

# A303 Amesbury to Berwick Down

TR010025

**Deadline 2**  
**8.10.8 Climate Change (CC.1)**

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**The Infrastructure Planning (Examination Procedure)**

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**A303 Amesbury to Berwick Down**

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**Climate Change (CC.1)**

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## 8 Climate Change (CC.1)

### Question CC.1.1

Please identify how the scheme would comply with the NPSNN in relation to climate change adaptation?

### Response

1. The Applicant has taken the steps required to confirm that the scheme will comply with the National Policy Statement for National Networks (NPSNN) in relation to climate change adaptation. Table 14.1 in Environmental Statement (ES) Chapter 14 [APP-052] sets out how the climate assessment has taken account of the relevant requirements of the NPSNN. The main points are summarised below.
2. The NPSNN sets a requirement that (NPSNN reference 4.40) "...applicants must consider the impacts of climate change when planning location, design, build and operation. Any accompanying environment statement should set out how the proposal will take account of the projected impacts of climate change". As such, Chapter 14 of the ES, section 14.8 [APP-052] explains how the scheme would account for the projected impacts of climate change through design, mitigation and enhancement measures during both construction and operation. This section of the ES is summarised in brief below.
3. The Scheme would be designed to improve its resilience to climate change through a range of design and material specification measures including where practicable, the use of construction materials with superior properties (such as increased tolerance to fluctuating temperatures). The Contractor will be defining materials to be used during the detailed design process. Highways England will review its proposals to ensure, where economically and feasibly practicable within the design standards of Scheme of this nature, that materials are of the highest specification.
4. The Scheme design would incorporate current road design standards and future climate change allowances. These measures are embedded within the OEMP [APP-187] such as:
  - MW-WA14, Surface water drainage: The main works contractor shall ensure that the surface water drainage system reflects the mitigation measures identified within the ES and conforms with Requirement 10 of the DCO.
  - MW- WA13 Flood Risk general provisions: minimising construction works within the floodplain areas, where practicable. According to the OEMP-MW-WAT13, the main work contractors shall be responsible for obtaining from the Environment Agency updated modelled water levels (1% AEP including climate change) as well as updated information on the required standard of protection of the flood defences. The main works contractors shall also ensure that all designs do not cause increased risk levels from those assessed in the Flood Risk Assessment (FRA) included in the ES (Appendix 11.5), and include the provision of a safe refuge during a flood event.

5. During operation, a range of measures would be in place to improve the resilience of the scheme to climate change, including:
  - Maintenance plans for drainage systems: The Handover Environmental Management Plan (HEMP) will include as built information and other details in a form that can be utilised by the body responsible for long term management and maintenance so that the body can prepare environmental management plans for the maintenance of the Scheme for the operational phase. This would be secured through item MW-G11 in the OEMP [APP-187].
  - To improve the resilience of the Scheme during extreme weather events, an emergency system for road users would be included within the Scheme design, for example the use of a Variable Messaging System (VMS). This is an expected design requirement for schemes of this size and nature.
6. The NPSNN sets a requirement that (NPSNN reference 4.41) “Where transport infrastructure has safety-critical elements and the design life of the asset is 60 years or greater, the applicant should apply the UK Climate Projections 2009 (UKCP09) high emissions scenario (high impact, low likelihood) against the 2080 projections at the 50% probability level”. As such, the Applicant has developed future baseline conditions using these criteria, as set out in the ES chapter on climate, Section 14.6 [APP-052] and ES Appendix 14.1 (climate resilience baseline) [APP-288]. These future baseline conditions have been considered during the identification of potential effects on the scheme, as well as during the identification of design, mitigation and enhancement measures identified above.
7. The NPSNN sets a requirement that (NPSNN reference 4.42) “The applicant should take into account the potential impacts of climate change using the latest UK Climate Projections available at the time and ensure any environmental statement that is prepared identifies appropriate mitigation or adaptation measures. This should cover the estimated lifetime of the new infrastructure”. As such, the ES chapter on climate, Section 14.6 [APP-052] and the ES appendix providing the climate resilience baseline, Appendix 14.1 [APP-288] demonstrate application of the latest UK climate projections up to the 2080s (2070-2099); since it is considered the project lifetime, including construction and operational stages, to be 60 years. The projections have been considered during the identification of potential effects, as well as during the identification of the mitigation and adaptation measures that have been incorporated into the OEMP [APP-187].
8. The NPSNN sets a requirement that (NPSNN reference 4.43) “The applicant should demonstrate that there are no critical features of the design of new national networks infrastructure which may be seriously affected by more radical changes to the climate beyond that projected in the latest set of UK climate projections. Any potential critical features should be assessed taking account of the latest credible scientific evidence on, for example, sea level rise (e.g. by referring to additional maximum credible scenarios such as from the Intergovernmental Panel on Climate Change or Environment Agency) and on the basis that necessary action can be taken to ensure the operation of the infrastructure over its estimated lifetime through potential further mitigation or

adaptation". As such, Appendix 14.1 [APP-288] uses the UKCP09 Weather Generator and Threshold Detector, (the latest climate projections data available at the time of preparing the ES) to assess the future likelihood of severe weather events, as well as change to average climatic conditions. This provides an indication of some of the potentially more radical changes to the local climate. The climate resilience assessment and in-combination climate change impact assessments, Section 14.3 [APP-052], are based on these projections, as well as UKCP09 projections for change to average climate conditions up to the 2080s (2070-2099); the 2080s being the furthest in the future that the projections data was available for at the time of the preparation of the ES. Sections 14.7 and 14.9 [APP-052], and Appendix 14.2 (Summary of climate impact effects) [APP-289], consider any potentially critical features of the design which may be seriously affected by climate change. The Applicant concludes that, based on the mitigation built into the design and operational management practices, as well as the UKCP09 climate change projections, information from other environmental disciplines, and details on scheme design, that none of the potential impacts identified would be significant (and are therefore classed as non-significant) as stated in 14.9.14 [APP-052].

9. The NPSNN sets a requirement that (NPSNN reference 4.44) "Any adaptation measures should be based on the latest set of UK Climate Projections, the Government's national Climate Change Risk Assessment and consultation with statutory consultation bodies. Any adaptation measures must themselves also be assessed as part of any environmental impact assessment and included in the environment statement, which should set out how and where such measures are proposed to be secured". As such, the ES chapter on climate, Section 14.8 [APP-052] considers the identification and implementation of adaptation measures. These measures are based on UK Climate Projections 2009 (UKCP09), the legislative and policy framework, and consultation with environmental assessment discipline leads. UKCP09 was the latest climate projections data available at the time that the ES was prepared. UKCP09 data was updated to form UK Climate Projections 2018 (UKCP18) in November 2018. The Applicant is familiar with, and has undertaken a review of, UKCP18 to assess whether the latter data would affect the conclusions of Chapter 14 of the ES. UKCP18 projections are broadly consistent with UKCP09, however, with the greater chance of hotter, drier summers and warmer, wetter winters. The outcome of the assessment of impact of these climate factors on the scheme receptors using UKCP09 was identified as not significant. Therefore, the updates to the UKCP09 data identified in the UKCP18 study do not affect the likelihood nor consequence ratings of any of the identified possible impacts. Furthermore, no additional impacts are expected as a consequence of the UKCP18 data. Consequently, the new projections do not affect the conclusions of Chapter 14, which is that none of the potential impacts are identified as significant.

## Question CC.1.2

The NPSNN, paragraph 4.42, advises that should a new set of UK Climate Projections become available after the preparation of any ES, the ExA should consider whether they need to request additional information from the applicant. At paragraph 4.44, it explains that any adaptation measures should be based, amongst other things, upon the latest set of UK Climate Projections.

- i. Has the Applicant taken account of any new set of UK Climate projections that have become available after the preparation of the ES, including the UKCP18 released in November 2018?
- ii. Please provide an assessment of how this next generation of UK Climate Projections would affect the conclusions of Chapter 14 of the ES.

## Response

- i. **Has the Applicant taken account of any new set of UK Climate projections that have become available after the preparation of the ES, including the UKCP18 released in November 2018?**
  1. Chapter 14 of the Environmental Statement (ES) [APP-052] was drafted in accordance with UK Climate Change Projections 2009 (UKCP09), which was the latest set of climate projections data available at the time of preparing the ES. The Applicant is familiar with and has undertaken a review of the latest set of UK climate projections to have been published, UK Climate Projections 2018 (UKCP18), released in November 2018, in order to assess the extent to which they would affect the conclusions of Chapter 14 of the ES.
- ii. **Please provide an assessment of how this next generation of UK Climate Projections would affect the conclusions of Chapter 14 of the ES.**
  2. As noted in response to question CC.1.1, UKCP18 projections are broadly consistent with UKCP09 however the greater chance of hotter, drier summers and warmer, wetter winters is identified in UKCP18. The outcome of the assessment of impact of these climate factors on the Scheme receptors using UKCP09 was identified as not significant. Therefore, the updates to the UKCP09 data identified in the UKCP18 projections do not affect the likelihood nor consequence ratings of any of the identified possible impacts. Furthermore, no additional impacts are expected as a consequence of the UKCP18 data. Consequently, the new projections do not affect the conclusions of Chapter 14, which are that none of the potential impacts are identified as significant.
  3. Other updates in the UKCP18 projections when compared to the UKCP09 projections are that UKCP18 is based on an updated baseline period (1981-2000, rather than a 1961-1990 baseline), a wider range of emissions scenarios (four scenarios versus three scenarios available under UKCP09) and parameters (47 parameters versus 20 parameters available under UKCP09). These changes do not have an impact on the likelihood or consequence of impact categories and therefore would not alter the conclusions of the assessment presented in Chapter 14, which are that none of the potential impacts are identified as significant.

### Question CC.1.3

Please explain how the ES demonstrates that there would be no critical features of the scheme which might be seriously affected by more radical changes to the climate beyond that projected in the latest set of UK climate projections.

If the ES fails to do so, then please provide a further explanation of this matter.

### Response

1. Within the climate resilience assessment and in-combination climate change impact assessment [APP-052 (Chapter 14 – Climate), APP-288 (Climate Resilience Baseline) and APP-289 (Summary of Climate Impact Effects)], the Applicant has assessed critical features of the design of the scheme that may be significantly affected by projected changes to the local and global climate. The approach applied is in line with the requirements set out in the National Policy Statement for National Networks (NPSNN) (NPSNN reference 4.43), as outlined in our response to the Examining Authority's written question CC.1.1.
2. Potential critical features have been assessed taking account of the latest credible scientific evidence at the time of the assessment, the UK Climate Projections 2009 (UKCP09), and on the basis that necessary action can be taken to maintain operation of the infrastructure over its estimated lifetime through potential further mitigation or adaptation. This is in line with the requirements of the NPSNN which states in para. 4.43 "Any potential critical features should be assessed taking account of the latest credible scientific evidence on, for example, sea level rise (e.g. by referring to additional maximum credible scenarios such as from the Intergovernmental Panel on Climate Change or Environment Agency) and on the basis that necessary action can be taken to ensure the operation of the infrastructure over its estimated lifetime through potential further mitigation or adaptation."
3. Environmental Statement (ES) Appendix 14.1, [APP-288] applies the UKCP09 Weather Generator and Threshold Detector to assess the future likelihood of severe weather events, as well as change to average climatic conditions that are considered to be relevant to the construction and operation of the proposed scheme. The Weather Generator and Threshold Detector are post-processing tools that can be (and were) applied to data within UKCP09. They allow for the assessment of climate change impacts and testing of impact thresholds beyond the standard UKCP09 data and provide a reasonable and sufficient method of assessing more radical changes. They allow users to investigate how often thresholds, such as temperatures or daily rainfall greater or less than a certain level, are likely to be exceeded in the future. This provides an indication of some of the potentially more radical changes to the local climate than those provided for in the UKCP09 projections. In terms of the Scheme, the Applicant has assessed [APP-289] a sufficient variety of projected future changes to the frequency of severe weather events, including frequency of heatwaves (3+ days with max daily temp of >30°C and min daily temp of >15°C), frequency of days when the temperature exceeds 28°C, frequency of dry spells lasting ten or more



days, and frequency of days when precipitation is greater than 40mm per day (this is defined as likely to cause flooding if exceeded in a three hour period by the Flood Forecasting Centre<sup>1</sup>). There is no single accepted methodology for the climate change assessment in EIA. The approach to climate assessment for the Scheme therefore follows guidance published by the Institute of Environmental Management and Assessment (IEMA) 'Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation', Ref 14.10 in the ES Chapter 14 [APP-052] which advocates the use of UKCP09 projections but does not go so far as to specify which set of projections to use. In line with the requirements of NPSNN paragraph 4.41 however the Applicant has applied the conservative UKCP09 high emissions scenario (high impact, low likelihood) against the 2080 projections at the 50% probability level. The climate resilience and in-combination climate change impact assessments are based on these severe weather event frequency projections, as well as UKCP09 projections for changes to average climate conditions up to the 2080s (2070-2099). The UKCP09 projections were the latest set of projections available at the time of the development of the environment statement.

4. Chapter 14, sections 14.7 and 14.9 [APP-052], and the ES appendix concerned with the climate resilience baseline, Appendix 14.2 [APP-289], consider any potentially critical features of the design which may be seriously affected by climate change, including potential in-combination effects.
5. The Applicant concludes that, based on the assessment undertaken, including the use of the MET Office Weather Generator and Threshold Detector no critical feature of the Scheme would be seriously affected by more radical changes to the climate beyond that projected in UKCP09.

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<sup>1</sup> Refer to <http://www.fcc-environment-agency.metoffice.gov.uk/>

## Question CC.1.4

Please identify whether any proposed adaptation measures would themselves give rise to consequential impacts.

## Response

1. Chapter 14, Table 14.13 of the Environmental Statement (ES) [APP-052] and the Climate Resilience Baseline, Appendix 14.2 [APP-288] set out the design, mitigation and enhancement measures that are embedded within the Outline Environmental Management Plan (OEMP) [APP-187], including those that will be defined by the contractor and approved by Highways England for both the construction and operation phases of the Scheme.
2. The proposed adaption measures include:
  - i. Specification of materials resilient to climate change (the Contractor will be defining materials to be used during the detailed design process. Highways England will review its proposals to ensure, where economically and feasibly practical within the design standards of a scheme of this nature, that materials are of the highest specification);
  - ii. Incorporation of current road design standards and future climate change allowances included in ES para 11.8.3 [APP-049] and in Appendix 11.3 (road drainage strategy) [APP-281], secured by paragraph 10 of Schedule 2 to the draft DCO, and (iii) drainage maintenance plans, to be included in The Handover Environmental Management Plan (HEMP) and secured through item MW-G11 in the OEMP [APP-187].
3. The process to identify the climate change adaptation measures was undertaken in conjunction with the Scheme design team and Environmental specialists as part of the Climate Change Risk assessment. This approach considered the wider construction and operation activities and environmental impacts of the Scheme and is summarised in paragraphs 14.3.18 to 14.3.25 for the ES Climate Chapter [App-052]. In undertaking this process no proposed adaption measures were identified as giving rise to consequential impacts.

## Question CC.1.5

The ES, Chapter 14, paragraph 14.3.13, recognises that identifying and quantifying the balance of what is additional greenhouse gas (GHG) emissions versus displaced with any level of certainty is challenging.

- i. Please explain in detail the assessment that has been made in this respect.
- ii. What degree of reliability does the Applicant assert should be placed upon the ES approach to this aspect of the GHG impact assessment?

## Response

### *i. Please explain in detail the assessment that has been made in this respect.*

1. In the greenhouse gas (GHG) assessment presented in the Environmental Statement (ES) Chapter 14 on climate [APP-052] we have considered both:
  - a. Displaced GHG emissions: existing sources that may be displaced as a result of the Scheme being consented i.e. GHG emissions that may occur without the Scheme.
  - b. Additional GHG emissions: sources of GHG emissions that would not occur but for the Scheme (e.g. all construction related activities, embodied carbon of materials).
2. The following outlines the quantification methodology for additional emissions as provided in the Environmental Statement Chapter 14, 14.3.1 [App-052]:

Phase	GHG emission source	Quantification methodology
Construction	Embodied carbon in raw materials and transportation of materials to site	IAN 114/08 Highways Agency Carbon Calculation and Reporting Requirements supplemented by the Highways England Carbon Tool, ES Chapter 14, section 14.3 [APP-052]
Construction	Construction activities (including fuel, electricity, water, business and employee travel, waste and waste transport)	Methodology set out in the ES Chapter 14, section 14.3 [APP-052] (5,

Operational	Energy and maintenance for operation	Methodology set out in the ES Chapter 14, section 14.3[APP-052])
Operational	Road user emissions	Web Transport Analysis Guidance (TAG) Greenhouse Gases Workbook from DfT TAG Unit A3 Environmental Impact Appraisal

3. The aim of the GHG assessment was to focus on the quantification of the additional GHG emissions associated with the Scheme. Climate assessment methodology published by the Institute of Environmental Management and Assessment (IEMA) Ref 14.18, ES Chapter 14 [App-052] requires only additional emissions occurring as a result of the Scheme to be assessed in terms of their potential impact on the climate. Furthermore, only additional emissions need to be considered in terms of their impact on the UK achieving its carbon reduction targets. Displaced emissions are not considered additional as they may occur anyway whether or not the Scheme is consented. Only displaced emissions from road users have been considered within the GHG assessment. It is possible that there may be some displaced emissions from existing energy use i.e. for road signs and lighting and for current maintenance activities however a conservative approach has been taken to include all such emissions from the Scheme as additional due to a substantial variation in operational requirements. Estimated additional emissions occurring as a result of the Scheme's construction are presented in chapter 14 of the ES, Table 14.14 [App-052]. For convenience this table has been reproduced below.

<b>Reporting category</b>	<b>Emission (tCO<sub>2</sub>e)</b>	<b>% of construction emissions</b>
Embodied carbon in raw materials and transportation of materials to site	267,100	57%
Fuel, electricity and water	198,935	43%
Business and employee travel	645	1%

Waste disposal and waste transport	235	1%
Total	466,900	100%

4. For road user emissions the GHG assessment has used outputs derived from the Web Transport Assessment Guidance (WebTAG) Greenhouse Gases Workbook. The WebTAG assessment uses the whole traffic model study area and presents GHG emissions from road users before and after the Scheme. WebTAG considers both additional and displaced road user emissions arising as a result of the Scheme. The additional road user GHG emissions identified in the WebTAG assessment are presented in the ES table 14.15 [Ref App-052] and represent the GHG impact of the Scheme from road users due to the Scheme. Table 14.15 presents total road user GHG emissions for the 'Year of opening' and the 'Design year' both with the Scheme (Do-something scenario) and without the Scheme (Do-minimum). The variation between the Do-minimum and Do-something scenarios represents the additional operational emissions as a result of the Scheme. Less than 2% of the additional emissions presented in table 14.15 result from energy and maintenance while the remaining 98% is due to road users. This table is reproduced below for convenience:

Reporting category	Year of opening (tCO <sub>2</sub> e)	Design year (tCO <sub>2</sub> e)
Do-minimum	59,124,590	66,939,225
Do-something	59,148,580	66,973,140
Variation	23,990	33,915

5. The quantification method for GHG emissions within the WebTAG estimates the changes in energy consumption using the road transport fuel and electricity consumption. Estimated fuel and electricity consumptions are converted into tonnes of carbon dioxide equivalents using the relevant emission factors given in TAG Data Book Table A3.3 "Carbon dioxide equivalent emissions per litre of fuel burnt/ kilowatt hour used". The consumption estimates incorporate the Renewable Transport Fuel Obligations, energy content of fuels and vehicle fuel efficiencies.
- ii. **What degree of reliability does the Applicant assert should be placed upon the ES approach to this aspect of the GHG impact assessment?**
6. As identified in the ES Chapter 14 on climate, paragraph 14.3.13 (APP-052) identifying and quantifying the balance of what is additional versus displaced GHG emissions with certainty is challenging, however the approach taken for the GHG assessment has followed published guidance (including the IEMA Environmental Impacts Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance Ref 14.18, ES Chapter 14 (APP-052) and DfT WebTAG assessment) which provides reliability and transparency in the method used and the outputs derived.

7. All GHG emissions arising from the construction, operation and maintenance of the Scheme are identified as additional emissions and have been assessed in line with published guidance for the calculation of GHG emissions, as detailed in the ES Chapter 14, Sections 14.6, 14.7 and 14.18. [APP-052]. As discussed in paragraph 3 above (in response to part (i) of the question) it is possible that there may be some displaced emissions from energy use and maintenance of the existing road however a conservative approach has been taken to include all operational emissions as additional. Road user emissions arising as a result of the Scheme have the potential to be either displaced from another part of the road network or to be in addition to emissions that may occur were the Scheme to not be built.
8. Road user emissions have been derived from the WebTAG assessment which is based on the whole traffic model study area and considers both additional and displaced GHG emissions from the Scheme. The use of WebTAG data for the GHG assessment provides consistency with other areas of assessment within the ES, such as the ES Chapter 5 on air quality [APP-043]. WebTAG is published by Department for Transport to provide a consistent and reliable method for assessing the environmental impacts of a road scheme on the environment.
9. In view of the use of the published GHG emissions calculation guidance and the use of the WebTAG environmental assessment method a high degree of reliability can be placed upon the ES approach to this aspect of the GHG impact assessment.

## Question CC.1.6

The ES, Chapter 14, paragraph 14.8.2, states that no operational mitigation measures have been proposed and that it would not be practical to monitor GHG emissions from road users during operational phase.

- i. Please explain further how the figures for GHG emissions set out in Table 14.15 have been derived and exactly what they represent.
- ii. Please provide further justification for the ES conclusion set out in paragraph 14.19.11, that the GHG impact of the scheme would not have a material impact on the Government meeting its carbon reduction targets.

## Response

- i. **Please explain further how the figures for GHG emissions set out in Table 14.15 have been derived and exactly what they represent.**
  1. The Environmental Statement (ES) chapter on climate, at Table 14.15 [APP-052] presents the outputs of a greenhouse gas (GHG) impact assessment of road user emissions. The assessment considers GHG emissions from road users under two operational scenarios. The first row outlines a 'do-minimum' scenario whereby the Scheme does not go ahead. This represents business-as-usual and provides a baseline against which the Scheme will be compared. The second row outlines a 'do-something' scenario whereby the Scheme does go ahead. The variation in GHG emissions presented between each of the scenarios (final line in the table), along with the operational energy and maintenance, represents the operational GHG impact from the Scheme (i.e. the additional GHG emissions that are anticipated to occur as a result of the Scheme). The GHG emissions as presented in the table are shown in tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e) for the year of scheme opening (2026) and the design year (2041). TCO<sub>2</sub>e is a measure used to compare emissions from various greenhouse gases based upon their global warming potential (GWP) For example, the GWP for methane over 100 years is 21. This means that emissions of one metric tons of methane is equivalent to emissions of 21 metric tons of carbon dioxide.
  2. Department for Transport's Web Transport Analysis Guidance (WebTAG) Greenhouse Gases Workbook has been used to calculate road user GHG emissions. Data presented in Table 14.15 has been derived directly from the WebTAG assessment. The quantification method for GHG emissions within WebTAG estimates the changes in energy consumption using the road transport fuel and electricity consumption formula in TAG Data Book Tables A1.3.8 and A1.3.9. The WebTAG assessment is based on Traffic modelling data and encompasses the whole traffic model study area for consistency with WebTAG methodology.
  3. Once the fuel and electricity consumptions have been estimated it is converted into tonnes of carbon dioxide equivalents using the relevant emission factors given in TAG Data Book Table A3.3 "Carbon dioxide equivalent emissions per litre of fuel burnt/ kilowatt hour used". The consumption estimates incorporate the

Renewable Transport Fuel Obligations (RTFO) energy content of fuels and vehicle fuel efficiencies. The RTFO requires suppliers of transport fuel in the UK to demonstrate that a percentage of the fuel supplied is from renewable and sustainable sources. The outputs of the WebTAG Greenhouse Gases Workbook used for the climate change assessment consist of the yearly road-user emissions with ('do-something') and without ('do-minimum') the Scheme. The difference between the two scenarios therefore represents the additional GHG emissions from the Scheme associated with road users.

- ii. Please provide further justification for the ES conclusion set out in paragraph 14.19.11, that the GHG impact of the scheme would not have a material impact on the Government meeting its carbon reduction targets.**
4. In line with the requirement of the National Policy Statement for National Networks (NPSNN), Table 14.16 [APP-052] provides an assessment of the Scheme's GHG emissions impact against the UK Government's five-year carbon budgets. The temporal periods and binding GHG emissions caps agreed for the 3rd, 4th and 5th carbon budgets are presented in 14.9.7 [Ref App-052].
  5. Construction of the Scheme will fall within the 3rd and 4th carbon budgets while operation of the scheme will commence during the 4th carbon budget period. The Scheme has also been compared against the most recently agreed 5th carbon budget. The 6th carbon budget 2033 to 2037 and further budgets through to 2050 have not yet been set.
  6. The outputs from the carbon assessment presented in table 14.16 [APP-052] indicate that the greatest period of emissions impact during the life of the Scheme will be during the 4th carbon budget period (2023 to 2027) when net emissions are estimated to be 449,231tCO<sub>2e</sub>. This will equate to 0.023% of the 4th carbon budget (1,950 MtCO<sub>2e</sub>). Construction is a one-off activity which will be completed in the 4th carbon budget period. There will only be emissions from the operation of the Scheme after the year of opening.
  7. Further evidence that the Scheme will have an immaterial impact on the Government meeting its carbon reduction targets is demonstrated by a comparison of the Scheme's GHG impact within the 5th carbon budget period. The 5th carbon budget central scenario assessment was produced by the Government's Committee on Climate Change (CCC) in November 2015. During the 5th carbon budget period (2028 to 2032) net GHG emissions from the operation of the Scheme are estimated to be 136,080 tCO<sub>2e</sub>. This equates to 0.008% of the total 5th carbon budget (1725 MtCO<sub>2e</sub>).
  8. The conclusion of the ES is put into further context when comparing the operational GHG impact of the Scheme during the 5th carbon budget period against the emissions cap identified for domestic transportation as presented in the Committee on Climate Change fifth carbon budget: central scenario data. Within the 5th carbon budget central scenario a cap of 51.8MtCO<sub>2e</sub> for domestic transportation (excluding aviation and shipping) has been identified. Operational



emissions from the Scheme during this period equate to 0.026% of the 51.8MtCO<sub>2</sub>e cap.

9. There is no specific industry guidance that provides thresholds on what level of GHG emissions should be considered significant. Whilst the GHG assessment has identified an increase in GHG emissions, in the context of the overall UK GHG emissions the magnitude of the increase will not have a material impact on the Government meeting its carbon reduction targets.

## Question CC.1.7

The ES, Chapter 14, Table 14.12: GHG Mitigation measures, makes reference to the construction contractor developing and implementing a plan to reduce energy consumption and associated carbon emissions. The delivery mechanism is stated to be the OEMP. However, the contents of any such plan insofar as they have been provided with the application seem unduly vague.

- i. The Applicant is requested to comment as to how appropriate construction mitigation measures could be delivered with a greater degree of certainty.
- ii. Please identify the relevant parts of the OEMP designed to secure such mitigation.

The OEMP Table 3.2b MW REAC Table Ref MW-AIR 5 simply states that the main works contractor “*shall implement measures to reduce emissions during the construction of the Scheme*”. That seems imprecise and fails to reflect all mitigation measures anticipated by Tables 14.12 and 14.13.

- iii. Please identify how the necessary GHG mitigation measures and climate change resilience measures could be satisfactorily secured by the OEMP in a manner that would ensure their enforceability.
- iv. Please specify the range of construction and operational measures referred to in Table 14.13 that would be in place to improve the resilience of the scheme to climate change and identify where these are included in and secured by the OEMP and/or dDCO.

## Response

- i. **The Applicant is requested to comment as to how appropriate construction mitigation measures could be delivered with a greater degree of certainty.**
- ii. **Please identify the relevant parts of the OEMP designed to secure such mitigation**
  1. Table 14.12 states that the contractor will use the Highways England Carbon Reporting Tool to monitor carbon emissions during construction. It is Highways England standard practice to use the Carbon Tool to monitor and report carbon emissions on all major road scheme projects. In addition, during the detailed design process, the appointed Contractor will be defining materials to be used. Highways England will review their proposals to ensure, where economically and feasibly practicable within the design standards of Scheme of this nature, that materials have the lowest environmental impact
  2. Appropriate construction mitigation measures identified in Table 14.12 of the Environmental Statement (ES) [APP-052] would be delivered through their inclusion in the Outline Environmental Management Plan (OEMP) [APP-187]. Measures contained within the OEMP would be secured by Paragraph 4 of Schedule 2 of the draft Development Consent Order (dDCO) [APP-020]. The relevant parts of the OEMP to secure the GHG mitigation measures set out in Table 14.12 of the (ES) [APP-052] are as follows:

3. The use of recycled or secondary materials: The main works contractor would seek to achieve a rate of 22% use of secondary and recycled aggregates for those applications where substitution of primary aggregates is technically and economically feasible. This would be secured through item MW-MAT4 of the OEMP [APP-187].
  4. The main works contractor would seek to achieve a recovery rate target of 70% from construction and demolition waste (excluding soils and stones). This would be secured through item MW-MAT3 of the OEMP [APP-187]. The main works contractor would produce a Site Waste Management Plan (SWMP) which would identify and record the types, quantities and destinations of waste arising and define measures to minimise and recover waste materials in accordance with the principles of the waste hierarchy. This would be secured through item MW-MAT1 of the OEMP [APP-187]. Use of materials with lower embedded greenhouse gas emission and water consumption: The main works contractor will develop a plan to reduce energy consumption and associated carbon emissions during construction, for example through specification of ultra-low sulphur diesel, management and minimisation of energy use. The main works contractor will define the specific details of the plan during detailed design, and this requirement would be secured through item MW-AIR5 of the OEMP [APP-187] and in turn by paragraph 4 of Schedule 2 of the draft DCO. The plan required under MW-AIR5 will also include, for example, the use of renewable or low carbon energy, and the percentage of saving achieved will be monitored and recorded. The Contractor would define measures to reduce emissions during detailed design.
  5. Use of sustainably sourced materials: The main works contractor will develop a Materials Management Plan (MMP), in accordance with the CL:AIRE Code of Practice. This would enable the on site re-use of materials, as an alternative to landfill, and reduce the Schemes demand on virgin material imports. This would be secured through item MW-MAT2 of the OEMP [APP-187].
- iii. Please identify how the necessary GHG mitigation measures and climate change resilience measures could be satisfactorily secured by the OEMP in a manner that would ensure their enforceability.**
6. The measures within Tables 14.12 and 14.13 are design related. As discussed in the answer to i and ii, the appointed contractor will be suitably experienced in designing a sustainable Scheme. The main works contractor will be defining appropriate climate change and GHG mitigation measures during the detailed design stage, as secured through the measures listed above in the OEMP [APP-187], which is in turn secured by Paragraph 4 of Schedule 2 of the Draft DCO [APP-020] and therefore enforceable pursuant to the DCO itself.
  7. The requirement for the specification, where practicable, of construction materials with superior properties (such as increased tolerance to fluctuating temperatures) so as to be more resilient to climate change, has not been included within the OEMP. This is to allow the main works contractor to not be restricted by Requirement to the use of materials that are not feasibly practicable within the design standards of a Scheme of this nature and also to allow for the inclusion of

future innovations, i.e. materials which are not currently known. The Contractor will be defining materials to be used during the detailed design process. Highways England will review their proposals to ensure, where economically and feasibly practicable, that materials are of the highest specification.

- iv. Please specify the range of construction and operational measures referred to in Table 14.13 that would be in place to improve the resilience of the scheme to climate change and identify where these are included in and secured by the OEMP and/or dDCO.**
8. The requirement for the specification, of construction materials with superior properties so as to be more resilient to climate change is discussed in Part iii.
  9. Table 14.13 [APP-052] specifies that a range of measures will be in place to improve the resilience of the scheme to climate change during construction and operation. These would be secured through the OEMP [APP-187] or the draft DCO [APP-20] as stated and include:
    - Incorporation of current road design standards and future climate change allowances. This is included in ES para 11.8.3 [APP-049] and in Appendix 11.3 (road drainage strategy) [APP-281], which is secured by paragraph 10 of schedule 2 to the draft DCO.
    - Adequate space within tunnels for anticipated future cooling and ventilation requirements. This would be secured through the Tunnel Ventilation Strategy item MW-AIR-3 in the OEMP [APP-187].
    - Maintenance plans for drainage systems: The Handover Environmental Management Plan (HEMP) will include as built information and other details in a form that can be utilised by the body responsible for long term management and maintenance so that the body can prepare environmental management plans for the maintenance of the Scheme for the operational phase. This would be secured through item MW-G11 in the OEMP [APP-187].
  10. To improve the resilience of the Scheme during weather events an appropriate emergency system for road users for example the use of a Variable Messaging System (VMS) would be developed during detailed design, to be agreed by the authority. The use of such systems is standard design for schemes of this size and nature.

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