory consultees, key stakeholders and the wider public. Throughout the iterative design process, design changes continue to be integrated into the project with the primary purpose of avoiding or reducing adverse effects at source and to make the project fit better into its landscape setting. These measures are considered integral to the project and are termed ‘embedded mitigation’. Embedded mitigation is reported as part of the scheme description and not repeated in each environmental factor assessment.
- 4.8.8 The project assessed within this PEI Report includes a number of engineering and design measures to avoid or reduce significant adverse environmental effects arising, where practicable. Those measures forming part of the scheme design (for all schemes including alternatives) are summarised within Chapter 2: The Project (including highlighting where key changes to the design have been made specifically to avoid or reduce an environmental effect). Chapter 3: Alternatives describes how environmental impacts have informed decision-making where design alternatives have been considered, as well as the reasons for selection of the alternative included within the design.
- 4.8.9 It is also assumed, as embedded mitigation, that all standard construction best practice measures to mitigate the environmental affects of construction will be implemented in line with the Environmental Management Plan (EMP). These will be identified in the Register of Environmental Actions and Commitments (REAC), contained within the EMP as part of the DCO application. An outline of what the EMP will include is included in Appendix 4.1: Outline of Environmental Management Plan. This remains a ‘live’ document and will be developed further and submitted with the ES to report on all of the environmental actions and commitments relied on within the ES. It will then become a certified document for the purposes of the DCO, meaning compliance with its terms will be a legal requirement. The EMP will be developed further by the contractor to set out exactly how each of the actions and commitments will be delivered.

Essential mitigation

- 4.8.10 Where avoidance of an impact through embedded mitigation is not possible, or is only partly effective, further mitigation measures may be required, which this PEI Report refers to as ‘essential mitigation’. Essential mitigation falls into three broad categories:
- Measures that do not remove an impact but make it less significant. A typical example on the project includes planting trees to screen views of the road where it is visually intrusive.

- The like-for-like replacement of a feature that would be lost. For example, this includes the creation of hedgerows on the project alignment to replace those that cannot be avoided.
 - The provision of a beneficial effect that is related to the impact but is not a like-for-like replacement of the feature to be lost. A typical example would be the construction of a bridge to replace an existing culvert, allowing associated watercourse re-naturalisation and improving the wildlife corridor function.
- 4.8.11 Mitigation measures can produce adverse as well as beneficial effects e.g. an environmental noise barrier can increase visual intrusion.
- 4.8.12 Mitigation identified during the EIA process that is required to further prevent, reduce and, where possible, offset any adverse effects on the environment will be described in the relevant topic chapters. A design to show how the required environmental outcomes and objectives of that mitigation could be met will be shown on the indicative Environmental Masterplans as part of the DCO application, however the exact detail of mitigation locations and designs will be determined through the detailed design process and a final environmental mitigation design will be developed as part of the pre-commencement process and secured through the EMP. The current outline environmental mitigation design, which is subject to ongoing design development, is shown in the map book¹⁴. It is important to note that the precise content of the map book is not intended to be 'secured' by way of the DCO – instead, they present indicative layouts to show how the relevant mitigation measures could be implemented so as to be effective in terms of mitigating effects. However, as detailed design progresses, it may be the case that the layout indicated on the maps in the map book needs to be altered – importantly, this could only be done insofar as the layout complies with the EMP.

¹⁴ The map book is available as part of the consultation material on:
<http://www.highwaysengland.co.uk/A66-NTP>

- 4.8.13 The essential mitigation measures identified in the topic chapters of the ES will be added to the the construction best practice measures summarised in the Register of Environmental Actions and Commitments (REAC), contained within the EMP as part of the DCO application. Where the project design and the parameters included in the DCO allow for some flexibility in design or how aspects of the project are constructed, the EMP will specify the mitigation objective to be achieved and any specific constraints on the design, construction or operation that need to be implemented, but will include adaptive mitigation to ensure that the mitigation as implemented achieves its desired outcome.
- 4.8.14 The preliminary likely significant effects of the project are identified taking into account the embedded mitigation. The significance of an effect is then reported after an assessment of the effectiveness of any essential mitigation that has been identified specifically to address an effect (the residual effect). This approach allows for all deliverable and committed mitigation to be taken into account in determining the significance of effects.

Construction mitigation

- 4.8.15 There are potential impacts to the environment that could occur as a result of the construction process, including incidents during construction. The timing and location of these impacts cannot be accurately predicted at this stage. An example would include spillages of fuels, oils or other chemicals.
- 4.8.16 The assessment considers reasonably foreseeable construction impacts. The likelihood of occurrence and the severity of any such incidents can be reduced through good construction site management practices. To help ensure adequate consideration of risks identified during the EIA which would relate to the construction period, the EMP will incorporate construction phase management. This will set out how construction stage mitigation measures would be implemented to manage risks and certain requirements for the contractors.
- 4.8.17 The EMP will set out the roles and responsibilities, control measures, training and briefing procedures, risk assessments and monitoring systems to be employed during planning and construction for all relevant environmental factor areas.
- 4.8.18 Each topic chapter describes measures identified to date to be adopted during construction to avoid and reduce environmental effects, such as pollution control measures.

Implementation and enforcement of mitigation

- 4.8.19 Mitigation will be secured through the DCO process, likely by being 'written in' to the DCO as a legal requirement. As such, the project must comply with the measures provided for.
- 4.8.20 The EMP will be implemented at construction stage and compliance will be secured through a Requirement of the DCO. This will be in line with the EMP submitted with the DCO application as part of the ES.
- 4.8.21 Contractors at detailed design and construction stage will be obliged to comply with the DCO.

Environmental enhancement

- 4.8.22 Enhancement is a measure that is over and above what is required to mitigate the adverse effects of a scheme. Enhancement opportunities will be considered throughout the design development. They are reported, where known at this stage, in this PEI Report and will be reported in full within the ES.
- 4.8.23 The following items may be relevant to the design and delivery of enhancement opportunities:
- National and local policy requirements
 - Policy and performance requirements of the regulating organisation
 - Scheme specific objectives
- 4.8.24 Where essential mitigation is being delivered for other purposes, this offers an enhancement opportunity where it does not compromise the original mitigation objective for that land.

4.9 Monitoring

- 4.9.1 Where the environmental assessment reported in the ES concludes that there are likely significant adverse environmental effects, schemes must undertake proportionate monitoring of associated mitigation measures, in accordance with the EIA Regulations, to ensure they are successful in achieving their mitigation objectives.
- 4.9.2 Mitigation and monitoring measures shall be identified and developed through the design and environmental assessment process and documented in the ES. Where it is possible at the current stage to specify the type of monitoring that may be required, this is described in the topic chapters of this PEI Report.
- 4.9.3 Monitoring measures would be undertaken as required during construction, handover and through the operation and maintenance periods. These measures will be secured in the DCO application. The results of monitoring shall be reported through updates of the EMP during the construction and handover phases. The EMP shall be used as a method of reporting specific monitoring and management measures post-consent.