

A303 Amesbury to Berwick Down

TR010025

6.1 Environmental Statement

Chapter 4: Environmental assessment methodology

APFP Regulation 5(2)(a)

Planning Act 2008

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

October 2018



4 Environmental assessment methodology

4.1 Environmental scoping

- 4.1.1 An EIA Scoping Report was submitted to The Inspectorate on 20th October 2017 (the EIA Scoping Report). The Inspectorate reviewed and consulted on the EIA Scoping Report and published a Scoping Opinion on 30th November 2017 (the Scoping Opinion).
- 4.1.2 Both the Scoping Opinion and the comments from the consultees have been considered in undertaking the EIA and in preparing this ES. The individual chapters within this ES provide a tabulated summary of Scoping comments relevant to that chapter. Where assessment has been undertaken in accordance with the Scoping Opinion, the relevant ES section is provided; where an alternative approach has been agreed with the relevant stakeholders, an explanation is provided. The Scoping Opinion is provided as Appendix 4.1.

4.2 General approach

The National Policy Statement - National Networks (NPSNN)

- 4.2.1 The NPSNN sets out the need for and the Government's policies to deliver NSIPs on the national road and rail networks in England. The NPSNN is used by the Secretary of State as the primary basis for making decisions on DCO applications for NSIPs, in accordance with s104 of the Planning Act.
- 4.2.2 Given the Scheme is a road network NSIP, Highways England has ensured that the EIA approach adopted is in accordance with the NPSNN. In particular, the EIA adheres to all of the methodology requirements cited within NPSNN Section 5: Generic Impacts. Mitigation measures have been developed in accordance with the mitigation requirements also set out in Section 5 of the NPSNN. There are a number of more generic policy requirements relating to EIA within the NPSNN¹ and these are identified in Table 4.1.

Table 4.1: NPSNN – Requirements relating to EIA

NPSNN para number	Requirement	Where addressed
4.15 (Environmental Impact Assessment)	All proposals for projects that are subject to the European Union's Environmental Impact Assessment Directive and are likely to have significant effects on the environment, must be accompanied by an environmental statement (ES), describing the aspects of the environment likely to be significantly affected by the project. The Directive specifically requires an environmental impact assessment to identify, describe and assess effects on	Environmental Statement prepared in accordance with the EIA Regulations.

¹ A full review of the NPSNN and the conformity of the application with each policy requirement is included within the wider application for development consent in Appendix A of The Case for the Scheme (Application Document 7.1).

NPSNN para number	Requirement	Where addressed
	<p>human beings, fauna and flora, soil, water, air, climate, the landscape, material assets and cultural heritage, and the interaction between them. Schedule 4 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 sets out the information that should be included in the environmental statement including a description of the likely significant effects of the Scheme on the environment, covering the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project, and also the measures envisaged for avoiding or mitigating significant adverse effects. Further guidance can be found in the online planning portal... In this NPS, the terms 'effects', 'impacts' or 'benefits' should accordingly be understood to mean likely significant effects, impacts or benefits.</p>	
4.16	<p>When considering significant cumulative effects, any environmental statement should provide information on how the effects of the applicant's proposal would combine and interact with the effects of other development (including projects for which consent has been granted, as well as those already in existence).</p>	Chapter 15.
4.18	<p>In some instances it may not be possible at the time of the application for development consent for all aspects of the proposal to have been settled in precise detail. Where this is the case, the applicant should explain in its application which elements of the proposal have yet to be finalised, and the reasons why this is the case.</p>	Maximum development extents and activities have been identified for the purposes of assessment. These are set out within Chapter 2.
4.19	<p>Where some details are still to be finalised, applicants are advised to set out in the environmental statement, to the best of their knowledge, what the maximum extent of the Scheme may be (for example in terms of site area) and assess the potential adverse effects which the project could have to ensure that the impacts of the project as it may be constructed have been properly assessed.</p>	Maximum development extents and activities have been identified for the purposes of assessment. These are set out within Chapter 2.
4.26 (Alternatives)	<p>Applicants should comply with all legal requirements and any policy requirements set out in this NPS on the assessment of alternatives. In particular:</p> <ul style="list-style-type: none"> The EIA Directive requires projects with significant environmental effects to include an outline of the main alternatives studied by the applicant and an indication of the main reasons for the applicant's choice, taking into account the 	Chapter 3 Alternatives. Chapter 8 and Appendix 8.24 HRA Likely Significant Effects Report and Appendix 8.25 Habitat Regulations Assessment (HRA) Statement to Inform Appropriate Assessment.

NPSNN para number	Requirement	Where addressed
	environmental effects. <ul style="list-style-type: none"> • There may also be other specific legal requirements for the consideration of alternatives, for example, under the Habitats and Water Framework Directives. • There may also be policy requirements in this NPS, for example the flood risk sequential test and the assessment of alternatives for developments in National Parks, the Broads and Areas of Outstanding Natural Beauty (AONB). 	Appendix 11.2 Water Framework Directive (WFD) Assessment. Appendix 11.5 Flood Risk Assessment (FRA).
4.27	All projects should be subject to an options appraisal. The appraisal should consider viable modal alternatives and may also consider other options (in light of the paragraphs 3.23 to 3.27 of this NPS). Where projects have been subject to full options appraisal in achieving their status within Road or Rail Investment Strategies or other appropriate policies or investment plans, option testing need not be considered by the examining authority or the decision maker. For national road and rail schemes, proportionate option consideration of alternatives will have been undertaken as part of the investment decision making process. It is not necessary for the Examining Authority and the decision maker to reconsider this process, but they should be satisfied that this assessment has been undertaken.	Chapter 3.

The Design Manual for Roads and Bridges

- 4.2.3 Guidance published by the Government for the preparation of environmental assessments of proposed road schemes is contained in the Design Manual for Roads and Bridges (DMRB) Volume 11 (Ref 4.1). This sets out both the general process and the methods for assessing individual environmental topics. This Environmental Statement adheres to Interim Advice Note (IAN) 125/15 Environmental Assessment Update (Ref 4.2), which provides a new structure of DMRB Volume 11.
- 4.2.4 DMRB Volume 11 advises on the environmental topics to be included in an EIA, and the methods to be used in the assessment for each of those topics. The topics identified in Chapters 5 to 14 of this ES are those required by DMRB and by the EIA Regulations.
- 4.2.5 The EIA undertaken adheres to up-to-date guidance contained in DMRB and Highways England IANs. The methodologies used for the assessments for individual topics in this ES are based on those set out in the EIA Scoping Report, having regard to the Scoping Opinion, feedback on the PEIR, and

discussions with relevant statutory bodies, and are described in topic chapters 5 to 14 in this ES.

Other studies

Heritage Impact Assessment

- 4.2.6 A Heritage Impact Assessment (HIA) is provided as Appendix 6.1. HIA is recommended by the International Council on Monuments and Sites (ICOMOS) for development which may affect cultural World Heritage properties, in order to evaluate effectively the potential impact of development upon the Outstanding Universal Value (OUV), Integrity and Authenticity of the WHS, and to inform the Scheme design and mitigation. The HIA focuses on the impact of the Scheme on the OUV of the WHS and the attributes that convey the OUV.

Habitats Regulations Assessment

- 4.2.7 A Habitat Regulations Assessment (HRA) Screening was undertaken for each Special Area of Conservation (SAC) and Special Protection Area (SPA) which could be affected, before the incorporation of mitigation. Where a likely significant effect could not be dismissed beyond reasonable scientific doubt an 'appropriate assessment' has been undertaken. The appropriate assessment defines 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. Required mitigation has been identified and incorporated into the Scheme design. A summary of these assessments is provided within Chapter 8 Biodiversity and the full reports (including the appropriate assessment) are provided in Appendix 8.24 and 8.25.

Water Framework Directive Assessment

- 4.2.8 A Water Framework Directive (WFD) Assessment has been undertaken and a WFD compliance assessment report is provided as Appendix 11.2. The report considers the extent to which the Scheme could impact on the current and future target WFD status of the water bodies (the River Avon, the River Till and the Upper Hampshire Avon groundwater body). Where potential adverse effects are identified, the assessment of these has informed the mitigation measures incorporated into the design and construction methods of the Scheme to remove or minimise the effect.

4.3 Study area and site boundary

- 4.3.1 The study area assessed for the ES for each environmental topic is described in the relevant topic chapter (Chapters 5 to 14). The study area is based on the DCO application boundary (hereafter referred to as the Scheme boundary) which represents the land anticipated to be potentially required temporarily and/or permanently for the construction, operation and maintenance of the Scheme.

4.4 Existing baseline and future conditions

- 4.4.1 In order to identify the effects of the Scheme on the environment, it is important to understand the environment that would be affected by the Scheme (the 'baseline conditions'). Understanding the baseline allows the measurement of changes that would be caused by the Scheme.
- 4.4.2 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 Scheme either (a) at the time that construction is expected to start (assumed to be 2021), for impacts arising from construction or, (b) at the time that the Scheme is expected to open to traffic (assumed to be 2026), for impacts arising from the operation of the Scheme. Therefore, the identification of the baseline conditions involves predicting changes that are likely to happen in the intervening period, for reasons unrelated to the Scheme.
- 4.4.3 This entails taking current conditions and potential future development into consideration and using experience and professional judgment to predict what the baseline conditions might look like prior to start of construction and operation. The list of potential future development considered as part of both the future baseline and the cumulative scenarios is discussed within Chapter 15 and presented within Appendix 15.1 and Figure 15.2.
- 4.4.4 Where there are any potential differences in the 2021 and 2026 baseline conditions or in the Scheme effects identified (both construction and operational phase), this is identified within the 'Future Baseline' sub-sections within the 'Baseline' and the 'Assessment of Effects' sections respectively of each of the topic chapters.

4.5 Potential significant effects and mitigation

Defining assessment years and scenarios

- 4.5.1 The assessment of effects involves comparing a scenario with the Scheme against one without the Scheme over time. The absence and presence of a Scheme are referred to as the 'Do Minimum' and 'Do Something' scenarios respectively. The 'Do Minimum' scenario represents the future baseline and assumes the current routine highway maintenance regime is followed with no changes to the existing infrastructure.
- 4.5.2 Depending on the topic, the effects are assessed for the 'Do Minimum' and 'Do Something' scenarios in the baseline year (assumed to be the year of opening, 2026 for the purposes of the ES) and a future assessment year (assumed to be 15 years after opening).
- 4.5.3 Demolition of the Scheme has been scoped out of the EIA on the basis that the road would become an integral part of national infrastructure and would not be decommissioned (refer Section 2.5).

Identifying potential effects

- 4.5.4 The ES addresses the requirements of the EIA Regulations in presenting: “*The description of the likely significant effects*” of the Scheme on the environment, covering “*the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development*” (see Schedule 4 paragraph 5 of the EIA Regulations).

Assessing significance

- 4.5.5 The significance of an environmental effect is typically a function of the ‘value’ or ‘sensitivity’ of the receptor and the ‘magnitude’ or ‘scale’ of the impact.
- 4.5.6 DMRB Volume 11, Section 2, Part 5 HA 205/08 ‘Assessment and Management of Environmental Effects’ provides advice on typical descriptors of environmental value, magnitude of change and significance of effects. Table 4.2 to Table 4.5 reproduce these descriptors and demonstrate how the significance of effect category can be derived. Assessments against these criteria have been made on the basis of professional judgement.

Table 4.2: Environmental value (or sensitivity) and typical descriptors

Value	Typical Descriptors
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 (or lower)	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

Table 4.3: Magnitude of change and typical descriptors

Magnitude of Change	Typical Descriptors
Major	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Moderate	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Minor	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).
	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 (Beneficial).

Magnitude of Change	Typical Descriptors
Negligible	Low or medium importance and rarity, local scale.
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
No Change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

4.5.7 Table 4.4 demonstrates how combining the environmental value of the resource or receptor with the magnitude of change produces a significance of effect category.

Table 4.4: Significance of effects matrix

Magnitude of Change	Value/Sensitivity of Receptor				
	Very High	High	Medium	Low	Negligible
Major	Very Large	Large/ Very Large	Moderate/ Large	Moderate	Slight
Moderate	Large/ Very Large	Moderate/ Large	Moderate	Slight	Neutral
Minor	Moderate/ Large	Moderate	Slight	Neutral	Neutral
Negligible	Slight	Slight	Neutral	Neutral	Neutral
No Change	Neutral	Neutral	Neutral	Neutral	Neutral

4.5.8 The DMRB recognises:

“the approach to assigning significance of effect relies on reasoned argument, professional judgement and taking on board the advice and views of appropriate organisations. For some disciplines, predicted effects may be compared with quantitative thresholds and scales in determining significance. Assigning each effect to one of the five significance categories enables different topic issues to be placed upon the same scale, in order to assist the decision-making process at whatever stage the project is at within that process”.

4.5.9 Table 4.5 illustrates how the DMRB describes the significance of effect categories. In arriving at the significance of effect, the assessor considers whether they are direct, indirect, secondary, cumulative, short, medium or long-term, permanent or temporary, positive or negative.

Table 4.5: Descriptors of the significance of effect categories

Significance Category	Typical Descriptors of Effect
Very large	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change (e.g. loss or severe damage to key characteristics) in a site or feature of local importance may also enter this category.
Large	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
Slight	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision making process but are important in enhancing the subsequent design of the project.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

- 4.5.10 Effects determined to be slight or neutral are not deemed to be significant, and as such are not reported in detail in the ES and do 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.
- 4.5.11 Not all of the environmental topics have used the above criteria or 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) and some topics do not have agreed methods of assessment or scales of measurement for either value or sensitivity (e.g. geology and soils). Therefore, each environmental topic specialist has used the information provided above, their topic specific guidance as well as their professional judgement to assess the significance of effects. However, irrespective of the criteria or approach that is required by a topic, the descriptors of significance listed in Table 4.5 have been used.
- 4.5.12 Further topic-specific details of the methodology for determining significance are presented in Chapter 5 to Chapter 14.

Mitigation measures, enhancements and residual effects

- 4.5.13 The assessments within this ES have taken into account the design measures that have been incorporated into the Scheme design (embedded mitigation measures), as well as any standard construction management activities that the Scheme would implement through the OEMP and in accordance with NPSNN.

4.5.14 Highways England has included the mitigation measures necessary to address the Scheme's potentially significant adverse environmental effects identified during the EIA process as far as is reasonably practicable. Mitigation of potentially significant adverse environmental effects (including, where appropriate, any proposed monitoring arrangements) was an iterative part of the Scheme development following the hierarchy below:

- a) Avoidance – incorporation of measures to avoid the effect, for example, alternative design options or modifying the Scheme programme to avoid environmentally sensitive periods.
- b) Reduction – incorporation of measures to lessen the effect, for example, fencing off sensitive areas during construction and implementing an Environmental Management Plan (EMP) to reduce the potential impacts from construction activities.
- c) Compensation/Remediation – where it is not possible to avoid or reduce a significant effect then offsetting measures have been considered, for example the provision of replacement habitat to replace that lost to the Scheme or remediation such as the clean-up of contaminated soils.
- d) Enhancement – where possible enhancement measures have been incorporated into the Scheme. Enhancement measures are considered to be over and above any avoidance, mitigation and compensation measures required to remove the adverse impacts of the Scheme. Enhancement measures are not factored into the determination of residual significant effects. However, the potential additional benefits are still identified within the ES.

4.5.15 With regard to the protection of internationally designated or inscribed sites, Highways England has liaised throughout the EIA process with the relevant stakeholders to ensure that the Scheme includes the requisite measures to:

- a) ensure that the OUV of the WHS is maintained; and
- b) ensure that the integrity of the River Avon SAC and the Salisbury Plain SAC and SPA is not adversely affected.

4.5.16 Within this ES, the individual technical chapters identify the mitigation required to mitigate any potential significant adverse effects. This mitigation has been identified and incorporated into the Scheme design and is referred to as 'embedded mitigation'. The embedded mitigation is shown on the Environmental Masterplan (Figure 2.5) and described in Table 2.3c of the OEMP. Effects that remain after mitigation are referred to as residual effects. The identification of the significance of the residual effects is the key outcome of the ES.

Construction and operational effects

4.5.17 The EIA has considered impacts during the construction and operation of the Scheme. The construction phase assessment addresses both the temporary activities involved in building the Scheme and the subsequent permanent presence of the Scheme once constructed; where relevant, these temporary and permanent effects are described separately. The operational assessment considers the situation when the Scheme is being used by traffic. For in combination effects (described below), the effects of both the construction and the operational phases on a single receptor are considered.

Assessment of cumulative and in combination effects

4.5.18 Cumulative effects are the result of multiple impacts on environmental receptors or resources. There are principally two types of cumulative impacts:

- a) The combined action of a number of different projects, cumulatively with the project being assessed, on a single resource/receptor (cumulative); and
- b) The combined action of a number of different environmental topic specific impacts upon a single resource/receptor (in combination).

4.5.19 The cumulative and in combination effects assessment is provided in Chapter 15.

4.6 Major events

Legislative requirements

4.6.1 The EIA Regulations, which enacted the 2014 EIA Directive introduced a requirement to consider major accidents and disasters. Specifically, Regulation 5(4) requires that:

'The significant effects to be identified, described and assessed under paragraph (2) include, where relevant, the expected significant effects arising from the vulnerability of the proposed development to major accidents or disasters that are relevant to that development.'

4.6.2 Schedule 4(8) of the EIA Regulations also require that the ES include:

'A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. ...Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies'.

4.6.3 It is considered likely that the original changes to the EIA Directive that introduced the requirement to consider major accidents and disasters were made in order to bring certain other statutory requirements, mainly other EU Directives, within the overall 'wrapper' of EIA and the ES. This is implied both in the Directive itself and the domestic Regulations, which cite two specific Directives as examples of risk assessments to be brought within EIA; these are Directive 2012/18/EU of the European Parliament and of the European Council (the 'Seveso III Directive') which deals with major accident hazard registered sites - enacted in the UK by the Control of Major Accident Hazards Regulations 2015) and Council Directive 09/71/Euratom, which deals with nuclear sites. Neither of these Directives is relevant to the Scheme.

Methodology

4.6.4 At the time of writing there is no published or adopted guidance for the assessment of major accidents and disasters. However, the methodology presented below is considered to provide an appropriate approach to assessment.

4.6.5 For the purposes of this assessment, major accidents and disasters are collectively referred to as 'major events'.

4.6.6 The proposed approach to the assessment of major events follows a four-stage process which, in summary, is as follows:

- a) Apply professional judgement to develop project specific definitions of major events;
- b) Identify any major events that are relevant to and can affect a project;
- c) Where major events are identified, describe the potential for any change in the assessed significance of the project on relevant environmental topics in qualitative terms. Report the conclusions of this assessment within the individual environmental topics; and
- d) Clearly describe any assumed mitigation measures, to provide an evidence base to support the conclusions and demonstrate that likely effects have been mitigated/managed to an acceptable level.

4.6.7 The initial stage requires a definition of major events to be agreed. For the purposes of this assessment a major event is defined as an acute or chronic accident or disaster, of human or natural origin, which occurs either as a consequence of, or which interacts with, the construction or operation of the Scheme, and which has substantial consequences for people or the environment.

4.6.8 It is important to consider both the Scheme as a source of major events (for example if a bridge or the tunnel were to collapse) and a receptor of major events (for example if there were a wildfire or major flood event). The above definition does not distinguish between a major accident and a major disaster

as there is substantial overlap; however, it is recognised that an accident is necessarily of human origin, whereas a disaster can have a human or natural origin.

4.6.9 The methodology adopted has included three main tasks during stage b) of the assessment process (the screening of major events); these are as follows:

- a) Task 1: a long list of all possible major events was developed. This list drew upon a variety of sources, including the UK Government's Risk Register of Civil Emergencies. Major events with little relevance in the UK (for example famine) were not included. Stage 1 also included an initial review of potential receptors, to identify any receptor groups that it was not considered necessary to include in the assessment.
- b) Task 2: a screening exercise was undertaken to review the long list of major events and to give consideration to their relevance to the Scheme, and therefore whether they should be included on the project specific short list of events requiring further consideration, including by topic specialists.
- c) Task 3: where further design mitigation is unable to remove the potential interaction between a major event and a particular topic, the relevant ES chapter identifies the potential consequence for receptors covered by the topic and gives a qualitative evaluation of the potential for the significance of the reported effect to be increased as a result of a major event.

Task 1 and 2 findings

Task 1

4.6.10 A copy of the long list of major events is provided in Appendix 4.2. Although the majority of these major events are already considered under other legislative or design requirements, this is not considered to be sufficient reason to eliminate the major event from any further consideration.

4.6.11 It is considered reasonable and proportionate to exclude certain receptor groups from the outset. Construction workers, as a receptor, have been excluded from the assessment, because existing legal protection is considered to be sufficient to minimise any risk from major events to a reasonable level. Legislation in force to ensure the protection of workers in the workplace includes:

- a) Construction (Design and Management) (CDM) 2015 Regulations;
- b) The Management of Health and Safety at Work Regulations (1999);
- c) The Workplace (Health, Safety and Welfare) Regulations 1992; and
- d) Health and Safety at Work etc. Act 1974 (HSWA).

4.6.12 Another potential source of major events related to the Scheme is road traffic accidents during its operation. These can clearly impact on people through fatalities and serious injury, but can also impact on the environment, through the spillage of fuel and hazardous loads. However, for the Scheme, the Stage 2 Economic Appraisal Report identified that there would be an overall reduction in the number of accidents. The Economic Appraisal Report states that:

“The accident and safety impacts were assessed quantitatively ... The assessment demonstrates that all options will reduce accidents due to the replacement of the existing single carriageway with a grade-separated dual carriageway. It is estimated that the Scheme would save six accidents per year over the appraisal period”.

4.6.13 As such, although the ES will still consider the risk of spillages, as part of the assessment of road drainage and the water environment (in line with DMRB Volume 11 requirements), the potential for such accidents to affect people, as receptors under the topic of human health, is not considered further.

Task 2

4.6.14 In general, major events, as they relate to the Scheme, fall into three categories:

- a) Events that could not realistically occur, due to the type of Scheme or its location;
- b) Events that could realistically occur, but for which the Scheme, and associated receptors, are no more vulnerable than any other development; and
- c) Events that could occur, and to which the Scheme is particularly vulnerable, or which the Scheme has a particular capacity to exacerbate.

4.6.15 The screening stage was undertaken primarily to identify this third group of major events, which would then form the shortlist of events to be taken forward for further consideration.

4.6.16 This screening stage included a workshop attended by a number of topic specialists and a representative of Highways England. Topic specialists who attended were those whose topics would be most likely to interact with major events.

4.6.17 The results of the screening exercise undertaken for the long list of events are provided in Appendix 4.2.

Task 3

- 4.6.18 Task 3 requires more detailed consideration of the short list of major events developed during Stage 2, though this may only mean that the risk needs to remain on the design risk register until it is closed out through design. Major events that were included on the short list and which have subsequently been considered in more detail are presented in Table 4.6.

Table 4.6: Major events shortlisted for further consideration

Major Event	Reason for consideration on Short List	Potential Receptors	Source topics	Does ME Need to be considered further?	Where Considered
Sinkholes / Ground instability	Phosphatic chalk is known to be present in the area, the properties of which may present ground stability issues.	Road users.	Geology and Soils.	Not in the ES - this issue is considered in the Land Instability Report. A risk will remain of dissolution; however the risk will be addressed through design, and there is therefore no potential for any associated effects.	Appendix 10.6 Land Instability Risk Assessment.
Radon Gas	There is increased radon potential from phosphatic chalk, which should be considered.	Road users.	Geology and Soils.	No - monitoring work has confirmed no measurable activity and therefore no risk of any related effects on receptors. Other aspects of ground gas would be considered during detailed design.	Chapter 10 Geology and Soils.
Floods	Both the vulnerability of the Scheme to flooding, and its potential to exacerbate flooding, are covered in Appendix 11.5 Flood Risk Assessment. These aspects are also reported in EIA terms in Chapter 11 Road Drainage and the Water Environment.	Road users, property and people in areas of increased flood risk.	Road Drainage and the Water Environment.	No - the issue of flooding does not need to be considered for other topics as the Flood Risk Assessment identifies no change to flood risk, and no significant risks as a result of thaw/freeze effects.	Chapter 11 Road Drainage and the Water Environment; Appendix 11.5 Flood Risk Assessment.
Lightning strikes	Elevated sections of the Scheme (such as the River Till viaduct and Countess flyover) may possibly be more prone to lightning strikes than the existing infrastructure.	Road users.	N/A	No - there is considered to be no greater vulnerability to lightning strikes than any other flyover/viaduct on the road network and any associated risks are considered to be low, therefore this does not need to be considered further.	N/A

Major Event	Reason for consideration on Short List	Potential Receptors	Source topics	Does ME Need to be considered further?	Where Considered
Heat waves	Some consideration has been given to the potential for the tunnel to be more sensitive to heat wave conditions, though it is likely that a tunnel will be less sensitive than the open road, which is directly exposed to the sun.	Road users.	N/A	No - the tunnel is below ground by several metres or tens of metres; therefore, they are likely to remain cooler than outside during a heatwave. Average year-round ground temperatures are approximately 15°C, so the deepest parts of the tunnel are likely to be several degrees cooler than outside. Using the ventilation system to provide airflow would be possible, however, this would be bringing in additional (hot) outside air and would most likely warm, rather than cool, the tunnel interior. The open sections of the Scheme are no more vulnerable than any other roads on the road network.	N/A
Wildfires	There may be some potential for scrub, grassland or heather fires, though the risk is no greater than the existing road. The reduced accident rate means the risk of a road traffic accident causing a fire is actually reduced.	Road users, habitats and species.	N/A	No – there is no heath/moorland in the vicinity, which could present a genuine risk. There is some grassland adjacent to the Scheme, however it is considered that the Scheme is no more vulnerable than the existing road, and in fact it is less vulnerable given the inclusion of the tunnel and cuttings.	N/A
Air Quality Events	Although relevant, as vehicles emissions can contribute to poor air quality, it is not considered necessary to undertake any more assessment than has been completed for the Air Quality assessment.	Road users and local residents.	Air Quality.	No - acute air quality phenomena, such as smog are highly unlikely to be an issue given the rural location of the Scheme. There is no real risk or serious possibility of acute air quality effects as a result of, or likely to affect the Scheme.	Chapter 5 Air Quality.

Major Event	Reason for consideration on Short List	Potential Receptors	Source topics	Does ME Need to be considered further?	Where Considered
Solar flare	Solar flares can interrupt radio and other electronic communications. The increased reliance on roadside technology could mean the Scheme is more vulnerable than the existing route.	Road users.	N/A	No - power supplies to the tunnel are very robust, and the risk of disruption is low, therefore it is considered unnecessary to consider any consequential environmental effects that would result due to system failure.	N/A
Road Accidents	The risk posed by spillage from hazardous loads as a result of a road traffic accident, e.g. fuel tankers, is considered in Chapter 11 Road Drainage and Water Environment. Although military vehicles may use the road, they already use the existing road, and given the reduced accident rate, it is unlikely that there will be any increase in relation to Major Events.	Road users, aquatic environment.	Road Drainage and Water.	No - this issue is already assessed in Chapter 11 Road Drainage and the Water Environment.	Chapter 11 Road Drainage and the Water Environment.
Aircraft Disasters	Although there is an RAF base in the vicinity, it is to the east of Amesbury, and there is not considered to be an increased risk to road users.	Road users, pilots and aircraft.	N/A	No - there is considered to be no greater risk of aircraft disasters as a result of the Scheme therefore this does not need to be considered further.	N/A
Bridge Failure	There are a number of bridge crossings within the Scheme including 4 green bridges and the Countess flyover. Consideration needs to be given to the consequences of bridge collapse.	Road users.	N/A	No – the design is compliant with all required standards in DMRB.	Design and Access Statement (Application Document 7.2).

Major Event	Reason for consideration on Short List	Potential Receptors	Source topics	Does ME Need to be considered further?	Where Considered
Tunnel Failure or Fire	There is a tunnel as part of the design.	Road users.	N/A	<p>No - the tunnel features a range of fire life safety measures that are detailed in the Fire Strategy. The design is compliant with the various standards and regulations to be met, which are:</p> <ul style="list-style-type: none"> • EU Directive 2004/54/EC on minimum safety requirements for tunnels in the Trans-European Road Network; • The Road Tunnel Safety (Amendment) Regulations 2009; • BD 78/99 Design of Road Tunnels • Regulatory Reform (Fire Safety) Order 2005; and • Building Regulations 2010 (for Tunnel Service Buildings). <p>Water supply for fire-fighting applications is assured by having water tanks at each portal that hold sufficient water for 1 hour of fire-fighting activity.</p>	Design and Access Statement (Application Document 7.2).
Tunnel/Bridge Closure and Traffic Diversion	Should closure of the tunnel or bridge be required, any increased effects on diversion routes could have increase environmental effects, though short durations are likely to reduce the risk of significant effects.	Road users.	N/A	Yes –the use of diversion routes is considered within topic chapters where relevant.	Chapter 5 to Chapter 15 as appropriate.
Dam Failure	Could lead to flooding of the road, but already considered in Appendix 11.5 Flood Risk Assessment.	Road users.	Drainage and Water	No – there are no dams in proximity to the Scheme, and therefore no vulnerability to dam failure. As such, this issue has been formally scoped out of the assessment.	Appendix 11.5 Flood Risk Assessment.
Flood Defence Failure	Could lead to flooding of the road, but already considered in Appendix 11.5 Flood Risk Assessment.	Road users.	Drainage and Water	No – considered within Appendix 11.5 Flood Risk Assessment.	Appendix 11.5 Flood Risk Assessment.

Major Event	Reason for consideration on Short List	Potential Receptors	Source topics	Does ME Need to be considered further?	Where Considered
Mast and Tower Collapse	To ensure any masts or towers are not within 'topple distance' of the Scheme.	Road users.	N/A	No - there are no towers or masts proposed as part of the Scheme. There is an existing mast at Stonehenge Cottages. This mast has been scoped out as the Scheme is in tunnel at this location.	
Utilities failure (gas, electricity, water, sewage, oil, communications)	There is an Esso pipeline present.	Road users.	N/A	Consultation has been undertaken with statutory undertakers, and agreements are being sought with regard to diverting or applying protective provisions to third party utilities where needed. It is therefore not considered likely that the Scheme would increase the risk of utilities failure. In terms of utilities failure affecting the Scheme, there are a number of back-up systems in place, specifically designed to provide resilience in the face of utilities failure. It is therefore not considered necessary to consider utilities failure any further in relation to the assessment of major events.	N/A
Mining Industry	Potential for current or past mining activity in the vicinity to lead to unstable ground conditions.	Road users.	Geology and Soils.	No – there has been no mining identified in the vicinity of the Scheme.	N/A
Military Accidents	There is a significant amount of military activity in the area, including military vehicles using the existing road and which will also use the Scheme. There is also a military base and munitions storage in relatively close proximity to the Scheme. There remains some potential for interaction with the Scheme during construction and operation.	Road users and local residents.	N/A – lower risk than existing.	There is considered to be no greater risk of military accidents as a result of the Scheme compared to the existing A303, therefore this does not need to be considered further.	N/A

Major Event	Reason for consideration on Short List	Potential Receptors	Source topics	Does ME Need to be considered further?	Where Considered
Bomb/vehicle attack on people	Possibility that inclusion of a tunnel will make the road more of a target for a terrorist attack.	Road users.	N/A	There is considered to be no greater risk of a bomb/vehicle attack on people as a result of the Scheme compared to any other road/tunnel within the highways network, therefore this does not need to be considered further.	N/A
Bomb/vehicle attack on Infrastructure	Possibility that inclusion of a tunnel will make the road more of a target for a terrorist attack.	Road users.	N/A	There is considered to be no greater risk of a bomb/vehicle attack on infrastructure as a result of the Scheme compared to any other road/tunnel within the highways network, therefore this does not need to be considered further.	N/A
Cyber-attacks	The increasing reliance on roadside technology could render the Scheme more vulnerable to a cyber-attack.	Road users.	N/A	There is considered to be no greater risk of a cyber-attack as a result of the Scheme compared to any other road/tunnel within the highways network, therefore this does not need to be considered further.	N/A

4.6.19 It is confirmed that all major events included on the shortlist are either already considered in the relevant topic chapter (where there is a potential related environmental effect) or else it has been concluded that there is no need for further consideration. It is concluded that with the mitigation measures already included in the design of the Scheme, no significant adverse effects from major events would be expected.

4.7 Population and health

4.7.1 An assessment of the effect of the Scheme on human health is required as per EIA Directive (2014/52/EU) which aims to achieve high levels of protection of human health and wellbeing and the environment in accordance with Schedule 4, paragraph 5(f) of the EIA Regulations. The Directive, which is reflected in the EIA regulations, requires that direct and indirect effects of a project on human health and wellbeing should be identified, described and assessed. The Directive also requires consideration of potential interactions between human health and wellbeing and other aspects included in the directive such as land, air, climate, noise and landscape when identifying and evaluating potential effects.

4.7.2 There is no consolidated methodology or accepted good practice for the human health topic, however the NPSNN (paragraph 4.81) requires that an assessment of impacts on human health should be set out in environmental statements and the scope of the assessment reflects existing Highways England guidance.

4.7.3 The human health assessment addresses health in the first instance by utilising individual guidance for air quality, noise and vibration, landscape and visual, transport and people and community effects. To enable overall health conclusions to be drawn, a qualitative assessment of information collated via the topic assessments has been undertaken through using the approach set out in the London Healthy Urban Development Unit (HUDU) Planning for Health Rapid HIA Tool (Ref 4.3). The HUDU tool is generally recognised as an appropriate mechanism for assessing human health impacts.

4.7.4 In order to undertake a consideration of the Scheme's effects on human health, the collated findings of the following topics, which are conducted principally in isolation as is required by their methodologies, have been utilised; Air Quality, Noise and Vibration, Landscape and Visual, People and Communities, and Climate. The collated findings and associated Human Health assessment are summarised within Chapter 13 People and Communities and presented in Appendix 13.2 Human Health.

References

- Ref 4.1: Highways Agency (2007) Design Manual for Roads and Bridges: Volume 11
<http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/index.htm>
- Ref 4.2: Highways England (2015), Interim Advice Note 125/15, Environmental Assessment Update
- Ref 4.3: NHS, HUDU Planning for Health (2015), Rapid Health Impact Assessment Tool, Second Edition

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